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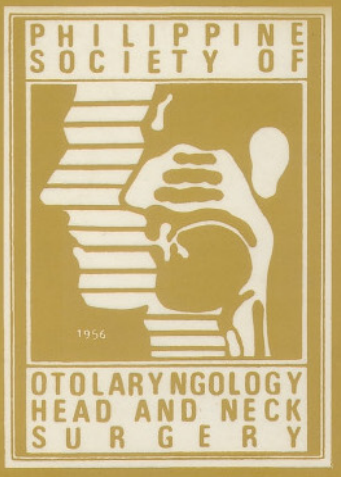

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from neutrophils. In most cases, the proteases are blocked by inhibitors, and inflammation remits and is cured. If the activity of proteases exceeds that of inhibitors, the mucosa of the host may be damaged and facilitate fluid secretion. In general, the rheologic properties of this secretion are far from optimum for transport by mucociliary function, and mucociliary transport is further impaired by nasal mucosal changes. Since the ostium of paranasal sinuses is narrowed in chronic sinusitis, stagnation and accumulation of fluid occurs. Stagnated fluid is easily infected, and this is followed by inflammation. This repetition of reinfection-induced inflammation as well as the maintenance of inflammation by mediators are considered serious problems. Thus, the above mechanism was proposed for the pathogenesis of chronic sinusitis: a vicious cycle of self-mediated inflammation which may be induced by smoking.

Explaining to patients the effects of smoking on nasal mucociliary clearance, therefore, can prevent the vicious cycle initiated by mucociliary dysfunction. Aside from the basic methods of treatment consisting of administration of antibiotics, if indicated, drainage, administration of anti-inflammatory agents, and ventilatory support, physicians must also advise their patients to stop, if not, minimize cigarette smoking due to its ill effect on mucociliary clearance.

CONCLUSION

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Between 4 to 12 weeks AOG, the cartilaginous bars and the branchial arches differentiate into the initial cartilages of head and neck. The ventral portion of the first bar, also known as Meckel's cartilage, is destined to form the mandible by intramembraneous ossification. Failure to do so results in a hypoplastic mandible. At the same time, porencephalic cysts, a defect in the development of the cerebral mantle, with the replacement of the temporo-parietal areas by fluid filled spaces develops secondary to insult to the cerebrum. While skeletal structure at the leg region are being formed, insult at this time would result in femoral tibial and feet abnormalities[10].

The striking feature of the newborn skull is the small size of the facial portion in comparison with that of the cranium. At birth, the relative proportions are about 1:8; by age 5, they are 1:4 and in the adult, they are 1:2.5. The infant's face is proportionately wide, short, thus appearing flat with a pug nose beneath a bulging forehead. The small face is almost entirely due to immaturity of the maxilla and mandible. Vertical growth of the face, which is absent in this patient, occurs in spurts related to respiratory needs and tooth eruption and takes place during the first six months after birth and then during the third and fourth years until 19 years old. This continuity between the maxilla and the mandible due to intraoral adhesion prevents continuous expansion of facial soft tissue[2]. This will hinder posterior elongation of the maxillary arch through bony deposition on the posterior surface of the maxillary tuberosity providing no space for future molar teeth. Absence of resorption of the inner face of the tuberosity will not enlarge the maxillary sinus. Non-displacement of the maxilla anteroinferiorly will not lead to sutural growth which further enlarges the bone. Furthermore, anterior displacement of the mandible accompanies that of the maxilla, providing for the balanced growth of these bones so that the relationship of the teeth remains reasonably constant throughout life. Growth of the mandible will not occur since there is no growth of the ramus and condyle in a backward and upward direction[4]. Absence of bony deposition posteriorly is equaled by absence of resorption of the anterior surface of the ramus. With this pathology, the patient retains the regional proportions among the various facial regions apparent in neonatal life.

CONCLUSION

Based on the above development scheme, it can be inferred that an insult was introduced between 4 to 12 weeks AOG. Many cases of unknown causation probably resulted either from unrecognized exposure to drugs and chemicals or from a complex interaction between drug effect, genetics and environmental factors[3]. From statistics, it was found out that the average woman takes 10 prescription or non-prescription drugs during pregnancy, most of them without the physician's supervision[5]. Needless to say, many women of childbearing age are exposed frequently to potential chemical teratogens in their jobs, and presumably all women are exposed, to some extent, to an enormous array of environmental chemicals. The conglomeration of congenital defects in this patient do not conform with non-cleft disorders as listed by Cummings. It will be a geneticist's concern and interest to establish

PATIENTS ACCEPTABILITY OF NASOGASTRIC TUBE (NGT) VERSUS OROGASTRIC TUBE (OGT)*

ABRAHAM L. GONZALES, M.D.**
RODERICK SUAREZ, M.D.**
THANCO V. DE GUZMAN, M.D.**
CONRADO PABICO, M.D.**
GIL M. VICENTE, M.D.***

ABSTRACT

This is a prospective randomized, cross-over study done in a tertiary government hospital using 17 subjects with an age range of 15-41 years. Subjects who underwent both orogastric and nasogastric intubation procedure were evaluated according to ease of insertion, bothersome effects scoring, and subjects preference.Data obtained were statistically evaluated using the paired T-Test,Wilcox signed rank test and Mcnemar's Chi-square test. Based on the results, it was concluded that OGT is easier to insert, had less bothersome effects and was preferred by subjects over NGT.

Keywords: Orogastric Insertion,Bothersome Effects, Nasogastric Intubation

INTRODUCTION

The nasogastric tube (NGT) has an enduring place in a physician's diagnostic and therapeutic armamentarium and its insertion is one of the more common invasive procedures practiced. Traditionally, the NGT is the preferred route of delivering nutrition in patients unable to eat and as a tool to decompress the stomach. NGT insertion, though a simple procedure, is not without complications or discomfort to the patient (Keith Wrenn, 1993). There have been reports of epistaxis related to trauma to the turbinates and septum, submucosal placement of the tube in the posterior pharynx (Lind, 1978), eustachian tube dysfunction (Wake,1990), occurrence of maxillary sinusitis (Desmond,1991 and Vicente, Batol,1991), and passage into the cranium (Galloway, 1979) which has occured almost exclusively in the setting of maxillo-facial trauma with accompanying basilar skull fracture.The last complication is usually fatal.

The fact is that the patients hate to see themselves with NGT because of the following reasons (Sunga, 1995): (1) cosmetic (i.e. disfigurement), (2) feeling of hopelessness, (3) feeling that patient has a serious problem, and (4) limitation of social interaction. This is especially true among men who want to preserve their image of virility till the very last.

In search for some other alternative routes, the authors thought that the orogastric route deserved reinvestigation. Orogastric tube is a good alternative to nasogastric tube since these side effects may not be present at all during OGT insertion. OGT also obviates the problem brought about by:

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a new name for this syndrome and its precipitating insult. This being the first case of an imperforate oral cavity reported in the Philippines, there is understandably a lack of literature both local and foreign. It is, therefore, proposed that physicians regardless of their specialties, report congenital defects with possible associated prenatal insults. This will create a wealth of study material for establishment of a more definitive means of diagnosis and management.

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NASAL AND PARANASAL SINUS PROFILE AMONG FILIPINO ASTHMATICS*

ALEJANDRO SY, M.D.**
BERNARDITO BARRIENTOS, M.D.**
VICTOR JOHN LAGMAN, M.D. **
FRANCIS V. ROASA, M.D.**

ABSTRACT

The association between asthma and concomitant rhinitis and sinusitis has been recognized since the early part of the century and has been reconfirmed in children and adult. Sixty five Filipino asthmatic patients were included in this study. Their nasal and respiratory symptoms were evaluated using a set of questionnaires with visual analogue scales.

History taking and otorhinolaryngologic examination were performed to differentiate between allergic versus no allergic conditions. Nasal endoscopy revealed that the middle turbinate was commonly affected. An abnormal Waters' view x-ray was present in 86%. The evaluation of asthmatic patients in the present investigation was designed to obtain basic data to assess the nasal and paranasal profile among Filipino asthmatics. To manage these patients, one must recognize and treat the factors that initiate, aggravate, and perpetuate the bronchospatic state.

Keywords: Asthma, rhinosinusitis, allergy

INTRODUCTION

It is well established that the upper and lower airways are pathophysiologically related. Recent publications correlate nasal and paranasal sinus disease with lower airway disease, particularly asthma.

In a study made by the American National Institute of Allergy and Infectious Disease, non-rhinologically oriented physicians failed to accurately delineate over 50% of nasal and paranasal conditions. More are probably unaware of the myriad rhinologic conditions which can trigger recurrent and refractory asthmatic symptoms. It is in the light of such complaints that this study was conceived.

The objectives of this study is to evaluate the relationship between asthmatic patients and their nasal and paranasal conditions by describing the nasal and paranasal profile of Filipino asthmatic with regards to history, nasal endoscopy and Water's view x-ray; to determine the relationship between nasal disease and lower airway hyperactivity; and to establish an anatomic trend with clinical correlations on the nasal and paranasal sinuses among Filipino asthmatics.

MATERIALS & METHODS

Sixty five Filipinos diagnosed to have asthma and are presently members of the Asthmatic Foundation of the Philippines were included in the study. Subjects were seen on two occasions during the regular meeting of the group in February and March of 1993. The age range was 15 to 71 years. There were 38 females and 27 males.

Complete histories were taken and otolaryngologic examinations performed to differentiate between allergic and non-allergic rhinitis. Characteristics such as age and sex, history of other atopic diseases, family history of allergies, presence of

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* Presented in Descriptive Research Contest
October 27, 1995, Holiday Inn Hotel, Manila
**Resident, Department of Otorhinolaryngology, Sto.Tomas University Hospital
***Consultant, Department of Otorhinolaryngology, Sto.Tomas University Hospital

stress, anxiety and other environmental factors and use of medications were noted. Excluded were smokers and those who were habituated to topical decongestants.

A questionnaire was used to assess present and past respiratory complaints. The probable causes of their nasal symptoms and asthmatic attacks, the time of the day and season when the symptoms occurred, and the treatment they got were also probed. Likewise, a visual analogue score sheet was used to grade nasal complaints, the scale was from 0 to 10 cms. (0=no symptoms; 10=very bad), (Royal Brompton Nose Clinic in London).

Nasal endoscopic examination was performed after intranasal instillation of 4% xylocaine and oxymetazoline (1:1 dilution) mixture over both nasal cavities. A 30 degree Hopkins Storz telescope was used. The following categories of abnormalities were assessed: (1) structural abnormalities were defined as deformities of the bony skeleton or cartilaginous skeleton (or both) of the nose, including the septum, lateral nasal walls, upper lateral cartilages (roof, cartilages), lobular cartilage, soft tissue scars and synechiae, (2) mucosal abnormalities were defined as disorders of the nasal mucosal lining, and (3) mixed abnormalities were defined as abnormalities that involved both the nasal skeleton and the mucosal lining. All endoscopic findings were noted in nasal endoscopy examination forms developed by Jorgensen.

Water's view were taken on all patients and the films were evaluated independently by the authors and two radiologists without knowledge of the patients' clinical status. Radiologic abnormalities were classified according to presence of opacification of the sinuses; presence of mucoperiosteal thickening and condition of the bony walls.

RESULTS

Of the 65 patients, 45 (69%) had a positive history of atopy. Three most common complaints were sneezing (mean score of 6.6), followed by anterior nasal discharge (5.8) and nasal obstruction (5.6). Epistaxis was the least common symptom (0.76). Most patients had nasal and paranasal complaints prior to asthmatic attacks.

Nasal endoscopic examination revealed that the middle turbinates were commonly affected with polypoid mucosa. Eight (12.3%) patients had nasal polyps while 7 (11%) patients had septal deviation. Four (6%) of the patients had normal endoscopic examination. Of these 2 had negative Water's view x-ray and 2 had bilateral maxillary sinusitis.

Polysinusitis was seen in 25 (39%) patients, pansinusitis in 19 (29%) patients, bilateral maxillary sinusitis in 11 (17%), unilateral maxillary sinusitis in 1 (1%). Nine (14%) patients had normal x-ray results.

DISCUSSION

The nose regulates air flow resistance in series with the tracheo-bronchial tree, and, because of this, alterations in nasal function could have direct and/or reflex effects on lower airway performance. The caliber of the nose and intrathoracic airways can be altered by both humoral stimuli and neural reflexes, and there is some suggestion that patients with respiratory disease may respond differently than normal subjects to exercise, cold air and inhaled pollutants. Mechanical or chemical irritation of the nose results in bronchoconstriction especially in patients with combined asthma and allergic rhinitis. These observations are supported by the high incidence of coexisting rhinitis and sinusitis in patients with bronchial asthma.

Although both rhinitis and asthma can occur without a recognized allergic mechanism, IgE mediated inflammation is a major pathway. A survey of 1,100 allergy patients done by Smith, et.al. found that 78% of patients with extrinsic asthma had concomitant nasal allergy symptoms while 38% patients with allergic rhinitis had episodes of asthma. Rackeman and Edwards found that approximately 20% of patients with allergic rhinitis subsequently developed asthma.

Based on the present day concepts of the pathogenesis of bronchial asthma, three mechanisms by which paranasal sinus disease could produce bronchial asthma seem particularly plausible include: 1) Bacterial seeding of the lung with pansinobronchitis with resultant wheezing. 2) Reflex bronchospasm from nasal stimuli

carried by the trigeminal nerve to the parasympathetic fibers of the 3) Enhancement of B-adregenic blockade by sinusitis.

The frequent occurrence of polypoid turbinates and abnormal Waters view among our patients conform with observations made by other authors.

CONCLUSION

In this study, the authors combined anamnesis and physical examination with nasal endoscopic and roentgenographic examinations to establish the presence of allergy and paranasal disease among Filipinos asthmatics. Most patients had a history of nasal and paranasal complaints prior to exacerbation of asthmatic attacks. The middle turbinates were commonly affected with mucisal polypoid degeneration, some presented with nasal polyps and septal deviation.

Since a significant number of patients with rhinitis and sinusitis will go on to develop asthma, it is recommended that clinicians properly diagnose and treat nasal abnormalities that may become more prominent and problematic over the years. Successful care of asthmatic based on appropriate medical management should be a team approach.

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VISUAL ANALOGUE SCORE (IN CENTIMETER)

Patient	Age	Sex	Nasal Endoscopy Exam	Atopic Family History	Nasal Blockade	Problems W/ Smell	\0=None\ Sneezing	Nasal Discharge Ant	Nasal Discharge Post	\10=VeryBad/ Epistaxis	Facial Pain	Head achess	Itchiness of the Nose	Throat	Ears	Sinus X-ray Film (Water's View)
1	51	F	Granular Changes Middle Turbinates	Positive	6.0	5.8	6.2	5.2	4.0	4.5	0.0	6.5	0.0	6.6	8.0	Polysinusitis
2	28	F	Polypoid Inferior Turbinates	Positive	5.9	5.9	6.8	6.0	8.6	8.0	4.2	7.5	6.9	6.5	7.4	Bilateral Maxillary Sinusitis
3	27	F	Polypoid Middle Turbinates	Positive	6.2	6.2	7.0	5.9	6.8	0.0	0.0	6.6	3.3	4.8	4.9	Polysinusitis
4	41	F	Polypoid Middle Turbinates; Septal Deviation	Negative	3.3	3.3	3.8	10.0	6.0	0.0	0.0	10.0	5.7	5.7	5.6	Negative
5	42	F	Polypoid Middle Turbinates; Septal Spur	Negative	7.0	7.0	10.0	10.0	10.0	0.0	0.0	0.0	1.0	1.0	0.0	Polysinusitis
6	15	M	Paradoxically Bent R. Middle Turbinates; Septal Spur	Positive	2.6	2.6	5.9	5.9	0.0	0.0	0.0	5.9	6.0	5.9	0.0	Polysinusitis
7	16	M	Essentially Normal	Positive	5.8	5.8	0.0	0.0	0.0	0.0	0.0	5.7	5.5	5.5	5.5	Bilateral Maxillary Sinusitis
8	29	M	Polypoid Middle Turbinates; Septal Spur	Positive	0.0	10.0	0.0	4.4	4.6	4.4	4.5	4.5	4.5	0.0	0.0	Pansinusitis
9	31	M	Polypoid Middle Turbinates; Paradoxically Bent Middle Turbinates	Negative	6.0	6.0	6.1	6.1	6.3	0.0	6.0	5.9	0.0	2.5	0.0	Pansinusitis
10	29	F	Septical Deviation	Positive	8.0	3.7	10.0	10.0	10.0	0.0	0.0	10.0	10.0	7.4	7.4	Polysinusitis
11	15	F	Concha Bullosa, Septal Deviation	Negative	9.0	0.0	3.7	8.6	0.0	8.2	0.0	6.1	9.3	6.0	0.0	Pansinusitis
12	71	F	With Scar-Middle Turbinates, Polypoid Nasal Mucosa	Negative	8.6	8.0	4.0	2.3	7.6	0.0	0.0	4.3	8.4	8.5	4.0	Polysinusitis
13	23	F	Polypoid Middle Turbinates; Septal Deviation	Positive	10.0	0.0	10.0	0.0	10.0	0.0	0.0	0.0	5.0	5.0	0.0	Pansinusitis
14	32	M	Hypertrophied Inferior Turbinates	Positive	7.0	8.0	9.0	9.0	7.0	0.0	0.0	3.0	9.0	7.0	0.0	Negative
15	63	M	Polypoid Middle Turbinates	Positive	10.0	0.0	10.0	0.0	10.0	0.0	0.0	0.0	0.0	0.0	10.0	Pansinusitis
16	52	F	Polypoid Mulberry-like Inferior Turbinates	Positive	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.0	10.0	10.0	0.0	Negative
17	18	F	Hypertropied Inferior Turbinates	Positive	6.0	2.1	7.4	7.2	6.8	0.0	0.0	3.0	5.4	3.9	0.0	Bilateral
18	62	M	Polypoid Middle and Inferior Turbinates	Positive	0.0	8.0	3.0	0.0	3.0	0.0	0.0	0.0	2.9	2.9	0.0	Maxillary Sinusitis Pansinusitis
19	31	F	Nasal Polyps	Positive	0.0	7.8	10.0	10.0	0.0	0.0	0.0	10.0	10.0	10.0	0.0	Polysinusitis
20	36	M	Septal Deviation	Positive	6.0	6.3	6.8	7.8	5.7	0.0	0.0	4.4	4.5	5.6	5.6	Bilateral Maxillary Sinusitis
21	15	M	Septal Deviation	Negative	10.0	10.0	10.0	10.0	0.0	0.0	10.0	0.0	10.0	10.0	10.0	Pansinusitis
22	25	M	Polypoid and Thickened Mucosa Middle Turbinates	Positive	9.4	8.4	10.0	5.1	10.0	0.0	8.1	8.1	10.0	9.8	0.0	Polysinusitis
23	32	F	Enlarged Agger Nasi; Polypoid and Middle Turbinates	Positive	3.8	4.0	4.0	4.0	4.4	0.0	0.0	7.8	6.2	6.2	6.2	Negative
24	44	F	Nasal Polyps; Polypoid Middle Turbinates	Positive	5.5	5.6	5.6	5.6	5.7	0.0	0.0	4.5	5.6	8.8	5.6	Polysinusitis
25	25	M	Violaceous Mulberry-like Inferior Turbinates	Negative	4.2	2.5	4.2	2.5	4.8	0.0	0.0	3.4	2.6	2.3	6.5	Polysinusitis
26	28	F	Essentially Normal	Positive	3.9	2.9	1.0	9.5	9.2	0.0	0.0	2.4	0.0	4.6	0.0	Negative
27	61	M	Mulberry-like Inferior Turbinates; Polypoid Middle Turbinates	Positive	8.0	2.8	6.6	4.4	3.9	0.0	2.5	2.3	6.4	4.5	0.0	Polysinusitis
28	51	M	Granular Mucosa Middle Turbinates	Positive	3.9	0.0	3.0	3.1	8.8	3.0	0.0	7.4	0.0	10.0	0.0	Pansinusitis
29	18	F	Thickened Mucosa Middle Turbinates	Negative	0.0	0.0	6.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	Pansinusitis
30	19	M	Thickened Mucosa Middle Turbinates Septal Deviations	Positive	3.0	5.0	1.0	3.0	6.0	0.0	0.0	0.0	1.0	5.0	0.0	Negative
31	25	F	Nasal Polyps; Nasal Mucosa Thickened	Negative	8.0	5.0	9.0	8.0	7.0	0.0	9.0	8.0	8.0	8.0	8.0	Bilateral Maxillary Sinusitis
32	55	F	Enlarged Bulla with Polypoid Mucosa	Positive	5.0	6.0	5.5	6.0	6.0	0.0	5.0	6.0	6.2	0.0	6.3	Polysinusitis
33	32	F	Polypoid Middle Turbinates	Positive	4.4	0.0	5.5	5.4	0.0	0.0	0.0	0.0	0.0	3.3	0.0	Polysinusitis
34	20	M	Polypoid Middle Turbinates; Septal Deviation	Negative	6.0	5.6	7.0	0.0	0.0	8.9	3.6	3.8	7.1	3.7	6.0	Bilateral Maxillary Sinusitis
35	37	F	Thickened and Polypoid Mucosa Middle Turbinates	Positive	8.8	2.9	9.6	6.5	0.0	0.0	0.0	2.4	9.6	2.2	2.7	Pansinusitis
36	15	F	Thickened and Polypoid Mucosa Middle Turbinates	Negative	0.0	0.0	7.8	7.9	0.0	0.0	0.0	0.0	8.2	0.0	0.0	Right Maxillary Sinusitis
37	37	F	Polypoid Middle Turbinates	Negative	8.0	2.0	7.0	4.0	4.0	0.0	0.0	7.0	8.0	9.0	4.0	Negative
38	32	F	Polypoid Middle Turbinates; Septal Spur	Positive	10.	5.3	10.0	5.3	5.5	0.0	4.5	10.0	6.1	6.7	3.5	Bilateral Maxillary Sinusitis
39	50	M	Polypoid Middle Turbinates	Positive	8.4	3.2	8.2	8.9	2.9	0.0	2.5	2.5	8.4	4.0	4.0	Polysinusitis
40	34	F	Nasal Polyps; Granular Mucosa Middle Turbinates	Positive	7.2	10.0	4.0	4.7	4.2	0.0	6.0	6.2	0.0	0.0	2.5	Polysinusitis
41	58	F	Polypoid and Thickened Mucosa Middle Turbinates	Negative	7.6	10.0	10.0	10.0	7.4	0.0	0.0	0.0	8.1	6.1	5.8	Bilateral Maxillary Sinusitis
42	41	M	Polypoid Middle Turbinates; Septal Deviation	Positive	8.2	9.0	10.0	4.2	8.8	0.0	9.0	4.3	8.0	5.6	8.0	Polysinusitis
43	26	F	Nasal Polyps	Positive	4.0	7.8	3.7	3.3	6.3	0.0	0.0	5.9	5.6	6.1	4.9	Pansinusitis
44	22	F	Septal Deviation	Positive	6.1	2.2	6.4	5.2	3.7	0.0	0.0	3.2	3.0	1.7	6.0	Pansinusitis
45	48	F	Thickened Mucosa-Middle Turbinates	Negative	3.9	0.0	3.0	3.1	8.6	0.0	1.0	3.4	2.6	2.3	0.0	Pansinusitis
46	29	M	Essential Normal	Positive	6.0	6.0	6.1	6.2	4.4	0.0	0.0	4.6	10.0	10.0	3.6	Bilateral Maxillary Sinusitis
47	58	M	Polypoid Middle Turbinates	Negative	5.8	6.0	5.9	3.4	6.3	0.0	0.0	5.8	2.9	3.4	1.8	Polysinusitis
48	42	F	Polypoid Middle Turbinates	Negative	7.0	6.5	9.0	10.0	10.0	0.0	3.4	1.0	1.0	1.0	0.0	Polysinusitis
49	32	F	Septal Deviation	Positive	8.0	3.7	10.0	10.0	10.0	0.0	1.8	10.0	10.0	8.4	7.2	Polysinusitis
50	46	M	Nasal Polyps	Positive	4.2	7.8	10.0	8.0	9.0	0.0	6.2	6.5	10.0	8.1	1.8	Polysinusitis
51	54	M	Granular Mucosa Middle Turbinates	Positive	3.9	2.9	10.0	9.5	9.2	0.0	0.0	2.4	0.0	4.6	0.0	Polysinusitis
52	42	F	Enlarged Bulla, Right	Positive	5.0	6.0	5.5	6.0	6.0	0.0	5.0	6.0	6.2	0.0	6.3	Polysinusitis
53	18	F	Polypoid Middle Turbinates	Negative	0.0	0.0	7.8	7.9	0.0	0.0	0.0	0.0	8.2	0.0	0.0	Bilateral Maxillary Sinusitis
54	29	M	Polypoid Middle Turbinates Septal Spur	Positive	0.0	10.0	0.0	4.4	4.6	4.4	4.5	4.5	4.5	0.0	0.0	Pansinusitis
55	36	F	Polypoid Inferior Turbinates	Positive	5.9	5.9	6.8	6.0	8.6	8.0	4.2	7.5	6.9	6.5	7.4	Bilateral Maxillary Sinusitis
56	17	M	Granular Mucosa Middle Turbinates	Positive	6.0	5.8	6.2	5.2	4.0	4.5	0.0	6.5	0.0	6.6	8.0	Polysinusitis
57	25	F	Nasal Polyps	Negative	8.0	5.0	9.0	8.2	7.4	0.0	8.9	6.9	8.0	8.2	6.3	Pansinusitis
58	58	M	Polypoid Middle Turbinates Septal Spur	Negative	7.6	10.0	10.0	10.0	7.4	0.0	0.0	0.0	8.1	6.1	5.8	Polysinusitis
59	19	M	Thickened Mucosa – Middle Turbinates	Positive	3.0	5.0	1.0	3.0	6.0	0.0	0.0	0.0	1.0	5.0	0.0	Negative
60	36	F	Hypertropied Inferior Turbinates	Positive	7.0	8.1	9.0	9.3	7.6	0.0	0.0	3.4	8.6	6.9	0.0	Negative
61	52	F	Nasal Polyps; Septal Deviation	Positive	8.0	4.2	8.7	8.6	9.1	0.0	4.3	3.2	5.0	7.8	1.9	Pansinusitis
62	17	F	Polypoid Middle Turbinates	Positive	10.0	0.0	10.0	0.0	10.0	0.0	0.0	0.0	8.0	0.0	0.0	Pansinusitis
63	27	M	Polypoid Middle Turbinates	Positive	6.2	7.0	7.1	6.0	7.0	0.0	0.0	6.4	3.0	4.5	4.7	Polysinusitis
64	36	M	Essentially Normal	Positive	3.3	5.4	3.8	10.0	6.0	0.0	0.0	10.0	5.5	5.0	5.6	Negative
65	42	F	Septal Deviation	Negative	6.0	6.3	6.8	7.8	5.7	0.0	0.0	4.4	4.6	5.2	5.4	Polysinusitis

NASAL MUCOCILIARY CLEARANCE: ITS STATUS AMONG SMOKERS AND NONSMOKERS*

MELIZA A. SOTELO, M.D.**
ROANNIE CANDIDA A. IBARRA, M.D.**
FRANCISCO A. VICTORIA, M.D.***
EDGARDO C. RODRIQUEZ, JR., M.D.***

ABSTRACT

The inhibitory effects of smoking on mucociliary clearance of the tracheobronchial tree has been well documented. However, limited information is available for its effect on nasal mucociliary clearance; hence the reason for this study. A group of 30 healthy nonsmokers (controls) and a group of 30 smokers was investigated in a government hospital between October, 1994 to October, 1995. Using the saccharin method, a significant delay in mucociliary clearance was found among smokers as compared to the nonsmokers. The mean nasal mucociliary clearance was 26.37 +/- 5.61 minutes in smokers compared with that of nonsmokers, 9.53 +/- 4.08 minutes.

Keywords: Mucociliary clearance, saccharin method, smoking

INTRODUCTION

Nasal mucociliary clearance is the first line of defense of the respiratory system against inhaled particles. Foreign microbodies in inspired air are entrapped in the mucus blanket of the airway mucosa and transported with mucus by ciliary activity to the pharynx. This mucociliary transport function is one of the most important and indispensable protective mechanisms of the airway against the atmospheric environment.

This role of the nose as a filter has today assumed a great importance due to the contamination of the atmosphere with injurious gases and exhaust fumes. These pollutants, including cigarette smoke, has been shown to depress mucociliary activity. Prolongation of the mucociliary transit time may predispose an individual to nasal entry of virus and/or bacteria. Mucociliary dysfunction may then cause deterioration and perpetuate inflammation of the nose and paranasal sinuses. It is accompanied by an increased incidence of nasal infections.

Several studies have shown significant differences in the histopathology of the tracheal and bronchial epithelium of smokers and nonsmokers. Hilding and more recently Falk et al and Guilerm, Badre, and Vignon reported that cigarette smoke is a potent inhibitor of ciliary transport activity. Kensler et al described a quantitative method of studying the effect of repeated short term exposure to gases and aerosols mammalian ciliary transport activity. Cigarette smoke was found to inhibit this transport activity. The bulk of the ciliary depressant action action of cigarette smoke was found to reside in the gas phase rather than the particulate phase. Among the various components of the gas phase studied in this system, hydrogen cyanide, ammonia, formaldehyde, acrolein and nitrogen dioxide were found to have appreciable ciliary depressant activity.

Being part of the respiratory system, the effect of cigarette smoking on nasal mucociliary clearance was assumed to be the same as its effect on the tracheobronchial tree as was described above. However, limited direct information regarding the effect of cigarette smoking on the ciliary activity of the nasal epithelium is available.

This study was undertaken to correlate the effect of cigarette smoking on

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*1st Place, PSOHNS Analytical Research Contest
December 5, 1995, Hotel Nikko Manila Garden, Makati City
**Resident, Department of Otorhinolaryngology, PLM-Ospital ng Maynila
***Consultant, Department of Otorhinolaryngology, PLM-Ospital ng Maynila

the mucociliary activity of the nasal epithelium among Filipinos.

SUBJECTS AND METHODS

Thirty chronic smokers, 15 years old and above, from both sexes, were included in the study. A smoking history of at least 10 cigarettes per day for a minimum period of two years was required for inclusion. As a control group, thirty healthy nonsmokers were included in the study. Both groups were selected from patients seen at Ospital ng Maynila, ENT Outpatient Department, from October, 1994 to October, 1995. All 60 subjects selected did not have any nasal or upper respiratory tract disease in the recent past or during the period of the study; were not given any antibiotics or steroids; and had no congenital, systemic, or metabolic problems.

Complete history and ENT examination were done on the subjects. Informed consent was taken from each subject prior to the study. Mucociliary clearance was measured by the saccharin method of Stanley et al wherein a 1 mm diameter particle of saccharin was placed on the surface of the inferior turbinate 1 cm. behind its anterior end. The time required for the subject to experience a sweet taste (saccharin transit time), was measured. Both nasal cavities were tested for each subject. The subjects were asked to sit and were instructed not to sniff, sneeze, smoke, eat or drink during the test. Subjects were then asked to swallow every 30 seconds and to indicate when the sweet taste was perceived. If no taste was perceived after 60 minutes, the test was stopped and the ability of the patient to taste saccharin placed directly on the tongue was verified. The tests were carried out under conditions of room temperature and humidity. . All 60 subjects were tested on two occasions with an interval of one week between the two tests. The average nasal mucociliary clearance rate was then computed for each subject and recorded.

This is a case control study using stratified sampling of subjects. The average nasal mucociliary times of the two study groups, namely the nonsmokers and smokers, were calculated and compared using the Student's t-test with a confidence limit of +/- 2 S.D. or a p value < 0.05.

RESULTS

The nasal mucociliary clearance rates ranged from 4.50 to 20.75 minutes among nonsmokers and from 15.05 to 36.58 minutes among smokers. The mean rates were statistically significant--- 9.53 +/- 4.08 minutes among nonsmokers and 26.37 +/- 5.61 minutes in smokers --- showing that smoking has a significant inhibitory effect on nasal mucociliary clearance rates.

DISCUSSION

Jaffe in 1990 showed that the action of tobacco on the nasal mucosa and mucociliary system was due to nicotine and lobeline. A similar study made by Bhide et al in 1989 showed that a group of compounds known as N - nitrosamines also found in tobacco likewise affects the nose and its mucociliary function. The effects of nicotine and lobeline on the nose include the following:

1. An initial increase in quantity of secretions followed by a prolonged decrease;
2. Vasoconstriction of the cavernous sinusoids leading to a reduction in the swelling of the erectile tissues of the nose;
3. Vasoconstriction of the arterioles and venules leading to a local ischemia.

N-nitrosamines causes a decrease in the number of ciliated cells in the nasal mucosa, damage to the remaining cilia and metaplasia of columnar cells to cuboidal then to squamous epithelial cells.

Bhide et al (1989) has shown that the purified extracts of the above compounds possess carcinogenic effects in mice. Because of the delayed nasal mucociliary clearance, the potential carcinogens remain in contact with the nasal mucosa for prolonged periods of time and in greater concentrations. This chronic exposure of the nasal epithelium to potential carcinogens leads to metaplastic changes in the cells of the nasal epithelium and to malignancy.

Mucociliary dysfunction sets up a vicious cycle in which the infection-induced accumulation of fluid maintains and aggravates airway inflammation. Bacterial infection causes neutrophil accumulation in the nose and paranasal sinuses and leads to excessive increase in proteases released

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IATROGENIC FACIAL NERVE PALSY SECONDARY TO STAPEDECTOMY: A CASE REPORT*

MARIDA AREND V. ARUGAY, M.D.
PROF. UGO FISCH, M.D.

ABSTRACT

A rare case of immediate facial palsy secondary to stapedectomy is presented. A dehiscent facial nerve covering the oval window was mistaken for a polyp: displacement of polyp in the course of the stapedectomy induced an immediate facial palsy and a total hearing loss. The facial palsy lasted for four (4) months before exploration and removal of the offending prosthesis which was placed through the dehiscent intratympanic portion of the facial nerve. Seventeen (17) cases of post-stapedectomy facial palsy reported by several authors were reviewed. This case report shows that a malformed pinna and a conductive hearing loss is almost always associated with an aberrant facial nerve and abnormal middle ear. This paper further serves as a reminder to all otologists that: (1) the presence of a congenital malformation of the pinna and hearing impairment is most likely an indicator of an abnormal course of the facial nerve; (2) in case of post-operative facial paralysis, repeated eletroneuronography (ENoG) is necessary to establish the extent of the nerve lesion and the need for revision surgery.

Keywords: Aberrant Nerve, Congenital Malformation of the Pinna, Electroneuronography, Iatrogenic Facial Palsy

INTRODUCTION

In this modern era of super microscopic otologic surgery, iatrogenic facial paralysis should be avoided with more confidence. The important thing is to take all the necessary precautions to prevent such a mishap. Thorough knowledge of normal anatomy and embryology, (as well as variations from the normal and frank abnormalities of the facial nerve and middle ear) is mandatory for all otologic surgeons. A well taken history and physical examination is always the most important tool for diagnosis. With the armamentaria of facial nerve monitor and repeated electroneuronography (ENoG) in case of a facial paralysis, the extent of the nerve lesion can be established to aid the surgeon in the decision to do revision surgery. The surgeon should analyze the benefits of the surgery for the patient, over and above the accompanying risks of the contemplated procedure.

OBJECTIVES

I. To present a rare case of facial palsy secondary to stapedectomy.

II. To review the embryology and anatomy of the facial nerve in relation to the middle ear ossicles.

III. To remind all otologists that:

(a) the presence of a congenital malformation of the pinna and hearing impairment are heralds of an abnormal course of facial nerve;

(b) in case of a facial paralysis, repeated ENoG is necessary to establish the extent of the nerve lesion and the need for revision surgery.

*Research, Department of Otolaryngology, University Hospital Zurich
**Observer Fellow, Department of Otolaryngology, University Hospital of Zurich
***Department Head, Department of Otolaryngology, University Hospital of Zurich

EMBRYOLOGY AND ANATOMY OF THE MIDDLE EAR AND FACIAL NERVE

The normal development of the facial nerve and the middle ear bones are intimately related. Table I summarizes the highlights of their development.

Table I.
EMBRYOLOGY OF FACIAL NERVE AND MIDDLE EAR BONES

AGE OF GESTATION (WEEKS)	LANDMARK OF DEVELOPMENT
2	OTIC PLACODE; first appearance of second arch
4	fascio-acoustic primordium; start of stapes development slightly later than facial nerve)
5	facial nerve with 2 branches:main trunk and chorda tympani
6 TO 7	bends caudally forming genu
8	established location in the temporal bone; contiguous structures: stapes, layrinthine capsule, mastoid bone, and temporal bone
10	facial nerve runs deep in the cartilaginous otic capsule
20	ossification of bony covering
25	bone encloses the facial nerve
BIRTH TO FIRST YEAR OF LIFE	completion of the ossification of bony canal

It is worthwhile to note the difference between the classic and the modern theory of embryologic development of the middle ear ossicles. (see Tables II.A & II.B.)

TABLE II.A
EMBRYYOLOGY OF FACIAL NERVE AND MIDDLE EAR BONE

Age of Gestation (Weeks)	Landmark of Development
2	OTIC PLACODE; first appearance of second arc
4	fascio-acoustic primordium; start of stapes development (slighty later than facial nerve)
5	
6 to 7	bends caudally forming genu
8	established location in the temporal bone; contiguous structures: stapes, layrinthine capsule, mastoid bone, and temporal bone
10	facial nerve runs deep in the cartilaginous otic capsule
20	ossification of bony covering
25	bone encloses the facial nerve
Birth to first Year of life	completion of the ossification of bony canal

Table II.B

Development of Middle Ear Bones

Classical Theory

Middle Ear Bone	Origin
malleus	Meckel's cartilage (first arch)
incus	Meckel's cartilage (first arch)
stapes	Reichert's cartilage (second arch)

The stapes develop slightly later than the facial nerve. In the early part of the second week, the Reichert cartilage or the second arch first appears. But by this time, the horizontal portion of the facial nerve has already been established. If intrinsic forces occur, the nerve may be displaced anterior to the stapes and long crus of incus. One or both stapes crura may fail to develop or the crura may be small and the rudimentary stapes will be hanging free. The long crus of the incus as well as the manubrium of the malleus may become atrophic. Mere anterior displacement or migration of the facial nerve over the area of stapes blastema is enough to disrupt normal development of the ossicles resulting in a congenital conductive hearing loss.

The intratympanic portion of the facial nerve begins as it enters the anterosuperior portion of the middle ear, just proximal to the processus cochleariformis. The nerve then turns posteriorly to run across the middle ear in a slightly oblique direction, and inferiorly, just above the articular surface of the head of the stapes. The abrupt change in the direction of the nerve upon entering the middle ear is the genu of the facial nerve and just proximal to it is the geniculate ganglion. The intratympanic portion of the nerve is enclosed in a thin bony canal which is frequently dehiscent and which is intimately related to the inferior aspect of the surgical dome of the vestibule and the inferior surface of the bony horizontal semicircular canal lateral to the oval window.

The facial nerve is frequently displaced and uncovered in congenital middle ear malformations. The two most common anomalies of the facial nerve are: (1) displacement of the nerve and (2) lack of bony cover. It is normal for the bony canal of the facial nerve to be partially dehiscent above the oval window but, it is abnormal for the bony cover to be so completely lacking as to allow the tympanic segment of the facial nerve to sag against the stapes and obscure the oval window.

The development of the stapes and the facial nerve is intimately related that malformations of one are commonly associated with malformations of the other. Both the second branchial arch cartilage and the otic capsule play a role in the development of the facial nerve canal. Failure of the development of the stapes superstructure may allow the facial nerve to assume a more inferior position in the middle ear.

The appearance of the pinna allows one to predict the degree of development of the middle ear. In general, the more developed the pinna, the more developed are the ossicles and facial nerve canal. The literature leaves no doubt that the degree of microtia indicates the degree of congenital malformation of the facial nerve. Minor congenital anomalies of the middle ear without atresia maybe associated with an anomalous course of the facial nerve.[4]

REPORT OF A CASE

A 43 year old male was suffering from a unilateral conductive hearing loss. The diagnosis of otosclerosis was made and stapedectomy was done. During surgery, a "polyp" was found covering the oval window. The "polyp" was carefully wrapped around the prosthesis after placement. The associated anomaly of the stapes arch was observed. After surgery, there was an immediate facial palsy and a total loss of hearing. The patient was referred for evaluation to this department four (4) months after the stapedectomy.

The physical examination revealed a right microtia, a right endaural scar, and a retracted tympanic membrane with sclerotic areas in the postero-superior quadrant. The face showed minimal active movement on the right side. Electroneuronography (ENoG) demonstrated 100% denervation. The Fisch facial nerve score was 23 points. Diagnosis on admission was "lesion of a dehiscent facial nerve in the region of the oval window secondary to stapedectomy". The MRI scan showed a pathologic increased enhancement above the oval window in the sagittal plane (Plate No. 1). The coronal sections confirmed the increased enhancement above the oval window and demonstrated an indentation in this area which was probably the prosthesis (Plate Nos. 2-4). In view of these findings, surgery was carried out as follows: An endaural incision was done after inspection of the external auditory canal which was smaller than normal. A tympanomeatal flap was created and the external bony canal was enlarged with a diamond drill until the malleus became visible. On opening the middle ear, the following findings were noted : (1) the long process of malleus was eroded at the region of the prosthesis; (2) the lenticular process was detached; (3) the Shea all-teflon prosthesis was embedded in the facial nerve; (4) the facial nerve was covering the oval window completely (Figures 1-3). The prosthesis was then removed carefully. The facial nerve was edematous and strangulated at the distal entrance of the fallopian canal. Because the continuity of the facial nerve was preserved, no attempt was made to expose the oval window to avoid further damage. Mastoidectomy was carried out exposing the mastoid segment of the facial nerve after identifying the stylomastoid foramen. A posterior tympanotomy was done to expose the tympanic segment of the fallopian canal to the geniculate ganglion. Intraoperative monitoring of the nerve showed that there was a minimal nerve activity after stimulation with 0.5 m amp. No irritation potential was audible while decompressing the nerve. After decompression, response to 0.5 m amp. stimulation was identical to that at the beginning of surgery.

REVIEW OF LITERATURE

There are few reported cases of iatrogenic facial nerve palsy secondary to stapedectomy. Most of these were delayed in onset and recovery of function occurred within eight (8) weeks.

Table III & IV shows the report of some authors.

TABLE III.
REPORTED CASES OF FACIAL PALSY SECONDARY TO STAPEDECTOMY

AUTHOR	NO. OF CASES	%
Schuknecht (1971)	Rare (no exact figure)	-
Althaus & House (1973)	5 /2,307	0.2%
Causse (1984)	3 /6,724	0.044%
Wiet & Levine (1984)	2 cases	-
Herman & diggelmann (1988)	4 /33	12%

Table IV.
FREQUENCY OF FACIAL NERVE DEHISCENCE

AUTHOR	%of Dehiscent VII Nerve	AREA
Shambaugh (1976)	50% (opinion only;no statistics given)	above the oval window
Portman (1976)*	no data	no data
Hough (1976)	40%	level of oval window
Wiet, Davies & Shambaugh (1982)	"common"	tympanic area
Baxter (1982)	55% 300/535 temporal bones	level of oval window

*(more frequent in otosclerosis ears than in chronic draining ears)

The most frequent sites of dehiscence in the bony wall of the facial canal are in the area of the oval window niche in two-thirds (2\3) of cases. More marked anterior displacements of the nerve are well known from many observations. The oval window may be partially or totally overlaid by the nerve. This results in various malformations of the stapes even to the extent of complete aplasia. The developmental disturbance may also affect the incus. An anterior displacement of the nerve may prevent the formation of one or both crura. Interposition of the nerve between the labyrinth and the branchial part of the stapes blastema prevent the formation of the footplate and oval window. The stapes rudiment may rest as a flat bow upon the nerve. (Pou 1963 and Hoogland 1977).

Hoogh, in a twenty-year review of various ossicular malformations concluded that all otologists should come to realize that even a severe "normal" middle ear is as unique as the human face and that even a severe congenital malformation producing a loss of function is indeed "common" and reports a 40% occurrence of a dehiscent facial nerve and its oval window encroachment in all ears. Rarely, however, the facial nerve may take an unpredictable course as in the following instances: (1) it changed its course entirely from above the oval window but inferior to it and across the promontory; (2) congenital absence of the oval window and the nerve completely covering the floor in the (2) cases; (3) a case of a unicrurate stapes resting on the nerve trunk itself.[14]

DISCUSSION AND COMMENTS

Persistent immediate facial paralysis is rare after stapes surgery. It may be due to surgical trauma, a dehiscent facial nerve, or an occasional inadvertent bone chip penetration. Immediate facial paralysis calls for an immediate electroneuronography (EnoG). Surgical exploration is indicated if denervation of the face reaches more than 90% within (6) days of onset of palsy.

There is no doubt that every otologic surgeon should suspect a possible middle ear anomaly in a patient with congenital aural malformation. It has been observed that as the degree of malformation worsens, the greater the incidence of middle ear anomalies. It is also important to establish the onset of hearing impairment, family history of deafness, infectous disease in childhood, and other pertinent data to consider congenital conductive hearing impairment. The history of diminished hearing since childhood without any history of aural discharge or other infections which may lead to unilateral hearing loss points to a congenital condition. The microtia of the patient is another clue which can lead the surgeon to suspect an aberrant course of the facial nerve and middle ear ossicles anomaly. Many reports have confirmed that the degree of microtia indicates the degree of congenital malformation of the facial nerve and middle ear ossicles.[4]

The facial nerve which was anteriorly displaced and completely dehiscent in its tympanic portion is abnormal and is related to the congenital malformation of the middle ear ossicles during its embryologic development. A partial dehiscence in the area of the oval window is considered a normal variant because of its common occurrence.

Iatrogenic facial paralysis should not occur if the surgeon is aware of the presence of a dehiscent facial nerve. Monitoring of the facial nerve function is an invaluable tool in avoiding this tragedy which, according to some authors, may occur in spite of the most meticulous microdissection.

Goodhill divided those patients who have facial paralysis after stapedectomy into three categories: (1) temporary paresis, which is more common and is immediate after operation. This may be due to invasion of the anesthesia affecting the tympanic, horizontal or genu areas. This paresis usually resolve in a few. History and a thorough physical examination of the ear as microtia, accessory digits, pre-auricular tags, etc. should alert the surgeon of an aberrant facial nerve and middle ear anomaly. Before any surgical procedure, the surgeon should have analyzed the benefits of the surgery for the patient over and above all accompanying risks of the contemplated procedure. It should be stressed that the most common cause of facial nerve injury in congenital ear malformation is the failure to recognize the facial nerve. If a dehiscent facial nerve is suspected, intra-operative monitoring of evoked spontaneous activity of the facial muscles should be done. Adequate monitoring will prevent unnoticed traumatic section of the nerve. An inexperienced surgeon who finds a large dehiscence of the facial nerve should stop the procedure and send the patient to a more experienced center having monitoring equipment for the facial nerve.

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CAPTIONS FOR ACCOMPANYING ILLUSTRATION:

Figure 1 & 2. SAGITTAL PLANE: "PATHOLOGIC INCREASE ENHANCEMENT ABOVE THE OVAL WINDOW"

Figure 3 & 4. CORONAL SECTIONS: increased enhancement above the oval window with indentation in the same area.

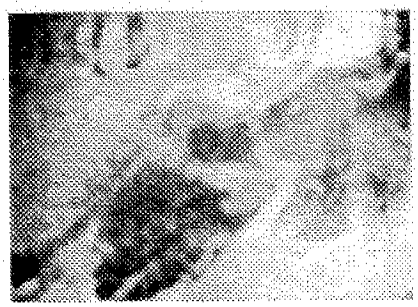
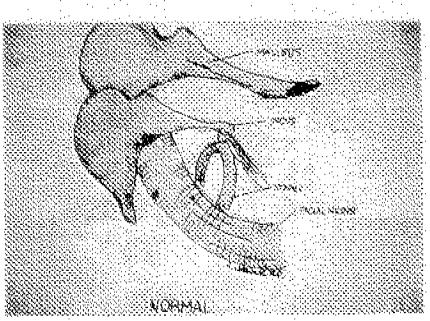
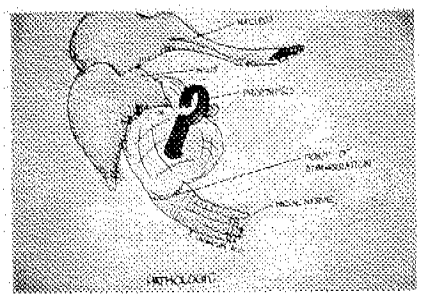
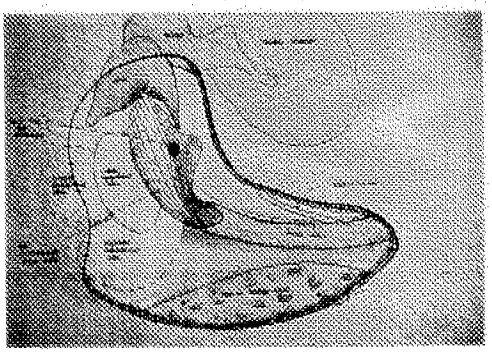


Figure 5, 6 & 7. Shows the normal; intra-operative; and the post-operative appearance







IATROGENIC SINUSITIS*

ROANNIE CANDIDA A. IBARRA, M.D.**
EDUARDO C. YAP, M.D.***
EDGARDO C. RODRIGUEZ, JR., M.D.**

ABSTRACT

This is a case of a 71-year old female with chronic sinusitis persisting despite four sinus operations who was found to harbor a gauze pack inside the maxillary sinus. It reminds physicians that iatrogenic causes should be considered among others in cases of surgically intractable nasal polyposis and that scrupulous attention to surgical procedure is the only guarantee against such mishaps.

Keywords: Iatrogenic Sinusitis, Gauze Packing, Maxillary Sinus

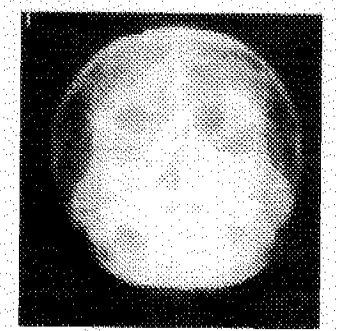
INTRODUCTION

A patient seeking medical attention with a complaint *of "masakit ang ilong at palaging barado"* is usually suggestive of rhinosinusitis. The cause of sinusitis are many and varied, allergic, inflammatory or chemical. With the advent of fiberoptic rigid telescopes, these causes are better understood and the process of finding solution to them are made easier. This paper presents just one more unexpected cause of sinusitis which is oftentimes ignored.

CASE REPORT

U.D., a 67 year old housewife presented with the chief complaint of *"barado ang ilong"*. She has been suffering from nasal obstruction for the past 20 years for which she underwent two nasal polypectomies under local anesthesia 20 and 8 years before admission and two Caldwell-luc operations with intranasal polypectomies and antrostomies 14 and 5 years before admission. Recurrence of nasal obstruction prompted consultation and subsequent admission in this institution.

Physical examination revealed polyps at the left middle and inferior meatus with yellowish-green purulent, foul-smelling discharge issuing from the middle meatus, and a small nasal polyp at the right middle meatus with watery, thin, non-purulent, non-foul-smelling discharge. The upright Waters view showed haziness on both maxillary sinuses.



Upright Waters view of the skull

An endoscopically-guided intranasal polypectomy was performed on the left. Intra-operatively, the stalk of the polyp at the middle meatus was traced to be coming out from a small opening in the maxillary ostium. The polypoid mass at the inferior meatus was first thought to be an extension of that in the middle meatus, but on further inspection, was noted to be a completely separate mass with its origin coming from a small opening in the inferior meatus

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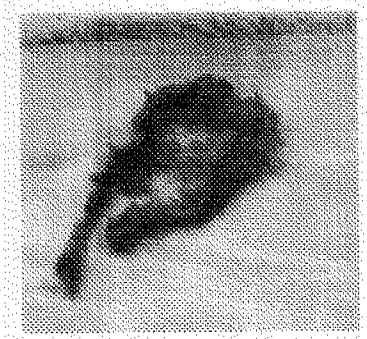
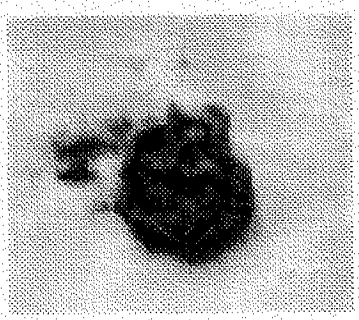
*Presented, PSO-HNS Clinical Case Report Contest
April 7, 1995, Subic International Hotel, Olongapo City
**Resident, Department of Otorhinolaryngology, Ospital ng Maynila
***Consultant, Department of Otorhinolaryngology, Ospital ng Maynila

presumed to be the site of a previous antrostomy.

During the course of the operation, when the left maxillary ostium was enlarged to allow inspection of the interior of the sinus, purulent discharge was drained. The maxillary mucosa was polypoid and several small polyps were severed. Furthermore, there was a ball-like substance inside the sinus cavity covered with thickened pus with some blackish patches overlying it. An attempt to extract it from the sinus ostium proved difficult, thus a gingivobuccal incision was made to remove the ball-like substance through an opening in the anterior maxillary wall. The ball-like substance turned out to be a gauze pack.

Endoscopically-guided polypectomy was also done on the right nasal cavity. There was no purulent discharge seen. After polypectomy, the maxillary ostium was noted to be adequate and no further enlargement of the ostium was necessary. A sinusotomy on this side was done to ascertain that the sinus cavity was normal. Isolated areas of polypoid mucosa were noted.





Retained Gauze Packing

DISCUSSION

Foreign bodies constitute impediments to healing. The presence of an inorganic foreign body in any mucosal surface will initiate inflammatory reactions in the involved tissue and serve as a nidus for bacterial growth. This is what happened to the retained gauze pack in the maxillary sinus. Edema and swelling of the mucosa, impairment of mucociliary action, ostium obstruction with subsequent polyp reformation and intractability to surgical treatment could have been partly caused by its presence.

Under these circumstances, the conventional adage that "whatever the body considers foreign to itself will eventually be removed and extracted out by the body itself" did not hold true. Fortunately granuloma formation did not occur as a reaction to the continued presence of the foreign body.

CONCLUSION

Aside from the usual factors which cause sinusitis, human factors and technical errors must be considered. This case of an iatrogenically caused chronic sinusitis should remained physicians that only scrupulous attention to surgical procedures can prevent occurrence.

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IMPERFORATE ORAL CAVITY: A CASE REPORT*

ALFONSO H. FAMARAN JR., MD**
VIRGILIO R. DE GRACIA, M.D.***

ABSTRACT

This paper reports a rare case of imperforate oral cavity in a 2 year old male. The paper also discusses the possible pathophysiology involved in this case, its consequences as well as proposed logical surgical intervention. Associated findings were a wide intercanthal distance, flattening of the nasal bridge, and splaying of the alae nasi, hypoplastic mandible, bowed legs, right pes planus and left pes plano-valgus. By performing a bilateral coronoidectomy, the patient was provided with a near normal conduit for food and an oral aperture.

Keywords: Imperforate oral cavity, Bilateral coronoidectomy

INTRODUCTION

Interest in structural abnormalities in the newborn dates back to around 5000 B.C. when Babylonian priests made a list of 62 malformations recognizable at birth. However, widespread scientific interest and public concern did not develop until 1960 with the first report of teratogenicity associated with the sedative-hypnotic drug thalidomide. While this tragedy stimulated an enormous growth in basic and applied research in this field, there is still little knowledge about how drugs and chemicals cause congenital anomalies and even less about how genetic and environmental factors interact in individual unborn children. About 20% to 30% of reported defects is thought to result from spontaneous genetic aberration and 6% is clearly related to drugs and chemicals, leaving the cause unknown in nearly 70%.[6] These figures underestimate the magnitude of the problem, since there are unknown percentages of unrecognized and unreported cases, and instances of failure to associate a teratogen with an abnormality.

CASE REPORT

This is the case of P.T., a 2 year male, born at Fabella Maternity Hospital to a 31 year old G4P4 (4-0-0-4) by normal spontaneous delivery, full term with a birth weight of 1900 grams, who presented with an imperforate oral cavity. Patient was placed in an incubator and nutrition was provided through a nasogastric tube. An attempt to document an existing oral cavity was done. This was confirmed by inserting a 10cc syringe with a gauge needle, yielding air from the supposed oral cavity.

Figure A: Photograph showing external facial features
-wide intercanthal distance
-flat nasal bridge, splayed alae nasi
-rounded face, hypoplastic mandible

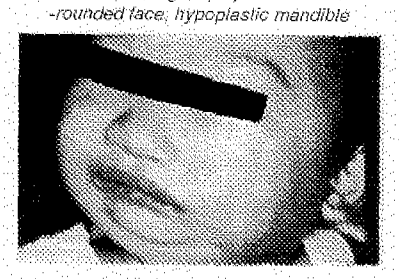
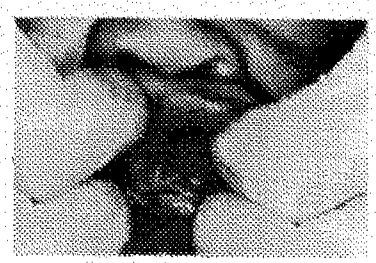


Figure B: Photograph showing gingivo-buccal sulcus, frenulum of upper lip and imperforate oral cavity



At 1 year and 7 months, the patient was referred to a private teaching hospital for further evaluation and management. On initial examination, the patient was mildly stunted, not wasted, and was not in any

*3rd Prize, Clinical Case Report Contest, PSO Mid-year Convention, Subic International Hotel
**Resident, Department of Otorhinolaryngology, University of the East-RMMMC
***Consultant, Department of Otorhinolaryngology, University of the East-RMMMC

Post-operatively, a Denhard mouth gag was installed to maintain the patency and to prevent synecchiae of fresh tissues. A dental obturator was fitted at the third post-operative day for less traumatic maintenance of an oral cavity.

DISCUSSION

Because of the high rate of cellular differentiation, function development and growth taking place over a relatively brief period of time, the fetus is susceptible to chemical insults which may result in congenital anomalies. The kind of anomalies caused by these insults depend critically upon the development stage at the time of exposure[1].

Figure J: Tabulation of syndromes with oral manifestations

Syndrome	Cause/ Inheritance	Major systemic manifestations	Oral manifestation
Aarskog-Scott syndrome	X-linked	Growth retardation	Hypoplastic narrow maxilla, relative mandibular prognathism
Achondroplasia	80% sporadic 20% autosomal dominant	Dwarfism with large head	Malocclusion, anterior crowding of teeth, anterior overjet, various crossbites
Acrodynia	Etiologic agent: mercury	Neurologgic signs: bruxism, causing chewing of buccal mucosa and tongue	Stomatitis with ulceration, spongy red gingiva with periodontal abscesses and shedding of teeth
Acrodysostosis	Sporadic	Growth retardation, short stubby fingers	Maxillary hypoplasia, prominent upper aveolar process, open bite, relative mandibular prognathism
Arachnodactyly (Marfan's syndrome)	Autosomal dominant	Tall thin, ocular lens, subluxation, aortic wall defects	High palatal vault, cleft palate, bifid uvula, dental malocolusion, long narrow teeth, mandibular prognathism
Ascher's syndrome	Possible autosomal dominant	Blepharochalasis, non toxic thyroiod enlargement	Duplicationof upper lip
Ataxia telangiectasia (Louis-Bar syndrome)	Autosomal recessive	Ataxia, mental deficiency	Telangiectasia of hard and soft palate, drooling, diminished or absent oropharyngeal lymphatic tissue
Beckwith-Wiedemann syndrome	Sporadic	Omphalocele	Macroglossia, class III malocclusion, anterior open bite, retroclined mandibular incisors
Chediak-Steinbrinck-Higashi syndrome	Autosomal recessive	Defective pigmentation, abnormal granulation of leukocytes, increased susceptibility to infection	Aphthae and/or gingivitis, rapid breakdown of periodontium
Cleidocranial dysostosis	Autosomal dominant	Clavicular aplasia or hypoplasia, delayed ossification of fontanels, large cranium	High-arched palate, submucous or overt cleft palate, non-union of mandibular symphysis, failure of eruption of deciduous and permanet teeth; poor premaxillary developpment with relative prognathism
Cockayne's syndrome	Autosomal recessive	Dwarfism	Congenital absence of teeth, increase in dental caries, atrophy of alveolar process, and condylar hypoplasia
Craniocarpotarsal dysplasia (whistling face syndrome)	Autosomal dominant	Growth retardation, flexion contracture of fingers	Microstomia, small mandible and tongue, high-arched palate, lips held as in whistling, fibrous band from chin to the middle of lower lip
Familial dysautonomia (Riley-Day syndrome)	Autosomal recessive	Nervous system, cutaneous and eye manifestation	Mouth transversely elongated into a horizontal slit; absence of fungiform and most of circumvallate papillae with decreased sensitivity to sweet and bitter; excessive drooling, swallowing disturbance, dental-arch crowding, periodontal disease
Hyperkeratosis palmaroplantaris and periodontociasia in childhood (Papillon-Lefevre syndrome)	Autosomal recessive	Palmar and plantar hyperkeratosis	Gingival swelling with loss of primary and secondary teeth after alveolar process is destroyed
Hypospadias/dysphagia (G syndrome)	Autosomal dominant	Genitourinary	Ankyloglossia, bifid uvula, neuromuscular dysfunction of swallowing mechanism, large laryngopharyngeal cavity causing aspiration
Inability to open mouth fully and pseudocampodactyly	Autosomal dominant	Reduced stature, abnormalities of extremities	Enlarged coronoid process limiting the aperture between upper and lower incisions to 1.0 to 1.6 cm
de Lange syndrome	Sporadic	Musculoskeletal, cutaneous, genitourinary manifestations	Micrognathia, prominent mental spur, thin lips with corners of mouth downturned, long philtrum with delayed tooth eruption, cleft palate, oral self-mutilation
McCune-Albright syndrome	Sporadic	Endocrine, cutaneous manifestations, bone problems	Large expanded distorted jaws, dense maxillary mass protruding into the oral cavity, oral pigmentation on lips and mucosa
Multiple endocrine neoplasia, type 3	Autosomal dominant	Pheochromocytoma, medullary thyroid carcinoma	Mucosal neuromas on lips and tongue, enlarged and nodular lips; tongue lesions are pink, pedunculated, and limited to anterior dorsal surface
Oral-facial-digital syndromes I and II	I-Dominant x-linked II-Autosomal recessive	Skeletal, cutaneous, and neeurologic manifestations	Cleft lip and palate, cleft tongue, abnormally developed frenula with intraoral synechia
Peutz-Jeghers syndrome	Autosomal dominant	GI polposis	Brown-bluish maculae perioraily, perinasally, and periorbitally; 98% have lip pigmentation, 88% have buccal mucosa pigmentation

respiratory distress. Vital signs were within normal limits. Eye examination revealed a wide intercanthal distance and unremarkable fundoscopic findings. Ear findings were normal. Nasal examination showed a flattened nasal bridge and splayed alae nasi. Oral cavity examination revealed a gingivobuccal sulcus without an oral aperture. A hypoplastic mandible was evident. Lower extremities presented with bowing of the legs with right pes planus and left plano-valgus. All other organ systems were essentially normal. The patient underwent a battery of laboratory work-ups which include complete blood count revealing anemia which required blood transfusion. Cranial CT scan showed normal maxillae, mandibles, temporo-mandibular joints, and a porencephalic cyst at the basal ganglia. Bleeding parameters, chest x- rays and urinalysis were normal. The service contemplated releasing the intraoral adhesions under general anesthesia. Referrals to the pediatric, neurosurgery and orthopedic services were done. The patient was not cleared for surgery due to malnutrition. Weekly and monthly follow-ups were undertaken to monitor weight gain and general health.

Figure C: CT Scan of the Temporo-mandibular joint (axial cut)

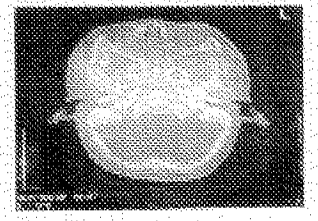
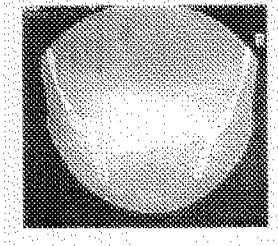


Figure D: CT Scan of the Temporo-mandibular joint (coronaal enhanced cut)



At 1 year and 9 months, the patient was admitted for the contemplated procedure. Repeat CT scan on the mandible still revealed a normal temporomanibular joint, without any evidence of ankylosis or sclerosis; however, it also showed that the lateral borders of the coronoid processes were in contact with the inner surfaces of the zygomatic arches. Patient tolerated the procedure well, with postoperative installation of an intraoral dental obturator to keep the 1 cm opening of the oral cavity from collapsing. Again, overall condition and nutrition were monitored by weekly and monthly follow-ups. A chromosomal study revealed no abberations.

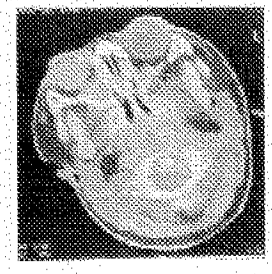


Figure E: CT Scan of the Mandible (repeat axial cut)

At 2 years and 4 months, the patient underwent bilateral coronoidectomy with repeat release of intraoral adhesions via the submandibular approach. Airway was provided through fiberoptic-guided insertion of a nasotracheal tube. Intraoperatively, the soft and hard palate were noted to be absent, tooth buds present and the tongue hypoplastic. Manual manipulation of the mandible showed mobility permitting a maximum opening of 2 cms.

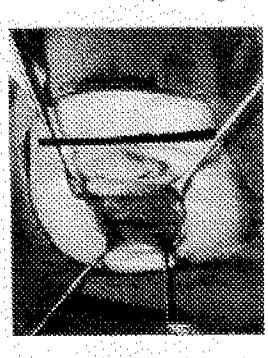


Figure F: Release of intra-oral intra- adhesions (first operation)

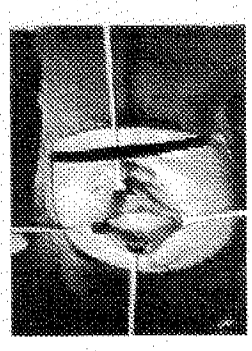


Figure G: Installation of oral device (first operation)

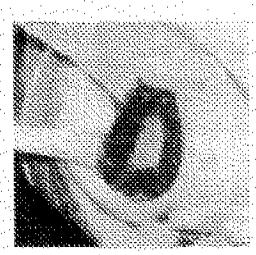


Figure H: Coronoidectomy, left (second operation)

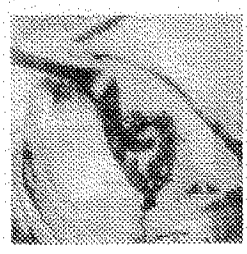


Figure I: Coronoidectomy, right (second operation)

proposed consanguinity of the patients seem to be likely, suggesting an autosomal mode of inheritance.

Later histologic feature of the tumor include (1) sheets of spindly cells surrounding numerous capillaries, (2) monotonous round to oval nuclei usually lacking frank anaplasia, (3) indistinct cytoplasmic borders, and (4) on silver staining, each tumor cell is seen to be surrounded by a reticulin sheath outside of the capillary walls. A histologic grading system was proposed by Tang and co-workers (1988) classifying the tumor into Grade I, Grade II, and Grade II (Table 2).

Table 2. Histologic Grading of Hemangiopericytoma

GRADING	DESCRIPTION
I	These are hypocellular lesions containing cells with small ovoid nuclei set in fairly abundant cytoplasm without prominent nucleoli, and with zero to 1 mitoses per 10 high power fields (HPF) (HPF=X250). A "deer-antler" vascular pattern is a striking and characteristic feature.
II	These are lesions that are more cellular. Containing moderate sized ovoid nuclei showing peppery chromatin, small nucleoli, and from 2-4 mitoses per ten HPF. The "deer-antler" vascular pattern is usually prominent.
III	These lesions are characterized by more numerous cells with small amounts of cytoplasm and enlarged nuclei containing atypical chromatin pattern, atypical nucleoli, and mitoses greater than 4 per 10 HPF. A "deer-antler" vascular pattern is much less discernible than the lesions of other grades.

Tang, Gold, Mira, Eckardt, Cancer vol 62, 1988.

Since the early 1970's attempts have been made to differentiate between benign and malignant hemangiopericytoma but, up to the present, there is no clear cut distinction. McMaster, Soule and Ivin (1975), based on the Mayo clinic experience, agreed with Stout that tumors may be malignant if it is larger and deep seated, if it exhibited few mitotic figures with moderate cellular anaplasia, if with foci of necrosis within a given tumor. Enzinger and Smith (1976) based their criterion of malignancy on 4 or more mitotic figures per 10 high power field. To date, this is the most important predictive factor for malignant behavior. Other histologically unfavorable factors may be high cellularity with seemingly immature tumor cells. Also, patients with small well circumscribed tumors had a 92% 10-year survival rate as compared to a 63% survival rate in patients with tumors greater than 6.5 cm. in diameter. Another factor attributing to its malignant nature is patient's age. Review of literature showed increased incidence of malignancy in older children and adults. All in all, hemangiopericytomas must be regarded as unpredictable neoplasms and as malignant, not in the usual 5-year survival sense, but over the lifetime of the host. These tumors are locally aggressive and infiltrative and manifest a high recurrence rate, frequently persisting for years. Barkwinkel and Diddams (1970) found a total recurrence rate, local and distant, of 52.2% in 224 cases (table 3).

Table 3. Recurrence Rates of Hemangiopericytoma

Location	Cases#	Recurrence#	Percentage
musculoskeletal & skin	103	50	50.5
intra-abdominal & retroperi-toneum	39	16	41.0
Lung/medias-tinum	22	10	45.3
orbit, mouth, nasosinus	21	12	57.1
central nervous system	15	12	80

Modified from Barkwinkel and Diddams, Cancer, vol. 25, 1970.

Some variants of hemangiopericytoma are observed in several cases. The congenital hemangiopericytoma is said to be a cross between hemangioma and hemangio-pericytoma. Campagno and Hyams (1976) designated a variant called hemangiopericytoma-like tumor. This lesion is believed to be within the spectrum of the classic hemangiopericytoma, yet has sufficient characteristic features related to location, behavior and histologic pattern to warrant its recognition as a related yet distinctive entity. This type of tumor is usually found as an intranasal mass producing variable degrees of obstruction and recurrent epistaxis. This tumor demands a less aggressive management because of its low recurrence potential as compared to the classic hemangiopericytoma.

TREATMENT AND PROGNOSIS

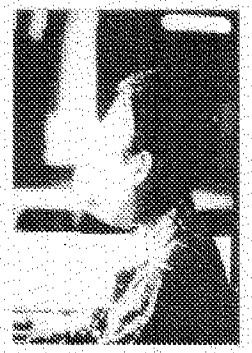
The treatment of choice is wide surgical excision but as a single mode of management it contributes to 20% to 50% rate of local recurrence. Mina et al. (1977) have discussed the merits of radiotherapy and found a response rate of 90% with complete regression in 47% of 29 patients with local recurrences. Best response was obtained when tumor size was less than 5 cm. in diameter and with doses above 35 Gy. Chemotherapy has been used by some authors as a single mode of treatment. The chemotherapeutic drug combination usually

Figure 9

Figure 10

Figure 11

Figure 12



DISCUSSION

Margaret Murray and Arthur Stout were the first ones who named this disease as hemangiopericytoma in 1942 and were inclined to believe in the existence of a new pathologic process while studying glomus tumor. Nine cases of recurrent, infiltrating "glomus tumors" were noted with none of these cases presenting with the typical symptoms of glomus tumor. Peculiarities noted in these group were the pattern and diffuse distribution of the tumor; the anatomic location, the multiple recurrences unusual in glomus tumor, and the distant metastasis that developed in some of these patients who died 5 years later. These pieces of evidence convinced Murray and Stout that the 9 cases comprised a new pathologic entity and named the new entity as hemangiopericytoma, after the predominant cell comprising the tumor.

In 1949, to establish hemangiopericytoma as a distinct clinical and pathologic entity, Stout accumulated 25 new cases through personal contacts from pathologists all over the United States. From the data gathered, it was concluded that (1) involvement in both sexes was equal, (2) the patients ranged from neonates to octogenarians, (3) the tumor had an aggressive growth pattern, (4) there was a high incidence of recurrence, and (5) 50% of the tumors with distant metastasis was malignant.

The identifying cell of hemangiopericytoma, the pericyte, was initially described by the Swiss pathologist Zimmermann in 1923 who noted that this cell is not connected with arterial or venule epithelium but is an independent contractile cell intimately surrounding the capillary. Hence, it is the proliferation of these pericytes with their ovoid or spindle shaped cells intimately surrounding the capillary that constitutes the diagnosis of Hemangiopericytoma. Also peculiar to the tumor is the ultra structural demonstration of a basement attached to the tumor's cell membrane which is present in the pericyte. This differentiates hemangiopericytoma from other sarcomas.

The distribution of the tumor is as wide as the capillary distribution in the body. Even osseous structures are not spared. Stout in 1956, described the primary counterpart of this rare tumor. In adults, the common sites of origin are in the lower extremity and retro-peritoneum. In children and adolescents, the tumor has a predilection for the head and neck region as exemplified by this case (table 1).

Table I. Location of Hemangio-pericytoma as Compiled Pitluk and Conn, The American Journal of Surgery, vol.137, March 1979.

ANATOMIC SITE	n (%)
lowel lower extremities	63 (36.4%)
Retroperitoneum/ non- uterine pelvis	37 (21.4%)
head and neck	23 (13.3%)
upper extremities	23 (13.3%)
trunk	21 (12.1%)
paraspinal	6 (3.5%)
TOTAL	173 100%)

As to the etiology, little has been reported. It is often noted to arise as a rapidly growing mass from a previously traumatized area. Plukker et al. (1988) presented a series of 3 cases of hemangiopericytoma occurring in three kindred members of one family and

contains adriamycin (doxorubicin). The most effective treatment to control tumors as well as to decrease the incidence of metastasis seems to be surgery with high dose radiotherapy and chemotherapy. In conclusion, it is incumbent upon the surgeon to make every effort to excise the neoplasm. This might include adjunctive radiation and chemotherapy to shrink huge masses to allow resectability. Careful assessment of age, location of tumor and general condition of the patient is important in establishing a reliable prognostic profile. The pathologist assumes an important role in accurate determination of histologic grade, adequacy of resection and the presence or absence of unfavorable histologic elements. Survival of patients with hemangiopericytoma in selected sites (e.g. maxillary antrum) may be improved by routine adjuvant therapy. Similar tumors in other sites (e.g. skin) must be evaluated on an individual basis. Finally, it must be emphasized that the total number of these lesions reported to date is small. Therefore, close, long term observation of present and future cases is necessary.

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HIGH DOSE RATE BRACHYTHERAPY AS A MANAGEMENT OPTION FOR STAGE I SQUAMOUS CELL CARCINOMA OF THE GLOTTIS: A PRELIMINARY STUDY*

RAYMOND VINCENT P. JURILLA, M.D.**
BENJAMIN S.A. CAMPOMANES, JR., M.D.***
GIL M. VICENTE, M.D.***
EDUARDO TAN, M.D.****

ABSTRACT

This is a retrospective case series involving five patients with stage I glottic squamous cell carcinoma wherein high dose rate brachytherapy was used as the primary mode of management. To date, these patients have shown resolution of the tumor without any damage to the laryngeal mucosa, vocal problems or recurrences after 18 weeks of follow-up. Two patients still undergoing brachytherapy showed marked decrease in tumor size.

Despite the limited experience, HDR brachytherapy can provide oncologic control and preserve vocal function with less morbidity than either surgery or external radiation therapy. This makes it an excellent management option for patients with Stage I squamous cell carcinoma of the glottis.

Key words: Brachytherapy, squamous cell carcinoma, glottic, stage I

INTRODUCTION

The larynx is the most common site of malignancy in the upper aerodigestive tract. Squamous cell carcinoma accounts for 90-95% of these malignant lesions. Most laryngeal tumors are located in the glottic compartment which fortunately has the best prognosis. One reason for this is early detection because these lesions cause chronic hoarseness which prompts early consultation. In the management of early glottic carcinoma, it is generally accepted that the first line is radiation therapy with surgery (cordectomy, hemilaryngectomy) reserved for irradiation failures.

Brachytherapy is a form of radiotherapy where the radiation can be directed only to where it is needed. It is able to deliver a high dose of radiation to a well-circumscribed area without excessive irradiation of the surrounding structures. High dose rate (HDR) brachytherapy is a form of brachytherapy where the radiation delivered exceeds 200cGy/min.

It is the main objective of this paper to describe the experience gained by this institution in the use of HDR brachytherapy as a valid and practical treatment option in the management of Stage I glottic squamous cell carcinoma. In addition, the specific objectives of this paper are:

1. To demonstrate that HDR brachytherapy can cause resolution of Stage I glottic carcinoma

2. To show that HDR brachytherapy can provide more patient satisfaction in terms of:

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*1st Place, PSOHNS Descriptive Research Contest
October 27, 1995, Holiday Inn Hotel, Manila

**Resident, Department of Otorhinolaryngology, St. Luke's Medical Center
***Consultant, Department of Otorhinolaryngology, St. Luke's Medical Center
****Chief, Section of Brachytherapy, St. Luke's Medical Center

a. voice quality
b. exclusion of normal tissue in treatment area
c. cosmetic acceptability
d. convenience with regards to treatment schedule

This study is significant because an extensive foreign literature review did not show any previous study which documented the use of HDR brachytherapy for early glottic carcinoma. Furthermore, this is probably the first locally-based study of specific application of HDR brachytherapy in the region of the head and neck. It suggests an alternative mode of management which promises none of the morbidity of external beam radiotherapy, the present accepted management for Stage I glottic carcinoma. Also, there is added significance for the ENT surgeon since this paper suggests a technique of radiotherapy which maintains an active participation in the delivery of treatment to the patient.

MATERIAL/METHODS

CLINICAL DATA:

From April 1994 to September 1995, a total of five patients with Stage I squamous cell carcinoma of the glottic larynx were treated with HDR brachytherapy-therapy in this institution. All diagnosis were based on histopathological reports. There was no clinical evidence of metastasis at the time of diagnosis. Staging was done according to the system recommended by the American Joint Committee for Cancer Staging. Stage I glottic refers to tumors limited to one (T1a) or both (T1b) vocal cords with normal mobility, without neck node (N0) or distant metastasis (M0). There were three male and two female patients. Four of the patients were in the sixth decade, one was 24 years old. Four patients were newly diagnosed case of glottic squamous cell carcinoma, all of whom were managed with HDR brachytherapy alone. One patient was a case of glottic squamous cell carcinoma previously managed with external radiation therapy with recurrent tumor fitting the description of a Stage I lesion re-irradiated with HDR brachytherapy alone. Details are shown in Table I.

Table 1. Clinical Profile of Patients

Patient	Age/Sex	Location of Mass	histopathology
M.J	67/M	Anterior 1/3 of right and left vocal cord to include anterior commissure (T1b)	Moderately differentiated squamous cell carcinoma
A.C	65/M	Anterior 1/3 of left vocal cord (T1a)	Moderately differentiated squamous cell carcinoma
N.S	24/F	Whole length of left vocal cord (T1a)	Well differentiated squamous cell carcinoma, recurrent
N.T	65/F	Whole length of left vocal cord (T1a)	Well differentiated squamous cell carcinoma
A.M	69/M	Middle 1/3 of right vocal cord (T1a)	Well differentiated squamous cell carcinoma

All patients were followed up monthly after the last treatment session. Follow-ups were made regularly and were closely monitored and documented. At each visit, direct visualization of the larynx, either by flexible rhinolaryngoscopy or using a rigid 30 degrees endoscope, was performed. Quarterly scoping will be done on follow-up for the next two years.

IRRADIATION TECHNIQUE:

For four patients, the following procedure was done. Under general endotracheal or intravenous anesthesia, the ENT surgeon did suspension laryngoscopy to expose the glottis, then placed the special rigid HDR brachytherapy applicator in contact with the identified tumor (See Fig. 3C). The applicators were held in place by fixing them externally to the suspension. Anteroposterior (AP) and lateral x-rays of the neck were taken for verification of the position of the applicator and for treatment planning. The radiotherapist then calculated the dose to be administered based on the clinical assessment of the tumor size (see Fig 3B). (Being a new application of HDR brachytherapy, the radiation doses employed here were based on a large volume of international studies done on other organs, specifically the cervix). In the brachytherapy room, the applicator was then attached to the "high dose rate remote after loading brachytherapy machine", which delivered the prescribed Iridium-192 radiation (See Fig. 3A). After the treatment, the applicators and suspension laryngoscope were withdrawn and standard post-operative care was administered.

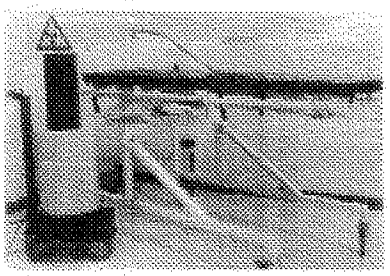

Figure 3A: High-Dose rate remote after loading Brachytherapy machine

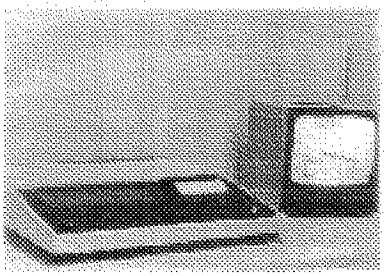

Figure 3B: Control center/monitor

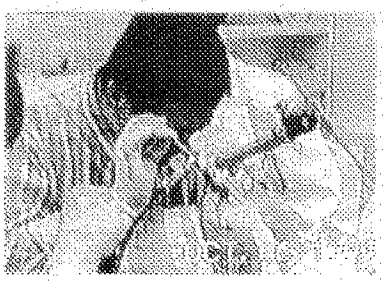

Figure 3C: Putting special rigid HTR Brachytherapy applicator in place via suspension laryngoscopy/GA

For one patient, another technique was employed, based on previous applications of HDR brachytherapy on bronchogenic carcinoma. With local anesthesia (Xylocaine 10% spray) to the oro-and hypopharynx and with patient in a sitting position, an adult flexible rhinopharyngoscope was introduced up to the level of the glottis. A flexible blue applicator catheter was introduced through a port in the scope to reach and come in contact with the glottic tumor. The scope was carefully withdrawn, leaving the catheter in place. AP-lateral views of the neck were done to verify the catheter's position. The catheter was anchored as one would a nasogastric tube. The radiation dose was then delivered via this catheter. The catheter was withdrawn after the procedure.

The number of sessions ranged from three to five done on a weekly basis depending on the size of tumor and response to therapy. Details of the HDR brachytherapy sessions are shown in Table 2. One complete session usually lasts for 30 minutes done on an out-patient basis.

Table 2. Brachytherapy Records of Patients

Patient	Mode of Treatment	Radiation Dose and Distribution	Number of Sessions
M.J.	HDR Brachytherapy under GA (Endotracheal)	400 – 500 cGy at 1.0 cm radius single dwell position	3
A.C.	HDR Brachytherapy under GA (Endotracheal)	500 – 700 cGy at 1.0 cm radius single dwell position	5
N.S.	HDR Brachytherapy under GA (Endotracheal)	500 cGy at 1.0 cm radius single dwell position	5
N.T.	HDR Brachytherapy under GA (Endotracheal)	500 cGy at 1.0 – 1.2 cm radius single dwell position	4 (ongoing)
A.M.	HDR Brachytherapy under Local Anesthesia	400 cGy at 1.0 cm radius x 4 dwell position	3 (ongoing)

RESULTS

To date, the three patients who have completed their therapy show total resolution of their tumors. In all patients there was no damage to the mucosa following brachytherapy. In this series, there were no complications related to the treatment. Vocal function went back to normal or even improved. All patients expressed satisfaction with the results of the treatment and the resolution of the mass was closely documented using standard video equipment. During follow-up, hoarseness was noted to resolve within one month from the last treatment day. There was also no report of radiation necrosis or mucositis. For the patients whose sessions are still ongoing, there is a marked decrease in the size of the tumors (See Figure 1a,1b,1c,2a,2b for results of some patients). No untoward side effects were likewise noted, save for some vocal cord edema. Details are shown in Table 3.

Table 3. Follow-up/Results if Patients Post-Brachytherapy

Patient	Date of Last Treatment	Result on Tumor	Voice Quality	Complications	Date of Last Follow-up
M.J.	4-28-1994	Resolving	Normalized in 1 week	None	5-15-1994
A.C.	10-4-1994	Resolved	Normalized in 2 weeks	None	6-4-1995
S.N.	11-10-1994	Resolved	Normalized in 1 month	None	7-10-1995
N.T.	5-27-1995	Resolving	Treatment ongoing	None	NA
A.M.	3-22-1995	Resolving	Treatment ongoing	None	NA

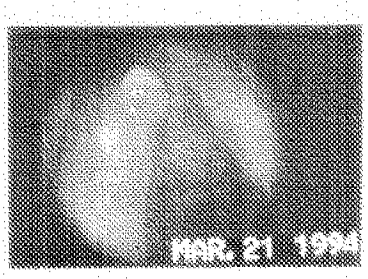

Figure 1A: Patient AC, Original Tumor, Pre-Biopsy

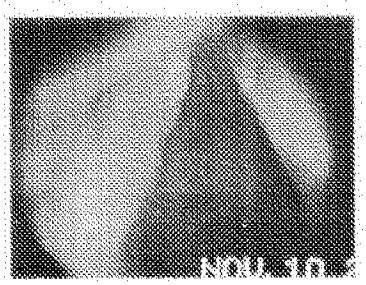

Figure 1B: Patient AC, Immediately Post-HDR Brachytx

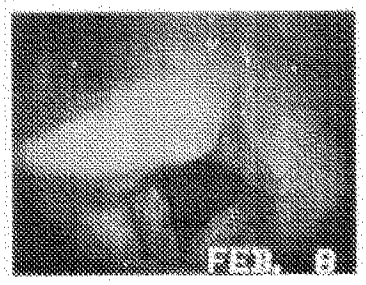

Figure 1C: Patient AC, Post-HDR Brachytx, On Follow-up

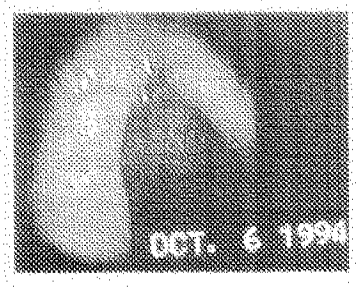

Figure 2A: Patient NS, Pre-HDR Brachytx

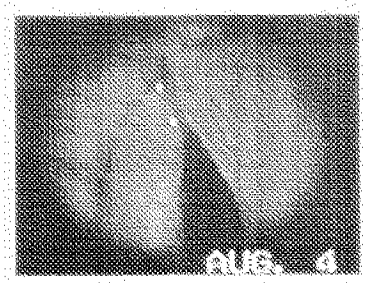

Figure 2B: Patient NS, Post-HDR Brachytx, at follow-up 10 months later

DISCUSSION

The larynx is the most common site of malignancy in the upper aerodigestive tract. The tumor histopathology is squamous cell carcinoma in over 90% of cases[16]. For the purpose of classification and for consideration of appropriate treatment and prognosis, the larynx can be subdivided into three anatomical regions: the glottic compartment, the supraglottic compartment and the subglottic compartment.

Anatomically, the glottic compartment of the larynx consists of both true vocal cords and the anterior and posterior commissures surrounding the glottic chink. The supraglottic-glottic boundary is located at the apex of the ventricle. The junction of the glottis and subglottis is 1.0 cm below the free edge of the vocal fold. Fifty-nine percent of laryngeal tumors are glottic. This is fortunate because glottic carcinoma has the best prognosis among the laryngeal cancers. Most glottic carcinoma originate on the free margin of the vocal cord with a predilection for the anterior half of the cord and the anterior commissure.[4]

Treatment of stage I glottic carcinoma can either be surgical or radiological. The aim of therapy is to achieve cure with maximum voice preservation without damage to normal tissue. Radiation treatment can either be some form of external radiation therapy or interstitial brachytherapy. Surgical treatment can be done either with a knife or by laser. Studies have been done showing the effectiveness of both modalities in achieving cure.

Surgical techniques for Stage I includes simple cordectomy for T1a tumors where only the affected cord is resected completely and extended cordectomy of T1b tumors, which involves uni- or bilateral resection of vocal cords anterior commisure, with or without unilateral arytenoidectomy [14]. Hemilaryngectomy is indicated if there was minimal extension to the vocal process and/or arytenoid.[12] Surgical series have demonstrated rates as high as 26 % in selected patients undergoing laryngofissure in early laryngeal cancer.[13]

Since 1975, many authors have been recommending the use of carbon dioxide laser[11] as an alternative surgical "knife". Cure and recurrence rates are comparable to conventional surgery and radiation therapy though not any better[16] Complications in laser surgery, though, are rare.

In most countries, irradiation is the initial treatment prescribed for early malignant tumors in the glottis, with surgery (hemilaryngectomy or cordectomy) reserved for salvage of irradiation failures.[6] This protocol was developed because it was noted that for small glottic carcinomas, 90% of cases are cured by radiotherapy alone, with salvage surgery curing another 4-8%.[16] While some studies seem to indicate that most patients who undergo external radiation will eventually regain normal voice function, abnormal voice characteristics often persist. Phonation following external radiation therapy is generally considered to be less impaired following conservative surgical treatment.[17] The study by Chen et al. (1993) showed a 77 % voice preservation for post-radiotherapy cases compared to 34% (improved to 60% after 1988 with more conservative technique) for post-surgical patients.[12] This would indicate that radiation therapy is the treatment of choice in early vocal cord carcinoma, as far as preserving vocal function is concerned.

The external beam irradiation technique for T1 lesions usually employs a field that includes the larynx from the hyoid bone to the cricoid cartilage using anterior oblique wedged fields. (Good local control is achieved with 200 cGy per fraction for a total dose of 6500-6600 cGy.[25]

Although external radiation therapy, be it the old Cobalt units or the newer linear accelerator, may seem ideal for treating early glottic carcinoma, it also has its own significant morbidities. Much of these arise from damage to uninvolved normal tissue in the treatment volume. The types of radiation damage may include tissue necrosis, fibrosis, strictures, atrophy, poor healing of a surgical wound and radiation induced neoplasia.[25] Because of the exposure of a large volume of tissue to irradiation, the patient is prone to develop external skin necrosis and unsightly burn marks on areas outside the intended target. This cosmetic disadvantage is most marked in the head and neck region.

Even before any sign of skin necrosis begins, however, the patient's oral and pharyngeal mucosa membrane will already become erythematous, proceeding to a stage where a fibrinous exudate appears. This is called radiation mucositis. There is intense pain especially associated with swallowing, making the patient more miserable with consequent decline in nutritional status. External radiation affects the mucous membrane directly by reduction of mitosis of the normal cells. Indirectly, it causes endarteritis leading to ischemia of the mucosal tissue.[7]

Assessment of the irradiated larynx proves to be difficult as a result of the swelling and edema from external radiation therapy. Thus, an occult carcinoma (recurrent disease or second primary tumor) may progress beyond what can be salvaged surgically.[16,17] In addition to this, the prolonged edema may likewise cause narrowing with various degrees of respiratory obstruction. The protracted edematous condition may lead to repeated biopsies, with subsequent perichondritis and stenosis.[2]

Also, the risk for radiation-induced tumors must be kept in mind. Although the frequency of such is low (0.1-0.5% in adults and 1-5% in children, developing 5-25 years post irradiation), the importance of even a few is great because such tumors are usually fatal, and appear long after the primary tumor was eradicated and the patient perceives himself to be recovered from cancer. The stress of the late appearance of an induced tumor, not only to the patient but also to the relatives and the involved medical team, is unusually severe. There will almost certainly be a decreasing tolerance of such untoward outcomes when the induced malignancy appear in non-target tissue and there were other technical means (even if costly) available. So what was once an acceptable morbidity in the past may not be acceptable now because of available technology.[24]

Furthermore, another disadvantage of external beam therapy is the treatment course which usually takes six and a half weeks on a once-daily basis. This schedule makes it inconvenient for people who desire to continue their daily routine despite their illness. There is the added inconvenience and expense of going to the hospital everyday.

Thus, factors other than cure rates and functional (voice) results must be considered and may also influence the choice of therapy. Besides, no truly informed patient would agree to have his/her normal tissues (non-target) irradiated when feasible means were available to exclude them from the treatment volume and could also be assured of coverage of the target in three dimension treatment sessions.

Therefore, those patients who have the financial resources to try an alternative modality and/or who do not have the time to go to the hospital everyday as an outpatient (as in external radiation therapy) or to be admitted (as in surgical treatment) must be provided with another option. Such option should satisfy the desire of the attending physician to circumvent the complications associated with external radiation therapy discussed above. In this institution, to meet these valid demands, HDR brachytherapy as an alternative means of managing early glottic carcinoma was used.

Brachytherapy is a form of interstitial radiotherapy used to deliver radical high treatment to small target volumes. It developed from the parallel pioneering work of radiotherapists from France and England in the 1930s. High dose rate after loading techniques have been in clinical use for over twenty years now.[3] In contrast to external beam radiation, brachytherapy is performed by placing encapsulated radionuclide sources close to or within the tumor (the prefix "brachy" is the Greek word for "short", referring to this short distance between the radiation source and the tumor). Its main advantage is the ability to deliver a high dose of radiation to a well-circumscribed area without excessive irradiation of the surrounding structures. At present, it has been documented in the following head and neck applications: lip and buccal mucosa, floor of the mouth and mobile tongue, oropharynx, including base of tongue, lymph node metastasis and the nasopharynx.[3,19]

In irradiation therapy, there are two classes of failure: local control not achieved and radiation induced morbidity.[24] With regard to the former, as far as early stage glottic carcinoma is concerned, HDR brachytherapy has excellent results comparable to or even better than external radiation therapy. But it is in the area of radiation-induced morbidity where these radiological modalities markedly differ. The morbidities and disadvantages of external radiation discussed earlier are not experienced with HDR brachytherapy.

In addition, there is improved dose distribution. In radiation therapy, the goal of treatment planning is to achieve the closest feasible approach of the treatment volume to the target volume. Brachytherapy is able to deliver a high dose of radiation to a well-circumscribed area without irradiation of surrounding structures. Thus, in brachytherapy of the glottis, the laryngeal apparatus, hypopharynx, neck muscles, and skin are spared from complications such as persistent edema, necrosis, and poor function. Plus, the risk of radiation-induced neoplasia is greatly minimized. There is likewise an increase in the differential response between tumor and normal tissue.[24] The clinical benefits will be due to the irradiation of almost zero volume of normal tissue/ structures. The tumor and the tumor alone receives the full impact of the radiation.

An advantage of HDR brachytherapy specifically is that it has a short irradiation time which reduces the risk of embolism. Also, because of the short treatment time, the patient will not feel so isolated for a long time. In addition, the exact position of the applicator can be controlled during the therapy and can be reproduced throughout several dose functions. Thus, the higher dose-rate results in a higher biological effectivity.[3]

This paper is a preliminary report on the success of HDR brachytherapy in this institution in treating early glottic carcinoma. In comparison to external radiation therapy, HDR brachytherapy has very much less morbidity. Although Wang (1993) has

already shown that the radiation tolerance of laryngeal structures is high and has, in fact, proposed an external beam technique for re-irradiation[25], effectiveness of HDR brachytherapy for salvaging irradiation failures have been demonstrated.

At this point, the significant role the ENT surgeon plays in the delivery of therapy to the patient is emphasized. The ENT surgeon performs direct or flexible laryngoscopy three to five times a month for each patient and puts the brachytherapy applicators in place. Therefore, this procedure espouses a multidisciplinary approach. It is a team effort--the core of which consists of the ENT surgeon, the radiotherapist and the anesthesiologist (if general anesthesia is employed). Furthermore, the patient remains the responsibility of the ENT surgeon during the follow-up stage and assesses the results of the therapy.

With increasing awareness and education of cancer patients as well as physicians as to the treatment options open, there will ultimately be less acceptance of morbidity due to damage of non-target tissue which need not have been included in the treatment volume. This means that what is or is not acceptable financially needs to be regularly reevaluated with the development/availability of technology that will do the least damage to normal tissue.

CONCLUSION

In summary, using HDR brachytherapy as a treatment option for patients diagnosed with early stage glottic carcinoma showed the following pertinent advantageous features:

1. All patients in this study have demonstrated resolution (or marked diminution for ongoing cases) of their tumor masses. There is yet no report of recurrences for as long as 18 months after brachytherapy.
2. There is good preservation of vocal function.
3. There is more efficient dose distribution resulting in increased differential response between tumors and normal tissue.
4. Unsightly cutaneous burn marks in the head and neck area are avoided. Likewise avoided is the occurrence of radiation mucositis.
5. For the patient, there is less interruption of normal daily routine.
6. For the ENT surgeon, there is continued active participation in the actual management and follow-up of the patient.

Based on the favorable experience documented in the first five patients, it can therefore be concluded that brachytherapy can provide cure and preserve vocal function with less morbidity and more convenience that either conservative surgical treatment and external radiation therapy for early stage glottic squamous cell carcinoma. This was achieved without diminishing the role of the ENT surgeon in the active management of the patient.

RECOMMENDATIONS

Continued follow-up of the first five patients is recommended for a long-term assessment of brachytherapy effects. Because of the encouraging results derived, continued application and more complete documentation of this therapy for appropriate new patients is hereby recommended. This paper will thus be extended to become a prospective cohort study. A study comparing the advantages/ disadvantages of brachytherapy vis-à-vis external radiation on early stage glottic carcinoma can likewise be undertaken. Another possible adjunctive study of interest would be a cost-effectivity or cost-efficiency study concerning brachytherapy, perhaps also in contrast with external radiation.

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scan or MRI definitely would be more advantageous.

The occurrence of ptosis has given the patient more cause for alarm. But the EENT specialist has considered it to be primarily an orbital problem and an MRI of the orbit was initially requested. Acceding to a request from a relative doctor led to the patient undergoing MRI of the brain instead. MRI showed an enhancing mass in the central skull base. Consider newgrowth as in chondrosarcoma, chordoma and inflammatory process of the sphenoid sinus. The lastoOtolaryngologist who saw the patient considers the CT scan highly superior than the MRI with respect to sinus pathology. The MRI is good for soft tissues lesions while the CT scan shows the status of the bony architecture which is important in the evaluation of the sinus problem. The CT scan showed a soft tissue mass in the sphenoid sinus eroding its wall and extending to involve the cavernous sinus. CT scan reading was sphenoid sinus mass, Carcinoma? The involvement of cavernous sinus could explain the presence of all the eye symptoms.

Based on the central skull base lesion, shown in MRI and CT scan the following were considered:

1.) Chordoma
2.) Chondrosarcoma
3.) Sphenoid sinus mucocele
4.) Sphenoid Carcinoma

Chordoma originates from the notochordal rest whereas chondrosarcoma originates from the embryonal cartilage that escape resorption during endochondral ossification. Despite their unique cellular origins, chordomas and chondrosarcomas that originate at the central base of the skull share many symptoms and signs.

In this case, the patient presented with severe headache, a common initial symptom of chondrosarcoma and chordoma. In the later course of the disease, the patient had ptosis and facial numbness due to occulomotor and trigeminal nerve involvement which were all unresponsive to medication.

Epistaxis which was the initial presentation of the patient is also seen in chondrosarcoma and chordoma. Radiologically, both present with bone and cartilaginous destruction but the location of the lesion of chondrosarcoma and chordoma is mainly nonsphenoidal which is opposite that of the patient. Therefore, sphenoid sinus mucocoele or sphenoid carcinoma were the more important considerations.

Sphenoid sinus mucoceole is caused by obstruction of the secretory duct or sinus ostium. The symptoms and signs of sphenoid mucoceole and sphenoidal carcinoma are directly related to sinus anatomy and its contiguous structures. Headache is still the most commonly noted symptom; other symptom and signs present in the patient are ptosis, epistaxis and facial numbness.

The difference between the two is in the radiologic picture. In mucoceole, the bony wall is pushed to the periphery. In this patient, the lesion has gone beyond the confines of the bony wall to affect adjacent structures. Thus, the prime consideration was sphenoid carcinoma.

The biopsy has been through the Wigand approach to the sphenoid sinus. This is a safe and simple way to reach the area. Through this, a biopsy could easily be done with minimal risk. Biopsy revealed squamous cell carcinoma, moderately differentiated, sphenoid.

Squamous cell carcinoma of sphenoid is rare, accounting from 0.4 to 2 % of all paranasal malignancies. With regard to treatment, exhaustive review revealed scanty literature. In a retrospective study by J.D. Spiro in 1989, out of 105 patients with squamous cell CA of the paranasal sinuses, one had surgery and remained alive and well 5 years postoperatively but the other patient was lost to follow-up after the diagnosis. Other reported cases underwent radiotherapy but results of the treatment were not mentioned.

Surgery in this area is quite difficult because of its deep location and proximity to the cranial nerves and other important structures. The surgery that could be done in this patient is just debulking since a wide excision of this tumor, having affected the cavernous sinus, is practically impossible. The benefit of debulking with radiotherapy vs radiotherapy alone in advanced sphenoidal carcinoma with respect to the

survival rate is uncertain up to this time because of limited experience. The possible morbidity of surgery is quite high especially since the bony wall has been eroded and the dura involved. Comparing the surgery with the uncertain results, radiotherapy would be a logical modality of choice. Chemotherapy has been given in addition to the radiotherapy on the ground that a combination of modalities affords better prognosis in advanced malignancies. A wide excision of the tumor is practically impossible.

Presently, the patient is undergoing radiotherapy and chemotherapy and improvement has been noted. Ptosis and the limitation of the ocular movement has improved. A repeat CT scan after the management is warranted.

CONCLUSION

Presented was a case of a 58 year old, male who developed a sphenoidal carcinoma, having a 2 year history of on and off epistaxis and a two month duration of excruciating headache. A high index of suspicion could have enabled early diagnosis. And as is always stated, early diagnosis results in better prognosis. That could have been possible in this patient. Physicians, therefore, should be on guard for all seemingly unharmful symptoms like epistaxis and headache since these could give the patient the deadliest blow.

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FACIAL PROFILE ANALYSIS: AN AVERAGE FILIPINO ANTHROPOMETRIC MEASUREMENT*

PHILIP DIONISIO M. ROA, M.D.**
DEO MAGNO S. ANDAL, M.D.**
EDGARDO C. RODRIGUEZ, JR. M.D.***

ABSTRACT

Facial measurements of 100 male and 100 female Filipino medical students and medical staff members (20-30 years old) were taken to provide basis in reconstructing an average Filipino facial profile. Several factors were considered in the analysis, including age, gender, and cultural differences. Based on the computed average for each measurement, noticeable differences were seen in the forehead wherein males presents a wider forehead than females. In the overall facial contour, males have a relatively square face compared to the rounded shape in females. Males have longer noses (4.14 cms) than females (3.96 cms). Considering both sexes, no significant differences was noted in the measurement of the nasolabial angle and nasal tip projection using the Good method. Measuring the Legan facial convexity angle, the males exhibited a more convex profile than the females. In the process of creating an average Filipino facial profile, discrepancy was noted in the measurement of the middle and lower portions of the face as based on Caucasian standards. Combining all the measurements, the author were able to form an average Filipino profile using foreign aesthetic standards.

Keywords: Filipino facial profile, facial profile analysis

INTRODUCTION

Perfection in beauty is what persons from all walks of life, in every part of the world, wish to achieve. Even in ancient times, man has been in constant quest to define and measure beauty, and to, eventually, create it flawlessly. The Greeks attempted to form the perfect beauty through mathematical and geometric equations which led to the formulation of the golden proportion of the human body. This proportion has frequently been described in Leonardo da Vinci's paintings, the so called Leonardo's square.

Since the beginning of the twentieth century, aesthetic and reconstructive surgery has evolved into an important therapeutic specialty. Once a socially condemned work of art and science, it has now gained wide acceptance worldwide. In the Philippines, there has been an increasing number of Filipinos, both males and females, who have expressed their desire to undergo facial profile plasty to improve certain facial features and/or to correct defects which may be congenital in origin or a result of trauma.

Present demands in this field has led some authors to establish standard facial proportions and relationships which provide basis for the diagnosis and planning in facial surgery. These data, however, were based on Caucasian measurements, and cannot be completely applied to Filipinos. Racial differences make Filipino features unique from that of Caucasians.

So, though using the standard measurements that yield pleasing results, it is the ultimate goal of every plastic surgeon to create an aesthetically acceptable and balanced facial profile which does not

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**Resident, Department of Otorhinolaryngology, PLM-Ospital ng Maynila
**Consultant, Department of Otorhinolaryngology, PLM-Ospital ng Maynila

deprive one of his inherent ethnic and cultural identity.

OBJECTIVES

1. To present average facial measurements of Filipino medical students and medical staff members using basic parameters set by foreign authors.
2. To be able to reconstruct a Filipino facial profile using the average measurements taken from this study.

METHODOLOGY

This study was conducted using 100 male and 100 female medical students and medical staff members. These included 54 third year medical students (24 males/30 females), 62 medical clerks (32 males/30 females), 35 medical interns (11 males/ 24 females), 34 residents (24 males/10 females), and 15 nurses (9 males/6 females) selected randomly from a population aged 20-30 years. Those selected for the study had natural set of anterior teeth as part of the requirement.

Since intermarriages with other groups has greatly modified the original Filipino structure, the authors chose subjects who have, at least, parents and grandparents coming from the original Filipino ancestry. Those with congenital facial defects or had a history of facial injury were excluded. Likewise, those who had undergone aesthetic and corrective facial surgery were eliminated from the group.

Actual measurements were taken by the same persons using a steel ruler, caliper, and protractor (Figure 1.1). True lateral view photographs of the subjects (figure 1.2) were used to determine facial inclinations and angles. Fixed landmarks were marked and measured (Figure 1.3).

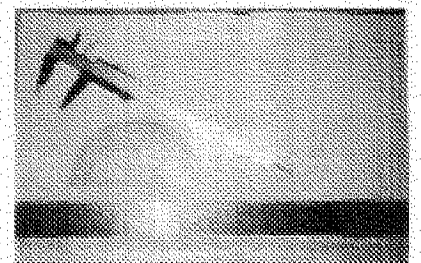


Figure 1.1.

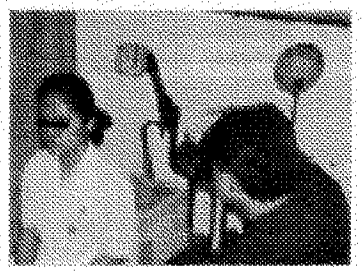


Figure 1.2

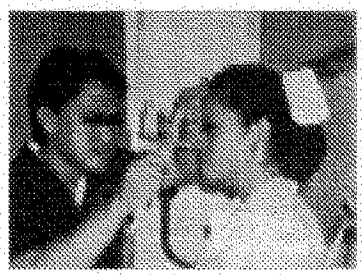


Figure 1.3

Results of the measurements were recorded and analyzed using measures of central tendency (mean, range). Measurements were then used to form the average Filipino facial profile.

The following were measurements and key points for analysis used by the authors to arrive at the proportional facial structures:

I. KEY POINTS FOR ANALYSIS (FIXED LANDMARKS):

Tragion (tr)	- most anterior portion of supratragal notch
Trichion (Tr)	- hairline at midsagittal plane
Glabella (G)	- most prominent portion of forehead in midsagittal plane
Eyebrows (Eb)	-
Eyelid (Ely)	-
Nasion (N)	- most prominent point at root of nose in midsagittal plane
Tip (T)	- most anterior projection of the nose
Subnasale (Sn)	- junction of columella and upper lip
Upper lip (Ul)	-
Lower lip (Ll)	-
Labiale superius (Ls)	- most anterior point on convexity of upper lip
Stomion superius (St)	- most inferior point on vermilion of upper lip
Cuspid line (C line)	- distance between the 2 lower canines
Pogonion (Pg)	- most anteriorportion of soft tissue chin
Menton (Me)	- lowest point of contour of soft tissue chin
Cervical point (C)	- junction of tangents to neck and submental areas
Gnathion (g)	- intercept of subnasale to pogonion line with cervical point to menton line
Zygoma (Zy)	-
Angle of the mandible (Mn)	
alar base (alb)	
nasal ala (al)	
supra-aurale (sa)	- highest point of helix
sub-aurale (sba)	- lowest point of lobule
pre-aurale (pra)	- anterior extent of the ear at the site of helical attachment
post-aurale (pa)	- posterior extent of helix
otobasion superius (obs)	- point of attachment of helix temporal region
otobasion inferior (obi)	- point of attachment of lobule to cheek

II. DEFINITION OF MEASUREMENTS:

A. Frontal Analysis:

Facial thirds - trichion to glabella, glabella to subnasale, and subnasale to menton (Figure 2.1)

Nasal Height - nasion to subnasale (Figure 2.1)

Lower facial height - subnasaleto menton (Figure 2.1)

Facial width - distance between the 2 zygomas, the 2 angles of the mandible, and C lines (Figure 2.2)

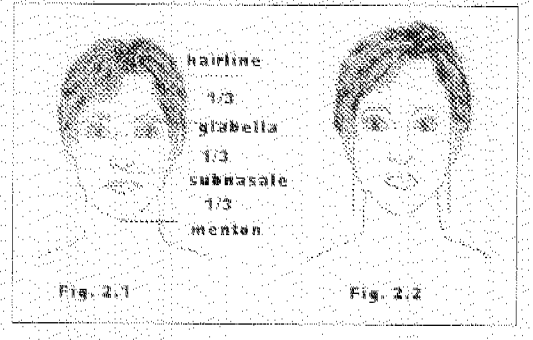


Fig. 2.1 Fig. 2.2

Facial depth - distance between the tragion and trichion, tr-G, tr-T, tr-Sn, & tr-Me (Figure 2.3)

Other measurements needed to reconstruct facial profile: (Figure 2.4)

1. tr-Eb
2. G-N
3. Eb-Eyl
4. Eyl-st line

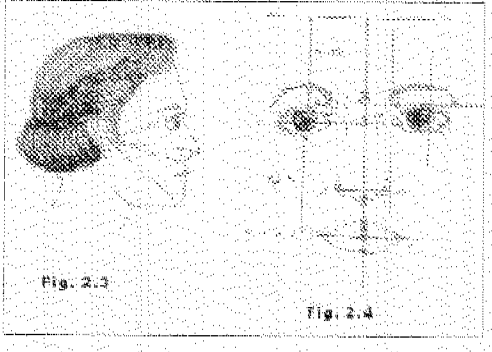


Fig. 2.3 Fig. 2.4

B. Profile Analysis:

Frankfort and vertical planes (Fr) – intercept of tragion to infraorbital rim line with glabella to pogonion line (Figure 3.1)

Aesthetic Triangle: (Figure 3.2)

1. nasofrontal angle (NFr) -intercept of glabella to nasion tip line.
2. nasofacial angle (NFa) -intercept of glabella to pogonion line with nasion to tip line
3. nasomental angle (NMe) -intercept of nasion to tip line with tip to pogonion line
4. mentocervical angle (MC) -intercept of glabella to pogonion line with menton to cervical point line.

Legan Facial convexity angle - intercept of glabella to subnasion line with subnasion to pogonion line

Alar-lobule ratio - tip to posterior lobule divided by posterior lobule to ala

Goode ratio of nasal projectionalar point to tip divided by nasion to tip distance.Alar point defined by intercept of nasion to alar line with perpendicular line to tip

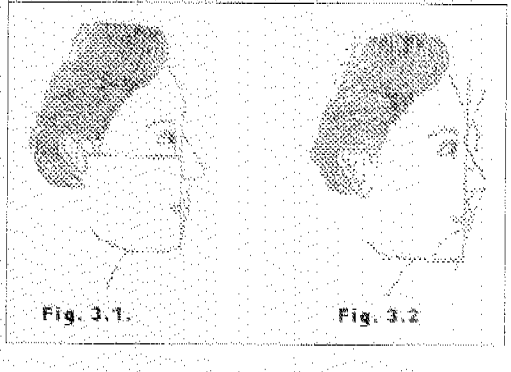


Fig. 3.1. Fig. 3.2

RESULTS

PART I: INITIAL ASSESSMENT OF THE FACE

Table I. Frontal Analysis

	Male	Female
A. Facial Thirds		
1. upper (Tr-G)	5.37	5.19
2. middle (G-Sn)	5.91	5.85
3. lower (Sn-Me)	6.02	5.92
B. Anterior Facial Height		
1. total length	10.53	10.33
2. N-Sn	4.51	4.41
(nasal height ratio)	(43%)	(42%)
3. SN-Me	6.02	5.92
(lower facial height)	(57%)	(57%)
C. Facial width (see Fig.2.2)		
1. Zy-Zy	11.80	11.70
2. Mn-Mn	11.40	10.80
3. C line - C line	5.40	4.60
D. Facial depth (see Fig.2.3)		
1. tr-Tr	11.70	11.80
2. tr-G	10.33	9.92
3. tr-N	9.31	9.07
4. tr-T	11.00	10.80
5. tr-Sn		10.20
10.15		
6. tr-Me		12.74
12.64		
E. Other (see Fig. 2.4)		
1. tr-Eb		5.30
4.60		
2. G-N		1.70
1.50		
3. Eb-Eyl		0.60
0.80		
4. Eyl-St line		6.40
9.00		

Note: Values shown above were the mean measurements computed and expressed in centimeters, unless otherwise specified.

Table II: Profile Analysis

	Males	Females
A. Frankfort and vertical planes	98	100
B. Aesthetic triangle		
1. nasofrontal angle (NFr)	133	134
2. nasofacial (NFa)	34	33
3. nasomental angle (NMe)	133	133
4. mentocervical angle (MC)	109	91.8
C. Legan facial convexity	10	5

Note: Values appearing above were mean measurements computes and expressed in degrees.

PART II: ASSESSMENT OF MAJOR AESTHETIC UNITS

Table III

Eyebrows (see Fig.5)		
A. Length:	male = 5.25 cms.	female = 5.00 cms.
B. Distance:	male = 1.60 cms.	female = 2.10 cms.
C. Thickness:	male = 1.00 cms.	female = 0.90 cms.
Eyes (see Fig. 5)		
A. en-en:	male = 3.19 cms.	female = 3.20 cms.
B. le-en:	male = 3.01 ms.	female = 3.03 cms.
C. lid distance:	male = 0.81 cms.	female 0.76 cms.
Nose		
A. Nasal width: (see fig. 6.1)		
1. al-al:	male = 3.85 cms.	female = 3.83 cms.
2. sb-sb:	male = 3.17 cms.	female = 2.19 cms.
3. fb width:	male = 2.09 cms.	female = 3.96 cms.
B. Nasal length (N-T): (see fig. 6.2)	male = 4.14 cms.	female = 3.96 cms.
C. Ala-to-tip ratio: (see fig. 6.2)	male = 0.57 cms.	female = 0.47 cms.
D. Goode ratio of nasal tip projection:	male = 0.60 cms.	female = 0.53 cms.
E. Angle measurements:(see fig. 3.2)		
1. nasolabial angle:	male = 113 degrees	female = 114 degrees
2. nasofrontal angle:	male = 133 degrees	female = 134 degrees
3. nasofacial angle:	male = 34 degrees	female = 33 degrees
4. nasal tip angle:	male = 101 degrees	female = 101 degrees
Lips: (see fig. 7)		
A. Ul-St:	male = 0.75 cms.	female = 0.71 cms.
B. St-Li:	male = 0.93 cms.	female = 0.87 cms.
C. St length:	male = 4.75 cms.	female = 4.73 cms.
D. Sn-Ll:	male = 1.15 cms.	female = 1.14 cms.
E. Ll-Me:	male = 2.90 cms.	female = 2.90 cms.
Ear: (see fig. 8)		
A. sa- sba (length):	male = 6.00 cms.	female = 5.90 cms.
B. pra- pr (width):	male = 2.80 cms.	female = 2.80 cms.
C. obs- obi (width of attachment):	male = 4.30 cms.	female = 5.00 cms.
D. tr-g (vertical position):	male = 12.30 cms.	female = 11.90 cms.
E. tr-Sn (horizontal position):	male = 10.30 cms.	female = 10.00 cms.
F. Inclination:		
1. sa-Sn:	male = 9.90 cms.	female = 11.60 cms.
2. tr-Sn:	male = 10.30 cms.	female = 10.00 cms.
3. sba-Sn:	male = 10.20 cms.	female = 8.50 cms.

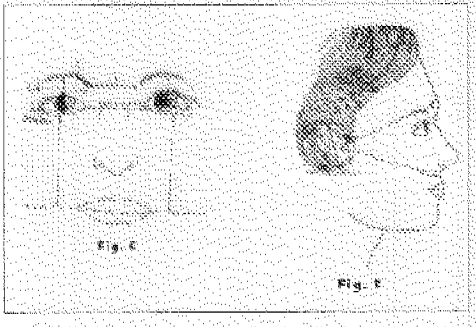


Fig. 4

Fig. 5

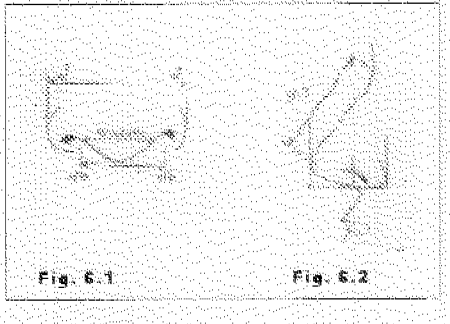
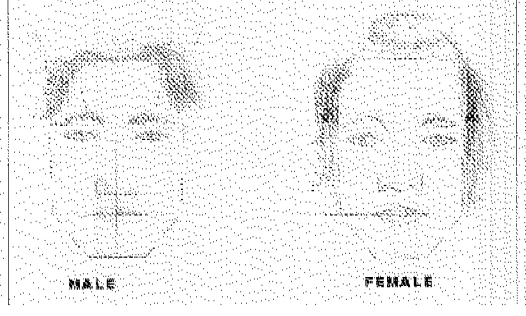


Fig. 6.1

Fig. 6.2

Combining all these meassurements, the authors were able to create an average Filipino face (Figure 9).



MALE

FEMALE

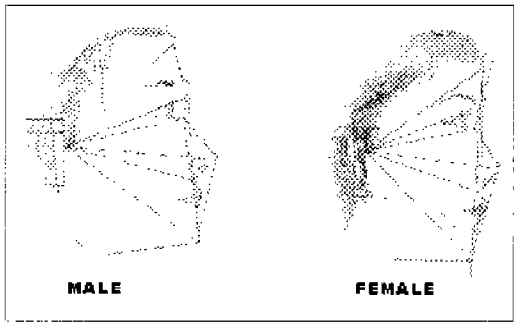


Figure 9

DISCUSSION

As Plato once stated: "The qualities of measure and proportion invariably constitute beauty and excellence". Therefore, in order to achieve excellence in the presence of beauty, a certain degree of relative proportion of the various parts of the body, and, in particular, the face must be established.

Several factors must be put in mind in forming a basis for analysis of facial components. One is age which usually constitute one's desire to undergo aesthetic surgery. The initial effects of aging become apparent when one reaches the age of 30 when there is loss of skin elasticity and increase in laxity. That is why, in this study, the authors limited the subjects to those belonging to 20-30 years age group, which could give an ideal facial analysis without the unwanted effects of the aging process. Using measurements based on such age group, the surgeon could satisfy the patient's goal in undergoing cosmetic surgery --- to rejuvenate one's lost youth.

Another factor which is vital in facial analysis and has been highly considered in this particular work is gender. Each measurement has been grouped and recorded separately according to sex. As what foreign authors have observed in Caucasian subjects regarding this aspect, gender difference was also evident among Filipinos. Based on the computed average for each measurement, there were several differences noted between the male and female measurements. First is in the facial proportions. Males were observed to have wider forehead (5.37 cms.) than the females (5.19 cms.) using the distance Tr-G. In the evaluation of the facial width, males present a relatively square face compared to the rounded shape of females.

In the measurement of individual aesthetic units, the most noted difference is seen in the analysis of overall nasal contour. The male gender has a longer nose (4.14 cms) as compared to the female (3.96 cms) using the nasion-to-tip measurement. The tip-lobule distance is longer in males (0.57) than in females (0.47). There is too much variability in then nasal tip projection using the Goode method and the usual nasolabial angle differences written in textbooks, saying that the female has more obtuse angle than the male, was not noted in this study (shown in table 3). Analyzing the overall facial contour, it was observed in this study that males have a convex face with mentocervical angle of 106°, than female (91.8°). This was also proven using the Legan facial convexity angle (male = 10°, female = 5°). Analysis of the ears demonstrated that females have longer ears (5.9 cms.) than males (5.3 cms.), but males have a wider attachment of the pinna.

This may be a predominantly Western civilization but not all individuals would request change to have Caucasian features. Persons may desire reconstructive surgery yet wish to retain certain ethnic and cultural characteristics that are important to their self image. In view of this, the authors try to compare Caucasians and Filipino profile in terms of balance of proportionality. Individual measurements of each aesthetic units were not compared to Caucasian values per se, but instead, these foreign aesthetic norms were used as a guide in determining proportionality in facial structures without altering the basic Filipino features. Despite the discrepancy noted between the middle and lower face disproportion-portion for the Filipinos (both males and females) as compared to the Caucasians, the rest of the parameters show there is balance among the facial structures of the Filipino.

CONCLUSION

There is no precious algorithm that could describe an ideal facial beauty. Standards of acceptability and beauty are

quite varied in different parts of the world, and each ethnic group may have its own perception about it. In this study, however, it has been proven that though tastes, fashions, and standards of beauty may change from age to age, from one civilization to another, the classical concepts of harmony, balance, and proportion remain the basis in the creation of what one may consider an aesthetically acceptable facial profile. The authors of this study were able to reconstruct the average Filipino profile which is proportional based on the aesthetic norms of foreign authors. This could be a big step towards an advancement in the pre-operative assessment of patients to determine which facial features need change to produce harmony with the face as a whole and yet preserve one's cultural identity.

RECOMMENDATION

Though this study has established an average measurement of Filipinos, the sample size used was not representative of the total Philippine population and of every tribal group in this country. The authors recommend that a study of larger scale be done using a bigger population size, with each region of the country well represented. Advances in computer technology can be of use in this project. Utilizing computer soft-wares, measurements and editing of facial features could be done faster and with more precision. The plastic surgeon could then construct a 2-dimensional representation of a possible surgical outcome.

With computer technology combined with human ingenuity, there is no doubt that the search for a perfect beauty is not that far from existence.

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HEMANGIOPERICYTOMA OF THE PARANASAL SINUS*

J. GABRIEL C. DE BORJA, M.D.**

ABSTRACT

A fast growing tumor of the left maxilla was initially treated as pyogenic granuloma based on pyorrhea and an initial biopsy result. Further tests disclosed the case as a hemangiopericytoma. Tumors like this respond well to wide surgical resection but location of the neoplasm, more than histological features, is important to establishing guidelines to treatment and prognostication.

Key Words: Maxillary tumor, Hemangiopericytoma, Radiotherapy

INTRODUCTION

Hemangiopericytoma is a very rare mesenchymal tumor first described in 1942. Along with angiosarcoma, it is a general class of the malignant vasoformative neoplasms. Before this and even at present, pathologists have confused this type of tumor with various neoplasms such as glomus tumors, Kaposi's sarcomas, mesenchymal chondrosarcomas and fibrous histiocytomas.

CASE HISTORY

C.D., 15 y.o., F/S, Roman Catholic, from Polomok South Cotabato was admitted for the first time in this institution because of a left facial mass.

Eleven months before admission, the patient had intermittent toothache from a loose upper left first molar. The patient was given oral antibiotics and analgesics by the school dentist. Two months later, a painless swelling of the gingiva surrounding the left molar was noted. The same dentist disclosed that he had pyorrhea. Tooth extraction was done and the same antibiotics and analgesics were prescribed at higher dosages. Four months before admission, the gingival mass progressively enlarged accompanied with a painless left maxillary induration. Other notable complaints included gradual left sided nasal stuffiness, occasional left sided epistaxis; and a downward displacement of the left hemipalate. Consultation was sought with an EENT specialist who did a punch biopsy of the mass intra-orally. Histologic report was granuloma pyogenicum (capillary type hemangioma). The patient was given co-amoxiclav and oral steroids for 3 months.

Two months before admission, there was progressive dysphagia and trismus along with the enlarging mass. One day PTA, patient consulted our institution for noisy breathing and cachexia. Tracheostomy was done and the patient was admitted.

Pertinent physical examination findings included a bulge on the left maxillary area extending to the left side of the mandible, the skin over the mass showing telangiectasia and tautness. The mass was fixed, firm, non-tender and approximately 12 x 10 cm. in dimension (Fig. 1-3). On anterior rhinoscopy, a fleshy, fungating, slightly friable mass was noted to obstruct the left nostril totally. Examination of the oral cavity revealed a fungating mass, pale colored, occupying the left hemipalate, gingiva and buccal mucosa. The teeth on this side of the maxilla were embedded in the mass, loose and medially displaced. The trismus narrowed the mouth opening to about 1.5 cm. inter-incisor distance but there

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**Resident, Department of Otorhinolaryngology, Davao Medical Center

was no malocclusion (fig. 4). There were no neck masses. The rest of the findings were normal.

Figure 1

Figure 2

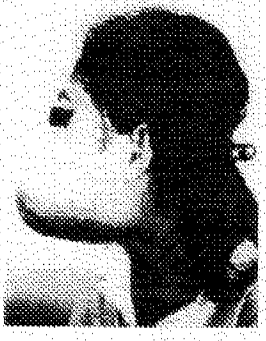


Figure 3

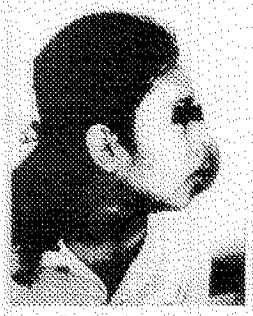


Figure 4

Radiologic examination of the paranasal sinuses showed a large soft tissue density overlying the left maxilla and mandible. No calcifications were noted. There is loss of the inner cortex of the mandibular ramus on the left with a thin sclerotic border. The left maxillary antrum was filled with the mass. The inferior and lateral walls were absent and was contiguous with the soft tissue density. Two unerupted teeth were likewise noted. The remaining erupted teeth were displaced medially. The overall picture was consistent with a slow growing tumor of the paranasal sinuses (fig. 5-7).

Figure 5

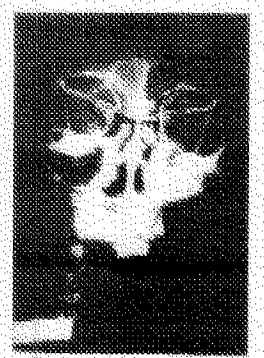


Figure 6

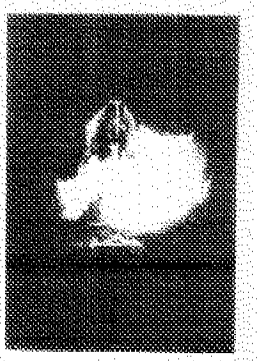
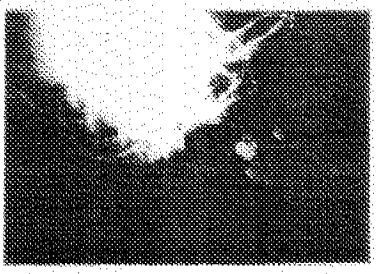


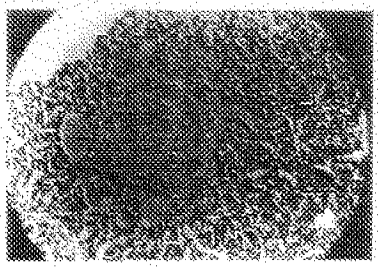
Figure 7



Peripheral blood smear showed a hypochromic and normocytic type of anemia with neutrophilia.

Wedge biopsy of the mass showed a subepithelial neoplasm composed of capillary-sized endothelial-lined channels surrounded by proliferating round to spindle cells. Focal areas showed solid nodules of neoplastic cells with cellularity, pleomorphism and many mitotic figures. Official report was hemangiopericytoma, malignant (fig.8).

Figure 8



After confirmation of the diagnosis and assessment of tumor extent, including the location of the tumor, the structures involved, and the general condition of the patient, the service referred the case to the Radiology Dept. for radiation therapy prior to maxillectomy and tumor debulking. The course of radiotherapy was uneventful in the first three weeks. Marked regression in tumor size and symptoms were noted. Due to radiation mucositis, the patient decided to forego the second half of the course and was lost to follow-up.

Four months later, patient was seen at the emergency room severely anemic and cachectic. Re-evaluation showed progression of tumor with focal areas of necrosis and multiple cervical masses. The anemia was corrected, chest x-ray was read as normal and patient was re-enrolled for radiotherapy (fig. 9-12).

Brainstem Response *(Table 5 and 6)*. A variety of studies demonstrated a better than 90% hit rate for acoustic tumors (see Table 7). The ABR tracings for this patient showed presence of wave 1 is located in the distal (cochlear end) of the eighth cranial nerve while the tumor is located more medial to this site, i.e. near the proximal (brain stem end) of the eighth nerve. A prolongation of wave 5 due to desynchronization may also be apparent while a delay in all of the wave forms may be evident due to compression of the enlarging tumor. Another mechanism involved in the generation of an abnormal ABR is interruption of the blood flow through the internal auditory canal which results in ischemia of the nerve peripheral to the tumor (retrogade degeneration) and also to the cochlea. (See *Table 2* for the expected outcome of audiometric tests in cochlear versus retrocochlear disorders). The summary of these battery of audiometric tests done is detailed in *Table 4.* Vestibular assessment was made via electronystagmography. According to a study in 1989 conducted by Hirsch and Andersdon, ENG is a helpful examination but is too inconsistent to be useful (Table 5). This patient showed a 50% right reduced vestibular response. Imaging at this time would be of limited value if the tumor is confined to the intracanalicular region. Most physicians routinely request for a CT Scan after obtaining abnormal audiometric results to be able to visualize the presence of the tumor in the CPA but this may not be the case. Enhanced CT scans detect 95% of large tumors (>2.5 cm) but small tumors (<1.5 cm) were detected in only 5% (Table 5 and 6). CT with gas cisternography is a more definitive and accurate diagnostic modality for this pathology especially for the small tumors (Table 5 and 6). The advantages of MRI over CT scan include the elimination of bone artifact in the brainstem and temporal bone region, and earlier and more accurate detection of modest soft-tissue masses. These imaging modalities are all expensive and invasive procedures.

Vertigo, as a symptom, would spontaneously resolve due to the compensation of the central vestibular nuclei while dysequilibrium would evolve accompanied by a worsening of the audiologic symptoms as seen in this patient. The tumor could be presumed to have increased in size (2.5 - 3.5 cm) to reach the cisternal stage. The average growth of these tumors are currently thought to be 0.25 - 0.30 cm per year. There is a damage to the vestibular nerve and beginning compression of the brainstem or cerebellum leading to the cerebellar dysfunction evident in this case. During the later part of this stage, a (-) bilateral corneal reflex, as seen in this case, points to involvement of the trigeminal nerve, the first nerve to be affected once the tumor is outside the internal auditory canal. Finally, worsening of the previous symptoms, signs of increased intracranial pressure due to hydrocephalus and lower cranial nerve palsies such as dysarthria and dysphagia points to the third stage of the tumor growth (>3.5 cm), the brainstem compressive stage. The dysphagia may due to compression of lower cranial nerves or due to the thyroid pathology. The bilaterality of symptoms somehow provided a dilemma in the diagnosis. A concrete diagnosis was only given during this late stage of tumor growth. Aside from this chronology of symptoms formulated by Cushing, a thorough neurootologic examination will help in the early diagnosis of acoustic neuroma. Presence of neurological findings such as those presented in this report would strongly suggest that the tumor has extended to the cerebellopontine angle. Diagnosis at an early stage is desirable using the least expensive and accurate strategy available. Audiometric testing would aid in selecting those patients at high risk who are then referred for more definitive diagnostic examinations such as imaging.

Around 4% of acoustic neuromas are bilateral and familial, the hallmark of the dominantly inherited syndrome Neurofibromatosis type - 2, with a defect in the long arm of chromosome 22. Chromosomal studies done revealed a normal 46XX female. The criteria for NF-2 are met by an individual who has (1) bilateral eight nerve masses, (2) a first degree relative with NF-2 and either a unilateral eight nerve mass or two of the following: neurofibroma, fibroma, meningioma, glioma, schwannoma or juvenile subcapsular lenticular opacity. Both NF-1 and NF-2 are neuroectodermal genetic diseases with an autosomal dominant

inheritance pattern and very high degree of penetrance (see *Table 1* for the comparison between NF-1 and NF-2). NF-1 are diagnosed at birth or infancy and almost always accompanied by skin manifestations, Lisch nodules of the iris, plexiform neurofibroma and distinctive osseous lesions; all of which were not appreciated in the patient. NF-2 becomes clinically apparent upon puberty or adulthood. The internal auditory canal shows marked enlargement and bony erosion. NF-2 are larger in size, multilobulated and surround rather than displace facial and cochlear nerves.

Histologically, a neurofibroma begins as an increasing endoneural matrix that spreads Schwann cells apart causing them to become elongated, tortuous and increased in number. A schwannoma, on the other hand, begin as confined local growth that compresses the adjacent axons around its periphery as it expands within the perineurium. Typical microscopic appearance of ANs has two distinct cellular characteristics either Antoni type A (tightly packed) and/or Antoni type B(loosely packed).

Total or near-total removal is much more difficult in bilateral tumors. The best treatment approaches are still being debated. The surgical approaches currently used are: middle cranial fossa, translabyrinthine, suboccipital and combined translabyrinthine-retrosigmoid approaches. Clinical observations suggest though that regrowth is infrequent.

Table I: Comparison Between NF 1 and NF 2 (Otologic Surgery by Brackman)

	NF 1	NF 2
incidence	30/100,000	3/100,000
Age of Onset	1st decade	2nd or 3rd decade
Skin Manifestations		
Cutaneous neurofibromas	95% have >2	Over 30% >1
>5 café au lait spots	Found in most	Rare
Intertriginous freckles	Usually present	Rare
Eye Manifestations		
Lisch nodules	Present in >90%	Rare
Lens abnormalities	Not reported	Postcapsular cataract, >50%
Bone abnormalities	Common	
CNS Tumors		
AN	None documented	Bilateral in 96%
Other brain tumors	Optic glioma 2-15%	9-100%
SC tumors	Occasional	Common

Table II: Expected Outcome of Audiometric Tests in Cochlear Versus Retrocochlear Disorders (Otolaryngology and Head & Neck Surgery by K.J. Lee)

	CHARACTERISTIC FINDINGS	
TEST	COCHLEAR	RETROCOCLEAR
Pure Tone Audiometry	Any configuration	Asymmetrical flat or high frequency
Speech discrimination	Consistent with PTA	Not consistent with PTA
Speech discrimination performance-intensity rollover	Little PI rollover	Marked PI rollover
Diplacusis	Present	Absent
Auditory recruitment		
Alternate binaural loudness balance	Present	Absent
Most comfortable and loudness discomfort level	Low sensation level	Normal or elevated sensation level
Auditory adaptation; tone decay test	Absent or mild	>25 dB from initial threshold
Suprathreshold adaptation test	Perception of tone persists for 60 seconds	Perception of tone fades within 60 seconds
Bekesy audiometry		
Conventional	Type I or II	Type III or IV
Forward-reverse frequency	Overlap of forward-reverse frequency tracings	Separation of tracings
Bekesy comfortable loudness	Overlap of pulse-continuous tracings	Separation of tracings
Impedance audiometry: acoustic	Present at low sensation level: absent with pure tone loss >85 dB	Elevatd thresholds, acoustic reflex decay or absent
Battery test	Positive results indicating cochlear lesions are usually quite consistent	Positive results indicating retrocochlear lesion may be consistent: mixed cochlear-retrocochlear patterns tend to indicate retrocochlear lesions

Table III: Acoustic Reflex Arc

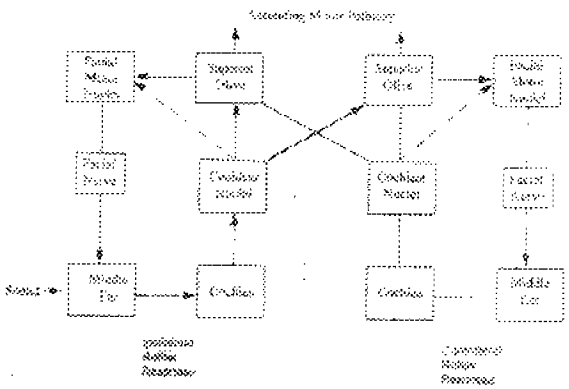


Table IV: Summary of Audiometry Tests Done on the Patient

TEST	COCHLEAR	RETROCOCHLEAR
Pure Tone Audiometry	Equivocal	Equivocal
Speech Discrimination Test		(+)
Tympanogram	Equivocal	Equivocal
Tone Decay		(+)
Acoustic Reflex		(+)
Auditory Brainstem Response		(+)

Table V: Relative Sensitivity of Various Tests in Detecting Acoustic Tumors

	'd'
Posterior fossa cisternography	>5
Computerized Tomography, gas cisternography	>4
Computerized Tomography, metrizanide cisternography	>4
Auditory Brainstem Response	2.9
Computerized Tomography, intravenous enhancement	2.6
Combined Acoustic Threshold/Decay	2
Threshold Tone Decay	1.6
Alternate Binaural Loudness Balance	1.5
Bithermal Caloric	1.5
Bekesy Audiometry	1.4
Short Increment Sensitivity Index	1.4
Plain X-ray	1.3
Speech Discrimination Scores	0.6
Tomography	1.8

Table VI: Receiver Operating Curves (ROC's) for Neurodiagnostic Procedures in Identification of Eight Nerve Pathology

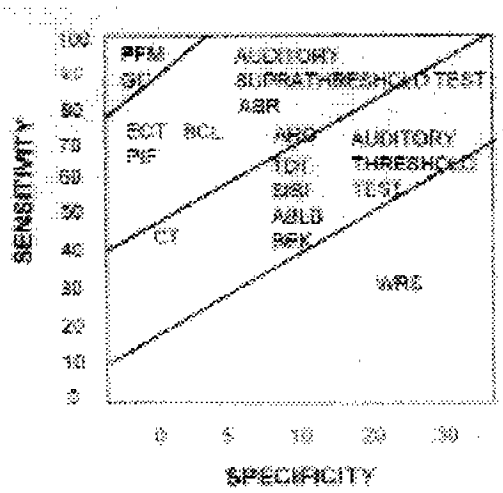


Table VII: Some Major Studies Indicating the Sensitivity of ABR for Confirmed Acoustic Tumors and False Positive Rate as Tested on Various Cochlear Lesions

		Hit Rate	False Positive
Selters and Brackmann	1979	92.7% (n=94)	8% *(n=266)
Clemis and McGee	1979	92.0% (n=28)	33% *(n=115)
Glasscock et al.	1979	98.0% (n=49)	7% *(n=399)
Harker	1980	94.6% (n=36)	9% (n=111)
Eggermont et al.	1980	95.0% (n=36)	
Terkildsen et al.	1981	96.0% (n=56)	9% (n=71)
Bauch et al.	1982	96.0% (n=26)	25% (n=229)

*= approximated

SUMMARY

The case presented has demonstrated the symptoms involved in the disease entity, that of a rare bilateral acoustic neuroma in a female patient. A detailed history, a thorough otologic and neurootologic examination is vital. It is imperative then to mention that in patients presenting with such symptomatology, proper ancillary procedures should be utilized and one should have a systematic and orderly approach regarding the utilization of diagnostic procedures without compromising the patient. A holistic approach, therefore, is emphasized by the general physicians to be able to realize one's limits. This is applicable even to the otolaryngologists who still at present have difficulty in the evaluation and management of such cases.

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COMPARISON OF FINE NEEDLE ASPIRATION BIOPSY AND FROZEN SECTION IN THE DIAGNOSIS OF PAROTID GLAND NEOPLASMS*

JOSE ANGELITO U. HARDILLO, M.D.**
TERESA GLORIA-CRUZ, M.D.**
RAMON ANTONIO B. LOPA, M.D. **
JOSEFINO G. HERNANDEZ, M.D.***

ABSTRACT

This study compared the diagnostic accuracies of preoperative fine needle aspiration biopsy (FNAB) and intraoperative frozen sections (FS) with the histopathologic diagnosis of 52 patients who underwent parotidectomy for parotid tumors at the Department of ORL, UP-PGH from 1993 to 1995. FNAB correctly diagnosed 9/14 malignant tumors (sensitivity of 64%) and 38/38 (specificity of 100%). FS, on the other hand, correctly identified 12/14 malignancies (sensitivity of 86%) and 38/38 benign lesion (specificity of 100%). Accurate histologic diagnosis was made in 46/52 specimen (88%). Error in diagnosis was noted in 5 FNAB and 2 FS readings. Positive predictive values for both diagnostic tests were high at 100%. Over all accuracy was 90% for FNAB and 96% for FS.

Keywords: FNAB, Frozen Section, Parotid Neoplasms

INTRODUCTION

Parotid gland neoplasms are the most common types of salivary gland tumors accounting for approximately 80% of salivary neoplasms. Of these neoplasms, 80% are benign while 20% are malignant.

The surgical therapy of parotid gland neoplasms is complicated by the presence of the facial nerve and its branches which run through its substance forming the so called pes anserinus. For benign lesions, the facial nerve is spared during surgery but for malignant lesions, the decision to preserve or sacrifice the nerve depends on the particular histology and degree of differentiation of the tumor as well as the intraoperative findings. A preoperative histopathologic diagnosis greatly aids in surgical decision making.

The various diagnostic techniques include open incisional wedge biopsy, fine needle aspiration biopsy (FNAB) and frozen section (FS) diagnosis.

FNAB was first developed in the Scandinavian countries during the 1950s. The technique consists of infiltration of a gauge 22 needle into the mass and obtaining a tissue aspirate with the application of negative pressure. The aspirate is then fixed to a glass slide in 95% ethly alcohol. The risks of tumor seeding along the needle tract and facial nerve injury is minimal. However, this technique requires an experienced cytopathologists well versed in salivary gland pathology. The difficulties lie in the not infrequent pleomorphic structure of salivary gland tumors, the possibility that the aspirate obtained is not representative of the tumor and the inexperience of the cytopathologist. Sismains in 1980 reported an 82.8% concurrence between FNAB and final histopathologic diagnosis.

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* 3rd Place, PSO-HNS Analytical Research
December 5, 1995, Hotel Nikko Manila Garden, Makati City
**Resident, Department of Otorhinolaryngology, University of the Philippines-Philippine General Hospital
**Consultant, Department of Otorhinolaryngology, University of the Philippines-Philippine General Hospital

Open incision wedge biopsy is another diagnostic technique available for the surgeon. Its advantage lies in its being able to obtain sufficient tissue for histopathologic diagnosis. Its disadvantage lies in its being an added operation with consequent risks of tumor bleeding, seeding and possible facial nerve injury.

The advantage of intraoperative FS lies in its being able to harvest representative tissue for examination. However, there is always the possibility that a frozen section diagnosis may be ambiguous leaving the surgeon with no choice but to proceed with conservative surgery and wait for the definitive histologic diagnosis.

In comparing these diagnostic, procedures, 52 patients who underwent preoperative FNAB and intraoperative FS of parotid neoplasms were studied to gain more insight on the strengths and weaknesses of these procedures and hopefully resolve the uncertainties in their use in the diagnosis of parotid gland neoplasms.

SPECIFIC OBJECTIVE

This study aims to determine the sensitivity, specificity, accuracy and predictive value of FNAB and FS compared with the final histopathologic report in the diagnosis of parotid gland tumors.

MATERIAL AND METHODS

A total of 52 patients requiring parotid surgery either for a presumptively benign or malignant lesion were included in this study. On initial consult, a complete history and physical examination was done with emphasis on the ENT examination. FNAB was performed after securing informed consent. The patients then underwent definitive parotid surgery guided by the clinical and histologic diagnosis provided by the FNAB. Intraoperatively, representative specimens were sent for FS. The entire surgical specimen were sent for definitive histopathologic examinations independently conducted by two pathologists blinded to the FNAB and FS diagnoses. FNAB results were grouped into benign, malignant and suspicious for malignancy. The lesions classified as suspicious for malignancy were considered malignant in the statistical analysis. FS results were classified as benign or malignant. The sensitivity, specificity, accuracy, and predictive values of FNAB and FS were obtained by comparing them with the final histopathologic diagnosis. Sensitivity is defined as the probability that a malignant neoplasm will be identified given that a patient has cancer as determined by the final histopathologic examination (True Positives / [Truepositives + False Negatives]). Specificity is defined as the probability that a benign lesion will be diagnosed given that the patient does not have cancer (True Negatives / [False positives + True Negatives]). Positive predictive value is the probability that a person has a malignant neoplasm given that the test is positive for malignant neoplasm (True positive / [True positive + False positive]). Negative predictive value is the probability that the patient does not have cancer given that the test is negative (True negative / [True Negative + False Negative]). The overall accuracy represents the combination of both sensitivity and specificity (True positives + true negatives / [True positives + false positives + False negatives + True negatives]).

RESULTS

Demographic Data:

A total of 52 patients were included in this study. Their ages ranged from 14 to 78 with an average of 46 years. The male:female ratio was 24:28. The surgical procedures performed were superficial parotidectomy, subtotal parotidectomy and total parotidectomy with or without facial nerve sacrifice.

FNAB and FS Accuracy:

FNAB specimens were obtained in 52 patients. As shown in Table 1, 9 of 14 malignant tumors (sensitivity of 64%) and 38 of 38 benign lesions (specificity of 100%) were correctly identified. Exact histologic diagnosis was made in 47 out of 52 specimen (78%). The overall accuracy of FNAB which is defined in this particular study as its ability to correctly identify benign and malignant lesions was 90% (Table2).

Table 1. Correlation between FNAB and Final Histopath

		FNAB	
Final Histopath	Number of Cases	Malignant	Benign
Malignant	(14)	9	5
Benign	(38)	0	38
Total	(52)	9	43

Table 2. Diagnostic Accuracy of FNAB and FS

	FNAB	FS
Accuracy	90%	96%
Sensitivity	64%	86%
Specificity	100%	100%
Positive Predictive Value	100%	100%
Negative Predictive Value	88%	95%
Exact tissue Diagnosis	78%	88%

Five malignant lesions were incorrectly identified and these included three muco-epidermoid carcinomas, one malignant mixed tumor and one squamous cell carcinoma all of which were read as pleomorphic adenoma on FNAB (Table 3). The negative predictive value was 88% (table 2). In no instance did a biopsy reading of malignancy turn out to be benign on histopathologic examination, yielding a very high positive predictive value of 100% (Table2).

Table 3. Error Analysis of FNAB

False Negative	
FNAB	Final Histopath
3 Benign mixed tumor	Mucoepidermoid carcinoma
1 Benign mixed tumor	malignant mixed tumor
1 Benign mixed tumor	Adenoid cyctic carcinoma
False Positive	
None	

When FS results were analyzed, twelve of fourteen malignant tumors (sensitivity of 86%) and 38 of 38 benign lesions (specificity of 100%) were correctly identified (table4). Overall accuracy of frozen section was high at 96%. Exact histologic diagnosis was made in 50 out of 52 specimen (88%). (Table2).

Error in diagnosis was made in two mucoepidermoid carcinomas which were thought to be pleomorphic adenomas (Negative predictive value of 95%). These two specimens were also incorrectly identified by FNAB (table5). Again in no instance did a reading of malignancy turn out to be benign on final histopathologic examination (Positive predictive value of 100%).

Table 4. Correlation of Frozen Section and Final Histopath

		FS	
Final Histopath	Number of Cases	Malignant	Benign
Malignant	(14)	12	2
Benign	(38)	0	38
Total	(52)	12	40

Table 5. Error Analysis of Frozen Section Biopsy

False Negatives	
Frozen Section Biopsy	Final Histopath
2 Benign mixed tumor	Mucoepidermoid carcinoma
False Positives	
None	

Comparing these statistics, it appears that the overall accuracy of both diagnostic modalities are high at 90% and 96% for FNAB and FS, respectively. FNAB, however showed a slightly higher false negative rate as reflected in its lower sensitivity of 64% compared to that of FS having a sensitivity of 86%, suggesting that between the two procedures FS has a higher ability to detect malignancy.

Both FNAB and Frozen Section showed 100% specificity and 100% positive predictive value. This is explained by the absence of any preoperative reading of malignancy that was eventually read as benign on final histopathologic examination for this particular series. The negative predictive value of FNAB (88%) was lower than that of FS (95%) as more FNAB specimens (total of five) that were read as benign turned out to be malignant on final histopath as compared to two incorrectly diagnosed FS specimens.

DISCUSSION

This study aims to gain some insights into the strengths and weaknesses of FNAB and Frozen Section Biopsy particularly the accuracy of these modalities in the diagnosis of parotid gland neoplasms. Both diagnostic modalities require considerable skill in performing the procedure and in evaluating the cytologic material. Diagnosis of benign lesions such as benign mixed tumors and mucoepidermoid carcinoma has

been based on the identification of cytologic features and architecture such as the presence of epithelial and mesenchymal elements for benign mixed tumors and the presence of mixed epidermoid and mucus secreting cells for mucoepidermoid carcinomas. These diagnostic criteria are still followed despite the fact that these features may not always be displayed consistently in either FNAB or FS specimens. The pathologist is often forced to utilize these diagnostic criteria which have been established for paraffin sections. Also, decisions as to whether there is capsular invasion or vascular invasion, which already provoke controversy in paraffin sections, are amplified in FNAB and FS specimens. Despite these limitations, the present study indicates that both modalities have high overall accuracy rates. The overall accuracy of FNAB was 90% with 100% positive predictive value and 88% negative predictive value. Sensitivity was 64% and specificity was very high at 100%. These results compare well with other series which reported overall accuracy rates of beyond 85%. The present study is comparable in number of patients and results with the series of Cross et al whose overall accuracy was 96% and whose positive and negative predictive values were 100% and 95%.

Both FNAB and FS, as shown in previous studies, are more accurate in the evaluation of benign salivary gland tumors. In this series, a 100% specificity and 100% positive predictive values were obtained for both procedures. This clearly suggests that benign parotid lesions would rarely be mistaken for a malignancy using either of the procedure. As such a malignancy detected by FNAB and or FS can be regarded as true and correct. A negative result, however, is more problematic. Error analysis of both modalities showed a tendency to under report malignancy. The same trend has been observed in other studies for mucoepidermoid carcinoma and acinic cell carcinomas. *

The failure of both FNAB and FS to identify these tumors can be attributed to at least two factors, namely, grading--- mucoepidermoid and acinic cell carcinomas can be high or low grade and the cytologic diagnosis of malignancy in low grade tumors is less likely--- and invasiveness as a measure of malignancy, since capsular and/or vascular invasion is already difficult to verify in paraffin sections and more so in FNAB and FS. Between the two procedures, FNAB showed a higher false negative rate thus a higher tendency to miss a malignancy. The complexity and variety of the morphologic patterns seen in salivary gland tumors and the minute amounts of FNAB specimens contribute to the so called sampling error that is inherent to the procedure.

Error analysis of FS showed two false negative diagnoses. To determine whether the FS reading resulted in a less than adequate surgery, these two cases, despite the FS results, both underwent total parotidectomy suggesting that intraoperative clinical impression still plays a role in determining the extent of surgery.

CONCLUSION AND RECOMMENDATION

One of the most pertinent question that should be answered by the study is whether information gained by FNAB and/or FS is of any significance in the management of patients with parotid neoplasms. This experience indicates that FNAB results should not only be used as a basis for operating or not but should also be employed in intraoperative decision making. It is further recommended, based on this high positive predictive value, that intraoperative FS can be disregarded given a preoperative needle aspiration biopsy that is positive for malignancy. However, because of the higher tendency of the FNAB to miss malignancy as seen in its lower negative predictive value, the use of FS is recommended in cases which are benign on FNAB but are suspiciously malignant clinically or intraoperatively.

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EPISTAXIS AND HEADACHE IN A PATIENT WITH NORMAL ENT PHYSICAL EXAMINATION FINDINGS (A CASE OF SPHENOIDAL CARCINOMA)*

JAIME M. TALAG, M.D.**
JOSEFINO G. HERNANDEZ, M.D.***

ABSTRACT

This paper reports a case of recurrent epistaxis in a 58 year old male with associated excruciating headache, right sided, frontal in location. Initial consult with an ophthalmologists revealed essentially normal findings. Sinusitis was the impression of an internist and neurologist but ENT examination revealed unremarkable findings. Two weeks PTA, ptosis of the right eye and right sided facial numbness developed and an MRI of the brain was requested. MRI revealed enhancing mass in the central skull base. Considerations were chondrosarcoma; chondroma metastatic; sphenoid sinusitis. CT scan of the paranasal sinuses revealed sphenoid sinus mass, probably carcinoma with contiguous extension to the cavernous sinus. A right sphenoid biopsy via nasal endoscopy was performed which documented the diagnosis of squamous cell carcinoma, sphenoid, moderately differentiated.

Presently, the patient is undergoing radiotherapy and chemotherapy with resultant improvement of ptosis and limitation of ocular movement.

Keywords: Epistaxis, excruciating right sided headache, skull base new growth sphenoid carcinoma

INTRODUCTION

Some symptoms are commonly of benign etiology such that physicians would rather think that patients having these symptoms are afflicted with benign problems rather than a dreaded malignancy. In many instances, physicians would tend to disregard the patients complaints even if not all the diagnostic possibilities are exhausted. It is, therefore, the objective of this paper to increase the doctors awareness that serious pathologies may exist in patients complaining of common symptoms even if physical examination findings are negative. This is one such case.

CASE REPORT

This is a case of a 58 year old male, who presented with excruciating headache. Two years PTA patient developed on and off epistaxis, amounting to approximately 1 tsp. per episode which stopped spontaneously. Five months PTA patient consulted an otolaryngologist and patient was cleared. Two months PTA severe excruciating right sided frontal headache started to develop lasting for 2-3 hours which spontaneously disappeared even without the intake of medications. Persistence of the headache prompted patient to consult an ophthalmologist whose findings were essentially normal. Consult with an internist was made and diagnosis was sinus infection. Patient was prescribed medications which however, afforded no relief. Three weeks PTA patient consulted a neurologist who also diagnosed it as sinusitis and advised nasal irrigation. Consult with an EENT specialist, whose findings were unremarkable, was made and the prescribed oral medications temporarily resolved the headache.

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April 7, 1997, Subic International Hotel, Olongapo City
**Resident, Department of Otorhinolaryngology, Medical Center Manila
***Consultant, Department of Otorhinolaryngology, Medical Center Manila

Two weeks PTA, upon waking up patient noted presence of ptosis on the right and right sided facial numbness. The EENT specialist gave steroids and requested a MRI of the eye but a doctor relative of the patient suggested an MRI of the brain instead since patient is also suffering from severe headache. The EENT specialist acceded. The MRI revealed an enhancing mass in the central skull base to consider newgrowth as in chondrosarcoma, chordoma, metastasis. Another possibility is an inflammatory process involving the sphenoid sinus. Patient was then referred to this service and was advised to have CT scan of the paranasal sinuses which revealed sphenoid sinus mass, carcinoma with contiguous extension to the cavernous sinus and was subsequently admitted.

On physical examination, ophthalmologic findings revealed ptosis of the right, pupil dilated 5 mm, non reactive to light, visual acuity of 20/30. There was limitation of movement in all quadrants and fundoscopic examination was essentially normal. There were normal findings in the left eye, and with essentially normal ENT findings.

OPERATIVE NOTES

Patient underwent right sphenoid biopsy via nasal endoscopy. Nasal findings were essentially normal except for slight mucosal bulge at the upper septum on the right side. Right anterior sphenoid wall is unremarkable. The posterior 1/3 of the middle turbine was removed in accordance with the Wigand approach to the sphenoid sinus. The anterior sphenoid wall was opened. A solid mass was noted to be friable. There was mild to moderate bleeding. Nasal packing was done.

HISTOPATHOLOGICAL RESULT

Squamous cell carcinoma, moderately differentiated (Sphenoid)

DISCUSSION

It is true that a big percentage of epistaxis is of benign etiology. More common causes of epistaxis include trauma, sinus infection as well as hypertension. All these causes are not present in the patient, who presented with a 2 year duration of on and off epistaxis which stops spontaneously. Nasopharyngeal carcinoma is also a possibility. However, posterior rhinoscopy did not show any lesion. A nasopharyngeal carcinoma resulting in epistaxis should be large enough to be visualized. Therefore, in the absence of a nasopharyngeal lesion, NPCA could be ruled out. But the 2 year duration of epistaxis should be a cause for alarm. Fungal sinusitis and paranasal sinus carcinoma can present similarly with epistaxis, and, as long as there is no bone involvement, physical examination will be essentially normal. Radiologic evaluation could have provided important information about the sinuses at an earlier time. And haziness of the sphenoid sinus alone in the absence of problems on the other sinuses, should point to the possibility of a serious pathology.

Two months PTA, the patient started to develop excruciating right sided headache. Consult with an ophthalmologist likewise cleared the patient of any eye pathology. The right sided excruciating headache persisted which prompted consults with an internist and a neurologist. With no localizing sign, the neurologist cleared the patient and advised no radiologic evaluation even though the problem was attributed to a sinus infection. Headache could be secondary to a number of causes from a benign tension headache to a formidable malignancy. In this patient, the lesion initially involved the sphenoid sinus and definitely no neurologic sign and symptom was present. After progressing in size and resulting in bone destruction, the barrier to its extension intracranially has been destroyed. The excruciating headache could be secondary to involvement of the dura. Plain sphenoid sinusitis can result in headache usually occipital but definitely less severe. The presence of the excruciating headache inferred that problem could be something else and not a simple case of sphenoiditis.

It would be advisable that, in patients with seemingly benign symptoms, care should be done to exhaustively evaluate these symptoms especially when physical examination reveal no other abnormality. Radiologic evaluation could show haziness of the sinus involved. A CT

Table 4 (see appendix) gives the anthropometric data of snorers and non-snorers. The mean values obtained from measurements of the oropharyngeal structures showed good correlation with snoring. Of the six anthropometric variables, only four were found to differ significantly between snorers and non-snorers. These include: 1) uvula length (Ul), 2) distance from soft palate to posterior pharyngeal wall (UP), 3) distance between anterior pillars (AP), and 4) distance between posterior pillars (P). There was no correlation between the patients demographic data and the anthropometric measurements.

Table 4. Anthropometric Data of Snorers and Non-snorers(x+SD)

Anthropometric Parameter(mm)	Non-snorer Male	Fe male	Snorer Male	Fe male
Soft Palate SP	32.87+ 3.37	30.18+ 3.72	33.64+ 4.13	33.47 + 3.55
Uvulalength8Ul width Uw	11.71+ 1.27 9.00+ 1.09			12.12 + 2.59
Distance bet. anterior pillars *AP	32.98+ 2.57	32.48+ 3.11	31.31+ 4.30	30.06 + 2.46
Distance bet posterior pillars *PP	2642+ 3.87	24.45+ 3.75	21.13+ 4.63	20.24 + 5.02
Soft palate-posterior pharyngeal wall *UP	12.45+ 2.37	12.27+ 2.08	9.85+ 2.24	9.35+ 2.29

*Significant difference between snorers and non-snorers=p<.05

Linear regression formulae were derived for these four parameters that strongly correlated with snoring (Table5). The patients measurement for the anthropometric variable was represented as x and the individual with computed y values of 1 to 1.5 was considered a non-snorer and that with 1.51 to 2 was labeled a snorer. From these linear regression equations, numerical values for the corresponding neck and oropharyngeal measurements were computed (Table6) and each patient was classified as a snorer accordingly.

Table 5. Linear Regression Formulae Derived to Predict Snoring

Anthropometric Parameters	Male	Female
Uvula lenght Ul	y=0.0141 + 0.1125x	y=0.1814 +0.1037x
Distancebet. anteriorpillars AP	y=2.513 +(-0.034)x	y=2.8946 +(-0.051)x
Distancebet. posteriorpillars PP	y=2.7074 + (-0.053)x	y=2.2592 +(-0.0421)x
Softpalate-posterior pharyngealwall UP	y=2.456 +(-0.0916)x	y=2.373 + (-0.0954)x

x= patient's measurement for the anthropometric variable
y= 1to 1.50 (non-snorer), 1.51 to 2 (snorer)

Table 6. Numerical Values for the Anthropometric Parameters to Predict Snorers

Anthropometric Parameters	Numerical Values(mm) Male	Female
Uvula length Ul	>14	>13
Distance bet anterior pillars AP	<29	<28
Distance bet. posterior pillars PP	<23	<19

Soft Palate-posterior pharyngeal wall UP <11 <10

In Phase 2 of the study, the sentivity, specificity, positive and negative predictive values were computed for each formula and corresponding numerical value in both sexes in 20 snorers and 20 non-snorers (Table7). All the derived linear equations and values for the four parameters had high specificity and positive predictive values, with those for Ul, AP and PP attaining almost 100% specificity and positive predictive values. However, poor sensitivity value was noted in the formula and value for the distance between anterior pillars. Therefore, the derived equations and numerical guides correctly predicted non-snorers in most cases and correctly distinguished true snorers.

Table 7. Sensitivity, Specificity, Positive and Negative Predictive Values of Derived Linear Regression Equations

Anthropometric Parameter	Sensitivity (%)		Specificity (%)		(+)Pred. Val(%)		(-) Pred. Val. (%)	
	M	F	M	F	M	F	M	F
Uvula length Ul	90	50	100	90	100	80	90	60
Distance bet. anterior pillars AP	10	10	100	100	100	100	50	50
Distance bet. posterior pillars PP	70	10	100	100	100	100	75	50
Soft palate to posterior pharyngeal wall UP	60	50	90	90	85	83	69	64

In the snorer group, no subject was correctly predicted to be a snorer in all four out of four parameters. Table 8 (see appendix) enumerates the combined anthropometric variables that correctly predicted snorers and non-snorers and their frequency distribution. The parameter Ul alone gave the most number of correct predictions (20%) with each of the combined Ul+UP and Ul+PP yielding 15% correct predictions. Hence, the most common sites of obstruction from the measured oropharyngeal dimensions are uvula (70%)

and the area from the soft palate to posterior pharyngeal wall (50%). Most (90%) of the non-snorers were correctly predicted in all four out of four parameters.

Table 8. Frequency Distribution of Combined Anthropometric Variables

Anthropometric Variable	Frequency
UI	4(20%)
UI+UP	3(15%)
PP+UP	2(10%)
UP	2(10%)
UI+AP+UP	1(5%)
UI+PP	3(15%)
UI+PP+UP	2(10%)
UI+AP+PP	1(5%)
0	2(1)%
Total	20

DISCUSSION

Normal breathing results from nerve signals that come from the brainstem causing the diaphragm, the chestwall or intercostal muscles and pharyngeal muscles to contract. These signals result in muscle contraction of the diaphragm and intercostal muscles to increase chest contraction of pharyngeal muscles that hold the pharynx open.[6]

The brain which is sensitive to changes in O_2 and CO_2 levels in the blood during waking hours becomes less sensitive during sleep.[7] As a result, muscles become relaxed but remain sufficiently active to maintain ventilation. The muscles around the pharynx relax making the walls floppy and collapsible. This already narrowed pharynx plus an increase in the negative pressure when breathing in may suck the floppy walls making it narrower or partially blocked generating the noise known as snoring. Fairbanks and Fujita noted that the noise in snoring and OSA is generated by air turbulence within the collapsible part of the pharynx[8,9]. Rice traced its exact source to the vibrating soft palate and posterior tonsillar pillars.[10] Compliance of the walls of the pharyngeal airway is quite variable, depending on local factors and most important, the tone of the musculature of the pharynx. Any lesion that can increase the resistance to airflow would necessarily increase the amount of effort required to maintain airflow. Remembering the Bernoulli effect, this would increase the negative intraluminal pressure further and the airway then tends to collapse.

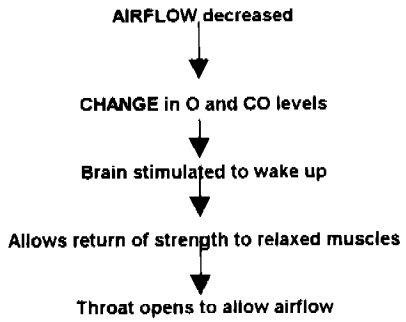
Snoring is common, estimated to be present in as high as 25-45% of the population.[8] Various authors noted that 20% of males and 5% of females snore at the age of 30 years with a dramatic increase to 60% males and 40% females who snore at 60 years of age.[10] In this study, 7.7% of males and 5.9% of females were found to snore at the age of 30 years and these proportions increased to 41% of males and 41.2% of females who snore at the 6th decade of life. Neither a symbol of good health nor a physiological respiratory sound, snoring describes a partial narrowing of the upper airway particularly the oropharynx, and frequently involves the velopharyngeal sphincter and tongue base.[3,4,5] As part of a disease continuum known as obstructive sleep apnea (OSA), snoring is regularly associated with OSA patients (89.6%) from the Sleep Disorders Laboratory of St. Luke's Medical Center, Phil. and 94-100%[11] from foreign literatures diagnosed by polysomnography.

OSA signifies a severe narrowing of the pharynx resulting in a complete block to breathing during sleep. It is defined as a cessation of airflow at the nostrils and mouth for at least 10 seconds[7] and is diagnosed by polysomnography[12,13] OSA is measured by apnea index which is defined as the number of apnea per hour of sleep and where a finding of apnea index > 5 is diagnostic. Clinical manifestations include snoring, excessive daytime sleepiness (EDS), apneas/choking, morning headache, intellectual deterioration, personality changes, behavioral disorders, restless sleep, bedwetting, breathlessness at night or day, decreased sexual activity, and heartburn.

Obstruction typically begins in the oropharynx with the tongue contacting the soft palate and posterior pharyngeal wall followed by progressive collapse of lower pharyngeal airway. When airflow is decreased or absent for a few seconds, the body's defense mechanisms are alerted as the changes in the blood O_2 and CO_2 levels stimulate the brain to cause arousal from sleep and increase ventilation. (Figure 4). Apnea-arousal pattern disrupts a night's sleep. If untreated or unrecognized, repetitive nocturnal O_2 desaturation can

potentially produce significant social consequences and serious medical complications or even death.[1,2,3,15] The medical conditions associated with snoring include hypertension, myocardial infarction, increased risk of brainnfarction, cor pulmonale, gastroesophageal reflux, nocturnalngina, cardiac, arrhythmia, sudden death during sleep, and OSA.

Figure 4. Diagram Showing Effect of O_2 and CO_2 Changes



Predisposing factors commonly implicated for worsening an already existing upper airway abnormality during sleep include:

1. endocrine disorders such hypothyroidism or acromegaly
2. obesity particularly around the neck
3. change in muscle tone which may be age-related reduction in muscle tone or due to neuromuscular disorder, or to CNS depressants
4. upper airway abnormality which may involve air passage anywhere from the nose to the pharynx

Obesity is the major disorder associated with snoring and OSA. Obese people are found to be three times more likely to snore.[16] Thawley observed that approximately 70% of patients with snoring and OSA are 15% heavier than their ideal body weights and a significant number have short, thick necks with excessive cervical tissue. The results of this study reveal that about 57% of snorers were more than 15% over their IBW, of which 14% were morbidly obese, i.e. twice the IBW. Frequently, these patients have an excessive amount of tissue in the oropharynx characterized by a low-hanging redundant palate, large tonsils, excessive pharyngeal folds, and a small oropharyngeal orifice. Commonly, the tongue simply appears too large for the mouth in these patients.

Aside from thyroid hormones, sex hormones are believed to play an important role in the development of snoring and OSA. Sixty-nine percent of snorers in this investigation were men attesting to the fact that not only does snoring and OSA occur predominantly in men, but high levels of testosterone have also been associated with its development. This is due to the hormone's effect on muscle strength and fat distribution wherein men tend to gain weight around their neck and abdomen while women around their hips. In contrast, progesterone which is known to stimulate ventilation may contribute to increased frequency of disordered breathing during sleep in premenopausal women.[7,16]

Change in muscle tone could be an age-related reduction such that patient with mild snoring may advance to severe snoring or even to OSA through a deterioration of competency of protective neurophysiological mechanism. Drinking alcohol and taking sedatives cause greater muscle relaxation during sleep than normally occurs and, hence, can result in an abnormally collapsible airway . It also decreases arousal responses and when excessive may also damage nerve. These may also explain the reason for an increased risk of snoring in males especially in heavy drinkers.

Upper airway abnormality may involve multiple sites from the nose down to the hypopharynx. The sites most commonly documented have been located in the oropharynx and frequently involves the velopharyngeal sphincter and the tongue base.[3,4,5] Clinical disorders associated with structural narrowing of the airway include nasal problems, adenotonsillar hypertrophy, low-hanging soft palate, long edematous uvula, prominent tongue, pharyngeal neoplasm, macroglossia and micrognathia which clearly predispose a person to the development of snoring.

Evaluation of the possible causes of snoring and OSA should include examination of the oral, nasal, pharyngeal, laryngeal and neck areas. Routine procedures to assess potential sites of

airway compromise currently used in most centers include:

1. complete otorhinolaryngological history and physical examination
2. fiberoptic nasopharyngolaryngoscopy with Mueller maneuver
3. Cephalometric analysis which includes the upper airway, soft tissue x-rays in the upright and supine position during the inspiratory and expiratory phase of respiration (Dynamic Cephalometry) CT Scan may also be used, though, in selective cases only since it is too expensive for a routine procedure.

The treatment of the health issues in snoring patients may be categorized into surgical and non-surgical modes. At present, there are at least 300 devices in the United States Patent Office claiming to cure or eliminate snoring, but the success rates of these devices have been estimated to be rather low.[15] (Table 9) outlines the non-surgical treatment options for snoring and OSA.

Table 9. Non-surgical Treatment Options for Snoring.[14]

1.	Exercise
2.	Weight loss
3.	Elevation of the head of the bed
4.	Avoidance of alcohol and other sedating drugs
5.	Ear plugs for bed partners
6.	Non-sedating nasal decongestants
7.	Dental appliances to reposition tongue and or mandible
8.	CPAP
9.	Nasopharyngeal tubes or catheters
10.	Anti-snore pillow
11.	Tennis ball sewn into the back of the night wear
12.	Negative reinforcers such as electric shocks, vibrating device lights, tape recording feedback of the snoring sounds.

Surgery as a treatment of snoring aims to provide an improved pharyngeal airway by eliminating sources of obstruction responsible for generating the snoring sound. Surgical treatment options varies according to the patients needs and may include 1) nasal surgery for polyp, septal deviation, or enlarged turbine, 2) tonsillectomy and/or adenoidectomy 3) tracheostomy, 4) uvulopalatopharyngoplasty (UPPP), and recently, 5) Laser Assisted Uvulo Plasty (LAUP).

The pre-operative evaluation of upper airway abnormalities is vital in the selection of the appropriate surgical procedure for effective control of snoring and OSA. Since its introduction in 1952 by Ikematsu,[17] uvulopalatopharyngoplasty (UPPP) has been demonstrated to effectively treat approximately 50% of unselected cases with snoring and OSA. The procedure involves the partial excision of the soft palate and uvula (Figure 5). The resection of the soft tissues is extended to the tonsils or the tonsillar bed together with the anterior pillars. The posterior pillars are preserved and mucosal closure is done with absorbable sutures. Efforts have been made to identify preoperatively those likely to benefit from the procedure and prior authors noted its effectiveness in treating snoring in as high as 90% in those whose major airway compromise is in the oropharynx.[15] The failure of uvulopalatopharyngoplasty to correct or treat snoring in some of these cases underscores the fact that though the velopharyngeal sphincter is the most common site of obstruction, other sites in the oropharynx may be responsible and must be considered. More importantly, it may be due to over-or under- estimation of margin of resection.

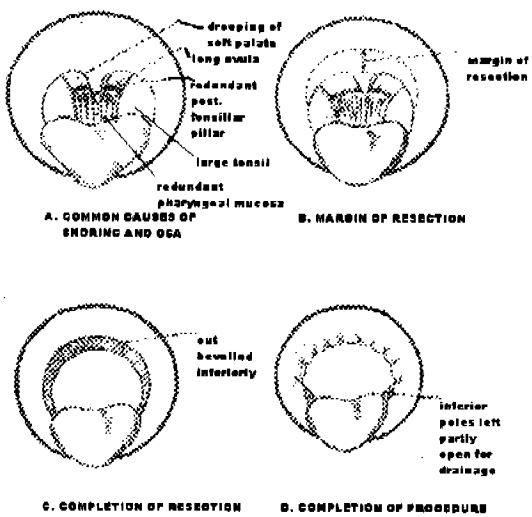


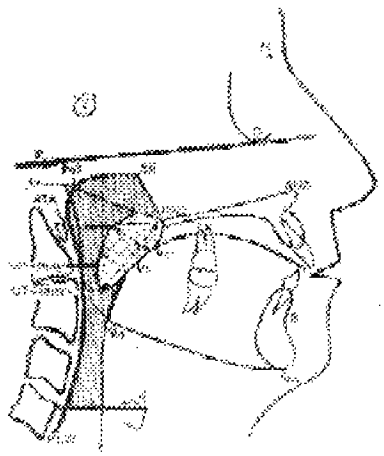
Figure 5. Uvulopalatopharyngoplasty (UPPP)

To date, the most promising predictive evaluation technique yet reported is direct endoscopic observation of airway collapse during Mueller maneuver. Mueller maneuver is a forced inspiratory effort with the patient's mouth and nose closed. Upper airway observation by flexible fiberoptic endoscope during Mueller maneuver is

found to be helpful in obtaining qualitative information regarding the diameter of the airway at the velopharyngeal sphincter and tongue base. Though it is difficult to provide quantitative measures in using this technique, it is nonetheless an important diagnostic procedure prior to palatopharyngoplasty (PPP) as it enables the surgeon to directly visualize at critical sites.[9,18]

Cephalometric studies as predictors of patients who might not respond to UPPP due to lower airway obstruction have been reported by several authors. Riley and co-workers have stated that cephalometric analysis by x-ray studies (Figure 6) represents the best evaluation of possible airway obstruction at and below the level of the tongue base. A low position of the hyoid bone measured cephalometrically correlated well with poor response to PPP for snoring and OSA. The distance from the tongue base to posterior pharyngeal wall was evaluated and the pharyngeal airspace was noted to be smaller in patients who continued to have OSA following PPP. Cephalometric studies clearly show the relationship between position of structures in the patient and the narrowing of pharyngeal airspace which may result from abnormalities of craniofacial skeleton and hyoid bone.

Figure 6. Cephalometry



In addition to endoscopic observation of airway collapse and cephalometric studies, a simple and practical diagnostic adjunct is described in this investigation. Measurement of certain oropharyngeal structures with a stainless steel two-prong caliper demonstrated four anthropometric variables that were significantly different between snorers and non-snorers, namely: 1) uvula length, 2) distance from sift palate to posterior pharyngeal wall, 3) distance between the anterior pillars, and 4) distance between the posterior pillars. There was no correlation between patient's demographic data and the anthropometric parameters inspite of the observed age, sex, and weight predilection of snorers.

Numerical values were derived from the linear regression for these four parameters (Table 5) separately for both sexes due to known anatomical differences. This not only allowed classification of subjects into snorers and non-snorers but also narrowed down the possible sites of oropharyngeal obstruction to the most probable ones. As was documented in various foreign literature, this study revealed that the most common site of obstruction involved the velopharyngeal sphincter, namely the uvula (70%) and the area between the soft palate and posterior pharyngeal wall (50%). Two out of the 20 snorers were not predicted to be snorers in any of the four parameters. This may be attributed to a different cause of obstruction other than the four anthropometric variables measured such as narrowed distance between tongue base and posterior pharyngeal wall. This parameter was not measured since depressing the tongue would give inaccurate values. With these anthropometric data, pre-operative measurements may then serve as a guide to the design and planning of the site and extent of the surgical procedure.

CONCLUSIONS AND RECOMMENDATIONS

In conclusion, the authors recommend a simple and practical office procedure that may serve as an adjunct to currently existing tools in distinguishing snorers from non-snorers and in localizing the probable sites of oropharyngeal obstruction. Further investigation comparing these anthropometric parameters in the upright and supine positions is suggested since a decrease in anteroposterior airway size in

supine position has been demonstrated to yield more information regarding possible airway compromise during sleep. Also, the use of the derived numerical values as a perioperative guide to the extent of surgical resection is a promising aspect that must be studied.

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BILATERAL ACOUSTIC NEUROMA: A REPORT OF A CASE*

CLYDINE MARIA ANTONETTE C. GUEVARA, M.D.**
MARIO S. ZAVALLA, M.D.**
FELIPE FEDERICO O. PIO, M.D.**
JAIME ANTHONY A. ARZADON IV, M.D.**
ANGIE E. MONTEIRO, M.D.**
CARLOS P. REYES, M.D.***
NORBERTO V. MARTINEZ, M.D.***

ABSTRACT

Any unilateral hearing loss, tinnitus and vertigo is an acoustic neuroma unless proven otherwise. One should maintain such a conviction in order not to miss its diagnosis. Occasionally, the dilemma is compounded when the tumor occurs bilaterally as seen in 5% of cases. However, diagnosis can be arrived at by performing audiologic studies which are readily available. Likewise, imaging techniques have made it possible to document suspected lesions. A 20 year old female with symptoms of bilateral tinnitus, hearing loss and vertigo is discussed. Neurotologic procedures confirmed that the patient has bilateral acoustic neuroma. A systematic and rational approach on arriving at the diagnosis is presented.

Keywords: Acoustic Neuroma, Vertigo

INTRODUCTION

Accurate identification of an acoustic nerve tumor is among the most formidable diagnostic problems facing the otorhinolaryngologist. Although classic symptoms of hearing loss, tinnitus and vertigo have been well documented, only few patients fit into the expected picture. Therefore, the clinician must be made aware of diagnostic misadventures such as the case presented. The bilateral presentation of symptoms may have confused the physicians and caused a delay in the proper diagnosis. Systematic evaluation of eighth nerve lesions through audiologic and vestibular evaluation constitutes an important aspect in the diagnostic regimen for acoustic neuromas. This case will show the clinician the possibility of an atypical presentation of acoustic neuromas, the importance of a battery of audiometric tests in early diagnosis and, therefore, earlier management of acoustic neuromas.

CASE REPORT

Three years PTA, Vanessa M., a 20 year old female noted tinnitus and hearing loss on both ears accompanied by pain of the right jaw. A general practitioner prescribed Carbamazepine and Betahistine which afforded no relief of symptoms. No diagnosis was given and patient was lost to follow-up. Three months later, vertigo described as a whirling sensation of the surroundings developed. Consult with an ENT was made and given Flunnarizine and Astemizole which afforded temporary relief of the vertigo but no audiologic work-ups were requested. At about this time, an anterior neck mass developed for which diagnosis of *Diffuse Non-Toxic Goiter* was given and patient was prescribed Levothyroxine. One year PTA, patient noted gait problems presenting as a sense of imbalance when walking, in addition to the previous symptoms. There were concomitant symptoms of palpitations, easy

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*2nd Place, PSOHNS Clinical Case Report Contest
April 7, 1995, Subic International Hotel, Olongapo City
**Resident, Department of Otorhinolaryngology, Sto. Tomas University Hospital
***Consultant, Department of Otorhinolaryngology, Sto. Tomas University Hospital

fatigability, fine tremors, weight loss despite a good appetite, difficulty of swallowing solids and a five month amenorrhea. A different general practitioner advised that Levothyroxine be discontinued. The gait problem as well as the symptoms of vertigo, tinnitus and hearing loss were attributed to the excessive use of Levothyroxine. Despite the clinical presentation, no work-ups whatsoever were requested previously until 4 months PTA, when slurring of speech developed. A neurosurgeon, in turn, immediately requested for a CT Scan which revealed a *Bilateral Acoustic Schwannoma*, and was advised surgery. Because of the morbidity of the said operation, a second opinion was sought.

On admission, patient demonstrated signs of hyperthyroidism and had a notable anterior neck mass. Neurologic examination revealed an ataxic speech, a drunken gait, dysdiadochokinesia and dysmetria. There was a 25% sensory deficit over right half of the face and a hyperactive reflex was elicited. Spontaneous and gaze nystagmus with an absent corneal reflex on both eyes was noted. The gag was not elicited.

Vestibular function tests showed a right swaying Rombergs, Mann's and Untenberger's tests. Tuning fork test showed a lateralization to the left (better ear) on Weber's test, an air conduction **(AC)** greater than bone conduction **(BC)** on Rinne's test and a short tone perception on both ears (Schwabach's test) when compared to the examiners. Since no audiologic studies were done previously, the following were requested: a **pure tone audiogram** *(Fig. 1)* which showed right moderate sensorineural hearing loss with poor speech discrimination and left normal hearing with a dip at the 2000 hz and a 4000 hz with good speech discrimination *(Fig. 2);* a **tympanogram** showing type A on both ears *(Fig. 3)*; an absent ipsilateral and contralateral **Acoustic Reflex Threshold** *(Fig. 4)*; a (+) **tone decay** on the right ear *(Fig. 5);* an **Auditory Brainstem Response (ABR)** which demonstrated a distinct wave I and the absence of the proceeding waves *(Fig. 6);* and **Electronystagmography (ENG)** revealing the following: Fixed Amplitude Saccade - horizontal showed right beating nystagmus on looking to the right, Horizontal Smooth Pursuit likewise showed a right beating nystagmus when target is on the right while Optokinetic Nystagmus revealed asymmetric results. Spontaneous nystagmus showed a right beating nystagmus which is still evident on gaze evoked nystagmus upon gazing to the right. Findings of Fixed Amplitude Saccade - Vertical still revealed right beating nystagmus on gaze upwards. On Vertical Smooth Pursuit there was an abnormal break of pursuit movement, and the Optokinetic Nystagmus showed asymmetric reading. There was no evident nystagmus on vertical Gaze Evoked Nystagmus, Stationary Positional and Paroxysmal Positional (Dix-Hallpike Maneuver). Caloric testing showed 50% reduced vestibular response on the right *(Fig. 7)*. The results of these procedures are highly indicative of a *retrocochlear disease* as evidenced by the **CT Scan** previously requested which exhibited a 5 cm mass on the right and a 1.7 cm mass on the left cerebellopontine angles *(Fig. 8)*. Blood specimen was sent for chromosomal analysis to document the possibility of Neurofibromatosis type-2. The results revealed a Normal 46XX female *(Fig.9)*.

Figure 1: Pure Tone Audiogram

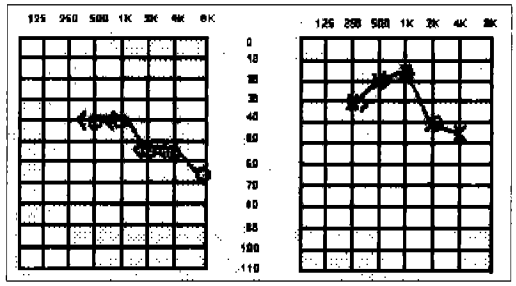


Figure 2: Speech Discrimination

TEST	RIGHT	LEFT
SRT	40dB	25 dB
PB	24%	88%
MCL	80	65
TOL	100	100

Figure 3: Tympanogram

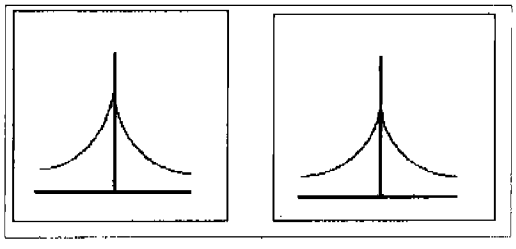


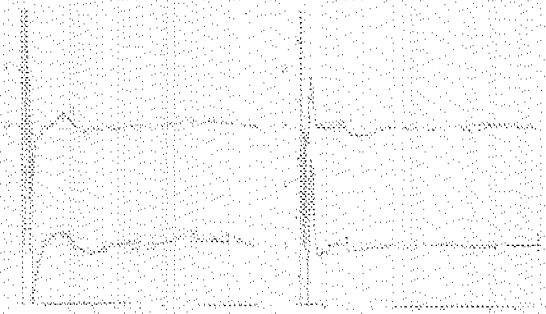
Figure 4: Acoustic Reflex

ACOUSTIC REFLEX	FREQUENCIES			
	500 Hz	1,000 Hz	2,000 Hz	4,000 Hz
Ipsilateral, AD	No reflex	No reflex	No reflex	No reflex
Contralateral, AD	No reflex	No reflex	No reflex	No reflex
Ipsilateral, AS	No reflex	No reflex	No reflex	No reflex
Contralateral, AS	No reflex	No reflex	No reflex	No reflex

Figure 5: Tone Decay

R. L.	500Hz		1,000 Hz		2,000 Hz		4,000 Hz	
	Right	Left	Right	Left	Right	Left	Right	Left
0								
5								
10								
15						T		
20				T		60		
25				60				
30								
35		T	60					
40	T		T					T
45	32		34					60
50	36		42		T		T	
55	38		36		8		27	
60	40		37		11		33	
65	52		38		27		39	
70					38		51	
75					42		54	
80								

Figure 6: Auditory Brainstem Response

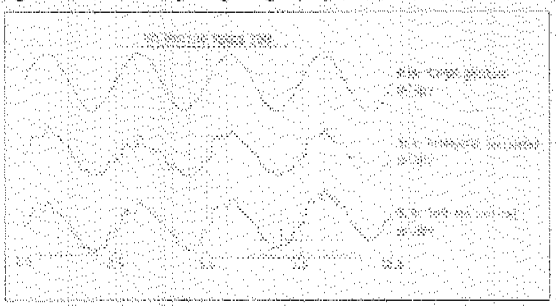


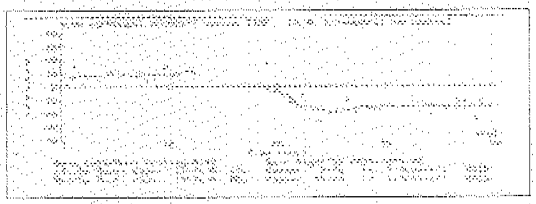
Left Right

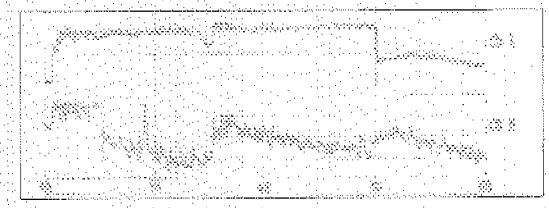
Peak Latency
T5 I = 1.58 ms
T7 I = 1.64 ms
T1 I = 1.80 ms
T1 III = 4.12 ms
T1 V = 6.80 ms
T5 I = 1.52 ms

Peak Amplitude
Peak-to-Peak Latency
T1-T1 I-III = 2.52 ms
T1-T1 I-V = 5.20 ms
T1-T1 III-V = 2.68 ms
Peak-to-Peak Amplitude
Peak-to-Peak Area
Peak-to-Peak Latency Ratio

Figure 7: Electronystagmography







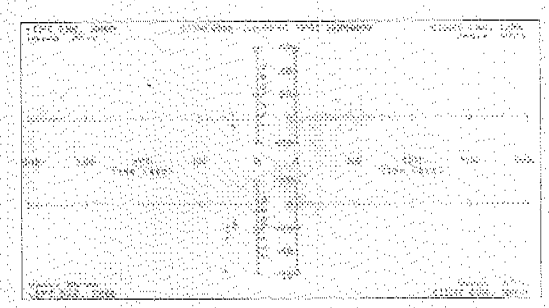


Figure 8: CT Scan

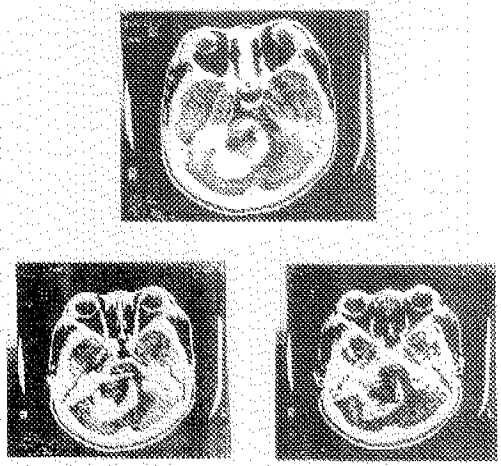
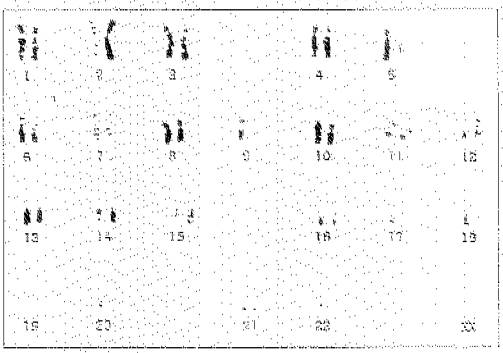
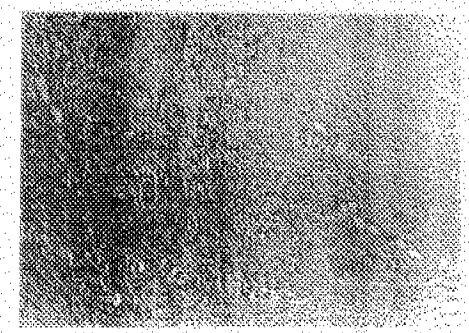


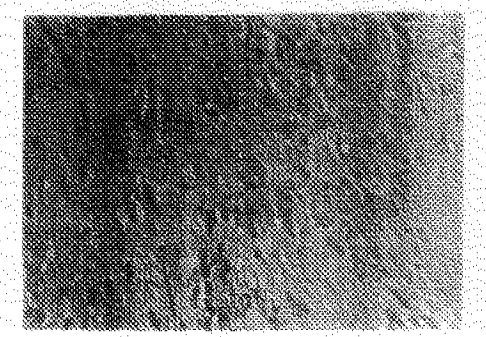
Figure 9: Chromosomal Analysis



Pre-operative dose of Hydrocortisone per IV were administered to prevent the occurrence of a thyroid storm. Excision of the larger sized right tumor via a *translabyrinthine approach* with facial nerve monitoring was performed. A subtotal removal was only accomplished due to the adherence of the posterior capsule of the tumor to the surrounding structures and the appearance of the sigmoid sinus anteriorly obstructing the operative field. The operation was thus staged, and excision of the remaining tumor via a retrosigmoid approach was rescheduled. Histopathologic findings were consistent with the diagnosis of Acoustic Neuroma *(Fig. 10)*.

Figure 10: Histopathologic Findings





DISCUSSION

The patient initially presented with gradual hearing loss, tinnitus and vertigo for three years. No audiologic work-ups were requested at this time although the symptoms were referrable to the vestibulocochlear system. This was followed a year later by gait disturbance and slurring of speech, clearly a sign of a serious problem in the central nervous system. The patient sought consult with a number of physicians in order to get a concrete diagnosis but this may have lead to more confusion. The existence of a concomitant thyroid disease further complicated the situation.

Whenever a patient presents with tinnitus, hearing loss and vertigo, an audiogram is clearly indicated. In cases of acoustic neuroma, it would show an asymmetric hearing loss of the sensorineural type. Early on, the patient only had hearing loss and tinnitus. These symptoms suggest that the tumor is confined to the *intracanalicular* stage of tumor growth wherein the neural tissue or its blood supply is compressed. Detection of these small tumors (<2.5 cm) would be possible after a battery of audiometric examinations. A pure tone test and speech audiometry are the first steps in this evaluation. Pure Tone Audiometry showed an asymmetric sensorineural hearing loss with poor speech discrimination score (right) indicating the possibility of a retrocochlear pathology. The left showed a high tone hearing loss and good speech discrimination which does not point to a retrocochlear pathology. However, this has become one of the least sensitive measures of the battery of tests with a sensitivity of <10% but becomes sensitive as a measurement in site of lesion testing as in performance - intensity function *(Tables 5 and 6)*.

Disease of the eighth cranial nerve has complex effect on the acoustic-stapedius reflex. This is the reflex contraction of the stapedius muscle in response to sound stimulation. *Table 3* illustrates the main components in the acoustic reflex arc. Therefore, any lesion found in the cochlear nuclei will impede the generation of the stimulus to the ipsilateral and contralateral sides. Intracanalicular vestibular schwannomas may abolish the reflex or may have subtle effects. In this patient, there was absence of the ipsilateral and contralateral acoustic reflexes suggestive of a retrocochlear pathology. The acoustic reflex has an accuracy rate of 85% in identifying eighth nerve pathology *(Table 5 and 6)*. Loss of neural adaptation lead to auditory fatigue explains the appearance of a (+) tone decay. The tone decay has a sensitivity of about 60% *(Table 5 and 6)*. Currently, the most reliable diagnostic examination is the Auditory

AESTHETIC NASAL RESTORATION*

JACKIE M. MORENO, M.D.**
FREDERICK Y. HAWSON, M.D.**
RAYMOND VINCENT P. JURILLA, M.D.**
EUTRAPIO S. GUEVARA, JR., M.D.***

ABSTRACT

This is a surgical case report that presents a modified method of subtotal nasal reconstruction that employs vascularized septal chondromucosal flaps for lining, and conchal cartilage grafts to support the nasal dorsum, replace the missing tip and rim support and forehead flap replacement of nasal subunits.

This method has many advantages. The lining is thin and highly viable. Neither external shapes nor airway patency is distorted by excessive bulk. Lose of lining, the chief enemy of nasal reconstruction, seldom occurs because these flaps are highly vascular.

Keywords: Nasal reconstruction, septal chondromucosal flaps

INTRODUCTION

It is a tacit promise that plastic surgeons can replace a missing nose. This promise has not been kept. Loss of the entire nose is unusual in traumatic injuries but usually occurs following radical resection for malignant disease. There is an inherent desire in human beings to look normal and not peculiar, horrible, or even different after a nasal reconstruction. It is well accepted that reconstructive procedures required for full thickness defects of the nose include restoration of the outer covering, the inner lining, and the supporting framework. Lining, support, and cover do not make a nose. Rather, it is the manner of shaping and assembling these materials that give contour to the lump and the visual impression of a nose. In line with this, a better technique of nasal restoration was modified to meet this demand.

The aim of this report is to present a modified method of subtotal nasal reconstruction employing the use of thin but highly vascular local lining and cover flaps to allow successful primary placement of delicate cartilage graft. The cartilage fabrication provides projection in space, airway patency, support and, when visible through conforming skin cover, the delicate contour of the normal nose. With this, the need for multiple revisions to sculpt and debulk is decreased.

HISTORICAL BACKGROUND

A brief summary of the history of the art of reconstructing the nose assists one in the understanding of the development of newer techniques. In ancient times, amputation of the nose was considered a justifiable punishment for a variety of crimes. In India, during Vedic times (2000 B.C. to 500 B.C.), the prevailing punishment for adultery was amputation of the nose. Self-mutilation by cutting off the nose was also practiced by women who wished to protect their honor by disfiguring themselves as related by Nelaton and Ombre'danne (1904) during the Danish invasions of England and France. The use of Forehead flap in nasal reconstruction bears the name of the " Indian Method " by the Koomas of ancient

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*3rd Place, PSO-HNS Surgical Case Report Contest
April 8, 1995, Subic Int'l. Hotel, Olongapo City

**Resident, Department of Otorhinolaryngology, St. Luke's Medical Center
***Chairman, Department of Otorhinolaryngology, St. Luke's Medical Center

India, members of the caste of potters. Since then various modifications of the Indian Forehead flap have evolved.

During the sixteenth century, Tagliacozzi, eminent anatomist and surgeon of Bologna, Italy was the first to practice reconstruction of the nose by means of direct delayed flap from the arm. This skillful technique became known as "Italian" or Tagliacotian (1597). Since then, reconstructive rhinoplasty appears to have been neglected during the subsequent two centuries.

EVOLUTION OF SUBTOTAL NASAL RECONSTRUCTION

The development of plastic surgery is so intimately associated with that of reconstructive surgery. During those days in the early modern times, nasal reconstruction of the raw area under the flap which is the inner lining was neglected. Thus, the raw area under the flap was open to infection, fibrosis, and contraction. The understanding of the necessity for providing an inner lining was the next advance in the development of the technique for full thickness defects of the nose. In 1942, Converse designed a reliable technique for subtotal nasal reconstruction by folding the distal end of the flap to form the tip, alae, and columella; this is known as the scalping flap (see Fig. 1A).

Figure 1A. Scalping Flap Technique by Converse (1942) used for subtotal nasal reconstruction by folding the distal end of the flap to form the tip, alae and columella.

This was later improved by using a midline island forehead flap as inner lining (see Fig. 1B), and the use of a delayed composite conchal cartilage for the alae (see Fig. 1C). Folding of the distal end of the flap resulted in a very thick, rounded and bulbous nose (see Fig. 1D, 1E). It distorts the external nose inward and outward. It also crowded the nasal cavity thereby disturbing the patency of airway. In addition, such lining is usually not vascular enough to allow the primary placement of support.

Figure 1B. Scalping Flap later improved by using a midline island forehead flap as inner lining.

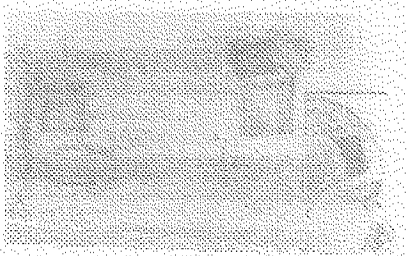


Figure 1C. And the use of a delayed composite conchal cartilage for the alae.

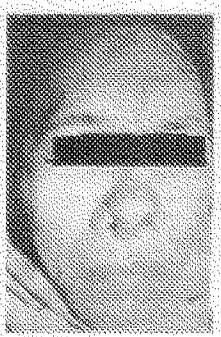


Figure 1D. Previous patient in which the technique of Converse for subtotal nasal reconstruction was used.

Figure 1E. Patient in which the technique of Converse was used (as taken from the book of Converse of Plastic-Reconstructive Surgery), with the following

disadvantages: Folding of the distal end of the flap resulted in a very thick, rounded and bulbous nose; distortion of the external nose inward and outward; and disturbance of airway patency. Such lining is usually not vascular enough to allow the primary placement of support.

Millard in 1974 started a technique in reconstructing the skeletal framework of the nose by modifying Gillies' concept using the nasal septum. The septum is cut in an L-shaped manner to form the nasal dorsum, tip and columella. But this septal advancement is short of excess mucoperichondrium to serve as inner nasal lining (see Fig. 2A). It was also Millard who started the Gull-shaped median flap (see Fig. 2B) and the preservation of the neurovascular bundle to enhance the vitality of the flap. The flap has the advantage of easy closure but, for most of the patients with narrow forehead, this straight forehead flap is short for rotation to reach the columellar defect.

Figure 2A. Millard's technique (1974) in reconstructing the skeletal framework of the nose by modifying Gillies' concept using the nasal septum. The septum is cut in an L-shaped manner to form the nasal dorsum, tip and columella. The disadvantage of such technique is that the septal advancement done is short of excess mucoperichondrium to serve as inner nasal lining.

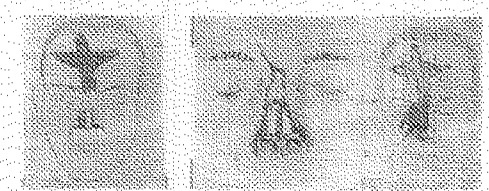


Figure 2B. Millard also started the Gull-shaped median forehead flap with the preservation of the neurovascular bundle to enhance the vitality of the flap. Such flap has the advantage of easy closure but for most of the patients with narrow forehead, this straight forehead flap is short for rotation to reach the columellar defect.

TECHNIQUE

Modification of Converse and Millard Procedures

The patient is a fifty-five year old woman who had a subtotal resection of the nose due to Basal Cell Carcinoma (see Fig. 3 & 4).

Figure 3 and 4. Our patient (55 years old, female), who underwent subtotal resection of her nose due to Basal Cell Carcinoma.

Reconstruction was delayed for six months to observe for further recurrence. In the first stage, a long full-thickness composite septal flap lying parallel to the nasal dorsum was pivoted forward from the septal donor. This septal composite flap was taken from the concept of Gillies and, as a modification, flap was made bigger so that its excess mucoperichondrial lining may serve as inner lining of the nasal cavity in a later stage (see Fig. 5).

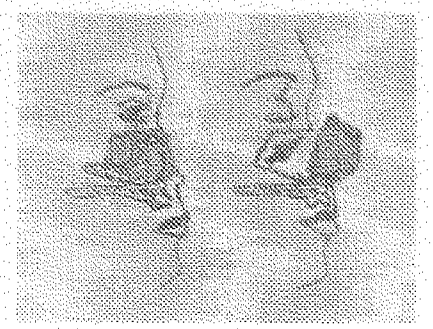


Figure 5. Stage I: Modified Converse & Millard Procedures of Subtotal Nasal Rconstruction: a long full-thickness composite septal flap lying parallel to the nasal dorsum was pivoted forward from the septal donor. This septal composite flap was taken from the concept of Gillies' and in our modification, it was made bigger so that its excess mucoperichondrial lining will serve as inner lining of the nasal cavity in a later stage. This is also the main difference from the Millard's L-shape septal flap.

This is also the main difference from Millard's L-shape septal flap. A back cut and resection of the cartilage was done to allow pivot yet still maintaining a mucoperichondrial pedicle which contain septal branches of the superior labial vessels (see Fig. 6 & 7).

Figure 6 and 7. Stage I (cont.). A back-cut and resection of the septal cartilage was done to allow pivot but still maintaining a mucoperichondrial pedicle which contain septal branches of the superior labial vessels.

At the same operation, a tunnel was created by nibbling away part of the septal cartilage to insert a costal cartilage graft which will resemble the normal hard tissue of the nasal bridge and dorsum. Such a costal cartilage graft is directed under the skin at the root of the nose (see Fig. 8A & B).

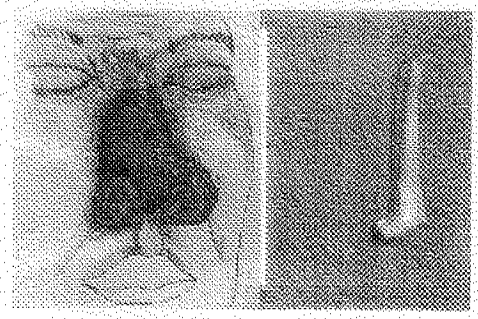


Figure 8A and B. Stage I (cont.). A tunnel was created by nibbling away part of the septal cartilage to insert a costal cartilage graft which will resemble the normal hard tissue of the nasal bridge and dorsum. Such a costal catilage graft is directed under the skin at the root of the nose. (see arrow)

Six weeks later, the excess mucoperichondrium was split down the middle and turned over to meet the lateral lining flap while its distal extension provides lining for the dome of the nasal vestibules (see Fig. 9). Curved conchal cartilage grafts were installed to provide normal surface contour of the alae. A Peck-style graft was placed to add further tip projection (see Fig. 10). A semi-curved Indian Forehead flap containing supratrochlear vessels was lifted to act as an external drape to the dermis (see Fig. 11). The distal portion of the donor site was closed using a full-thickness skin graft (see Fig. 12 & 13). Two weeks later, this forehead flap was amputated and the remaining proximal segment of the flap was restored back to the forehead (see Fig. 14 & 15).

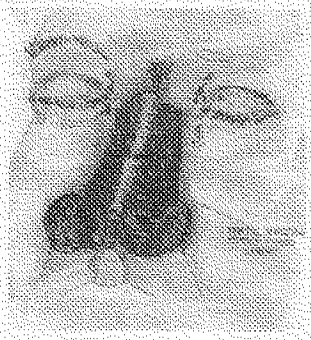
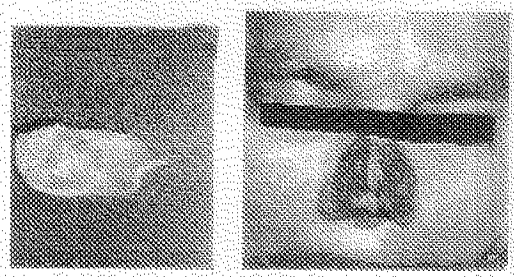


Figure 9. Stage II. Six weeks later, the excess mucoperichondrium was split down the middle and turned over to meet the lateral lining flap (taken from the skin of the remaining portion of the nose); while the distal extension of the excess mucoperichondrium provides lining for the dome of the nasal vestibules.



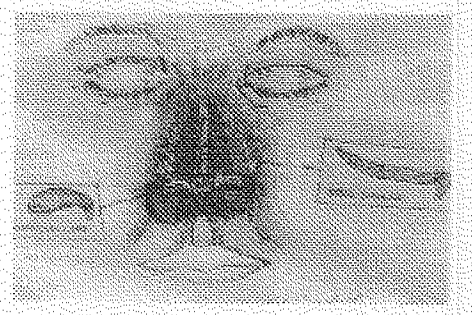


Figure 10A & B. Stage II (cont.). Curved conchal cartilage grafts were installed to provide normal contour of the alae. A Peck-style conchal graft was placed to add further tip projection.

Figure 11A & B. Stage II (cont.). A semi-curved Indian Forehead Flap containing supratrochlear vessels was lifted to act as an external drape to the reconstructed nose, with the distal tip of the flap made thinner quite close to the dermis.

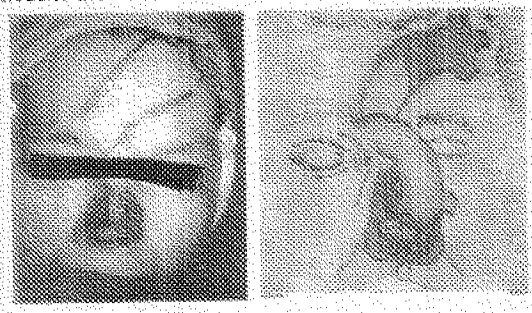


Figure 12 & 13. Stage II (cont.). The distal portion of the donor site was closed with full-thickness skin graft taken from the supraclavicular region for satisfactory color match.

Figure 14 & 15. Stage III. Post-operative (7days) picture with amputated forehead flap and remaining segment of the flap restored back to the forehead.

DISCUSSION

Why should a missing nose be replaced? Obviously, to make the patient feel better - to provide the peace of mind that comes with easy nasal breathing and the sense of well-being associated with a normal look. Yet frequently function is made worse by the new nose if its nostrils are filled by thick lining flaps that lack cartilaginous support and are constricted by circumferential scar. Often lining flaps bulge inward and outward, filling the nasal airway and forcing the surface of the nose to bulge. The blood supply of the flaps is further compromised when placed within a tight mantle of covering skin. Usually the covering flaps must be fashioned larger than would be normally required to accommodate this bulky lining. This necessitates multiple secondary revisions to discard the excess and to thin and resculpture the distorted nose. It has been emphasized that the major function of framework is to achieve and maintain profile and patency of the airways. Once soft tissue collapse fixed by contracting scar occurs, reexpansion of soft tissue and secondary placement of support cannot regain fully what has been lost. Nasal support is best supplied at the time of soft-tissue lining and cover construction.

CONCLUSION

The method of nasal reconstruction described here utilizing vascularized septal chondromucosal flaps for lining; costal and conchal cartilage grafts fabricated to support the nasal dorsum, replace missing tip and rim support; and forehead flap replacement of nasal subunits has many advantages. These linings are thin and reliably viable. Neither external shapes nor airway patency is distorted by excessive bulk as compared to other previous techniques. Loss of lining, the chief enemy of nasal reconstruction, seldom occurs because these flaps are highly vascular.

This marriage of primary cartilage grafts and thin vascular intranasal lining flaps is a happy one and are made for each other. Like man and wife, both cherish and support from this day forward - if only properly introduced. Furthermore, Millard's achievement of "the seductive formula of reconstructing noses in one stage, the basic three layers: cover, framework, and lining" has been acknowledged by Converse, but in general condemned. As "Rome was not built in one day", so are Noses cannot be built in one day to achieve an aesthetically

and functionally restored nose in a fourth dimension - "BEAUTY".

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ANTHROPOMETRIC MEASUREMENT OF OROPHARYNGEAL STRUCTURES AS A PREDICTOR OF SNORING AND OBSTRUCTIVE SLEEP APNEA*

EDGAR DE GUZMAN, M.D.**
NORBERTO V.MARTINEZ, M.D.***
JOY QUE, M.D.****
JAIME ANTHONY A. ARZADON IV, M.D.**

ABSTRACT

To determine if oropharyngeal measurement could predict snoring and localize the probable site/s of obstruction, differences in the oropharyngeal measurements of subjects seen at the outpatient department of ENT were determined. Phase I of the study included 99 snorers and 56 non-snorers and involved identification of parameters that correlated with snoring and derivation of linear regression formulae and numerical values to predict snoring and the probable site of obstruction. Measurements were correlated to the occurrence of snoring and probable sites of obstruction identified based on the statistically treated data. Of the five anthropometric variables measured, the following were shown to be significantly different between snorers and non-snorers: 1) uvula length (UI), 2) distance from soft palate to posterior pharyngeal wall (UP), 3) distance between anterior pillars (AP), and 4) distance between posterior pillars (PP). There was no correlation between the patient's demographic data (age, height, weight) and the oropharyngeal measurements. Phase II included 20 snorers and 20 non-snorers and involved validation of linear regression formulae and derived numerical values to predict snoring and localize probable sites of obstruction. All had high specificity and positive predictive values with those for UI, UP, and PP attaining almost 100% specificity and positive predictive values. From the measured oropharyngeal variables, the most common sites of obstruction are the uvula (70%) and the distance between the soft palate and posterior pharyngeal wall (50%). With these anthropometric measurements, delineation of snorers from non-snorers and localization of probable sites of obstruction may be achieved.

Keywords: anthropometric measurements, oropharyngeal structures, snoring, obstructive sleep apnea

INTRODUCTION

Snoring is not funny and must not be regarded as something benign nor trivial. Neither a symbol of good health nor a physiological respiratory sound, it signifies a partial narrowing of the airway. Probably a pre-clinical state for the development of Obstructive Sleep Apnea (OSA), it causes repetitive nocturnal oxygen desaturation which then tends to potentially produce significant social and serious medical complications.[1,2,3] Certain anatomical factors contribute to the generation of noise: poor pharyngeal muscle tone and upper airway abnormalities which may involve multiple sites from the nose down to the hypopharynx. The sites of upper airway obstruction most commonly implicated have been located in the pharynx and frequently involves the uvula-soft palate complex and the tongue base.[3,4,5] Uvulopalatopharyngoplasty (UPPP) as a treatment for snoring and OSA is effective in those whose major airway compromise is in the oropharynx. Pre-operative identification of the specific site is crucial in the therapeutic plan. Routine procedures to

*2nd Place, PSO-HNS, Analytical Research Contest, Hotel Nikko Manila Garden
**Resident, Department of Otorhinolaryngology, Sto. Tomas University Hospital
***Consultant, Department of Otorhinolaryngology, Sto. Tomas University Hospital
****Consultant, Department of Anesthesiology, Sto. Tomas University Hospital

assess the potential sites of airway compromise currently used include: 1) complete otorhinolaryngological history and physical examination 2) fiberoptic nasopharyngoscopy with Mueller's maneuver and 3) cephalometric analysis or dynamic cephalometry which includes upper airway soft tissue x-rays in the upright and supine position during inspiratory and expiratory phases of respiration. Computerized tomography scan, which has greater accuracy in localizing sites of obstruction, may also be employed but the considerable expense it entails limits its widespread use.

The objectives of this study are: 1) to correlate the various oropharyngeal measurements with the presence of snoring. 2) to determine the differences in the oropharyngeal measurements between snorers and non-snorers and thus be used to delineate the two population; 3) to determine the value of age ,height and weight in predicting oropharyngeal measurement 4) to provide numerical values derived from linear regression equations for the various oropharyngeal measurements to predict snoring and the probable sites of obstruction and 5) to determine the specificity, sensitivity, positive and negative predictive values of the derived numerical values in predicting snoring and the probable sites of obstruction other than snoring (excessive daytime sleepiness, personality changes, etc.). Therefore, sleep studies were not done as part of evaluation. Data regarding height, actual weight and ideal body weight (IBW), together with age and sex were likewise obtained. Due to the differences in the measurements and proportions of the male and female anatomy, data were analyzed separately for both sexes.

Statistical analysis: Preliminary correlation of oropharyngeal measurements with snoring was carried out using Spearman-Rank correlation test. All parameters with significant correlation at a two-tailed measure were then subjected to two-group comparative studies using Student's unpaired t-test with a p value of < 0.05 considered significant. All identified parameters which can delineate the snorers from the non-snorers were then subjected to regression logistics with age, height, weight as dependent variable.

Linear regression equation formulae were then constructed using the identified parameters correlated with snoring. From the linear regression equations, numerical values for the corresponding oropharyngeal measurements were derived to serve as a guide in predicting snorers.

Phase II. Validation of the derived formulae. Twenty snorers and twenty non-snorers were seen at the same institution from September to October 1995 and screened with the same aforementioned exclusion criteria. They were then subjected to the standard otorhinolaryngologic examination and oropharyngeal anthropometric data were measured using the same technique as in Phase I. The measurements were done by a single junior ENT resident who was blinded as to the presence of snoring. These data compared to numerical values derived in the first phase of the study and subjects were subsequently classified as snorers or non-snorers. Parameters that correctly predicted snorers were considered probable sites of obstruction.

Statistical analysis: To validate the derived linear regression formulae and numerical values, the following were determined:

Sensitivity - percentage of correctly predicted snorers as a proportion of all true snorers computed as:

$$\frac{\text{true positive}}{\text{true positive + false negative (TP+ FN)}} \text{ or } \frac{(TP)}{}$$

Specificity- percentage of correctly predicted non-snorers as a proportion all non-snorers computed as:

$$\frac{\text{true negative}}{\text{true negative+false positive (TN+FP)}} \text{ or } \frac{(TN)}{}$$

Positive predictive value - percentage of correctly predicted snorers as proportion of all predicted snorers computed as:

$$\frac{\text{true positive}}{\text{true positive+false positive (TP+FP)}} \text{ or } \frac{(TP)}{}$$

Negative predictive value- percentage of correctly predicted non-snorers as a

proportion of all predicted non-snorers computed as:

$$\frac{\text{true negative}}{\text{true negative+false negative}} \text{ or } \frac{(TN)}{(TN+FN)}$$

MATERIALS AND METHODS

This study consisted of two phases. Phase I involved identification of parameters that correlate with snoring and derivation of linear regression formulae to predict snoring. Phase II involved validation of the formulae.

Phase I. Identification of parameters and derivation of linear regression formulae. All subjects ages 20 and above who consulted at the out-patient department of the Division of Otorhinolaryngology of the author's institution from March to September 1995 were screened as to the presence of snoring during sleep. Those who went to the OPD by themselves or slept alone were not included. A data sheet (Figure1) was accomplished by both the patient and his/her companion (bed partner or roommate) to confirm the presence of snoring. Subjects were excluded if they had any of the following:

1. nasal, nasopharyngeal and hypopharyngeal problems
2. history of recent intake of drugs, alcohol, sleeping pills and other CNS depressants
3. neurological and neuro-muscular disorders
4. endocrine disorders-goiters
5. obvious facial abnormality like micrognathia, retrognathia

Figure 1. Data Sheet (Snorers)

Subject#_____
Name:_____age__Sex___
Address:_____Phone No.__
Occupation:_____Weight(lbs)
Companion's name:_____height cm

Relation to patient:

does snoring disturb you/someone?
same room_____other room_____
does he/ she snore every night?___
others_____
position of patient when snoring_____
on his/her back____
on his/her stomach_____
_____on his/her side_____
while sitting_____
have you been awakened by his/ her snoring? yes____no____
alcoholic-beverage drinker?_____
smoking?_____drugs?_____

Health problems:

mental/nervous system
EENT(tonsil, adenoid, sinus, larynx, H&N surgery)
heart/lungs
digestive
sexual/kidney
bones and joints
diabetes/endocrine disorders
blood pressure and others

All patients had a standard otolaryngologic examination which included examination of the nose, pharynx and larynx with a mirror. The tongue was depressed using a metal tongue depressor to allow better visualization. Particular attention was focused on the oropharyngeal structures which were measured in millimeters (mm) using an uncalibrated stainless steel two-prong caliper. The distance obtained was then calibrated against a Vernier caliper (Figure 2). The following anthropometric data were obtained (Figure 3): 1) distance from junction of hard and soft palate to root of uvula (SP), 2) length of the uvula (Ul), 3) width of the uvula (Uw), 4) distance between the anterior pillars (AP), 5) distance between the posterior pillars (PP), and 6) distance from uvula to posterior pharyngeal wall (UP). All measurements were done by a single senior ENT resident. In the snorer group, none of the patients had symptoms of OSA

Figure 2. Instruments used for Measuring Oropharyngeal Strutures

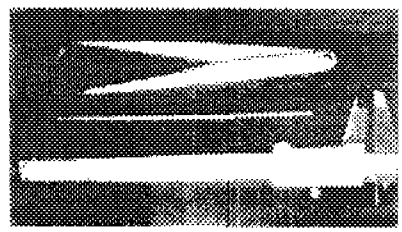
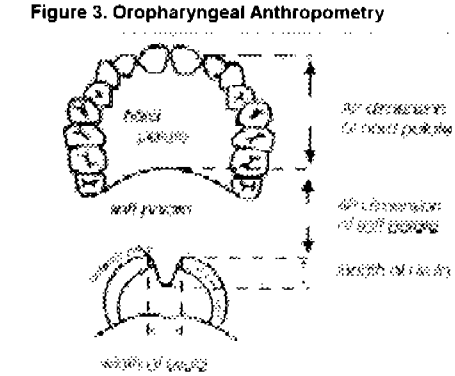


Figure 3. Oropharyngeal Anthropometry



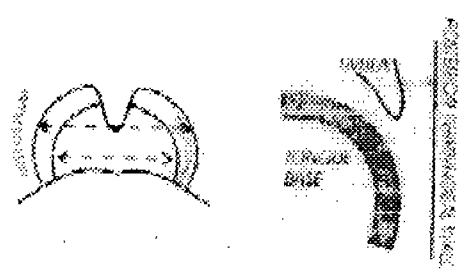
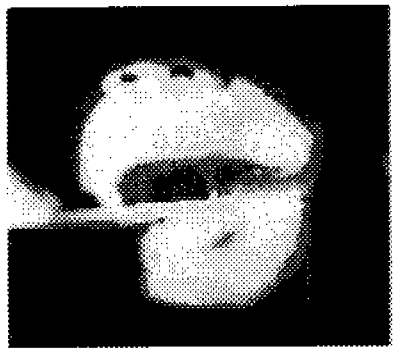
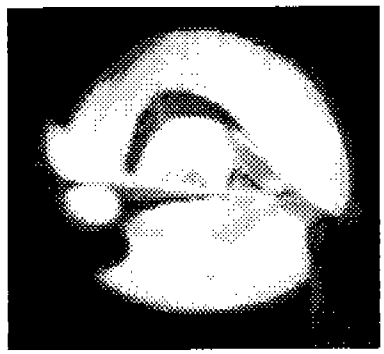


Figure 3.1 Anthropometric Measurements

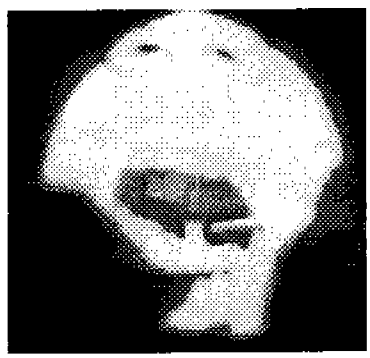


Uvula



Soft Palate

Anterior Pillars



Soft Palate to Posterior Pharyngeal Wall

RESULTS

A total of 155 patients were included in the first phase of the study, of which 56 (36.13%) were ascertained to be snorers by their companions. The patient's demographic features are shown in Table 1 (see Appendix) of which 7.7% of males and 5.9% of females were found to snore at the age of 30 years. These proportions increased dramatically to 41% of males and 41.2% of females who snore at 60 years of age (Table 2). Approximately 57% of snorers were more than 15% heavier than their ideal body weight (Table 3), of which 14% were morbidly obese (i.e. actual weight about twice the ideal body weight).

Table 1. Demographic Features of Patient Population

Features	Snorer Male	Female	Nonsnorer Male	Female
Age (years) x+SD Range	35.48+ 12.08 20-67	38.47+ 12.08 22-60	34.70+13.62 20-68	35.09 + 14.17 20-75
Height (cm) x+SD Range	165.92 +6.01 147-175	156.17+ 5.45 147-165	167.41+7.58 148-183	159.38+ 8.17 147-180
Weight (lbs) x+SD Range	156.67+ 32.53 81-220	132+ 25.43 98-185	139.25+21.34 81-200	117.77+ 18.76 81-170

Table 2. Age Distribution of Subjects

Age Groups	Snorer Male	Female	Non Snorer Male	Female
20-29	3(7.7%)	1(5.9%)	20(36.4%)	12(27.3%)
30-39	4(10.2%)	2(11.8%)	14(25.5%)	10(22.7%)
40-49	10(25.6%)	3(17.6%)	8(14.5%)	7(15.9%)
50-59	16(41%)	7(41.2%)	8(14.5%)	9(20.4%)
60-69	6(15.4%)	4(23.5%)	5(9.1%)	5(11.4%)
70-above	0	0	0	1(2.3%)
Total	39	17	55	44

Table 3. Weight Distribution of Subjects

Weight (%ofIBW)	Snorer	Non Snorer
>10% less than IBW	3(5.4%)	12(12.1%)
+10% of IBW	14(25.0%)	67(67.7%)
10-15% more than IBW	7(12.5%)	5(5%)
16-20% more than IBW	8(14.3%)	8(8.1%)
>20% more than IBW	24*(42.8%)	7**(7.1%)
Total	56	99

*8(14.28%) were morbidly obese, i.e. twice the IBW
**1(1%) was morbidly obese

and 2D) was not observed in the laryngoscopic procedures.

Table 12. Observed Frequency of Head Position Assumed by the Examiners while Doing Indirect Laryngoscopy

n=44

POSITION	number	Percentage
Upright	18	40.9%
Extension	13	29.5%
Flexion	6	13.6%
Protrusion	3	6.8%
Rotation	1	2.3%
lateral bending	1	2.3%
Extension + lat. Bending	1	2.3%
extension + rotation	1	2.3%

Approximately 41% of head postures were in the neutral or upright position. Only slight movements of the head were observed in the performance of indirect laryngoscopy.

Table 13. Observed Frequency of Leg Positions Assumed by Examiners while Doing Indirect Laryngoscopy

n=44

LEG POSITION	number	Percentage
In front		
a. open	16	36.4%
b. closed	1	2.3%
side by side	26	59.0%
Interlocked	1	2.3%

Table 14. Some Observations on Ergonomically Significant Practices and Adaptations of Some Subjects to their Working Environment

Subject Code	Comments/Observations
01	-spent several minutes with the back twisted to the right while writing on the chart and prescribing; ramped work area and poor placement of writing surface -similar observations made on other subjects
02	-patients was twisted/rotated left to right while doing otoscopy -decreases stress on examiner's back but somehow inconveniences the patient
03	-examiner's closed legs positioned in between male patient's legs during examinations; not frequently observed but not unusual in practice -prevents twisting of lower back and decreases trunk flexion by decreasing patient-examiner distance
10	-examiner made a 270 degree rotation utilizing his seat feature to shift from the left side to the right side of the patient during otoscopy -prevented undue twisting of the back: patient not inconvenienced
11	-crossing the legs while doing the examination may look graceful if done properly by lady but this practice has been recognized as stressful to the hips and is detrimental for circulation of the legs
12	-Subject is a shorter examiner who did all of his otoscopies standing up. Does the examiner's height dictate the examination posture assumed?
13	-The examiner being very tall and heavyset, removed his headlight and held it so that he could raise his head, decrease his trunk flexion and relieve back and abdominal stress while doing rhinoscopy on a short patient.
30	-Sitting the patient at an angle from his chair resulted in less rotation for the examiner's back
31	-Patient & examiner's thigh were positioned almost side by side with no trunk rotation on the part of the patient. -This position resulted in a decrease in the patient-examiner distance as well as a decrease in trunk flexion needed to gain access to the patient.
40/41	-Both examiners were the only 2 subjects who bent forward more than 20 degs.while performing indirect laryngoscopy. They utilized similar examination area set-ups using a fixed light source and the right edge of the writing table adjacent to the left side of the patient. The cramped working area probably contributed to this posture.
45	-Examiner navigated on his wheeled chair to move from the left to the right of the patient. Good functioning wheeled chair on the chairs help mobilize the physician.
46	-This examiner used the wheels of his chair to propel himself forward and backward thereby preventing too much trunk flexion.
51	- Backrest and armrest features on the physician's chair allowed the examiner to lean back and rest his arms in between examinations.

DISCUSSION

The current standard ENT texts' reference to proper posture while doing physical examinations are limited to statements regarding avoidance of stooping postures, occupying a comfortable position, and using a patient's chair that can be elevated, preferably a hydraulic chair. In medical school, most students are taught to examine ENT patients seated, in the face to face position, with legs to the side of the patient. This position may be socially and culturally proper, however, it causes spine rotation and places the examiner's back at risk of injury, specially if the rotation is combined with flexion.

Results reveal that 92 out of 138 or 66.66% of all back postures were recorded as having some degree of rotation (Subcategory B + D). Back rotation was noted to be the highest in sitting otoscopy procedures at 67.8% and lowest in the standing otoscopy procedures at 45%. Anterior rhinoscopy and indirect laryngoscopy, which were both done from the sitting position, yielded 58.7% and 61.4% prevalence of back rotation, respectively.

It was also observed that a side-by-side leg position resulted inevitably in rotation of the lower back while, for an open leg position of examination, only 4 out of 44 or 9.0% of examinations done were associated with back rotation.

Anderson and Nachemson separately documented using intradiscal pressure measurement studies and EMG studies that rotation and lateral bending of the trunk further increased the disc pressure as well as increased the contralateral muscle activity, probably to increase the force needed to balance the trunk.

Rotational and bending movements also impart shear and torsional stresses to

the disc which are less tolerated than tensile and compressive stresses.

The emergence of intra-abdominal pressure measurements as an index of body stress was based initially on the theory that the trunk acts as pressurized cylinder to help support longitudinal compression of the spine induced by physical activity. These measurements have been repeatedly shown to increase in forward flexion and rotation.

Back flexion greater than 20 degrees was observed in 38 out of 138 or 27.5% of all examinations performed.

The high percentage of Category 2 flexion postures observed in otoscopy (58.3%) compared to 17.4% and 4.5% in anterior rhinoscopy and indirect laryngoscopy respectively, could be partially explained by the fact that more otoscopies were done in the standing position with the patient remaining seated, thereby necessitating more flexion from the examiner. Another explanation could be the requirement of the procedure to bring the examiner's head close to the patient's ear, unlike in rhinoscopy or laryngoscopy where the examiner can observe from a distance.

Spine flexion has again been documented by several authors to be stressful to the back. Nachemson's pioneering work in litradiscal pressure measurements provided basis for establishing the following principles:

1. the load on L3 in sitting can be as much as three times the trunk weight;
2. sitting loads are higher than standing loads;
3. increasing forward flexion shows a linear increase in intradiscal pressure;
4. bending forward 20 degrees from upright sitting increases pressure by about 30%.

Increasing flexion also causes increased myoelectric muscle activity leading to muscle fatigue. The role of posterior back muscles in low back pain has been widely discussed. Forward flexion also aggravates disc stress by impairing non-compressive forces.

Adams (1995) reviewed a series of experiments regarding the effect of posture on the lumbar spine and convincingly argued that a slight flexed or flattened lumbar posture is better than an erect or "military" posture since the wedging effect on the disc allows it to resist higher compressive forces as well as improves nutrient delivery to an otherwise poorly perfused disc. Adams further cited the controversial argument that old chairless cultures who favored sitting or squatting positions that flex the lower back have fewer back problems but also acknowledge the remote possibility of prolonged low-load damage to the disc due to its flexion.

The third group of common postures observed are the combined postures. More attention should be directed towards postures under Categories 2B, 2C and 2D - postures with more than 20 degrees of flexion combined with rotation and/or lateral bending. These postures could be considered as being the most stressful on the back.

The overall prevalence of these postures was 23 out of 138 or 16.6% for all procedures done. The highest distribution of these postures was again observed in the otoscopy procedure probably because of the same reasons cited earlier in the discussion. Percentages of these combined Category 2 postures were computed at 5 out of 46 or 10.9% for anterior rhinoscopy and 0% for indirect laryngoscopy.

The combination of forward flexion and rotation placed the spine at risk of injury during the de-rotation and re-extension phase, which must be accomplished in a strict physiological manner. Faulty re-extension is a well-documented cause of pain and may result in "locking" of the articular facets as well as disc tears. These phenomena are more likely to happen to the older age group who, unlike children, have less flexible spinal components.

Although the standing posture results in less spine compression and better mobility, the greater angle of forward flexion required to examine a seated patient or one whose ear level is very low causes the examiner to bend very low and again, place his back at risk.

Very slight head movements were noted for both indirect laryngoscopy and anterior rhinoscopy. Performing otoscopy, however, required most of the examiners to twist their necks, sometimes close to the limits of motion. Spine compression loads have been argued to lead to local regions of strain, specially in postures that are close to their limits of motion.

The preceding arguments have made it clear that increasing degrees of flexion, rotation, and lateral bending, and especially combinations of these postures are either stressful, produce discomfort or are potentially harmful to the spine. Anderson, in 1985, advocated the following postural considerations:

1. Forward flexion should be avoided when possible as the trunk moment increases with forward flexion thereby increasing muscular activity and disc loading;
2. Lateral bending and twisting create not only high loads but also asymmetric distribution of forces;
3. When sitting, a chair should be provided with adequate back rest and, where appropriate, armrests and
4. Prolonged work in any posture should be avoided.

Timing of the examinations was undertaken and included in the data collection to emphasize that even if performing these activities only takes a few seconds, the cumulative time spent examining several patients in the above mentioned postures may make a significant contribution to the causation of back pain. This data may also be used as reference for future studies that may need to estimate the amount of work involved in doing these tasks.

SUMMARY AND CONCLUSION

In summary, this study reveals that:

1. Junior ENT residents assume a variety of lower back, neck and leg postures during the course of performing otoscopy, anterior rhinoscopy and indirect laryngoscopy;
   a. The back postures of rotation, flexion, lateral bending, upright and their combinations were all noted to have been assumed by the subjects;
   b. The head postures of rotation, flexion, extension, lateral bending, upright, and their combinations were observed to have been assumed;
   c. Four types of leg positions described as side-by-side (65%), open-in-front (36.5%), closed-in-front (1.7%), and interlocked (0.8%) were observed to have been assumed by sitting examiners;
   d. In doing otoscopy, both the standing (41.6%) and sitting (58.4%) positions were observed to have been assumed;
   e. No subject assumed the standing position in doing rhinoscopy or laryngoscopy;
   f. The common examiner's postures noted in otoscopy are:

      lower back: flexion of more than 20 degrees with or without other movements (58.3%)

      head: rotational positions with or without combined extension and flexion movements

      legs: the side by side leg position (57.1%) and the open leg position (42.9%)

   g. The common examiner's postures noted in anterior rhinoscopy are:

      lower back: 0 to 20 degrees flexion with or without other movements (85.4%)

      head: upright (37%) and extension (37%)
      leg: side by side (63%) and open leg position (32%)

   h. The common examiner's postures observed in indirect laryngoscopy are:

lower back: 0 to 20 degrees flexion with or without other movements (95%)

head: upright (40.9%) and extension (29.5%)

leg: side by side (59%) and open leg positions (36.3%)

2. Some postures assumed by junior ENT residents during the course of their examinations are relatively stressful and/or place the spine at a position of risk to injury.

   a. Forward flexion of more than 20 degrees combined with other movements were deemed as the most stressful and potentially harmful back postures observed.
   b. Head Rotation Position combined with extension postures were deemed the most stressful positions observed.
   c. The most stressful and potentially harmful of all head and lower back postures observed were most prevalent in otoscopy.
   d. The side-by-side leg position of the examiner invariably resulted in lower back rotation, a position which adds stress to the spine.
   e. Back rotation was noted in only 4 of 44 of 9% of procedures done in the open leg position.

RECOMMENDATIONS

In light of these observations that the stressful postures assumed during examination be significantly modified at will by examiners, it is, therefore, recommended that ENT residents, in particular, and all ENT practitioners, in general, be made aware of sound biomechanical and ergonomic principles.

Postures are governed by a multitude of factors, personal preferences being only one of them. The logistics needed to objectively and comprehensively evaluate postures and ergonomic considerations are beyond the technical capabilities of the authors. Plans for prospective, randomized future studies on the subject should involve experts in the fields of orthopedics, rehabilitation medicine, ergonomics and occupational medicine. No attempt to associate low back pain with poor posture was made in this study Provisions for such associations will be made by the authors in the future. Also, it would be beneficial to include studies on arm position during the ENT examination

A similar study regarding the practices of consultants should be interesting in that there is wider choice of equipment, clinic set-ups and clinic area available to thèm. The examination postures may be greatly affected by the above mentioned factors.

An interesting concept encountered in one of the reviewed literature is that of a semi-standing work posture which could be integrated into plans for development of a new generation ENT clinic or chair.

The use of rigid telescopes in ENT out patient practice has brought a new dimension to what was previously known as the traditional ENT examination. Since this new development alters the space requirements and postural adaption of the examiner, studies evaluating the use of these instruments may lead to a new chair or clinic design that is engineered for and unique to the specialty of Otorhinolaryngology.

APPENDIX A
SUBJECT QUESTIONNAIRE

No._____

Name(optional)_____ Age/Sex____Date_____
Institution_____Year level____Handedness____.
Weight_____, Height_____
Somatype: [ ]ectomorph [ ]mesomorph [ ]endomorph

1. Do you have a diagnosed organic back condition?
   [ ] yes (pls. specify)
   [ ] no
2. Do you regularly experience feelings of fatigue and/or pain affecting any section of the osteoarthromuscular and ligamentous apparatus?
   [ ] yes
   [ ] no
3. How often do you experience this pain?_____
4. If yes to #2, how long have you had this recurrent pain?_____

5. If yes to #2, please specify location/s.
   [ ] Back [ ]Arm/Neck [ ] Leg
   [ ] upper back [ ] neck [ ]hip/upper leg
   [ ]lower back [ ] shoulder/upper arm [ ]knee/lower leg
   [ ]elbow/forearm [ ]ankle/foot
6. If yes, do you have to take medications or consult another doctor so that the pain will go away?
   [ ] yes
   [ ] no

APPENDIX B
CHECKLIST

No:_____

Institution_____ Date_____

I AVAILABLE EQUIPMENT

A. Patient's Chair

1. fixed stool/chair []
2. screw type stool []
3. ENT chair []
4. Barber's chair []
5. Dental chair []
6. Others (specify) []

B. Physician's Chair	1	2	3	4
1. Fixed height	[]	[]	[]	[]
Adjustable height	[]	[]	[]	[]
a. hydraulic	[]	[]	[]	[]
b. screw type	[]	[]	[]	[]
2. Stationary	[]	[]	[]	[]
With functioning wheels	[]	[]	[]	[]
3. With cushion	[]	[]	[]	[]
Without cushion	[]	[]	[]	[]
4. With lumbar support	[]	[]	[]	[]
Without lumbar support	[]	[]	[]	[]
5. With armrest	[]	[]	[]	[]
Without armrest	[]	[]	[]	[]
6. Rotating seat	[]	[]	[]	[]
Fixed seat	[]	[]	[]	[]

Operation description _____ _____ _____

II. WORKING AREA

A. Air-conditioning [] yes [] no

B. Floor plan (illustration and measurements)

APPENDIX C
TALLY SHEET

_____ no._____

	Patient number 1	2
A. Patient profile		
1. Sex		
male	[]	[]
female	[]	[]
2. Status		
adult (age) []	[]	
pediatric (age)	[]	[]
B. Patient Position		
1. seated	[]	[]
2. standing	[]	[]
3. others (specify)	[]	[]
	_____	_____
	_____	_____
C. Equipment Used		
1. patient chair	_____	_____
2. physician's chair	_____	_____
3. light source	_____	_____
head mirror	[]	[]
head light	[]	[]
D. Examiner		
1 sitting	[]	[]
2. standing	[]	[]
3. others (specify)	_____	_____
Low back position		
a. upright	[]	[]
b. flexion (degrees)	[]	[]
c. extension	[]	[]
d. lateral bending	[]	[]
e. rotation	[]	[]
Head position		
a. upright	[]	[]
b. flexion (degrees)	[]	[]
c. extension	[]	[]
d. lateral bending	[]	[]
e. rotation	[]	[]
Leg position		
a. to the side	[]	[]
b. open	[]	[]
c. others	_____	_____
E. Total time elapsed (secs.)	_____	_____

F.Remarks:_____

_____

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"ACRYLIC PROSTHESIS" ITS ROLE IN THE MANAGEMENT OF ACQUIRED EXTERNAL AUDITORY CANAL ATRESIA*

EUGENIO TOMAS ALONZO, M.D.**
EDMUNDO M. FALCON, M.D.***

ABSTRACT

This case report demonstrates the role of customized acrylic prosthesis in the management of acquired external auditory canal atresia in a 3 month old female infant. With the prosthesis, the patency of the ear canal after canal plasty was maintained. The hypertrophic scar became smaller and the diameter of the canal increased four-fold.

Keywords: Acrylic Prosthesis, Acquired External Auditory Canal Atresia, Canalplasty

INTRODUCTION

Acquired external auditory canal atresia is usually secondary to an acute or chronic inflammation of the skin in the external auditory canal. Cremers[1] (1993) reported 17 cases operated from January 1985 to 1990. The treatment advocated (Beales and Soliman, 1993) was canalplasty with or without bone widening and application of synthetic stent to keep the ear canal patent during the epithelialization process.

The available synthetic prosthesis in the market is made of silicone block which is biocompatible, readily available and easy to fabricate but is expensive, may be too soft to provide pressure and must be carved in order to fit the patient's ear canal.

The use of silicone stent has varied results since the prosthesis should be carved to snugly fit the contour of the canal and should at all times be fixed properly in place. In the case of this patient these two conditions did not obtain and re-stenosis occurred. Hence the search for an alternative stent.

CASE REPORT

A three month old baby girl presented with bilateral acquired external auditory canal atresia. The mother claimed that the child had patent external ear canals at birth. At age two months, the child had bilateral ear discharge which was managed by a pediatrician with antibiotics and daily aural hygiene. After three days, the mother noted bleeding on ear cleaning which spontaneously disappeared. The infection was controlled. However both canals became narrowed with formation of hypertrophic scars.

Physical examination revealed obliterated ear canals due to hypertrophic scar. The rest of the ENT findings was unremarkable.

Initial conservative management with weekly intralesional injections of 3 mg Triamcinolone Acetonide (Kenacort 10 mg/ml) for four weeks failed. Surgery was thus contemplated.

Brain evoked response audiometry performed pre-operatively showed normal results for age (Appendix A.). X-ray of the mastoids , revealed mastoiditis and cholesteatoma, left (Appendix B.). Complete blood count, urinalysis and chest x-ray were normal (Appendix C., D., E.).

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**Resident, Department of Otorhinolaryngology, Rizal Medical Center
***Consultant, Department of Otorhinolaryngology, Rizal Medical Center

APPENDIX C

HEMATOLOGY		
HEMOGLOBIN	120	F=120-140g/L
		M=140-160g/L
HEMATOCRIT	40	F=38-48%
		M=40-50%
R.B.C.	4.2	4-6X10 12/L
W.B.C.	15.0	5-110X10 9/L
DIFFERENTIAL		
POLYS	75	.40-.60
LYMPHOS	25	.20-.40
MONOS		.02-.06
EOS		.02-.04
BASO		0-.005
STAB		.02-.04
BLOOD TYPE		
ERS		F=0=20 mm/hr.
		M=0-10 mm/hr.
BLEEDING TIME		1 – 5 min.
CLOTTING TIME		Less than 15 min.
PLATELETS		2-5x10 9/L
BLOOD MORPH.		
OTHERS		

APPENDIX D

URINALYSIS	
Color: Yellow	WBC: 0 – 1/hpf
Transparency: Clear	RBC: 0 – 1/hpf
Reaction: ph6	Epithelial Cell: rare
Albumin: Negative	Mucus thread: rare
Sugar: Negative	Crystals : A urates : rare
Specific gravity: 1.005	Cast : none
Other Test:	

APPENDIX E

RADIOLOGIC REPORT: Essential Normal Chest

Meatoplasty with excision of fibrous tissue and bony widening was done and a silicone stent was inserted inside the left ear (Figure1). A concomittant simple mastoidectomy done because of the questionable cholesteatoma on x-ray, showed only an enlarged antrum with no cholesteatoma, intact tympanic membrane, ossicles and bony canals. Planned removal of the silicone stent from the left ear six months after the operation was deferred because of recurrence of the hypertrophic scar. Seven months post-operatively, patient developed a pseudomonas infection of the external auditory canal which was appropriately treated with gentamicin otic drops 3 drops TID and cloxacillin 100 mg / kg/ day for 10 days. Re-stenosis occurred and the silicone stent had to be removed.

Figure 1. Silastic stent was placed on the left ear after canalplasty to keep the ear patent during epithelization process.

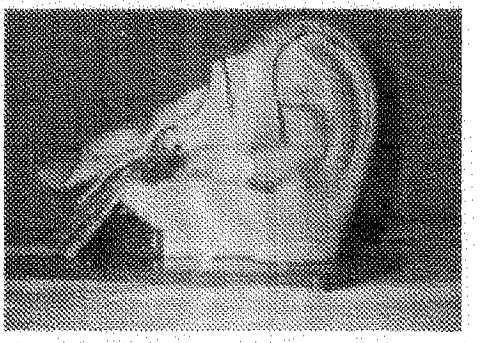


Figure 2. Appearance of the right ear. Note the hypertrophic scar.

Due to the failure of the stent, an alternative mode of management by using an innovative acrylic pressure prosthesis was done.

TECHNIQUE

A Dow Corning 3110 RTV silicone rubber was used to make an impression of the ear. The impression was mounted on a cast stone which served as the template for the acrylic prosthesis (Figure 3-8).

Figure 3. Materials used in making acrylic pressure prosthesis of the external auditory canal.

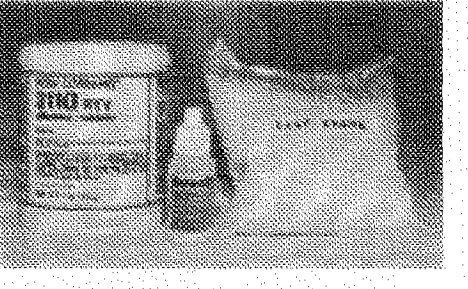


Figure 4. DOW CORNING silicone rubber was used as an impression of the ear.

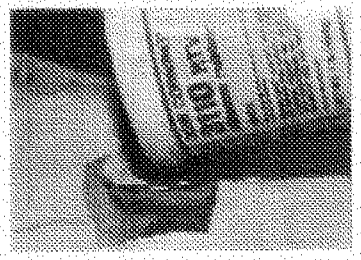


Figure 5. Cast stone was used as a template for the acrylic prosthesis.

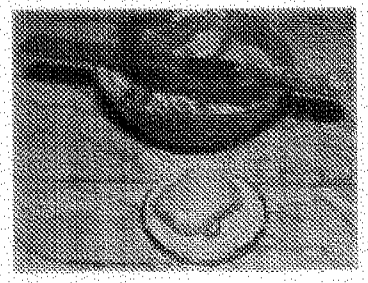


Figure 6. The silicone impression was removed from the cast stone which serves as a template.

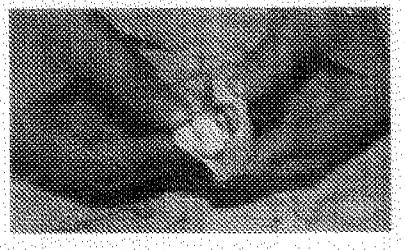


Figure 7. The template (cast stone) with acrylic resin.

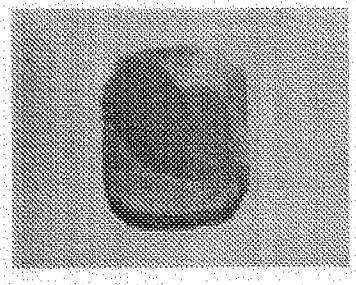
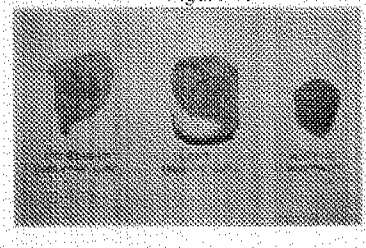


Figure 8.



The prosthesis was secured in place with an elastic bandage worn as a head band which at the same time, also added more pressure (Figure 9-10.).

Figure 9. The patient wearing the prosthesis.

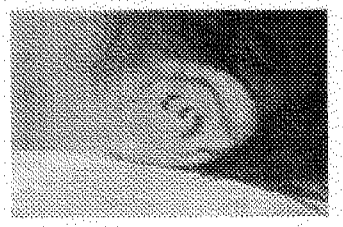
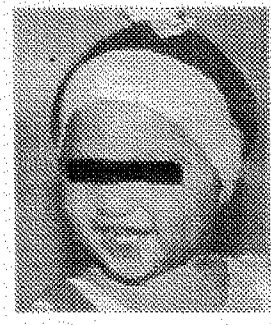
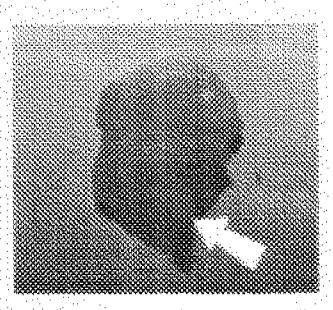


Figure 10. The patient wearing the prostheses with an elastic bandage as a headband.



The patient was advised follow-up on a regular basis (every 2 weeks). The canal part of the prosthesis was regularly remodeled by increasing its length and diameter in order to snugly fit and provide an evenly distributed pressure on the widening ear canal (Figure 11.).

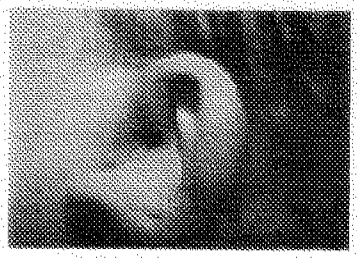
Figure 11. The canal tip was rebuilt by increasing its length and diameter in order to fit the widening canal snugly.



RESULTS

Four months after operation and with continuous use of the prosthesis, the surgical scar was noted to have atrophied producing a significant widening of the canal (Figure 12). Patency of the left external auditory canal was maintained and the canal diameter increased fourfold from one millimeter initially to 4 millimeters.

Figure 12. The hypertrophic scar was noted to diminish in size in a span of four months thus widening the canal.



No complications such as allergy to methacrylate (active component of acrylic), infection or pressure necrosis was seen. After 4 months of continuously using the prosthesis, the result was satisfactory enough to obviate a second operation.

The patient has remained prosthesis free for 3 months without re-stenosis. A similar prosthesis is planned for the right ear after canal.

DISCUSSION

Hypertrophic scar development may develop from injuries of the ear canals because of extensive tissue damage or sustained mechanical stresses transmitted across the wound surface during healing. In both instances, enhanced inflammatory and fibroblastic reactions cause excessive scar formation and closure of the canals.

Treatment of hypertrophic scar formation is either by excision, steroid injection, pressure or irradiation. The latter is not used nowadays due to unfavorable side effects such as hyperpigmentation and potential carcinogenesis.

Intralesional steroid injection which suppresses collagen synthesis is the mainstay treatment for hypertrophic scars. Two to three milligrams of triamcinolone acetonide (Kenacort 10 mg/ml) depending on the size of the lesion is used Although it may cause growth retardation and Cushing's syndrome in children, a trial of steroid therapy for four weeks is justified. Clinical response varies and may even be absent in stable scars.

The use of pressure is based on its role in the treatment of protruberant scars from burns. By decreasing tissue oxygen and inducing local ischemia, more collagen is degraded than synthesized. However too much pressure causes tissue necrosis while too little leads to re-stenosis.

The choice of medical grade acrylic was based on its wide use in making dental and maxillo-facial prosthesis. In addition, the acrylic stent was found to be

1. Easy and inexpensive to fabricate
2. Biocompatible and strong
3. Stable and durable
4. Resilient enough to resist tearing, and
5. Easy to clean

SUMMARY

A case of a female infant with bilateral external auditory canal atresia with a preceding history of ear infection, trauma, and hypertrophic scar formation is presented.

The patient was initially managed conservatively with steroid injection which proved to be unsuccessful. Despite surgery and the use of silicone stent, recurrence of the hypertrophic scar was noted.

A customized acrylic pressure prosthesis was then used and atrophy of the scar was seen causing widening of the left external auditory canal.

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CHARLOTTE M. CHIONG, M.D.

ABSTRACTS EDITOR

VALUE OF VIDEOSTROBOSCOPIC PARAMETERS IN DIFFERENTIATING TRUE VOCAL FOLD CYSTS FROM POLYPS

Article by * Jack A. Shohet, MD, Mark S. Courcy, MD
Margie A. Scott, MD, and Robert H. Ossoff, DMD, MD

Laryngoscope 1996; 106: 19-26

This paper investigated stroboscopic parameters that would allow the laryngologist to differentiate benign true vocal fold (TVF) cysts from polyps or nodules before surgery and to confirm this with histologic findings. A chart review of adult patients with benign TVF pathology treated surgically by the senior author from November 1990 to May 1993 were reviewed. There were 32 patients who had both preoperative videostroboscopic examination and postoperative histologic examinations. The parameters described by Bless et al (1987) were used to describe the stroboscopic findings (Table 1). There were 20 histologically confirmed polyps in 19 patients and 14 histologically confirmed cysts in 13 patients. After a comparison of histologic diagnosis with the original pathologic report diagnosis was changed in 11 (34%) of 32 patients. The surgeon's postoperative diagnosis differed from the clinicohistologic diagnosis in 25% of cases of the videostroboscopic parameters, mucosal wave was the most useful in differentiating polyps from cysts. Of 14 patients with TVF cysts, 13 had no mucosal wave on the involved segment while the other one had a diminished wave. Of 20 patients with TVF polyps 16 had a normal or increased mucosal wave. None of the other stroboscopic parameters such as symmetry, amplitude, periodicity and closure showed statistically significant difference between the 2 groups.

Table 1 Stroboscopic findings

Symmetry
- (1) Symmetric
- (2) Asymmetric

Amplitude
- Right
  (1)Great (2) Normal (3) Small (4) Zero
- Left
  (1) Great (2) Normal (3) Small(4) Zero

Periodicity
- (1) Regular
- (2) Irregular
- (3) Consistent

Mucosal wave
- Right
  (1) Great (2) Normal (3) Small (4) Absent
- Left
  (1) Great (2) Normal (3) Small (4)Absent

Closure
- (1) Complete
- (2) Incomplete
- (3) Inconsistent

COMMENTARY

Exudative processes in the Reinke's space can now be differentiated by using fiberoptic laryngoscopy and laryngeal stroboscopy. This paper highlights the need for a more descriptive terminology for what has been clasically designated as "nodules" and "polyps". What I found interesting is that this confusion in the histologic interpretation of true vocal fold lesions was noted by Fitz-Hugh, Smith and Chiong AT (Laryngoscope 958; 68:855-75) nearly 40 years ago! This paper reiterates the need for the laryngologist to share detailed information, perhaps including stroboscopy findings with the pathologist. A series of stroboscopic examinations in response to either voice rest, medical intervention or voice therapy may provide a basis for a diagnosis of vocal fold polyps, nodules and cysts This preoperative diagnosis will partly dictate the surgical plan and subsequent rehabilitation.

A CONTEMPORARY ANALYSIS OF ACUTE MASTOIDITIS

Article * Richard E. Gliklich, MD, Roland D. Eavey, MD
Ralph A. Jannuzzi, MD, and Alfonso E. Camacho R, MD,
Arch Otolaryngol Head Neck Surg 1996; 122:135-9

This paper is a retrospective review of admission and discharge diagnoses of acute mastoiditis at the Massachusetts Eye and Ear Infirmary and the Massachusetts General Hospital between 1964 and 1987. They identified 124 patients with acute mastoiditis. Average age was 12.8 years and median age was 8.0 years; 58% of patients were boys and 42% were girls. What is notable in this study is that only 55% of patients had a recent episode of acute otitis media and not all patients presented with expected physical findings. Pain, typically in the postauricular region, was the most common clinical symptom (98%). Physical signs included an abnormal-appearing tympanic membrane (88%), fever (83%), a narrowed external auditory canal (80%), and postauricular edema (76%) (Table 1). Audiologic testing was performed in 44 patients of whom 39 were shown to have conductive hearing loss. Radiography was performed in 112 patients revealing abnormality in 102; computed tomography was performed in seven and proved useful in identifying spread of infection outside the mastoid cavity. All patients were admitted to hospital and treated with intravenous antibiotics; double-agent therapy consisting of ampicillin or oxacillin in combination with chloramphenicol was used in the last 5 years of the study, while earlier in the study, 69 patients received single-agent therapy, usually with penicillin.Cultures were performed from either myringotomy or mastoidectomy specimens in 99 patients and were negative in 33 (24 of these patients had been taking oral antibiotics); of patients with positive culture results, *Streptococcus pneumoniae* was the most commonly isolated organism. Mastoidectomy was required in 67 patients (54%) because of failure to respond to medical therapy or because complications of infection extended beyond the mastoid compartment (33 patients). For patients treated medically alone or with myringotomy, hospital stay was 7.0 $\pm$ 4.1 days, and for those who underwent mastoidectomy it was 8.6 $\pm$ 4.4 days. Clinical variables predictive of patients who would require surgery included an elevated white blood cell count, proptosis of the auricle, and fever on admission.

Table 1. Clinical presentation of 124 patients with acute mastoiditis

Variable	n total	Frequency (%)
Pain	121	98
Abnormal tympanic membrane	109	88
Fever	99	83
Abnormal external auditory canal	59	80
Postauricular edema	94	76
Postauricular erythema	81	65
Auricular proptosis	52	42
Otorrhea	32	26
Complication (at presentation)	33	27
Radiographic abnormality	102	91

The conclusion of this paper is that since clinical manifestations vary, the practitioner must consider acute mastoiditis even in the absence of a history of recent acute otitis media. Surgery is frequently still necessary and acute mastoiditis remains a potentially serious infection.

A PROFILE OF OPD EXAMINATION POSTURES OF JUNIOR ENT RESIDENTS IN METRO MANILA SOME ERGONOMIC CONSIDERATIONS*

RANDY CAÑAL, M.D.**
GIL M. VICENTE, M.D.***
RODERICK A. SUAREZ, M.D**

ABSTRACT

This is a descriptive study conducted in five PBO-HNS accredited ENT training hospitals in Metro Manila with 24 residents on duty at the out-patient clinics as subjects. This study describes the common lumbar, head and leg postures assumed by ENT residents while performing the different ENT examinations on patients as well as evaluates the examination posture according to some currently accepted biomechanical and ergonomic principles.

This study describes the variety of lower back and head positions assumed by the subjects in the course of examining patients. Four leg postures described as side-to-side (1.5%), open in front (36%), closed in front (17%) and interlocked (0.8%) were observed to have been assumed by sitting examinees. All rhinoscopy and laryngoscopy procedures were done sitting while 46% of otoscopies were done while standing. Some lower back (category 2) and head postures were deemed stressful to the spine and placed it in a position of risk. Forward flexion of more than 20^0 degrees combined with other movements (category 2B, 2C, 2D) were deemed the most stressful back postures observed. The most stressful lower back and head postures observed were most prevalent in otoscopy. The side-to-side leg position invariably resulted in lower back rotation.

In the light of the observation that most of the stressful postures assumed could be modified by the examiner at will, it is recommended that ENT residents, in particular, and ENT practitioners, in general, be made aware of sound biomechanical and ergonomic principles in relation to one's practice.

Keywords: Ergonomics, ent examination, posture

INTRODUCTION

The contribution of posture in recurrent and troublesome back problems has been established by several studies on the etiology and epidemiology of back pain. Although current ideas on what "good posture" constitutes are still rather vague, recent developments in posture analysis now allow us to utilize both subjective and objective methods to evaluate postures. Cailliet (1984)in the introduction of his book "Understand Your Backache" highlights the fact that 80% of human beings experience low back pain at some time during their life time. Low back pain is considered to be most common disabling musculoskeletal symptoms and the second most costly medical problem in modern industrial societies in terms of work absenteeism and loss of productivity not to mention the billions of dollars that go into research and treatment of the problem.

The ENT surgeon is not exempt from working conditions that stress the back. Long hours spent sitting or standing in uncomfortable positions in the operating

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* Presented, PSO-HNS Descriptive Research Contest
October 27, 1995, Holiday Inn Hotel, Manila
** Resident, Department of Otorhinolaryngology, Jose R. Reyes Memorial Medical Center
*** Consultant, Department of Otorhinolaryngology, Jose R. Reyes Memorial Medical Center

room are, more often than not, typical of surgeries common in ENT practice. In his Out-Patient clinic, the ENT specialist is required to assume a rather awkward and confined working position that is unique in medical practice: face to face with a sitting patient at close range. The introduction of new material adaptions to this requirement havé been few and slow in coming. The electric headlight, the hydraulic "barber's chair", and now the rigid telescope all serve to increase the mobility and flexibility of the examiner. However, the expense involved in acquiring such equipment often limits its widespread use.

The goal of ergonomics, which can be more restrictively defined as "adapting the work to man, and man to his work", has long been recognized and developed in dental practice that they have books and lecture series on the subject. A review of ergonomics-related literature (Medline and bibliographies of journals) revealed voluminous studies on industrial workers, office workers, dental workers, nurses, and every other kind of worker but suprisingly none on ENT specialists.

In the light of the above considerations, the authors believe that the time is at hand for ENT specialists to initiate studies that would eventually lead to better working conditions for ENT specialists to initiate studies that would eventually lead to better working conditions for the ENT specialist. By embarking on a study on the profile of commonly assumed ENT examination postures by junior residents at the OPD setting, the authors of this study hope to make the ENT practitioner aware of the biomechanical aspects of work and introduce the "ergonomic mentality' into ENT practice.

OBJECTIVES

1. To describe the common lumbar, head and leg postures assumed by residents while otoscopy, anterior rhinoscopy, and indirect laryngoscopy are performed on OPD patients;

2. To evaluate the examination postures according to their conformity or violation of some currently accepted biomechanical and ergonomic principles.

REVIEW OF RELATED LITERATURE

A 1985 review of literature regarding posture analysis led Colombini et al to the conclusion that proper postural analysis should include a description and assessment of posture tolerability. The authors of that review recognized the difficulty in assessment and standardization of criteria to evaluate the multifactoral nature of postural determinants and suggested instead a combination of analysis methods such as 1) psychophysical and subjective methods, 2)electromyography, 3) study of discal pressures, and 4)biomechanical analysis.

The objective methods of analysis such as electromyography, intraabdominal pressure determinations, and intradiscal pressure studies involve highly specialized apparatus and cadaveric models which make such undertakings best left to experts of the field. However, data gathered from such studies are available and may be utilized to support arguments regarding the biomechanical and ergonomic aspects of posture.

Nachemson, who pioneered work on in vivo determination of intradiscal pressures, and others have repeatedly suggested that an important task in the prevention or prophylaxis of low back pain is to provide ergonomic and postural recommendations on ways to decrease the load on the lumbar spine.

In a comprehensive summary of the current state of knowledge on posture and compressive spine loading, Anderson, in 1985, stressed that posture essentially determines the total compressive load on the spine as well as the load distribution within the spine and also argued that postural recommendations can be made based on this knowledge.

Several methods of posture assessment have been utilized with some success, although, most of them are not easily learned nor readily applicable in non-laboratory setting. Engels et al

(1994)investigated the physical workload among nurses in a nursing home and observed and recorded the working postures making use of the highly technical OVAKO Working Posture Analyzing System, which required the authors to note down the positions of the back, arms, legs, and head. Back positions were described as either straight, bent, straight and twisted, or bent and twisted. Head positions were described as free, bent forward, bent to side, bent backward and twisted.

Okada (1970) studied static forward bending postures using estimates of the angle formed between the vertical and a line connecting the left acromion and trochanter to determine the degree of trunk flexion. Pelvic rotation was not controlled, which was probably why the EMG determinations obtained were not uniform compared with latter EMG studies. Nevertheless, the results were still consistent with increasing myoelectrical activity as degree of flexion was increased.

MATERIALS AND METHODS

Five Philippine Board of Otolaryngology-Head & Neck Surgery (PBO-HNS) accredited training hospitals (East Avenue Medical Center, Jose Reyes Memorial Medical Center, Ospital ng Maynila, Philippine General Hospital and Sto. Tomas University Hospital)were selected for the study on the following bases: 1) Board accredited for more than five years 2) high volume of OPD patients, 3) high number of ENT training residents, and 4)regular whole day OPD hours.

The hospitals were randomly assigned observation dates and all junior residents (first and second year) assigned at the OPD during those times were included in the study. A total of 24 junior residents from the 5 institutions were included.

The combined junior resident population in these hospitals account for 77% (41 out of 53)of the total accredited junior ENT resident population in Metro Manila. Junior residents are usually the ones assigned to man the OPD whereas the senior residents are usually assigned to the operating rooms or wards.

A preliminary survey of the lay-out/floor plan of the OPD clinics and the available examination equipment were made by the researchers.

Subjects were observed while examining patients at the OPD and the lower back and head postures as well as the leg positions were noted, as 2 otoscopies, 2 laryngoscopies and 2 anterior rhinoscopic examinations were performed on patients. Some subjects were not able to complete the 6 tasks due to power failure at their institution during the observation period. Subjects were initially not made aware of the nature of the study. Efforts to be as inconspicuous as possible were made by the researchers during the said observation period. Subjects were informed of the nature of the study after being observed peforming the maximum tasks of interest and were assisted by a researcher in answering the questionnaire. Consent for inclusion in the study was secured prior to inclusion of the subject's data into the data pool.

All observations regarding postures were made by the main author. The determination of the degree of back flexion was done by estimating the angle formed between a vertical line and a line draw from the examiner's trochanter to the acromion. The actual task in the data gathering were divided in the following manner:

main author - recording of postures
co-author - floor plan of working area
- checklist of available equipment
- time elapsed

The postures were recorded on checklist for each of the 3 task of interest - sitting and standing postures together with the 5 basic power back postures (and combinations thereof), namely:

1. upright
2. flexion (including an estimate of the degree of flexion)
3. lateral bending
4. rotation, and
5. extension,

as well as the 5 basic neck postures and combinations, namely:

1. upright or free

2. extension
3. lateral bending
4. rotation, and
5. flexion.

Protrusion of the head was defined and recorded as simultaneous flexion of the lower neck and extension of the upper neck.

The back postures were tabulated in the following manner: the observed postures were first classified as having less than 20 degrees of flexion (category 1)or having greater than 20 degrees flexion (category 2). The postures were further sub-classified as having no combined motion (Subcategory A), combined with rotation (Subcategory B, combined with lateral bending (subcategory C) and, combined with lateral bending and rotation (subcategory D).

The position of the legs of the seated examiner relative to those of the seated patient namely:

1. to the side
2. closed/open in front
3. interlocked, and
4. open at the side.

The actual time spent doing each task was recorded using a stopwatch. Starting and ending cues for timing were standardized as follows:

1. Otoscopy
- start timing upon introduction of otoscope tip into external auditory meatus in one ear and end timing upon withdrawal of otoscope from the other ear

2. Anterior Rhinoscopy
- start timing upon introduction of the nasal speculum tip into one nostril and end timing upon withdrawal of speculum from the other nostril

3. Indirect Laryngoscopy
- start timing upon introduction of the laryngeal mirror into the oral cavity and end timing upon withdrawal of the mirror from the oral cavity. In cases where there was more than 1 attempt to visualize the larynx, time was stopped when the subject temporarily withdrew the mirror and changed his examining position. Timing was resumed upon reintroduction of the mirror into the oral cavity.

The questionnaire distributed after the observation sessions served to provide data on the profile of the subjects.

RESULTS

A. SUBJECT PROFILE

Table 1. Some Demographic Data on the subjects included in the study

	FREQUENCY
Sample size	24
male	17
Female	7
Demographics	
Mean age (years)	28.2+/-2.3
Age range	24-36
Mean weight (kg.)	65.4+/- 14.3
Mean height (cm.)	165.0+/- 6.9
Somatotype	
ectomorph	6
endomorph	3
mesomorph	15
Composition	
year level 1	13
year level 2	11
Pain profile	
With diagnosed organic back condition	3
With significant recurrent low Back pain requiring medications	5

Twenty-four subjects were included in the study, 17 of whom were males and 7 were females. Thirteen of the subjects were first year residents and 11 were 2nd year residents. Their ages ranged from 24 to 36 with a mean of 28.2 +/-2.3 years. Mean weight of the group was computed at 65.4 kilograms +/- 14.3 kilograms.

Data regarding recurrent low back pain was determined by questionnaire (Appendix A).

Among the subjects included, 3 or 12.5% had diagnosed organic back conditions which included scoliosis, hyperlordosis and an herniated disc. Five subjects or 20.8% indicated that they had recurrent low back pain which compelled them to either take medication or consult another physician. Table 2 lists the number of included subjects contributed by each of the involved institution. It shows that 50 to 60% of the study population in each institution was included in the study.

Table 2. Breakdown of Subjects per Institution

Institution	# of subjects	total # juniors	percentage
1	5	8	62.5%
2	5	9	55.5%
3	3	5	60.0%
4	6	12	50.0%
5	4	8	50.0%

B. EQUIPMENT PROFILE

Table 3. Features of the Commonly Used Types of Examiner's Chair According to Institution

	INSTITUTION				
Features	1	2	3	4	5
adjustable height -screw type	x	x	x		
-pneumatic type				x	x
functional wheels				x	x
padded seat				x	x
lumbar support				x	x
arm rest					x
rotating seat	x	x	x	x	x

Institutions 1,2 and 3 made use of screw-type stools as physicians' chair. Although height adjustment is an option for these types of stools, it is cumbersome and the authors did not observe any physician who actually adjusted the height of this stool. The absence of wheels on these stools also made some position adjustments more difficult for the examiner. Institutions 4 and 5 made use of examiner chairs with wheels, backrests and pneumatic height adjusters. The backrests provided postural relief for the examiner in between examinations.

All examinations requiring co-axial lighting made use of head mirrors. No subject was observed using electric headlight.

The most common patient's chair used were; 1)fixed height chairs, 2)pneumatic stools and traditional ENT chairs. Modern hydraulic "barber's" chairs were available in some institutions although they were not used by subjects during the observation periods.

C. DURATION OF EXAMINATIONS

Table 4. Time of Doing Otoscopy, Rhinoscopy and Laryngoscopy

	TIME (SECONDS)		
	Otoscopy	Rhinoscopy	Laryngoscopy
	n=48	n=45	N=44
Mean	15.04	14.76	25.57
Median	13.00	11.00	24.50
Mode	15	6	15
Standard deviation	8.78	13.90	16.95

Table 4 shows the mean, median and mode for the duration of the examinations undertaken. Values were computed from 24 subjects who did otoscopy trials. Only 45 values and 44 values were used in the computation for the mean time of rhinoscopy and laryngoscopy, respectively. This was because 2 subjects were not able to complete the 6 examination tasks due to power failure in the Out patient departments during the observation period. Laryngoscopy procedures were shown to have taken the longest time to perform with a mean performance time of 25.57 seconds and a standard deviation of 16.95 seconds. Mean times computed for otoscopy and rhinoscopy were 15.04 seconds and 14.76 seconds respectively.

C1. OTOSCOPY

Table 5. Observed Frequency of Back Positions assumed by the Examiners while Doing Otoscopy

	Sitting n=28		Standing N=20		All n=48	
Back Position	no.	%	no.	%	no.	%
1)0 to 20 degrees flexion						
a. without other movement	6	21.4	1	5.0	7	16.7
b. with rotation	6	21.4	0	0	6	12.5
c. with lateral bending	0	0	2	10.0	2	4.2
d. with both	5	17.9	0	0	5	10.4
2) more than 20 degrees flexion						
a. without other movement	3	10.7	7	35.0	10	20.8
b. with rotation	5	21.4	2	10.0	7	14.6
c. with lateral bending	0	0	1	5.0	1	2.0
d. with both	3	10.7	7	35.0	10	20.8

Observed lower back positions of the subjects while performing otoscopy are shown in Table 5. Separate columns for sitting and standing positions are provided for since 42% of all otoscopies were done in the standing position. Eight subjects did their 2 observed otoscopies standing while 4 subjects did otoscopy in both sitting and standing positions. Forward flexion of more than 20 degrees was noted in 60% of standing otoscopies and in 39% of all sitting otoscopies. 58% of all otoscopies were done with more than 20 degrees forward flexion.

Rotation of the back was observed in 19 out of 28 of otoscopies done in the sitting position and in 9/20 or 45% in the standing position. Flexion greater than 20 degrees combined with other movements (Categories 2B, 2C and 2D)were noted in 8 out of 28 or 29% of sitting otoscopies and in 50% of standing otoscopies. Category 2B,

2C and 2D back postures were assumed in 18 out of 48 or 37.5% of all otoscopies done.

Table 6. Observed Frequency of Head Positions Assumed by Examiners during Otoscopy in the Sitting and Standing Positions

	Sitting n=28		Standing n=20		All n=28	
Head Position	no	%	no	%	no	%
rotation	13	46.4	8	40.0	22	45.8
extension + rotation	6	21.4	2	10.0	9	18.7
flexion + rotation	6	21.4	4	20.0	10	20.7
extension + lat. bending	0	0	3	15.0	3	6.2
extension	1	3.6	2	10.0	2	4.7
flexion	0	0	1	5.0	1	2.1
protrusion	1	3.6	0	0	1	2.1

Head positions were recorded and tabulated in decreasing order of frequency. Most common head posture involved neck rotation which were noted in 89% of all otoscopies done in the sitting position and in 70% of all those done in the standing position. Pure neck flexion, pure extension and lateral bending positions accounted for only 13% of all head postures.

Table 7. Observed Frequency of Leg Positions Assumed by Examiners While Performing Otoscopy in the Sitting Position

n=28

LEG POSITION	no.	Percentage
In front		
a. open	12	43.0%
b. closed	0	0
side by side	16	57.0%

C2. ANTERIOR RHINOSCOPY

Table 8. Observed Frequencies of Back Positions by Examiners while Doing Anterior Rhinoscopy

BACK POSITION	number	Percentage
1) 0 to 20 degrees flexion		
a. without other movement	16	34.7%
b. with rotation	16	34.7%
c. with lateral bending	0	0%
d. with both	6	13.05%
2)more than 20 degrees flexion		
a. without other movement	3	6.5%
b. with rotation	5	10.9%
c. with lateral bending	0	0%
d. with both	0	0%

All anterior rhinoscopy procedures observed were done in the sitting position on seated or carried patients using a head mirror and a nasal speculum. One subject was not able to perform any rhinoscopy due to power failure at their institution. Forward flexion of more than 20 degrees was noted in 8 out of 46 rhinoscopies or in 17.4%. Rotation of the back was observed in 27 subjects or 58.7%. Category 2B, 2C and 2D postures which combined greater than 20 degrees flexion with other movements accounted for only 10.9%.

Table 9. Observed Frequency of Head Positions Assumed by Examiners while Doing Anterior Rhinoscopy

n=46

HEAD POSITION	number	Percentage
Extension	17	36.9%
Upright	17	36.9%
Protrusion	8	17.4%
Rotation	2	4.3%
Flexion	2	4.3%

Only 5 head positions were observed to have been assumed by the examiners while doing rhinoscopy, the most common being extension and upright positions. Each accounted for 74% (34 out of 46)of all head positions. Neck rotation and flexion was minimal at 4.3% each. Protrusion accounted for 17.4%.

Table 10. Observed Frequency of Sitting Leg Position Assumed by Examiners while Doing Anterior Rhinoscopy

n=46

LEG POSITION	number	percentage
In front		
a. open	15	32.0%
b. closed	1	2.2%
side by side	29	63.0%

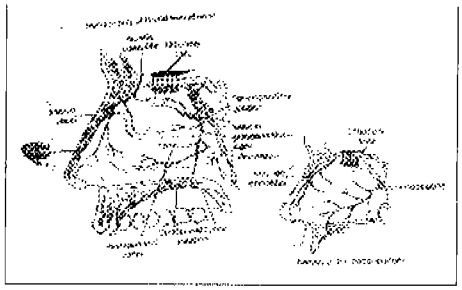
C3. INDIRECT LARYNGOSCOPY

Table 11. Observed Frequency of Back Position Assumed by the Examiners while Doing Indirect Laryngoscopy

BACK POSITION	number	percentage
1) 0 to 20 degrees flexion		
a. without other movement	17	38.6%
b. with rotation	19	43.9%
c. with lateral bending	0	0%
d. with both	6	13.06%
2)more than 20 degrees flexion		
a. without other movement	2	4.5%
b. with rotation	0	0%
c. with lateral bending	0	0%
d. with both	0	0%

All indirect laryngoscopies were done in the sitting position using a head mirror and a laryngeal mirror. Only 22 subjects were able to perform the 2 laryngoscopies required for observation. Back flexion of more than 20 degrees was noted in only 2 out of 44 laryngoscopies or a percentage of only 4.5 (Please refer to subjects 40 & 41 in Table 14).

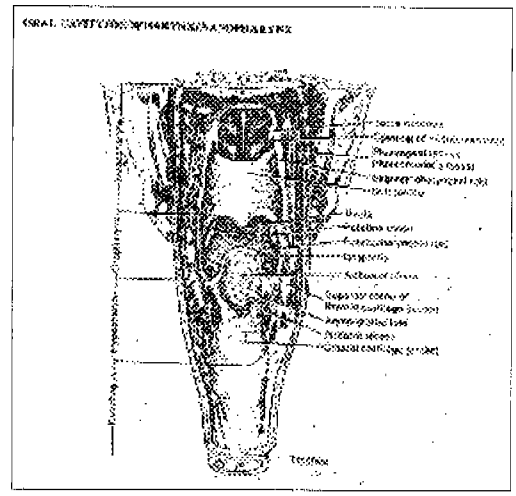
Rotation of the back was noted in 25 out of 44 (56.8%) while flexion combined with other movements (Categories 2B, 2C,

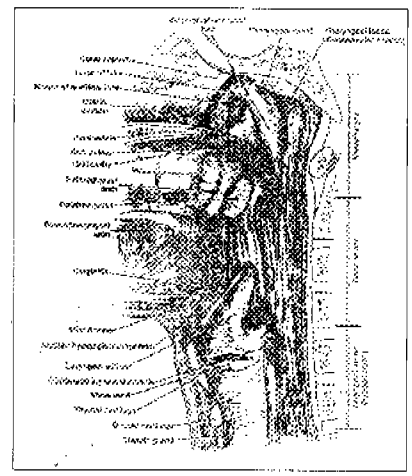


Adapted from Cummings, Otolaryngology Head and Neck Surgery

The nerve supply (both sensory and secretory) is via the nasopalatine, anterior and posterior ethmoidal nerves from the second division of the maxillary nerve (CN V), (Graney, 1993). Nasal obstruction, nasal discharge, and nasal pain were included as parameters even if these are expected in patients where the pulmonary tissue is stimulated through the naso-pulmonary reflex. In this regard, this also may happen in the OGT group since one patient in the OGT group developed nasal pain. The longer time needed for NGT to be inserted is due to this very narrow and delicate cavity which has to be traversed first by the tube before it goes to the oropharynx. It is the irritation by the tube of this nerve endings that caused the discomfort, nasal discharge (rhinitis), and nasal pain in the NGT subjects. The nasal obstruction was caused by the obstruction of the meatuses by the inflammed nasal mucosa which was irritated by the tube itself. However, the absence of nasal discharge and nasal obstruction of 3 and 2 subjects respectively in the NGT group could be possibly due to a widened nasal chamber or that the subject did not move a lot to cause movement of the tube would result in further irritation of the nasal mucosa. Further more, the subjects could have adapted easily to the presence of the tube.

The pharynx is a common aerodigestive tract, which is subdivided anatomically into the nasopharynx, oropharynx, and laryngopharynx (hypopharynx) , (Graney, 1993), (see appendix XI and XII). The nasopharynx begins as far as the tip of the uvula. The oropharynx is outlined by a line drawn from the tip of the uvula following along the palatopharyngeal fold to the level of the epiglottis. Finally, the laryngopharynx extends from the level of the epiglottis to the level of the cricoid cartilage.



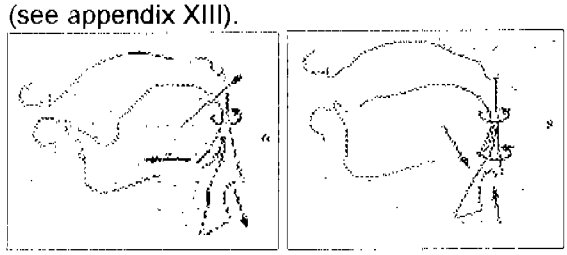


Adapted from Cumming, Otolaryngology Head and Neck Surgery

First, the pharyngeal wall is composed of stratified squamous epithelium covering a myofascial layer extending from the skull base to the esophagus. The sensory (touch, pain, and taste) distribution of CN IX (glosopharyngeal nerve) is to the posterior portion of the tongue, lateral wall of the oropharynx, and upper portion of the laryngopharynx. The glosopharyngealnerve also supplies the nasopharynx. The laryngopharynx is supplied by the internal branch superior laryngeal nerve which comes from CN X (vagus nerve). Maxillary and mandibular branches of CN V contributes to the somatosensory innervation of the oral cavity. It is the greater contact of the OGT with led the mucosa of the oral cavity with its free nerve endings which led to a more intense

oropharyngeal pain and gag reflex experienced by this group of subjects.

Drooling or salivation is elicited by gustatory and mechanical receptors located at the oral cavity particularly in the buccal mucosa and posterior portion of the tongue that led to the increased salivation in the OGT subjects. During speech, as a cavity of the vocal tract, the pharynx takes an active part in the generation and filtering sound (see appendix XIII).



Adapted from Cummings, Otolaryngology Head and Neck Surgery

Second, the muscles of the pharyngeal region (including the extrinsic muscles of the tongue) have both a local role in shaping the pharyngeal cavity and a more general role in positioning the tongue in relation to the interior part of the vocal tract

Finally, most of the efferent and afferent nerves that mediate the fine control of the speech maneuvers throughout the vocal tract pass in the vicinity of the pharyngeal region. Thus,the OGT acted as a barrier to these mechanisms thereby altering the speech of the subjects in this group

The limitation of this study was the absence of long term effect. If the tube stayed long the subjects may have a hard time recalling the previous experience when second intervention is done. Furthermore, the patient still experienced the effect of the first intervention and it would have taken some time for it to be washed out. Although inserting the OGT seemed to be a new procedure compare to the NGT, not much difficulty was encountered during its insertion probably because of the wide, practically unobstructed cavity it traverses.

Although each procedure has its own advantages and disadvantages which almost parallel each other in occurrence, either route can be used by the attending physician.

In summary, this study has shown that the NGT takes longer time to insert and is more discomforting to the subjects. NGT also causes nasal pain, nasal obstruction, and nasal discharge. Bothersome effects noted for OGT include more oropharyngeal pain, speech disturbance, gag reflex, and drooling. Over all, the subjects preferred OGT over NGT.

CONCLUSION

1. Insertion of OGT is easier compared to NGT insertion
2. There are more bothersome effects of NGT than OGT
3. Majority of the subjects accepted and preferred OGT over NGT

RECOMMENDATION

At present, OGT can be considered a viable alternative route of delivering nutrition or other indications to patients where NGT has been used in the past.

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OBTURATOR PROSTHESES FOR ORAL REHABILITATION OF POST-MAXILLECTOMY PATIENTS*

JOHN CARL M. BARON, MD.**
RONALDO A. REYES, MD **
RAMON ANTONIO B. LOPA, MD **
JOSE ANGELITO U. HARDILLO, MD **
EMMANUEL L. IBAY, MD **
MARIANO B. CAPARAS, MD ***

ABSTRACT

Thirty patients with surgically acquired palatal defects and resultant speech and swallowing impairment were fitted with a locally manufactured obturator prostheses made of hard and soft acrylic. Speech and swallowing were evaluated after obturator application. All patients, regardless of the extent of the defect, had dramatic improvement with the use of the appliance.

Keywords: Obturator Prosthesis, Palatal defects, Oral rehabilitation

INTRODUCTION

Acquired palatal defects generally occur as a consequence of trauma or as a result of surgical management for a maxillary or palatal malignancy. These palatal defects regardless of the cause and the size will result in speech and swallowing difficulties. Hypernasality, which is defined as an abnormal voice quality due to excessive nasal resonance, is one of the speech problems experienced by these patients. Swallowing becomes difficult because of the regurgitation of food through the defect into the nasal cavity. In addition, the loss of the underlying skeletal framework of the midfacial region predisposes one to the development of skin contractures resulting in severe facial disfigurement (Fig.1). To avoid these potentially incapacitating problems, it is imperative that these patients undergo complete rehabilitation as soon as possible. Guisford in 1965 once said that "It is totally unacceptable to assume that treatment is complete after the cancer has been removed. Many of these patients will be free of their cancer but will become permanent cripples if they are not rehabilitated..."

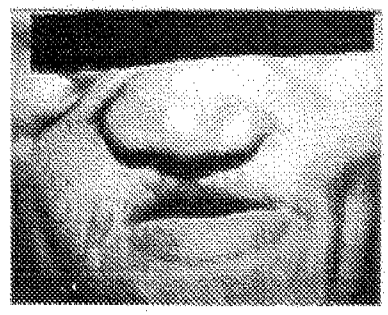

Figure 1: Patient with Midfacial Contracture Secondary to Bilteral Total Maxillectomy

One such form of rehabilitation for patients with acquired palatal defects secondary to tumor extirpation is an obturator or prosthesis. Ambroise Pare first described obturators for defects of the hard palate and used a dried piece of sponge attached to the upper surface of a plate of gold. The sponge protruding into the maxillary cavity absorbed moisture from nasal secretions and with consequent swelling sealed and held the plate in place over the defect.

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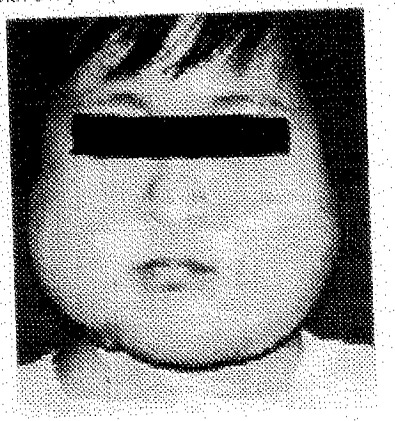
*2nd Place, PSOHNS Descriptive Research Contest
October 27, 1995 Holiday Inn Hotel, Manila

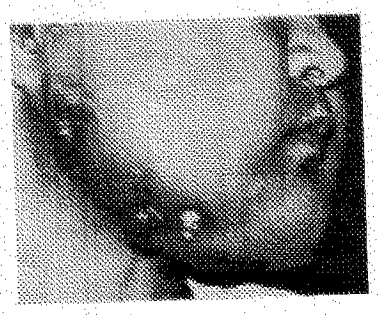
**Residents, Department of Otorhinolaryngology, University of the Philippines-Philippine General Hospital
***Consultant, Department of Otorhinolaryngology, University of the Philippines-Philippine General Hospital

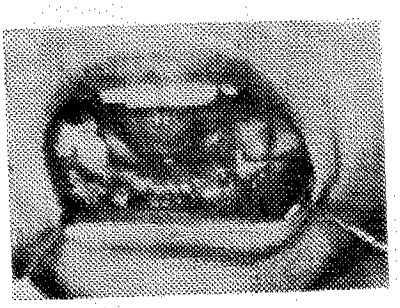
center was likewise not able to control the progressive swelling and discharge. With the increasing severity of the mandibular swelling and with the development of bony sequestra and purulent discharge, the patient was then referred by a provincial hospital to this institution for further management. Review of history revealed limping of the left leg of 4 years duration with progressive blurring of the left eye. Similar manifestation were likewise present in one sister.

Physical examinations showed a bilaterally swollen mandible with purulent sequestrum. Multiple, fleshy, and discharging masses were noted at the skin of the mandible and along the sites of previous dental extractions. (Please see Appendices 1 and 2).

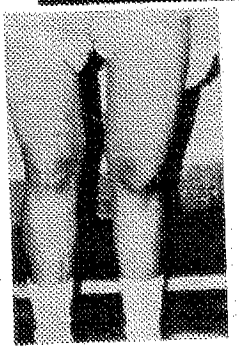
Appendix 1: Photographs of the swollen mandible: a) the patient's frontal view; b) left side; c) right side; d) intraoral lesion with bony sequestrum







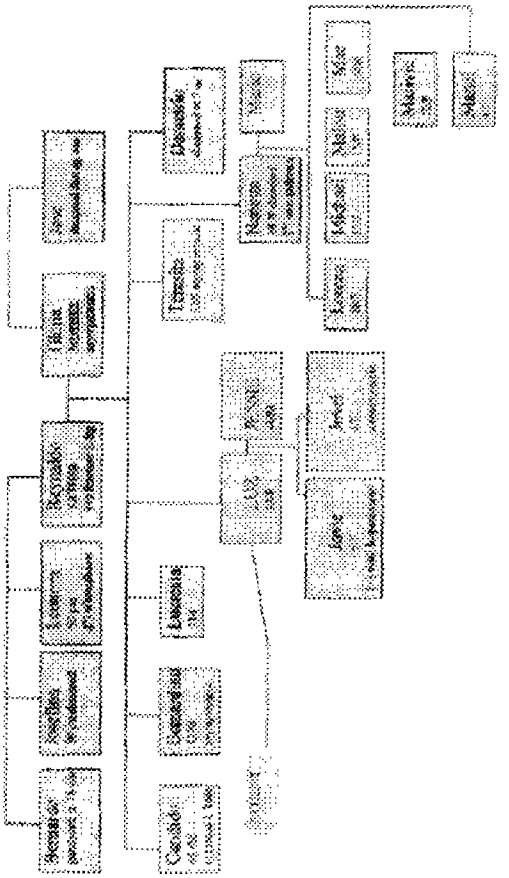
Appendix 2: Radiographs showing a) hyperopacity of the calvarium and base of the skull; b) osteomyelytic mandible, and c) pathologic femoral fracture



There was a palpable bony deformity on the left leg which was shorter than the right and opthalmoscopy revealed optic atrophy on the left eye. The patient was worked up and blood examinations revealed severe anemia with thrombocytopenia. Biopsy of the fleshy tissues revealed chronic inflammation with granulation tissue; the cultured discharge produced Pseudomonas. Radiographs revealed osteolytic changes in the mandible and a pathologic fracture on the left femur. The bones were hyperdense and a bone scan demonstrated hyperopacities in all of her skeleton, particularly at the skull base and pelvis. A diagnosis of osteopetrosis was given and the patient was referred to the hematologist for co-management. The patient was given several transfusions and antibiotics were given accordingly.

A thorough review of the family history was undertaken. A brother of the patient was said to have developed bony swelling on the legs. However, this brother was not located and no documentation was done. Bone scans on two daughters showed early signs of calvarial and base of the skull thickening in one of them. (Family tree in Appendix 3) After the patient was cleared by the hematologist, a debridement operation on the mandible was performed under general anesthesia. However, massive intraoperative bleeding was encountered and despite blood transfusion, the patient suffered hypovolemic shock, went into cardio-respiratory arrest and expired after resuscitative measures failed.

Appendix 3: Family Tree



DISCUSSION

The patient's progressive, painful swelling and enlargement of the mandible despite repeated curettage and antibiotics suggests several entities, namely: radicular cysts, dentigerous cyst, adenomatoid odonto-genic tumor, odontogenic fibroma, ameloblastoma, osteo-myleitis and malignancy. Radicular cysts and dentigerous cysts are very common but usually present and thus unlikely in this case. The first seven entities can be easily controlled completely with adequate incision and curettage.

Odontogenic myxomas may give rise to similar manifestations as this patient but has a definite histo-pathologic picture consisting of a basophilic homogenous ground substance and a distinct "honeycomb" radiologic appearance, both of which were not present in the patient. Because of the persistence of the swelling, ameloblastoma or a possible malignancy must be ruled out. The histopathologic findings, however, pointed to a chronic osteomyelitis.

Osteomyelitis may be primary or secondary but, looking at the other clinical manifestations, the possibility of an underlying systemic disorder was brought to mind. With the limping on the right leg, the possibility of a fracture, or an underlying bone pathology was considered. There was severe anemia and thrombocytopenia, hinting on a possible underlying disorder in the hematopoietic system. Optic atrophy was noted and thus cranial nerves may be involved. Furthermore, with one suffering from similar clinical manifestations, this strongly points to a possible hereditary disorder.

Is there a disease entity, or perhaps a syndrome that could encompass all these multisystemic clinical manifestation? With all these cranial, mandibular and femoral bone involvement a primary bone disorder was considered. The presence of generalized, diffuse and symmetric hyperopacity in all bones, particularly at the skull base and pelvis led to the diagnosis of the rare familial disorder of osteopetrosis.

Osteopetrosis, or Alber-Schoberg syndrome, is characterized by extraordinary thickness and density of cortical bones at the expense of the medullary portion. It is caused by defective bone resorption possibly related to dysfunctioning osteoclasts while bone formation is normal. There are three forms of the disease: 1) Infantile malignant 2) Intermediate autosomal recessive, and 3) adult- onset, benign, autosomal dominant form. Once this disease is survived beyond infancy, it is

of the benign type. While the first two forms present with severe hematologic, orthopedic, neurologic and other manifestations and usually perish at birth or early infancy, the benign type may still present with similarly severe manifestations but at later age. It is important for otolaryngologists to be aware of these disorders since the skull base is a site of proclivity for the osteopetroses and it is possible that a primarily otolaryngologic symptom may be the first sign of this disorder.

Having developed manifestations at a relatively later age, and with indications that one child, together with a sister and probably another brother, is affected with the disease, osteopetrosis in this patient's case is most probably of the benign autosomal dominant type. Available data gathered through history and radiographic documentations affirm the genetic mode of transmission of the disease, which in this case, is most probably from the father's side of the family. Prevalence figures for the autosomal dominant form is unreliable because many patients are asymptomatic although one study in Denmark approximated it to be around 5.5 for every 100,000 population. This is definitely an underestimate for reports of large families with many affected individuals may change the estimate considerably. The authors were not able to come across a local epidemiologic report on this disorder.

Osteomyelitis of the mandible, which is usually preceded by carious teeth and dental extraction, occurs in this disorder because of diminished vascularity of the bones and decreased resistance to infection. Pathologic fractures, the most common initial manifestation, occur because the bones are brittle despite hypercalcification. In a series compiled by Heinkel and Beiler, out of 25 adult patients reported, only 28 percent had any symptoms other than pathologic fractures, approximately 45 percent were completely asymptomatic, and none had osteomyelitis, although the mandible was involved radiographically in 14 of the patients.

The other manifestations seen in the patient are typical of this disorder. The severe pancytopenia was due to the obliteration of marrow cavity by cortical bone overgrowth. Optic atrophy is the most common cranial nerve affectation secondary to nerve impingement at the foramina due to bony overgrowths. Other cranial nerve affectations of interest to otolaryngologists but not present in this patient is facial nerve palsy. Retardation and hypersplenism may be present in osteopetrosis, but mainly on the recessive malignant form.

While advances in radiographic techniques have facilitated early detection of osteopetrotic patients, management has so far been only palliative. Treatment has been focused mainly on stimulating osteopetrotic activity, improve the hematologic profile, and avoidance of fractures. Prednisone (1-2 mg/ kg/day) has improved the hematologic function in some patients but no reduction of the bone mass has been achieved. An integral part of therapy is a calcium-deficient diet. High doses of calcitrol and parathormone have been given to stimulate osteoclastic activity but no long term and consistent improvements have been reported. Lately, bone marrow transplant, interferon gamma and macrophage stimulating factors have been given in the belief that these may alter osteoclastic and immune defects by stimulating cellular formation and function. So far, these treatment regimens, alone or in combination, ameliorate but not cure the osteopetrotic condition.

With the numerous severe clinical manifestation of osteopetrosis, early identification is very important, not because it can be cured, but to avoid unexpected complications that might ensue, especially if surgical procedures are to be performed. Being a familial disorder, diagnosis will also facilitate evaluation of other members of the family, and, accordingly, advise them of the genetic as well as the clinical implications of this disorder. Otolaryngologists, therefore, should be aware that osteopetrosis, with its numerous hematologic, orthopedic, and other severe manifestations, may initially present with a common otolaryngologic problem.

SUMMARY AND CONCLUSION

In this paper, mandibular swelling and osteomyelitis has been demonstrated as an initial manifestation of the rare familial disorder osteopetrosis or Albers- Schoberg

syndrome. The hereditary aspects and implications of the disease have been documented and discussed.

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PATTERNS OF PRESCRIBING INTRANASAL STEROID SPRAYS: A DRUG UTILIZATION STUDY

Jose Acuin, Ruzanne Caro and Charles Yu

INTRODUCTION

Chronic rhinitis is one of the most common ailments that cut through social and racial barriers. In a 1985 national survey, 41.5 million Americans, representing 20% of the total population, was found to be suffering from upper respiratory allergy with substantial symptoms occurring for an average of 19 weeks per year[11]. In 1975, the cost of medications and physicians visits for allergic rhinitis was estimated at 500 million U.S. dollars. Filipinos probably suffer as much, considering the hot and dusty environment prevailing in most time of the year. The escalating levels of air pollution tends to worsen the problem.

Intranasal steroid sprays are a fairly recent addition to the array of drugs for the treatment of chronic rhinitis. Beclomethasone diproprionate was first marketed in the 1970s, followed by budesonide, flunisolide and floucortin butylester in the early 1980s. These highly active topical glucocorticoids ushered in a new era of nasal allergy treatment, promising excellent local control of symptoms with minimal systemic effects. The antiinflammatory action of these drugs is primarily based on their ability to induce the formation of lipocortin, a protein which inhibits the release of arachidonic acid and the inflammatory mediators derived from it. Inhibition of endothelial adherence of leukocytes, basophil migration and mast cell concentration are other salutary effects[1].

In the Philippines, beclomethasone dipropionate is marketed as Beconase (trademark of Glaxo) and comes in freon propelled or aqueous nasal sprays delivering 50 mcgm of the active drug per actuation. A total of 400 mcgm per day, or two actuations per nostril twice daily, is generally recommended[2]. Budesonide is marketed as Budecort (trademark of Astra) in a freon propelled nasal spray also delivering 50 mcgm of the active ingredient per actuation. Most currently practising physicians who are using these drugs probably learned about it from continuing medical education efforts or from drug detailing. Its use, therefore, reflects not so much the physician's previous medical education as his contact with peers, with current literature and with representatives of the drug industry. Although steroid sprays are being recommended for several nasal disorders familiar to ENT practice, its acceptance among local otolaryngologists have not yet been determined.

REVIEW OF LITERATURE

The comparative efficacies of beclomethasone and budesonide have been determined by two single blind trials by Pipkorn and Rundkrantz (1982) and Samuelson (1983) and by a double blind trial by Vanzielleghem and Juniper (1987)[3]. All three showed almost equal efficacy rates with slightly better control of allergy symptoms with budesonide. Sixty to ninety percent of patients, adults and children alike, have been found to experience complete control of nasal symptoms. Although oral antihistamines produced more relief of allergic ocular symptoms in comparative trials with nasal steroids, the latter were just as effective in alleviating nasal symptoms[3]. The indications for the use of steroid sprays are fairly uniform across many studies. These include seasonal and perenial allergic rhinitis, nonallergic rhinitis without eosinophilia syndrome (NARES), nonallergic rhinitis (vasomotor), rhinitis medicamentosa, nasal polyps and post-polypectomy cases[1]. Transient sneezing, stinging or drying, nasal bleeding, nasal septal perforations and ulcerations have appeared in the literature. No case of nasopharyngeal candidiasis or atrophic changes have so far been reported. Compliance has not been problematic and,

with high efficacy rates, has been estimated at 85%[4].

No local study has yet been made determining how physicians prescribe nasal steroid sprays and how patients utilized the drug. This study aims to determine how physicians prescribe intranasal steroid sprays in terms of therapeutic indications, dosaging, duration and combination with other anti-allergy medications. Compared with allergologists, otolaryngologists are a bigger group of specialists who treat more patients with allergic rhinitis, who are more likely to be consulted first for nasal problems and who are frequently targetted by drug detailing activities. The first part of the study, therefore, will focus on otolaryngologists prescribing practices in a tertiary hospital setting. The second part of the study will review prescriptions made by two otolaryngologists and one pulmonologist's prescriptions. Qualitative data obtained from these two substudies will be utilized in building assumptions and inferences that will enable the calculation of the defined daily dose (DDD) per 1000 inhabitants per day in the third and final part of the study.

SUBJECTS AND METHODS

Sub-study 1.

Fifty physicians constituting the entire otolaryngology staffs of two tertiary general hospitals in Metro Manila, the Philippine General Hospital and East Avenue Medical Center, were consecutively entered into the study and given questionnaires on nasal steroid spray use. There were 9 consultants and 41 residents in the study population. With a response rate of 100% among the consultants and 60% (24 out of 41) among residents, a total of 33 questionnaires were evaluated. Mean age was 28 years among residents and 41 years among consultants.

The sample size has an 80% chance of detecting a prescribing practice with a prevalence rate of 60%.

Sub-study 2.

The outpatient records of two otolaryngologists and one pulmonologist from one peri-urban tertiary teaching hospital (De La Salle University Medical Center in Dasmariñas, Cavite) were reviewed. The number of prescriptions of either beclomethasone or budesonide over a one year period (1992) were obtained, combined for each type of specialist, compared for possible differences in prescribing indications and then pooled together to estimate the total number of units prescribed over the one year period. The population size of the catchment area was then obtained and used in the calculation of the DDD for Dasmarinas.

The sample size had a 95% chance of detecting a 60% prevalence of a specific indication for prescribing nasal steroid sprays.

Sub-study 3.

Defined daily doses were calculated from:

a) total annual number of units of beclomethasone and budesonide sold from the sales data reported by IMS, December 1992
b) sales records from a single Mercury branch in Greenhills, San Juan, Metro Manila area in San Juan.

RESULTS

Sub-study 1.

Among the 33 respondents, 52% prescribed budesonide, 27% prefer beclomethasone in either the freon-propelled or the aqueous solution form and 21% use either drug interchargeably. The most common indication for nasal steroids was allergic rhinitis. The other indications mentioned by the respondents closely matched those previously mentioned and reflect the current general consensus among otolaryngologists regarding the versatility of nasal steroids in treating many types of chronic rhinitis.

Table 1. Indications Cited by 33 Respondents for Use of Intranasal Steroids

Indications	No. of respondents
Allergic rhinitis	28
Vasomotor rhinitis	11
Nasal polyps	18
Sinusitis	0
Others (post-polypectomy)	8

Most respondents (85%) gave steroid sprays at the correct adult dosage of 2 puffs into each nostril twice daily. Those who were giving it at lower doses claimed they were tapering the drug and were wary of rebound congestion. In children, the correct pediatric dose, 1 puff per nostril BID[5], was being given although for shorter periods than in adults. Fifty-four percent of respondents did not give it at all to children. This reflects the general wariness with which physicians administer steroids to children even though long-term use of budesonide has been shown not to exert any systemic effect significant enough to suppress the pituitary-adrenal axis[6]. Table 2 further shown that steroid sprays were being given adults at periods no shorter than one month. Again this was in consonance with the general recommendation to use steroid sprays for prolonged periods and prophylacatically in as much as its therapeutic effect lags by at least one week after initiation[7].

Table 2. Duration of Treatment with Nasal Steroids

Duration of Treatment	No. of Respondents	
	Adult	Pediatric
Indefinite	5	3
1-2 weeks	4	4
3 weeks	0	0
1 month	11	4
2 months	6	2
3 months	2	0
Depends on indication	2	1
No answer	3	1
Does not prescribe	0	18
Total	33	33

Ninety percent of respondents combined steroid sprays with oral medications. Antihistamine-decogestant combinations were the most popular, followed by antibiotics. This reflects adherence to the recommendation to initially combine the drug with oral antiallergy medications because of its delayed onset of action. The coupling of antibiotics with steroid sprays despite a diagnosis of allergic rhinitis may be due to the fear of provoking an acute attack of sinusitis when steroids are used.

Table 3. Average Number of Weekly Prescriptions Of Nasal Steroids

No. of prescription/week	No. of respondents
0 - 1	6
1 - 2	8
2 - 3	4
3 - 4	1
4 - 5	0
> 5	1
>10	3
No answer	10
Total	33

Sixty percent of respondents averaged 0 to 2 prescriptions per week. Considering that patients with allergic rhinitis constitute about 30 - 40-% of outpatient consultations, the underprescribing might indicate that intranasal steroid sprays were being reserved for only the most severe and intractable cases as well as for post-surgery patients who are at risk for developing recurrent nasal polyposis. The prohibitive price of one container may also be at work here, with physicians preferring to start with the cheaper antihistamines and reserving the drug only for those who could afford to it over a long term basis.

Sub-study 2.

A total of seventy-seven patients out of 9.750 consultations were prescribed with either beclomethasone or budesonide by three specialists in Dasmariñas, Cavite in 1992. There were 29 males (38%) and 48 females (62%). The mean age was 29 years. Allergic symptoms were present in 90% of patients and findings of pale edematous turbinates with clear watery discharge were obtained in 86%. The drug was prescribed for the shrinkage of polyps or polypoid mucosa in 19.4% of patients and for the control of sinusitis in an additional 27%. Fifty-one percent have been treated with at least a class of antihistamine and 31% with at least one course of antibiotics prior to iniatiation of nasal steroid therapy. Twenty three of 67 patients received at least one course of antibiotics prior to steroid therapy. Steroid sprays were co-prescribed with either antihistamines steroids or antibiotics in 48. Ten percent was given oral steroids during the first week of nasal steroid therapy.

A total of 100 units were prescribed over the one year period for a mean duration of one month per unit per patient.

Table 4. Prescribed Duration of Nasal Steroid Treatment in 77 Patients

Duration	Number of Patients
1 month	63
2 months	9
3 months	2
4 months	2
5 months	1
Total	77

Thirty-eight out of the 77 patients (51%) reported for at least follow-up evaluation. Of these, 63% reported relief from most allergic symptoms, 26% were unchanged and 11% got worse.

Nasal steroid prescriptions are seldom secured by dispensing drugstores in this country and thus determining the number of prescriptions made over a period of time would be impossibe at present. However, each unit of steroid spray sold may be assumed to equal one prescription because the drug is expensive. Hence, patients could probably afford to buy only one unit per prescription and only after ascertaining from a medical consultaton that the medication would be efficacious. Sub-study 2 showed that physicians were prescribing one unit at a time and re-assessing the need for continuous treatment every month. Although prescriptions may be used more than once, the cost of the drug would tend to force patients to see the cost-effectiveness of consulting again before buying a subsequent unit.

The national prevalence of allergic symptoms in the Philippines was assumed to be 15%, that is, similar to the reported prevalence figures of both seasonal and non-seasonal allergic rhinitis in the United States which ranges from 10% to 20% (11,12). The similarity of the prevalence rates of the two countries was based on the observations that although most forms of allergic rhinitis among Filipinos are perennial (thus tending to inflate the U.S. rate), the absence of seasonal allergies among Filipinos would tend to pull the actual prevalence rate back to a region still near the U.S. rate. Therefore, in Dasmarinas, about 15% of 358,500 or 53,775 inhabitants would have had some allergic symptoms in 1990 and would have been theoretically. "exposed" to nasal steroid prescriptions. Although there are other indications for the use of nasal steroids, sub-studies 1 and 2 showed that allergic rhinitis was the main indication used by otolaryngologists and since there is no reason why other specialist would not prescribe likewise, it can be assumed that most physicians would reserve the drug only for allergic rhinitis cases.

However it must be considered that allergic rhinitis symptoms would have to be rather severe before prompting consultation. This low consultation rate was supported by the low follow-up rate, 50%, among patients in sub-study 2. Further, the rate of compliance to the advice to buy an expensive drug (such as either brand of steroid spray) that must be used daily over at least one month and patients whose symptoms may wax and wane independently of the drug, would probably be low. Personal communications with Astra, Phil. product managers (9) corroborated this low compliance rate which they pegged at 20% based on discrepancies between physicians prescriptions and actual product sales. An intermediate compliance rate of 50% was adopted for this substudy since personal experience with patients in this area confirm a higher than the national compliance rate.

The defined daily dose (DDD) for every 1000 inhabitants of Dasmarinas was calculated as follows:

number of prescriptions (n) = total units prescribed in 1992 = 100

average number of doses per prescription (D) = 200

mass of each dose (M) = 50 mcgm using either brand

population size (P) = 358,500 x 0.15 - (358,500 x 0.50) = 26,888

time period (T) = 365 days

Table 5. Annual Sales of Budesonide and Beclomethason Nasal Sprays

	Budesonide 50 mcgm/ 200 doses	Beclomethasone 50mcgm/ 200 doses	Total
Annual sales	35,200 Units	21,500 units	56,700
Regional distribution			
Metro Manila	51.41	53.14	
Luzon	17.53	20.11	
Visayas	18.54	16.55	

Mindanao	12.53	10.21	
Consuming Patients	97,000	30,000	127,000
Percent of ptts. w/ allergic rhinitis (Source: IMS Dec. 92)	42.6%	no data	

DDD = 200 mcgm
DDD/1000 inhabitants/day =

$$\frac{100 \times 200 \times 200 \times 1000}{26{,}888 \times 365 \times 200 \text{ mcgm}} = 2.04$$

Sub-study 3.

Glaxo Philippines racked up a national aggregate of 21,500 units of beclomethasone (Beconase freon-propelled and aqueous forms) sold from January to December, 1992. Astra Philippines scored a national sales figure of 35,200 units of budesonide within the same period 8. Total sales of nasal steroid spray units was therefore, 56,700.

Based on the 1990 census, the total population of the Philippines was taken to be 60,684,900 10. The rate of compliance to the advice to take the drug continuously was set at 90% for this substudy based on the the number of units sold and not the number of units prescribed. This meant that once the patients purchase the drug they will probably use it as prescribed. The national defined daily dose was, therefore, calculated as follows:

number of prescriptions (N) = total units sold in 1992 = 56,700
average number of doses per prescriptions (D) = 200
mass of each dose (M) = 50 mcgm using either brand
population size (P) = 60.68 million x .15 = 9 million less 1 million for non-compliance = 8 million
time period (T) = 365 days
DDD = 200 mcgm
DDD/1000 inhabitants/day =

$$\frac{56{,}7000 \times 200 \times 200 \text{ mcgm} \times 1000}{8 \text{ million} \times 365 \times 200 \text{ mcgm}} = 3.9$$

Sales records from the Mercury Drugstore branch in Greenhills, San Juan showed that 96 units of Beconase and 100 units of Budecort were dispensed from March, 1992 to March, 1993 13. The population at risk was calculated as follows:

Population of San Juan = 127,000
Population at risk for steroid spray exposure = 127,000 x .15 = 19,050
Therefore, DDD/1000 inhabitants/day =

$$\frac{196 \times 200 \times 200 \text{ mcgm} \times 1000}{19{,}050 \times 365 \times 200 \text{ mcgm}} = 5.6$$

DISCUSSION

Drug utilization studies are usually plagued by inadequate databases and difficulties in linking quantitative data on drug use with actual drug utilization. The defined daily dose (DDD) per 1000 inhabitants, although a generally accepted measure of the proportion of the population exposed to treatment with a particular drug, is fraught with methodologic limitations that threaten its applicability to diverse clinical settings in which the drug in question may be really used. In the Philippines, the lack of local reliable databases, the non-observance of the dispensing policies set forth by the Pharmacy and the Generics Acts and the free-for-all system of health care delivery make pharmacoepidemiologic studies doubly difficult.

This study proposes that the best means to forge ahead and surmount some of these daunting problems lies on maximizing whatever databases are available by "triangulating" them with qualitative studies. Thus, although this study used aggregated data on sales of drugs, the limitations that threaten its internal and external validity of quantitative data may be compensated for by the prescriber-based cross-sectional descriptive surveys on drug utilization. In this study, the choice of drug for investigation --- intranasal steroid sprays --- is particularly auspicious. The sameness of dosage per actuation for both brands, the definite indications for their use, the limited tendency for over-the-counter dispensing because of unfamiliarity to most patients and the limited number of specialist who are comfortable in prescribing them --- all of these factors bolster the validity of the assumptions made in calculations of the DDD per 1000 inhabitants.

What remains to be done is for qualitative studies to substantiates these facilitating assumptions and in this regard, both descriptive sub-studies, done in two settings and using different data collection methods, succeeded.

The differences observed in the calculated DDD per 1000 inhabitants of the national, Dasmarinas and the San Juan data --- 3.8, 2.0 and 5.6, respectively --- are probably due to the non-uniform availability of the drugs throughout the archipelago and the varying compliance rates. San Juan had the highest DDD because of the simultaneous presence of the kinds of physicians and patients who will and can patronize these drugs in Metro Manila. This statement is supported by the regional distribution of sales shown inTable 5.

Compared with other DDD values previously encountered, those calculated in this study appear comparable and may probably validate the decision to limit the population in the denominator to the segment which is really at risk. This may be methodologically questionable but in the face of drug that is not as uniformly available nor as widely accepted by either patient or physician as common antibiotics or analgesis the choice of delimiting assumptions seem inevitable.

RECOMMENDATIONS

Several assumptions used in this study may not be applicable in the short term because of the entry of one more steroid nasal spray within the past year and the aggressive marketing efforts of drug companies. This tends to increase the population of prescribing physicians and hence the size of the survey sample which will be drawn from them. The prevalence of irrational drug use may also increase due to heightened drug detailing and patient demands and this will againt affect sample size determinations.

DDDs will have to be re-calculated in two year intervals to monitor any increase in exposure rates to these drugs. Patient compliance rates may vary once the entry of expensive antiallergy drugs makes steroid sprays more cost-effective than before. Compliance rates may also differ from drug to drug since the most recent form of streoid spray is even more expensive than the ones used in this study. Finally, variations in regional distribution may be effaced by more efficient marketing.

CONCLUSIONS

This study has determined the appropriateness and extent of usage of intranasal steroid sprays for allergic rhinitis. The two descriptive sub-studies of otolaryngologists in tertiary hospitals in Manila and Dasmariñas, Cavite shows that intranasal steroid sprays are currently being used as treatment for patients with allergic rhinitis and other types of medically curable with allergic rhinitides after or concomitantly with antihistamines or antibiotic therapy. Otolaryngologists included in the study had a definite consensus on the indications, dosaging and duration of their use. The calculated national and municipal DDD's per 1000 inhabitants are different and reflect the unequal distribution and availability of the drug.

ACKNOWLEDGMENT

The authors wish to thank the help of Mr. Louie Wel, product manager of Astra, Philippines, Mr. Timoteo Cruz and Vic Valenzuela of Astra, Phil. and Glaxo Phil., respectively , and Mr. Jess Ustaris, senior manager of Mercury Drugstore, Shoppesville branch, Greenhill, San Juan M.M. for their invaluable help in securing the sales of Budecort nd Buconase.

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Present day obturators are made up of two parts: (1 the palatal section, which carries artificial teeth as well as wires known as clasps for successful retention to remaining dentition; and the (2) obturator section - a bulbous portion contoured to the size and shape of the cavity - to fill the palatal defect (Fig.2). The design and construction of obturator prostheses have become more versatile over the years, oftentimes incorporating more than one material in a single prostheses. Provisions can now be made for the inclusion of separate components or sections for reciprocal assistance in the retention and stabilization of the prosthesis (Watchtel, 1974).

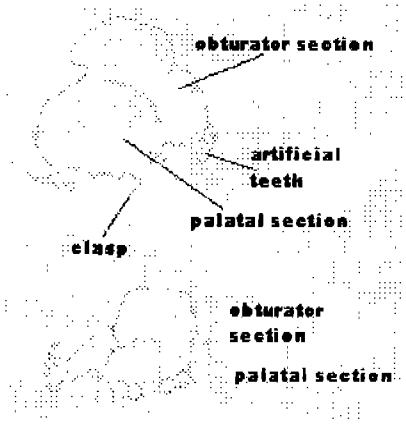


Figure 2: Obturator Prosthesis

The most popular materials used in prosthetic restorations include hard and soft acrylic resins and silicone rubber. Silicone rubber is well established as an inert material and is an excellent material for the obturator section of the prosthesis owing to its high tissue compatibility and its resiliency - which allows shaping of grooves on its surface for the purpose of retention. Unfortunately, silicone rubber is relatively expensive and is not easily available locally. Hard acrylic resins, which are available locally, are used mainly for the palatal section of the prosthesis. Soft acrylic resins, although not as inert as silicone, exhibits good tissue compatibility. Its wide availability and cheaper cost make it a popular material for fabricating the obturator section of the prosthesis. In recent years, the use of biochemical retention has been introduced. Metallic implants placed into remaining bone allows the prosthesis to be retained by means of mechanical interlocking of the prosthesis to the implant.

To date, no local studies have been done to evaluate the effectivity of obturator prostheses constructed of locally available materials in the oral rehabilitation of patients with surgically acquired maxillary defects. This particular study was done with the following specific objectives:

1. To fabricate an obturator prosthesis using locally available materials
2. To determine its effectivity in speech rehabilitation
3. To determine its effectivity in the rehabilitation of deglutition
4. To determine its effectivity in the prevention of scar contracture

METHODOLOGY

Patient Selection:

Thirty patients with surgically acquired maxillary defects seen over a one-year period (January 1992-January 1993) were included in the study. They were divided into five groups based on the size of the maxillary defect.

Group	Description	Number
I	Hard palatal defect	8
II	S/P Partial maxillectomy	12
III	S/P Bilateral Partial Maxillectomy	
IV	S/P Composite Resection	
	A. Total maxillectomy /orbital Exenteration/ Contra-leteral partial	2
	B. Total Maxillectomy/ Orbital Exenteration/Contra-lateral partial Maxillectomy with wide nasolabial resection	1
V	Soft palatal defect	1

Group I (hard palatal defect) consisted of patients who had less than half of the hard palate resected with intact portions of he alveolar margins or maxillary tuberosity (Fig. 3,4a, 4b). Group II (partial maxillectomy) patients had undergone a partial maxillectomy with at least one half of their hard palate resected without any remnant of alveolar margin or maxillary tuberosity on the resected side. These patients were a mixed group of maxillary and palatal malignancies, with subsequent surgery resulting in cavities of varying depth and width (fig. 3,5a, 5b). Group III (bilateral

partial maxillectomy) consisted of patients who underwent near-total to total palatectomy (Fig. 3,6a, 6b). These were predominantly patients with palatal malignancies with minimal involvement of the maxillary cavity. Subsequent surgery resulted in a defect with wide horizontal and relatively shallow vertical dimension. Group IV (composite resection) patients had more than half of their hard palate resected together with involved orbital and paraocular tissues (Fig. 3,7a, 7b). These patients had the deepest surgical defects. Group V (soft palatal defect) consisted of a patient with a benign salivary tumor involving a little more than half of the soft palate (fig. 3).

Figure 3: Patient Groups Based on Palatal Defect

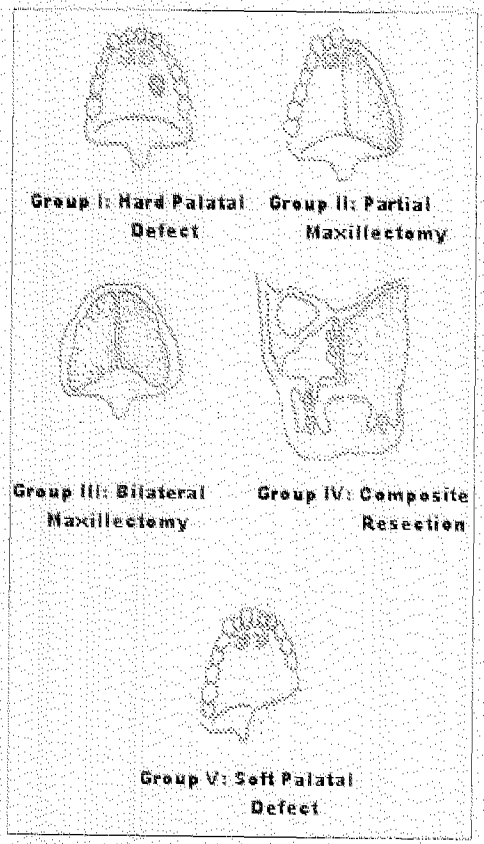


Figure 4A: Group I Patient with Hard Palate Defect

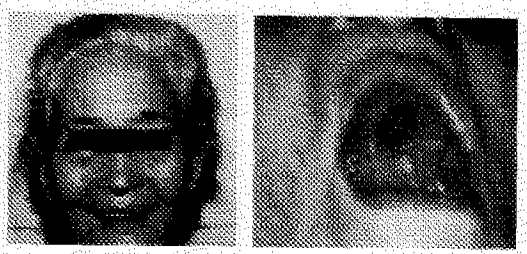


Figure 4B: Group I Patient with Hard Palate Defect Fitted with an Obturator Prosthesis

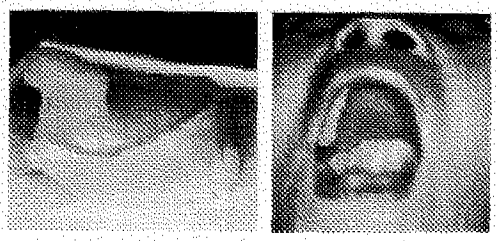


Figure 5A: Group II Patient s/p Partial Maxillectomy

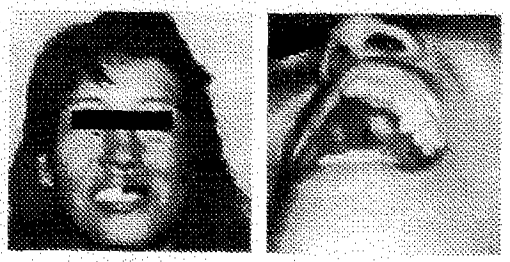


Figure 5B: Group II Patient Fitted with an Obturator Prosthesis

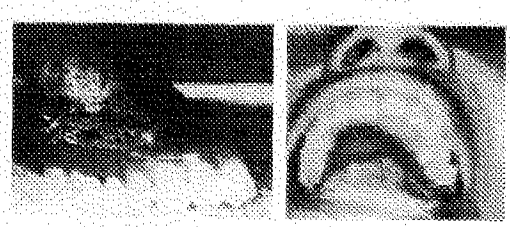


Figure 6A: Group III Patient s/p Bilateral Partial Maxillectomy

Figure 6B: Group III Patient Fitted with a Obturator Prosthesis

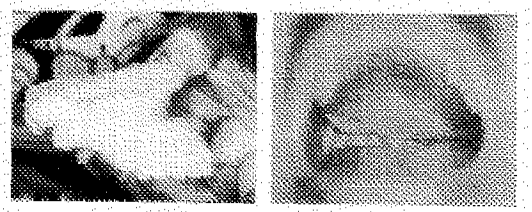
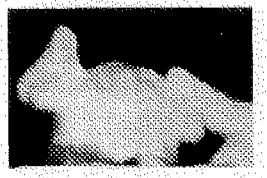


Figure 7A: Group IV Patient s/p Composite Resection Maxillectomy with Nasolabial Resection

Figure 7B: Group IV Patient Fitted with an Obturator Prosthesis



Patients with trismus, in whom an obturator could not be fitted were excluded from the study. Non-native speakers of the Pilipino language (Tagalog dialect) were also excluded from this study to avoid confounding by regional accents. Patients with previously diagnosed communication disorders were also excluded.

MATERIALS

Obturator/Prosthesis Construction

The construction of an obturator involves a three-stage procedure namely: (1) impression-taking, (2) positive copy construction and (3) construction of the definitive prosthesis.

1. Impression taking

Alginate impression powder (Replica-Matech) is mixed with water to form a gel which is then pressed against the surgically-created cavity and the remnants of the maxilla to form an impression, the so-called negative copy (Fig. 8, 9, 10).

CONSTRUCTION OF SURGICAL OBTURATOR

Fig.8: Patient with Palatal Mass

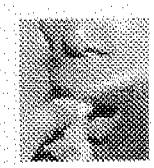


Fig. 9: Impression taking Using Alginate

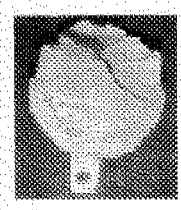


Fig.10: Negative Copy

CONSTRUCTION OF TEMPORARY OBTURATOR

Fig.8: Patient with Palatal Defect

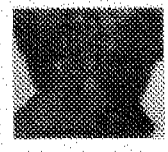


Fig.9: Impression taking Using Alginate

Fig.10: Negative Copy

2. Positive Copy construction

Plaster of Paris is then poured into the negative copy and shaped to form the positive copy which resembles the surgically-created cavity (Fig. 11a, 11b).

Construction of Temporary Obturator

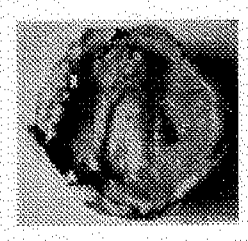


Fig.11: Positive Copy

Construction of Surgical Obturator

Fig.11: Positive Copy with lines Of Resection

3. *Construction of the Definitive Prosthesis*

Using the positive copy as a template, a wax model is then made as a prelude to the final copy of the obturator which is composed of acrylic. Wires or clasps are added as necessary for better retention (Fig. 12,13,14).

CONSTRUCTION OF SURGICAL OBTURATOR

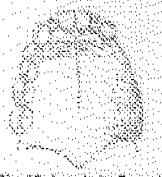


Fig. 12: Area to be Resected is Drinked

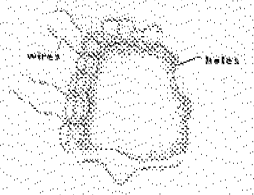


Fig. 13: Surgical Obturator made of Acrylic with wires for Retention to the remaining Dentition and holes for Retention to buccal mucosa Using sutures

Fig. 14: Surgical Obturator

Immediate, transitional and permanent obturator prostheses were made of all groups (fig. 15,16,17). Transitional obturators were fitted approximately five to seven days after surgery coinciding with the removal of the surgical packs. Over the following months, several transitional prostheses were fitted according to the progressive changes in size and shape of the cavity. Permanent obturators were fitted six months after surgery. The prostheses did not in any way interfere with radiation therapy undergone by the majority of the patients. Hard acrylic was used to construct the palatal sections of the prostheses while soft acrylic was used for the obturator section. Artificial teeth were added for edentulous areas while clasps were incorporated into the prostheses for application to existing dentition. Other areas such as the soft palate, posterior nares, fibrous bands at the buccal area and portions of the alveolar ridge were used for reciprocal retention as seen fit.

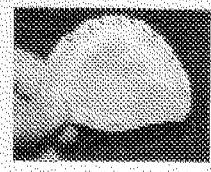


Fig. 15: Surgical obturator for Edentulous Patient

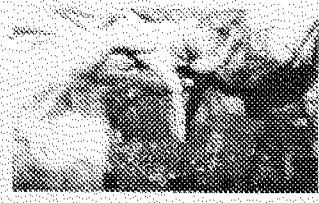


Fig.15: Surgical Obturator inserted immediately Post-op.

CONSTRUCTION OF TEMPORARY OBTURATOR

Fig.11: Positive Copy with Wire clasp for retention

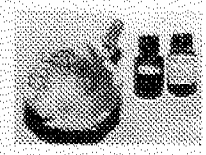


Fig.15: Obturator Made of Acrylic

CONSTRUCTION OF TEMPORARY OBTURATOR

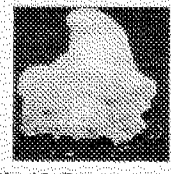


Fig.16: Temporary Obturator

Fig.16: Temporary Obturator Fitted into the Patient

PERMANENT OBTURATOR

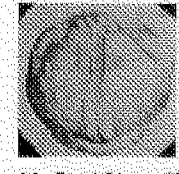


Fig.11: Cast Stone Model (Positive Copy) Patient with Bila-lateral Maxillectomy

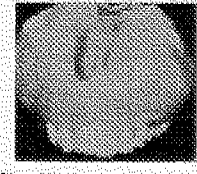


Fig.17: Permanent Obturator with Artificial Teeth

Speech Evaluation:

Evaluation of speech was done preoperatively and after fitting of the permanent obturator prosthesis six months after surgery. This was done by having the patient pronounce al list of test words incorporated in the Error Pattern Diagnostic Articulation Test (in Pilipino); and by reading test sentences which form the Pagsubok ng Artikulasyon sa Pagbasa ng mga Pangungusap (Appendix A). These tests are validated standard articulation tests used by the Speech and Language Section of the Department of Rehabilitation Medicine. Test words were grade by the speech pathologist as "correct", "indistinct", simple substitution", "gross substitution", and "omission". All words judged to be "indistinct", "substituted", or "omitted" were labeled "incorrect". The results were recorded as percentages of the correct number of test words over the total number of test words. The same speech pathologist was used for all participants throughout the study. Video and voice recordings were made for each patient for speech evaluation and documentation.

Swallowing Evaluation:

Each participant was allow to drink and eat with and without the permanent obturator prosthesis, after which they were asked if swallowing and drinking were the same, better or worse.

Evaluation of Ease of Use:

Each participant was also asked to evaluate the fit and ease of use of the prosthesis.

RESULTS

Without the prosthesis, the participants invariably pronounced all of the test words in the Error Pattern Diagnostic Articulation Test incorrectly (table 1). Most of the words pronounced were labeled as "substitutes" of "omitted". The sounds most affected were the *plosives* as exemplified by the words "pusa", "bola", "gulong", "isda", and "manok"; and the *fricatives* as exemplified by the words "aso", "silya",and "bus". The sounds least affected were the nasals such as "mesa', "kendi", "itim", "ibon", and "singsing". some of these sounds were labeled as "indistinct" (appendix B).

With the obturator prosthesis in place, however, the improvement in speech as dramatic, with all except two pronouncing all the different speech sounds correctly. The two exceptions were patients from Group IV (composite resection) who after extensive surgery had few available anatomic areas for prosthesis retention. However, both still obtained high satisfactory scores of 83.6% and 86.9% "correct" test words with all of the "incorrect" speech sounds labeled merely as "indistinct" (table 1).

Table I. Articulation Test Scores and Evaluation of Deglutition with Obturator Prosthesis

Subject	Articulation Test %	Swallowing Solid	Obturator liquid
Group I		better	Better
1	100	better	Better
2	100	better	Better
3	100	better	Better
4	100	better	Better
5	100	better	Better
6	100	better	Better
7	100	better	Better
8	100	better	Better
Group II			
9	100	better	Better
10	100	better	Better
11	100	better	Better
12	100	better	Better
13	100	better	Better
14	100	better	Better
15	100	better	Better
16	100	better	Better
17	100	better	Better
18	100	better	better
19	100	better	better
20	100	better	better
Group III			
21	100	better	better
22	100	better	better
23	100	better	better
24	100	better	better
25	100	better	better
26	100	better	better
Group IV			
27	86.90	better	better
28	100	better	better
29	83.60	better	better
Group V			
30	100	better	better

Swallowing of either solids or liquids without the obturator resulted in varying degrees of nasal regurgitation in all the patients. With the obturator firmly in retention, swallowing was assessed by the patients to be markedly improved. Nasal regurgitation was perceived by the patients to be markedly decreased and aspiration was largely avoided.

Three patients experienced discomfort due to tight-fitting prostheses, which was resolved with minor revisions to

the obturator. Two patient in Group IV (composite resection) and the single patient in Group V (soft palatal defect) complained of loose prostheses due to lack of adjacent anatomic areas for retention especially at the area of the soft palate. The prostheses were subsequently revised to their personal satisfaction. None of the patients developed midfacial contractures, nor were undesirable tissue reactions experienced.

DISCUSSIONS

During normal phonation, the hard and soft palate act as barrier sealing off the nasal cavity for most sounds. Only the nasal sounds (/m/,/n/,/ng/) are allowed to pass through the nose. When this barrier is absent, as seen in patients with acquired palatal defects, all sounds pass through the nose and speech becomes hypernasal. Both vowels and consonants are affected. However, the most significant articulatory error is the substitution of a nasal equivalent for the fricative and plosive speech sounds. Regardless of the size of the surgical defects, their resulting impediment was significant; as seen by their complete failure in the Error Pattern Diagnostic Articulation Test.

With a palatal defect, the Oral and Pharyngeal Phases of Swallowing are impaired. During a normal swallow, a food bolus is formed as the tongue pushes the food against the hard palate. The tongue then propels the bolus towards the anterior faucial arches by pushing it upwards and backwards against the surface of the hard palate. In the absence of an intact hard palate, there is difficulty in forming the food bolus. Furthermore, as the tongue pushes the food upwards, the fragmented food enters the nasal cavity instead of being propelled backward to the oropharynx. The inability to form a food bolus also hampers the Pharyngeal Phase of swallowing, since the bulk of the bolus, which serves to stimulate progression of the reflex peristaltic wave, is lost. The food bolus also helps to protect the airway by pressing the epiglottis downwards over the laryngeal vestibule. The consequent nasal regurgitation an food fragmentation result in coordination of the swallowing process and may lead to chronic aspiration of food particles into the laryngotracheal passage.

With uncorrected palatal defects, the patient adapted by swallowing smaller amounts of food. The diet of the patient also tended to incorporate more liquids as swallowing of liquids was noted to be less difficult. With the obturator prosthesis in place, all patients noted swallowing of both solids and liquids to be dramatically improved.

For the obturator prosthesis to be of maximum benefit, it has to be comfortably fitted into the patient's surgical cavity calling to the fore the prosthodontist's skill and experience: What proves most challenging is the fitting of the prosthesis into the extensive surgical cavities with few available anatomic areas for retention. The presence of remaining palatal bone, turbinates and most importantly, the soft palate makes for better retention of prostheses.

Preoperative and intra-operative consultations between the surgeon and the prosthodontist is absolutely necessary for successful prosthetic rehabilitation. Frequently, the surgeon may have to remove or spare certain areas to accommodate the prosthesis as long as the surgical margins are not compromised.

Previous to the advent of obturator prosthesis, patients with acquired palatal/maxillary defects either were not reconstructed or were reconstructed using other methods. These usually involved reconstruction using various soft tissue flaps. However, the surgical site was obscured by the soft tissue flaps which precluded visual inspection for techniques has been developed, namely, osseointegrated implants. These implants allowed secure anchorage of prostheses and, more importantly, enhanced bone development in the area. Its major limitation, however, are its prohibitive cost and its unavailability locally. As such, it is, at present, quite impractical in the local setting.

The advantages of the obturator prosthesis are: (1) it can be made from materials which are readily available locally;

(2) it is relatively inexpensive; and (3) since it can easily be removed, it allows for ease of inspection for tumor recurrences. Because of these advantages, the use of the obturator prosthesis as the most practical method for reconstruction of surgically acquired palatal/maxillary defects is advocated.

RECOMMENDATIONS

For future studies, the authors recommend:

1. the use of more objective parameters in evaluating deglutition (e.g. fluorography, manometry)
2. extending the study to include congenital palatal/maxillary defects

SUMMARY

An obturator prosthesis, made from locally available, inexpensive materials, used in patients with surgically acquired maxillary defects provides successful speech and swallowing rehabilitation and may decrease the incidence of post-operative scar contractures.

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APPENDIX A

ERROR PATTERN DIAGNOSTIC ARTICULATION TEST
In Pilipino

C=Corrrect I=Indistinct SS=Simple Sub. GS=Gross Sub. O=Omission

DA		PLOSIVES	C	I	SS	GS	O		C	I	SS	GS	O		C	I	SS	GS	O
3	p	pusa						ipis						ulap					
4	b	bola						baboy						dibdib					
4	k	kamay						kuko						manok					
4	q	gulong						saging						bibig					
5	d	dahon						isda						likod					
6	t	tasa						mata						damit					
		FRICATIVES																	
7	s	silya						aso						bus					
		AFFRICATES																	
6		tsinelas						kotse											
7		dyip						medyas											
		ASPIRAATES																	
3		hipon						bahay											
		GLIDES																	
3	w	walis						pakwan						dilaw					
5	y	yoyo						payong						tulay					
6	l	lobo						ilong						angel					
6	r	relos						baril						bapor					
		NASALS																	
3	m	mesa						kama						itim					
4	n	noo						kendi						ibon					
4		ngipin						tenga						singsing					
5								pinya											
		BLENDS																	
7	bl	blusa																	
7	br	braso						libro											
7	kl	klase						suklay											
7	kr	krus																	
7	dr	dram																	
7	gr	grupo						tigre											
7	pl	plaka																	
7	pr	prutas																	
7	tr	tren																	

APPENDIX B

PAGSUBOK NG ARTIKULASYON SA PAGBASA
NG MGA PNGUNGUSAP (PAPP)

_____
(Date)

Bilugan ang I, M, o F ayon sa posisyon ng pagkakamali sa pagbigkas ng titik o ponema at lagyan ng tsek ang C (correct), A (addition), S (substitution), O (omission) ayon sa uri ng pagkakamali.

TEST SENTENCES

		C	A	S	O
Vowels					
/a/	1. Nasugatan ang paa ng aso. M F I				
/e/	2. Bumili si Eliseo ng karne. I M F				
/i/	3. Isang taon na akong nakatira sa Makati. I M F				
/o/	4. Nakakatulog ka ba ng husto sa oras? M F I				
/u/	5. Masarap ang lutong ulam ni Lulu. M I F				
Plosives					
/p/	6. Masarap ang pasalubong ng Pepe. F I M				
/b/	7. Pumasok ang babae sa loob ng simbahan. I F M				
/t/	8. Natapos ang pagsusulit kaninang tanghali. M F I				
/d/	9. Darating ang kapatid ni Romelda. I F M				
/k/	10. Malakas ang patak ng ulan kahapon. M F I				
/g/	11. Ganito ang pagguhit ng bilog. I M F				
Sibilant					
/s/	12. Sino ang nagtago ng sapatos sa kusina? I F M				

OSTEOMYELITIS IN OSTEOPETROSIS THE MANDIBLE THAT MANY MISSED*

JERRY AGERICO B. ROSARIO, M.D**
EDWARD GINES, M.D.**
ABRAHAM GONZALES, M.D.**
THANH VU T. GUZMAN, M.D.**
GIL M. VICENTE, M.D.***

ABSTRACT

This is a case report of a 33 year old female who was referred to a tertiary government hospital for further management of bilateral mandibular swelling of 8 years duration despite adequate treatment. The patient also experienced limping and progressive decrease in visual acuity 4 years before admission. A sister had similar clinical manifestations. Biopsy revealed chronic granulation tissue and osteomyelitis. Radiologic findings showed the same radiologic picture was present in one of the daughters. Debridement to remove bony sequestra of the mandible was performed.

This paper demonstrates that osteomyelitis of the mandible can be an initial manifestation of a familiar disorder of osteopetrosis. Other members of the family affected with the disease were identified and documented.

Key words: osteomyelitis, mandible, osteopetrosis, Alber-Schoberg syndrome

INTRODUCTION

Swelling of the mandible is common clinical manifestation seen in all ENT clinics in the country. In this institution, it contributes to 5% of all ENT cases seen at the outpatient department and comprises approximately 20% of all hospital admissions. Most of these cases are secondary to infections, and some, to the not uncommon odontogenic and non-odontogenic tumors of the mandible. Except for the carcinomas, these entities usually follow a benign course with minimal complications, if at all, and recovery is often the rule.

However, a deeper problem may exist in a rare disorder that also affects other organs of the body which may lead to unexpected complications if not identified early. It is important for otolaryngologists to be aware of such disorders which may initially manifest as an apparently common otolaryngologic problem like mandibular swelling.

This paper, therefore, aims to present a case of mandibular swelling associated with other signs and symptoms pointing to the diagnosis of a rare familial disease of osteopetrosis. Secondly, it aims to identify and document the hereditary aspect in the transmission of this disorder.

CASE REPORT

The patient was a 33 year old female who was referred because of persistent, painful, bilateral mandibular swelling of 8 years duration. Initial dental consultations done with extraction of most of the lower teeth and prescription of antibiotics were unable to attain permanent cure. Four years before admission, otolaryngologists at a tertiary medical center in Manila did incision and curettage and gave antibiotics, but the swelling recurred after several months. Repeat incision and curettage at the same tertiary medical

*Presented, PSOHNS Clinical Case Report Contest
April 7, 1995, Subic International Hotel, Olongapo City
**Resident, Department of Otorhinolaryngology, Jose Reyes Memorial Medical Center
***Consultant, Department of Otorhinolaryngology, Jose Reyes Memorial Medical Center

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PECTORALIS MYOCUTANEOUS "FLY-OVER" FLAP FOR RECONSTRUCTION AFTER EXTENDED LARYNGECTOMY*

EDGAR G. DE GUZMAN, M.D.**
FRANCIS V. ROASA, M.D.***
ROBIE V. ZANTUA, M.D.***

ABSTRACT

The pectoralis major myocutaneous flap (PMCF) has enjoyed considerable popularity as the workhorse in reconstruction procedures of the head and neck. This procedure, together with the gastric pull-up and free jejunal transfer, has provided the ideal one-stage procedure and shorter completion time, in addition to its simplicity, for a timely entry into post-operative adjuvant radiation therapy. The problem encountered usually lies in its inherent bulkiness and in the difficulty of tubing it. This paper aims to describe a modification of the tubed pectoralis myocutaneous flap and to evaluate the technique in terms of postoperative complications and the ability to swallow.

In our institution, the pectoralis myocutaneous "fly-over" flap (PMCF) was employed for reconstruction after extended laryngectomy on a 62 year-old male with a diagnosis of squamous cell carcinoma, stage IV (1988 AJCC criteria). Without tubing it, the PMCF was sutured directly to the defect such that it formed the anterior wall, and the split-thickness skin graft formed the posterior wall of the neopharygoesophagus. No untoward complications arose except for minimal skin necrosis at the area of trifurcation both in the neck and chest donor site. These healed spontaneously and completion time was achieved in 2 weeks. No evidence of anastomotic leak nor fistula formation was noted. Barium swallow taken on the 5th month post-surgery showed smooth passage of barium in the neopharyngoesophagus.

The PMCF offers a viable reconstructive option when it is deemed appropriate for pharyngoesophageal reconstruction. The technique is able to provide a widely patent food conduit that does not appear to impede swallowing. It is simple, safe and within the technical capabilities of most head and neck oncologic surgeons.

Keywords: Pectoralis major myocutaneous flap, fly-over flap, extended laryngectomy

INTRODUCTION

One of the greatest challenges that faces the otolaryngologist-head and neck surgeon is the management of advanced carcinomas of the hypopharynx and cervical esophagus. First, the tumor must be adequately ablated to optimize the chances of patient survival. Second, satisfactory reconstruction must follow so that pharyngoesophageal function is restored and a good quality of life maintained.

Despite technical advances in surgery, radiotherapy and neoadjuvant chemotherapy, the prognosis of pharyngoesophageal carcinoma remains embarrassingly low, with a high incidence of treatment failure and low survival rates ranging from 20-30%.[1,2] Surgical ablation, which for many is only palliative, followed by post-operative adjuvant radiotherapy, continues to be the primary treatment modality. However, surgery which aims at

*Presented, PSO-HNS Surgical Case Report Contest
April 8, 1995, Subic International Hotel, Olongapo City
**Resident, Department of Otorhinolaryngology, Sto. Tomas University Hospital
***Consultant, Department of Otorhinolaryngology, Sto. Tomas University Hospital

wide field ablation of the disease is frequently limited by the inability to reconstruct.

The present thrust in the overall treatment of advanced hypopharyngeal carcinoma is geared towards surgical procedures that provide one-stage primary repair and shorter completion time for a timely entry into postoperative radiation therapy.[3] After extended laryngectomy, the three currently favored reconstruction procedures are the free jejunal transfer, the gastric pull-up and the tubed myocutaneous flaps principally the pectoralis major flap.

In this report, a useful modification of the tubed pectoralis myocutaneous flap (PMCF) repair after extended laryngectomy for pharyngo-esophageal squamous cell carcinoma will be described. The technique will be evaluated in terms of postoperative complications and ability to swallow. Other surgical procedures presently available are likewise reviewed and compared with this technique and the functional advantages and disadvantages of each are likewise cited.

SURGICAL TECHNIQUE

An apron flap extending from the mastoid tip down to two fingerbreadths above the sternum to the contralateral mastoid tip is made (Figure 1). Total pharyngolaryngectomy (extended laryngectomy) usually together with an en bloc unilateral or bilateral neck dissection with preservation of one jugular vein is carried out. Tissues from the proximal pharyngeal and distal esophageal remnants are then submitted for frozen section examination for routine clearance of the upper and lower limits of resection prior to reconstruction.

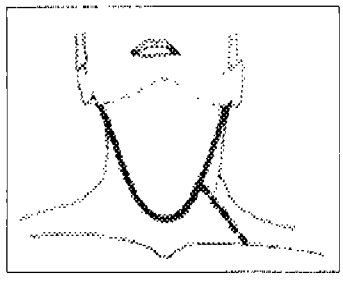

Fig. 1: Neck incision

A circumferential defect of 10-20 cm. in length then remains. It is advised that the inferior transection at the area of the esophagus should be made in an oblique fashion and a 1-2 cm. vertical incision should be made at the anterior wall of the esophagus to increase the distal luminal diameter, thereby preventing the occurrence of stenosis inferiorly. At the posterior wall, the remaining pharyngeal and esophageal mucosa are then sutured to the prevertebral fascia to prevent migration of the mucosa. A split-thickness skin graft (0.015 mm. thick) is then harvested from the inner thigh of the patient and sutured to the prevertebral fascia to fill up the defect between the pharyngeal and esophageal mucosa posteriorly (Figure 2). This will form the posterior wall of the neopharyngoesohagus.

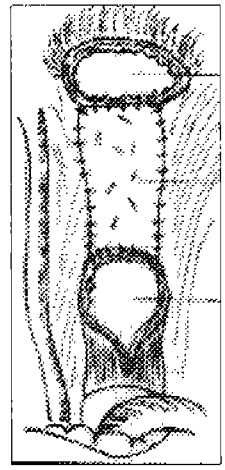

Fig. 2: Oblique inferior cut with a 1-2 cm anterior vertical incision to increase esophageal diameter

The pharyngoesophageal defect is then measured from the base of the tongue up to the distal cervical esophagus. The planned cutaneous skin paddle of the PMCF is then marked on the lower parasternal part of the chest wall (Figure 3). It is advisable to add 3-4 cm. of extra length inferiorly in order to allow the flap to be rotated without tension to the base of the tongue. The width of the flap should be 5-7 cm. The incision around the edges of the planned pectoralis skin paddle is carried down to the pectoralis fascia after which the skin paddle is sutured to the fascia to prevent shearing during flap elevation.

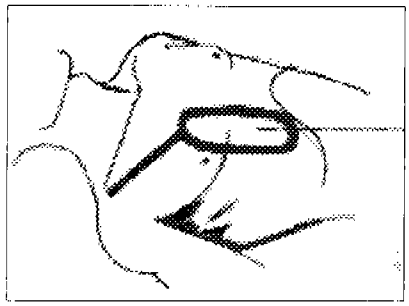

Fig. 3: Chest Incision

An incision in then made extending from skin paddle to the ipsilateral shoulder. The dissection and elevation of the pectoralis major muscle is initiated laterally with easy identification of the thoracoacromial vessels located underneath the muscle. The pectoralis muscle is then elevated from its most distal portion in a cephalad direction (Figure 4). Elevation is carried out beneath the deltopectoral skin to the level of the clavicle. The skin paddle, with its attached muscle, is tunneled under the skin of the neck into the operative defect. Mid-clavicular resection is usually not necessary in reconstruction of the pharyngoesophagus. A nasogastric tube (French 18) is then passed via the nose into the thoracic esophagus prior to reconstruction.

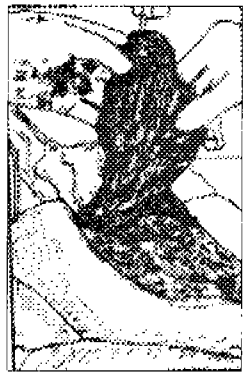

Fig. 4: Elevation of Pectoralis Major

The PMCF is then sutured directly to the prevertebral fascia laterally adjacent to the skin graft, the base of the tongue superiorly and the anterior wall of the distal esophageal segment inferiorly (Figure 5) using absorbable interrupted sutures (Vicryl or Dexon 2-0). A second layer closure between the pectoralis muscle and lateral prevertebral fascia is recommended to create a water-tight neopharyngoesophagus. In this way, the skin of the PMCF forms the topmost boundary while the skin graft forms the floor similar to a *fly-over* structure.

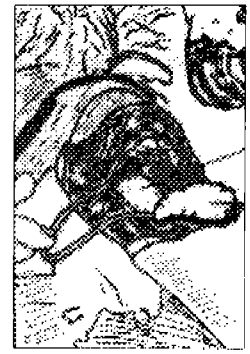

Fig. 5: Pectoralis Major Myocutaneous "Fly-Over" Flap

Suction tube drainage of the neck and chest is then placed prior to closure of the apron flap as well as chest donor site. The drains are removed selectively from each anatomical site as significant drainage ceases. No occlusive dressing is placed so that the vascularity of the flap will not be compromised. A tracheostomy tube (size 8) is placed. Tube feeding is commenced on the first day postoperatively and oral feeding is started on about the 14th day depending on the clinical course. Initially, one day of clear liquid diet is started and if there are no clinical evidences of anastomotic leaks or fistula formation heralded by fever, progressive skin erythema, and pockets of fluctuance, the NGT is removed and patient is shifted to soft diet until the patient can revert back to the usual feeding.

CASE REPORT

A 62 y/o male presented with an 18-month history of progressive difficulty of swallowing initially to solids later to liquids accompanied by hoarseness and frequent aspiration. Barium swallow revealed an irregular mass at the proximal esophagus at its transition with the larynx. On triple endoscopy, a fungating non-ulcerating mass was seen at the postcricoid area extending to the left pyriform sinus. Biopsy of the mass revealed a moderately differentiated squamous cell carcinoma. Surgery was advised but the patient opted for radiotherapy instead. The patient went

home for eight months without complying with radiotherapy only to be re-admitted because, for about a week prior, patient could not swallow anything at all and is now willing to undergo surgery. On indirect laryngoscopy, a nodular mass was seen at the posterior pharyngeal area extending to the left pyriform sinus obscuring the laryngeal introitus. Multiple non-tender 25-centavo size lymph nodes was palpated at the left submandibular and posterior cervical area. On CT scan, a soft tissue mass on the left side of the neck at the level of C4 - C5 was delineated with evidence of invasion of the carotid sheath and fuzziness of the adjacent prevertebral fascia. Diagnosis was hypopharyngeal carcinoma, stage IV. The patient underwent extended laryngectomy and left radical neck dissection with neopharyngoesophageal reconstruction using a PMCF. Post-operatively, no untoward complications arose except for minimal skin necrosis at the area of trifurcation both in the neck and chest donor site. These healed spontaneously. After 2 weeks, the patient could tolerate general liquid and soft diet and by the next day, was shifted to a regular diet. There was no evidence of anastomotic leaks or fistula formation. Five months postoperatively, the patient was doing well and had completed postoperative adjuvant radiotherapy. A barium swallow delineated smooth passage of barium through the neopharyngoesophagus without any evidence of post-radiation necrosis. Patient was then lost to follow-up until on the 9th month post-surgery, patient developed recurrence manifesting as enlarged mass over the right jugulodigastric area and dysphagia to solids. Patient underwent chemotherapy but did not complete the course because of weakness and eventually died of the disease 2 years post-surgery.

DISCUSSION

The hypopharynx is that portion of the pharynx extending from the level of the hyoid bone to the beginning of the esophagus at the lower border of the cricoid cartilage. It is subdivided into the pyriform sinus, the post-cricoid area, and the posterior pharyngeal wall (Figure 6)[4]. The cervical esophagus is less clearly defined but is regarded as that portion of the esophagus extending from the inferior border of the cricoid cartilage to the thoracic inlet. Tumors arising in these two areas may spread unimpaired from one site or region to another because boundaries between them merge imperceptively. Furthermore, these areas share a common pathway of lymphatic drainage to cervical posterior pharyngeal, paratracheal, and mediastinal lymph nodes (Figure 7).

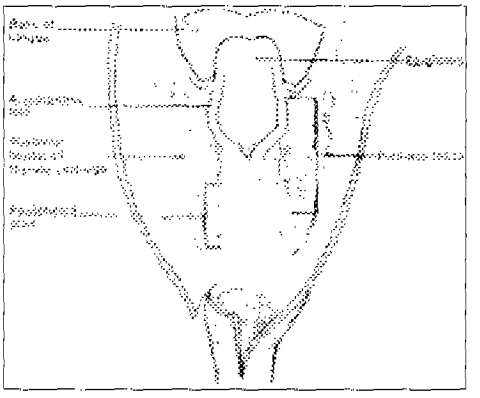

Fig. 6: Anatomy of the Hypopharynx viewed from the posterior aspect

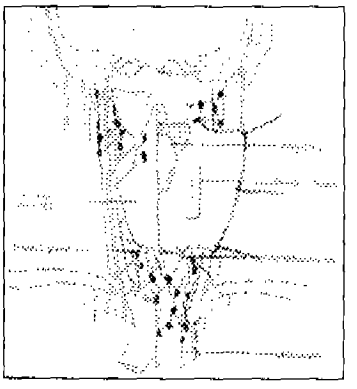

Fig. 7: Lymphatic drainage of hypopharynx and cervical esophagus

Stage III and IV squamous cell carcinomas of the hypopharynx and cervical esophagus are associated with extremely grave prognosis. Since the hypopharynx is a relatively silent area, tumors here tend to attain advanced stages before symptoms appear and get detected. The disease is aggressive with a tendency to extend directly into the soft tissue of the neck, laryngeal cartilages, thyroid gland, and mediastinum. Submucosal extension and development of skip lesions are common resulting in underestimation of the true magnitude of the disease. There is early metastasis to regional lymph nodes and a high incidence of distant metastasis[5].

Many oncologists and head and neck surgeons feel that combined radical surgery and post-operative radiation therapy provides the best chance for alleviating the patient's discomfort, providing good palliation even when cure is unlikely. Surgical ablation in advanced hypopharyngeal carcinoma usually requires extended laryngectomy. The indications for doing extended laryngectomy are: 1. unilateral (beyond the midline) or bilateral circumferential pyriform sinus disease; 2. contiguous extension of a laryngeal primary to the hypopharynx or posterior pharyngeal mucosa; 3. neoplasia of the postcricoid area or cervical esophagus; and 4. extension of the hypopharyngeal disease to the tongue base and lateral pharyngeal walls[3].

The radical nature of the surgical techniques employed creates significant problems in terms of functional impairment particularly of swallowing. The latter is a complex process that requires the synergistic motion of several different structures in rapid sequence and involves two main forces. The oropharyngeal propulsion pump entails the driving force of the tongue and the beginning of pharyngeal wall contraction. The hypopharyngeal suction pump consists of the negative pressure generated at the pharyngoesophageal segment[6]. In total pharyngolaryngo-esophagectomees, the tongue driving force is the only significant force that remains to propel food downwards. Reconstruction after cancer resection, therefore, becomes an absolute necessity, rather than an option, in order to increase chances of survival and improve the quality of life.

Since the start of the century, a variety of reconstructive techniques after extended laryngectomy have evolved. Free tissue grafting (fascia lata or skin) over a stent, local autografts, local flaps and polyethylene prosthetic repair are some of the procedures but these have failed to provide consistent success or adequate functional rehabilitation. Regional staged-flap repair as reported by Wookey, Montgomery, and Bakamjian, was advocated as the procedure of choice until the late seventies (Figure 8)[3,7]. The high incidence of persistent local complications, multiple operative procedures, and the resultant long completion times rendered these procedures less popular.

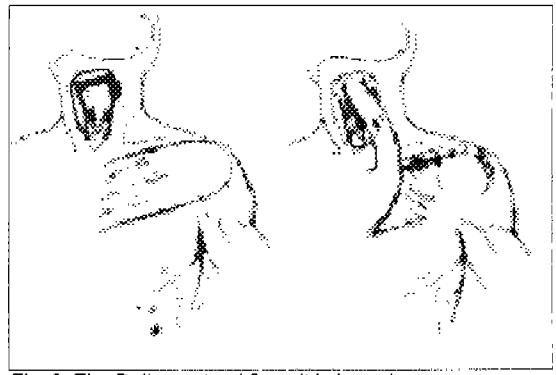

Fig. 8: The Delto pectoral flap. It is based on perforating vessels of the internal mammary artery, requires at least two stages to complete the first stage is demonstrated.

The ideal method of pharyngoesophageal reconstruction must conform with the hierarchy of treatment priorities. Survival is paramount, followed by function, freedom from pain and socially acceptable appearance plus the ability to institute adjunctive therapy immediately after reconstruction, completing the entire therapy in a time period appropriate to the natural history of the disease[2]. The current techniques available for pharyngoesophageal reconstruction that meet the above criteria are : 1) free jejunal transfer, 2) gatric pill-up, and 3) the use of tubed myocutaneous flaps, principally the PMCF.

Enteral reconstruction techniques (jejunal transfer and gastric pull-up) provide the best functional results after ablative surgery of the pharyngoesophageal complex[8]. However, these techniques mandate the presence of a highly-trained team.,

The JEJUNAL AUTOGRAFT (Figure 9) requires an abdominal operation, small bowel anastomosis, two microvascular anastomoses, and two visceral anastomoses in the neck[9]. Its use is limited to patients with lesions that do not require total esophagectomies. It is excellent after subtotal pharyngectomy with preservation of the larynx, without which adequate neoesophageal speech is impossible since the wide lumen of the jejunal segment does not allow air injected by standard oral

technique to produce effective vibrations for speech. The GASTRIC PULL-UP(Figure 10), on the other hand, does not require the special expertise of a microvascular surgeon. It can also be used for reconstruction independent of the extent of esophageal resection and with modification, may be brought as high as the nasopharynx. Swallowing as well as development of neoesophageal speech appears to be facilitated by the gastric pull-up reconstruction. The drawback is that it entails blind extrathoracic esophagectomy, pyloromyotomy, and pharyngogastric anastomosis in the neck.

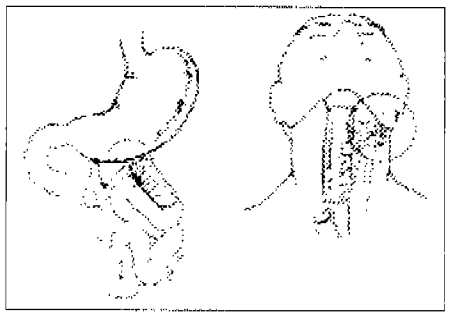

Fig. 9: Free Jejunal Flap. An arterialized segment of jejunum can be transferred to the neck by the use of microvascular techniques.

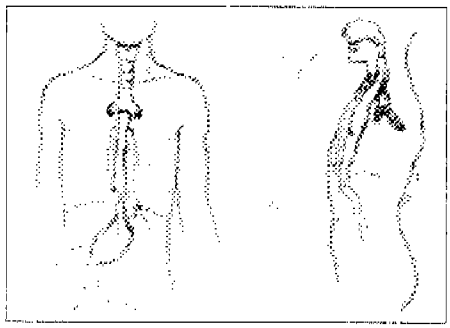

Fig. 10: Gastric Pull-up. Based on its rich vascularity, the stomach usually passes through the posterior mediastinum in the pull-up procedure.

While the two enteric procedures may have their advantages in terms of function, it can not be denied that both have drawbacks. Both are lengthy and cause considerable high morbidity and mortality.

The principal advantage of the PMCF (Figure 11) over the enteric procedures for reconstruction is its simplicity. The PMCF has become popular because it is versatile, constant, simple to raise, and provides excellent protection to the carotid artery after routine neck dissection. However, when transferring the flap as a tube, it is difficult to approximate it superiorly to the pharynx and inferiorly to the esophagus where stenosis and stricture formation may occur.

Fig. 11: Tube Pectoralis Major Myocutaneous Flap. It is based on the thoracoacromial artery

The technique described in this report is even simpler than the tubed PMCF reconstruction. The PMCF forms the anterior wall and the split-thickness skin graft forms the posterior wall of the neopharyngoesophagus. Theogaraj, et al first reported the use of a partially-tubulated pectoralis muscle flap over preserved posterior wall cervical esophageal mucosa in cases of short-segment stenosis[3]. Encouraged by these results, Fabian reported a technique using partial tubulation initially for long-segment stenosis and later expanding the indications to include the repair of the defect left after ablation of the laryngopharynx and cervical esophagus. These reports cite esophageal stenosis, although minimal, as a common complication. Maddox, concurrently reported a similar technique which left the prevertebral fascia uncovered allowing it merely to re-epithelialize.

Such entails some time to completely heal especially with big defects and feeding is delayed possibly explaining the 30% fistula formation in the series[10]. Lore, likewise published in a recent atlas another similar technique, using dermal grafts instead of split-thickness grafts to cover the posterior pharyngeal wall[11].

The modification in this technique centers on the prevention of esophageal stenosis. By cutting the cervical esophagus obliquely and making a 1-2 cm anterior vertical incision, the pectoralis major flap is interdigitated to the esophageal remnant, thus increasing the inferior diameter to more than 50% of the original. Inspired by the encouraging result of the first case, the "fly-over" PMCF was employed in 3 subsequent patients with stage IV disease of the anatomical sites listed (Table I, II and III).

Table I. Patient Profile

PX	Age/ Sex	Dysphagia	Hoarseness	Sore Throat	Hemoptysis	Neck Mass	Smoking	Alcohol	History of CA in Family
1. JT*	62/M	(+)	(-)	(-)	(-)	(+)	(+)	(-)	(-)
2. MA	68/M	(+)	(-)	(-)	(-)	(-)	(+)	(+)	(-)
3. OZ*	59/M	(+)	(+)	(+)	(+)	(+)	(+)	(-)	(-)
4. FDJ	60/M	(+)	(-)	(+)	(+)	(-)	(-)	(+)	(-)

*patient gave report
**patient died of diffuse parenchymal disease

Table II. Management for 4 patients with stage IV disease of the anatomical sites listed.

PX	Age/Sex	Tumor Site/s	TNM Class Staging	Management
1. JT	62/M	Pyriform sinus/posticoid - ext. to prox. Esophagus	$T_4N_2M_0$	Extended laryngectomy, RND, left Reconst using pectoralis major "Fly-over" flap
2. MA	68/M	Pyriform sinus - ext. to left vocal cord	$T_4N_2M_0$	Extended laryngectomy, RND, right Reconst. using pectoralis major "Fly-over" flap
3. OZ	59/M	Hypopharynx - ext. to left vocal cord	$T_4N_2M_0$	Extended laryngectomy, Bilateral neck dissection Reconst using pectoralis major "Fly-over" flap
4. FDJ	60/M	Pyriform sinus - ext. to left vocal cord and supraglottis	$T_4N_2M_0$	Extended laryngectomy, Bilateral neck dissection Reconst using pectoralis major "Fly-over" flap

Table III. Results of Pectoralis Myocutaneous "Fly-over Flap Reconstruction after extended

PX	TUMOR SITE/S	TNM CLASS (STAGING)	COMPLETION TIME	COMPLICATIONS	FOLLOW-UP STATUS
1	Pyriform sinus / posticoid - ext. to prox esophagus	$T_4N_2M_0$ (STAGE IV)	30 days	fistula formation	2 mos. post-op (-) dysphagia
2	Pyriform sinus - ext. to left vocal cord	$T_4N_2M_0$ (STAGE IV)	21 days	uneventful	5 mos. post op BA Swallow (-)stricture
3	Hypopharynx - ext. to left vocal cord	$T_4N_2M_0$ (STAGE IV)	not assessed	fistula formation	expired
8	Pyriform sinus - ext. to left vocal cord and supraglottis	$T_4N_2M_0$ (STAGE IV)	45 days	fistula formation	2 mos. post-op (-) dysphagia

Patient 2 developed transient fistula on the 7th day post-surgery. This eventually healed with conservative management. Completion time was achieved 30 days post-surgery. No complaint of dysphagia was reported two months post-surgery.

Patient 3 developed fistula on the 10th post-op day. This healed with conservative management and completion time was achieved 45 days post-op. Two months after discharge patient was apparently doing well with no signs of dysphagia.

With patient 4, radial free flap was used instead of split-thickness skin graft to cover the posterior wall. The patient initially showed signs of rapid recuperation until patient developed icterisia and ascites on the 10th post-op day which was diagnosed to be a diffuse parenchymal liver disease. There was wound dehiscence and fistula formation which was treated with debridement and antibiotics. Completion time was not, however, assessed because the patient died on the 32nd post-op day.

The functional result was excellent in terms of swallowing. However, as in other types of pharyngoesophageal reconstruction, esophageal speech has not been attained to date in these patients although all can produce some sounds. Patients who undergo extended laryngectomy with PMCF reconstruction can usually be subjected to radiation therapy quite early at approximately 30 days post-surgery. As reported by many authors, the mortality rate of zero and the low incidence of significant postoperative complications suggest that PMCF reconstruction is a viable alternative to one-stage reconstruction using gastric or jejunal transfer considering that the two enteric procedures are more complex, life threatening, and extremely morbid. Table IV summarizes the comparison of these reconstructive techniques.

Table IV Comparison of Reconstructive Procedures

Reconstructive Procedure	Technical Difficulties	Limitations	OR Time	Morbidity and Mortality	Completion Time
Free Jejunal Transfer	(+) abd surg microvascular surgeon	for lesions not requiring esophagectomy	lengthy	high	short
Gastric Pull-up	transthoracic surg	for large defects	lengthy	high	short
PMCF (TubedFlap	bulky difficult to tube	for large defects	shorter	low to nil	short
"FLY-OVER FLAP	SIMPLE	FOR LARGE DEFECTS	SHORT	LOW TO NIL	SHORT

The technique of pharyngoesophageal reconstruction discussed here is SIMPLE and SAFE, a technique within the technical capabilities of most head and neck oncologic surgeons of every discipline. The technique is able to provide a widely patent food conduit that does not appear to impede swallowing. Although it is not suggested that it be used routinely in preference to jejunal transfer or gastric pull-up, this technique is a useful alternative when a PMCF is believed to be the appropriate form of pharyngoesophageal reconstruction.

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PREDICTIVE VALUE OF CLINICAL SYMPTOMS IN NASOPHARYNGEAL CARCINOMA*

DIOSDADO C. UY, M.D.**
CHARLOTTE M. CHIONG, M.D.***

ABSTRACT

A five year retrospective study was done in 69 patients who underwent biopsy for suspected nasopharyngeal carcinoma (NPCA) at the Manila Doctors Hospital from 1989 to 1993 to determine if clinical characteristics were predictive of the outcome of the biopsy. There were 33 negative and 36 positive malignant biopsy results. The clinical characteristics found to be significantly associated with NPCA were nasal mass, nasal obstruction, neck lump, hearing loss, ear fullness or pain, upper respiratory tract infection (URTI), cigarette smoking, weight loss and diplopia. Age, gender, family history, head and neck pain, and epistaxis were not considered significant predictors of malignancy.

Keywords: Nasopharyngeal carcinoma, predictive value

INTRODUCTION

Nasopharyngeal carcinoma (NPCA)is a relatively rare neoplasm in the population at large with an overall incidence of only 0.0005%. Among Caucasians in North America, it comprises merely 0.25% of all cancers. It has been found to have the greatest frequency of occurrence among the Chinese at 18%[1,2]. Populations with Chinese genes been found to have a higher incidence of NPCA[1]. Martin and Irean noted a racial susceptibility among Orientals, except the Japanese, in their investigations[3]. Indeed, anecdotal report attests to its relative frequency in the Philippines. Local tumor registries confirm its relatively high occurrence rate[4].

NPCA presents a bewildering array of sign and symptoms from the onset of the disease to its potentially grim conclusion. Its biological behavior appears to be uniform in all races[1,5,7]. The clinical profile of the typical patient has been too intricate and nonspecific to be of much predictive value[5,6]. More often, these symptoms manifest themselves in both malignant as well as benign and inflammatory conditions. During the early stages, these tumors permit only subtle and seemingly trivial clues of their existence such that they remain overlooked until too late in their course. Delay in diagnosis of about eight to nine months has been attributed to these highly inconsistent clinical presentations[3,6].

The location of the primary tumor and its direction of spread determines the clinical behavior of these very destructive neoplasms. Hearing loss and a lump in the neck have been the most frequent reasons for seeking medical consult[1,2,7]. The final outcomes of the disease in such instances have been usually fatal. It is of great importance, therefore, to be able to recognize the existence of these malignancies during the early stages when successful therapy is far more likely[8].

The main purpose of this study is to identify the different socio-demographic variables and clinical features used in profiles of NPCA, and to find out which of these clinical findings correlate with malignancy based on nasopharyngeal biopsy. In so doing, a pattern of clinical signs and symptoms can emerge which can

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** Resident, Department of Otorhinolaryngology, Manila Doctors Hospital
*** Consultant, Department of Otorhinolaryngology, Manila Doctors Hospital

eventually be used as a more established criteria for early diagnosis.

METHODOLOGY

A total of 98 medical records of patients who underwent nasopharyngeal biopsy at the Manila Doctors Hospital during a five year period from January 1989 to December 1993 were reviewed. Clinical variables as identified in foreign and local NPCA profiles were obtained in these patients and tabulated[1,4,5,9,10].

Table I

The Mayo Clinic Series of Symptoms and Signs of NPCA at Diagnosis.	
1. neck lump	60%
2. ear fullness or pain	41%
3. hearing loss	37%
4. nasal bleeding	30%
5. nasal obstruction	29%
6. neck pain	13%
7. weight loss	10%
8. diplopia	8%
Local Review by Yatco, Uy BL et al, 1985	
1. cervical mass	77%
2. nasal obstruction	39%
3. nasal bleeding	35%
4. otologic complaints	
serous discharge	30%
Tinnitus	16%
Decreased hearing	14%
5. diplopia	25%
6. head & neck pain	30%

The following multiple socio-demographic factors were evaluated: age, sex, cigarette smoking, family history, and clinical signs and symptoms; neck lump, nasal mass, ear fullness or pain, weight loss, upper respiratory tract infection and diplopia. Only 69 patients were deemed adequate for analysis of data required.

Negative and positive NPCA biopsies were tabulated and compared according to each clinical variable. Descriptive statistics (average, mean, and percen-tages),Chi-square analysis and Fisher's exact test were employed whenever necessary to establish significance as a positive predictor of malignancy.

RESULTS

There were 69 patients included in the study, 45 males and 24 females. A positive malignant nasopharyngeal biopsy was found in 36 patients (52.17%), 27 males and 9 females, while 33 patients (47.83%),18 males and 15 females had negative biopsy results.

Of the 31 patients who had positive biopsy results, the ages ranged from 12 to 74 years with a mean of 45.89. This broad range of age distribution had two thirds of patients falling between 30 to 59 years of age. Age was not significantly associated with a positive biopsy result (p=0.5041) (Table II).

Table II. AGE

RANGE	BIOPSY (+)	BIOPSY (-)	TOTAL
10-19	3	0	3
20-29	2	5	7
30-39	5	6	11
40-49	9	9	18
50-59	9	8	17
60-69	6	3	9
70-79	2	2	4
TOTAL	36	33	69

X^2=5.315
p=.5041

Likewise gender was not a significant variable at x^2 =2.338 and p=0.1263 versus biopsy results.

Table III. GENDER

GENDER	BIOPSY (+)	BIOPSY (-)	TOTAL
MALE	27	18	45
FEMALE	9	15	24
TOTAL	36	33	69

P=0.1263 *NOT SIGNIFICANT

History of cigarette smoking showed significant correlation with NPCA for the combined sexes ($p=7.191x10^{-4}$) but not for sexes considered separately. Positive smoking history in males showed significant correlation ($p=3.71x10^{-3}$) but not in females (p=0.6791).

Table IV: CIGARETTE SMOKING

	BIOPSY (+)	BIOPSY (-)		TOTAL
MALE (+)	20	5		25
(-)	7	14		21
TOTAL $P=3.716X10^{-3}$	27	19	*significant	46
FEMALE (+)	2	1		3
(-)	7	13		20
TOTAL	9	14		23
Fisher's Exact Test p=0.6791			*not significant	

Among the 69 patients reviewed, only 1 patient had a family history of cancer.

The correlation between upper respiratory tract infection found in 30 patients, 21 positive and 9 negative biopsies, was statistically significant (p=0.0184).

TABLE V. URTI

	BIOPSY (+)	(-)	TOTAL
+	21	9	30
-	15	24	39
TOTAL	36	33	69
P=0.0184	*SIGNIFICANT		

Complaints of a lump in the neck in 41 patients, 27 positive and 14 negative biopsies was significantly ocrrelated with NPCA (p=0.0122) (Table VI).

TABLE VI. NECK LUMP

	BIOPSY (+)	(-)	TOTAL
+	27	14	41
-	9	19	28
TOTAL	36	33	69
x^2=6.287 P=0.0122	*SIGNIFICANT		

Nasal mass in 43 patients with 32 positive and 11 negative biopsies was significantly correlated with NPCA ($p=6.532x\ 10^{-3}$)(Table VII).

TABLE VII. NASAL MASS

	BIOPSY (+)	(-)	TOTAL
+	32	11	43
-	4	22	26
TOTAL =	36	33	69
x^2=20.326 P=6.532X 10^{-3} Fisher's P=1.721 $x10^{-6}$	*SIGNIFICANT		

Ear fullness or pain was present in 33 patients, 22 positive and 11 negative biopsies. The correlation with NPC was significant (p=0.0388) (Table VIII).

TABLE VIII. EAR FULNESS/PAIN

	BIOPSY (+)	(-)	TOTAL
+	22	11	33
-	14	22	36
TOTAL=	36	33	69
x^2=4.269 P=0.0388	* SIGNIFICANT		

Hearing loss in 30 patients, 23 positive and 7 negative biopsies, was significantly correlated with NPCA (p=8.713x210) (table IX).

TABLE IX. HEARING LOSS

	BIOPSY (+)	(-)	TOTAL
+	23	7	30
-	13	26	39
TOTAL=	36	33	69
x^2=11.083 P=8.713 $X10^{-4}$	* SIGNIFICANT		

Epistaxis among 34 patients,22 positive and 12 negative, was not significant (p=0.0698) (Table X).

TABLE X.

	BIOPSY (+)	(-)	TOTAL
+	22	12	34
-	13	21	35
TOTAL=	36	33	69
x^2=3.287 P=0.0698	*NOT SIGNIFICANT		

Forty-three patients had a complaint of nasal obstruction. Of these, 31 patients had positive biopsy and 12 had negative biopsies. The correlation was significant ($p=2.094x10^{-4}$).(Table XI).

TABLE XI. NASAL OBSTRUCTION

	BIOPSY (+)	(-)	TOTAL
+	31	12	43
-	6	20	26
TOTAL=	37	32	69
x^2=13.745 P=2.094 $X10^{-4}$	* SIGNIFICANT		

Head and neck pain in 44 patients, 27 positive and 17 negative biopsies, was not significant(p=0.1445)(Table XII).

TABLE XII. HEAD/NECK PAIN

	BIOPSY (+)	(-)	TOTAL
+	27	17	44
-	10	15	25
TOTAL=	37	32	69
x^2=2.130 P=0.1445	*NOT SIGNIFICANT		

Epistaxis is one variable which surprisingly did not turn out to be significant. Considered to be a late sign in NPCA, it indicates a massive space occupying lesion with pressure necrosis and fungation[3,9,10,12]. It is a question when to take into account the number of patients who complained of blood tinged sputum, suggesting post nasal bleeding, and if this will affect its overall significance. On the other hand, epistaxis is a common symptom in various benign conditions and might, as the results suggest, be considered with caution.

Head and neck pain is a clinical symptom of sundry physical conditions and is not necessarily specific for malignancy. This study shows this to be the most common complaint at 63.76%. However, this was not significantly predictive of a positive biopsy result.

Symptoms of weight loss and diplopia, not withstanding their uncommonness, were found to be significant predictors of NPCA.

Diplopia results from the superior extension of the tumor through the foramen lacerum, an unimpeded pathway near the Rosen-muller's fossa into the cranium, resulting in external rectus paresis from the involvement of the sixth cranial nerve[18]. This was considered a late sign in NPCA.

Although studies of clinical profiles of NPCA patients have been described in local literature, no systematic analysis of their predictive value of these symptoms have been analyzed.

CONCLUSIONS

Results of the study show that not all clinical variables routinely considered in epidemiologic profiles of NPCA are significant predictors of the disease.

Frequency of occurrence of a variable does not correspond to a higher incidence of malignancy.

These so called statistically insignificant variables that are present in both malignant and non-malignant conditions. On the other hand, those signs and symptoms which were considered statistically significant will enable us to predict with greater confidence the possibility of a naso-pharyngeal malignancy whenever their presence is noted. Moreover, not so common symptoms when present become significant in the light of findings of this study. Specifically, the presence of weight loss and diplopia in a patient when associated with the other significant variables identified warn clinicians to be highly suspicious of a possible NPCA. This will spell the difference between doing a single biopsy or multiple biopsies to patients highly suspected to have NPCA.

RECOMMENDATIONS

A multiple regression analysis of these variables in a prospective study is recommended to define the true predictive value in diagnosis of NPCA in Filipinos.

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There were 14 patients who suffered from weight loss, 12 positive and 2 who had negative biopsy results, showing signi-ficant correlation with NPCA (Fisher's test $p=4.793x10^{-3}$(Table XIII).

TABLE XIII. WEIGHT LOSS

	BIOPSY (+)	(-)	TOTAL
+	12	2	14
-	24	31	55
TOTAL=	36	33	69
Fisher's $P=4.793 \times X10^{-3}$	*SIGNIFICANT		

Diplopia in 12 patients, 10 positive and 2 negative biopsy results, was significantly correlated (Fisher's test p=0.0375) (Table XIV).

TABLE XIV. DIPLOPIA

	BIOPSY (+)	(-)	TOTAL
+	10	2	12
-	29	28	57
TOTAL=	39	30	69
Fisher's Exact Test P=0.0375	*SIGNIFICANT		

DISCUSSION

Table IB shows the common and not so common symptoms of NPCA in the study population. These includes nasal mass and nasal obstruction which were the two most common symptoms. It supports Batsaki's contention that cancers of the nasopharynx tend to extend and proliferate early into the nasal cavities[5,11,12]. Local studies by Yatco MM and Uy BL had cervical mass as their earliest presenting sign with serous otitis media, nasal obstruction and bleeding coming next[9,10]. Fletcher and Millian reports a lump in the neck as their most common presenting sign[13].

The mean age of our patients at 48.5 years, is comparable with that of local and foreign literatures[3,10,11]. The frequency distribution conforms with those of studies with Chinese subjects showing the highest incidence among the 40 to 69 age groups. This is in contrast with the bimodal occurrence in Caucasian at ages 30 and under to 80 and above[14,15].

The 3:1 male preponderance in this study is also consistent with the findings of previous investigations[4,16].

A positive history of cigarette smoking of about 30 years had been associated with nasopharyngeal malignancies, the incidence rising 7.2 fold compared with controls[17]. This factor was likewise significant in our study.

Although among 69 patients reported in our study, only 1 with a positive biopsy result had a family history of cancer, one cannot discard the influence of genetics altogether, bearing in mind the possibility of under reporting and lack of awareness about the disease[16].

The inclusion of recurrent upper respiratory tract infection as a variable is unique to this study. This was because of compelling evidence linking the Epstein-Barr virus, long known to cause chronic rhinosinusitis, with NPCA[1,3,17,18]. True enough, it proved to be a significant sign associated with malignancy.

Nasal mass and nasal obstruction, the two most common symptoms found in this study at 46.37% and 44.92% respectively, also figured prominently with that of the Mayo Clinic series (Table I) and were found to be significant predictors of malignancy.

A lump in the neck was the commonly reported symptom in NPCA in the Mayo Clinic study at 60% frequency. Although it is considered a significant variable in this study, it only ranks third in the order of frequency at 39.13%.

Otologic symptoms (ear fullness or pain and decreased hearing) were all significant variables in this study. These manifestations are a result of tumor invasion of the lateral nasopharyngeal wall, near or directly involving the mucosa of the Eustachian tube orifice or particularly Rossemuller's fossa, leading to tubal malfunction, a sensation of ear blockage, serous otitis media and ultimately, conductive hearing loss[1,7,8].

movable, progressively enlarging mass in the right upper lateral neck was first noticed. In that same month, consult with an ENT specialist revealed a mass in the right nasopharynx on physical examination. A CT-scan of the nasopharynx done showed a cyst-like pre- and para-vertebral mass on the right nasopharynx, extending downwards towards the oropharynx (fig.1). Biopsy of the nasopharyngeal mass was doe. Histopathology report showed parakeratosis, negative for malignancy. There was progressive growth of the lateral neck mass so consultation was done in this institution.

Fig. 1: Initial CT Scan of nasopharynx done May 1994 showing cyst-like right nasopharyngeal mass.

There were no other associated signs and symptoms except chronic non-productive cough for one year. Chest x-ray done in August, 1993 showed normal findings. However, a repeat done on April, 1994 showed a suprahilar mass on the right. Patient does not have a family history of diabetes mellitus or malignancy, does not smoke nor drink alcoholic beverages. On review of systems, the patient had anorexia and weight loss of about 20 lbs within 3 months. There was no history of hoarseness, dyspnea, hemoptysis, dysphagia and neck pain nor did the patient experience headaches, nausea, irritability, and behavioral change.

Patient was admitted for the first time on November 23, 1994. On admission, a 4x3x2 cm non-tender, non-movable, doughy mass in the right upper lateral neck was seen. There was no erythema nor ulceration of the overlying skin. There was note of an indistinct bulge in the right posterior wall of the nasopharynx on posterior rhinoscopy. Otherwise, the rest of the ENT and physical examination was unremarkable. The pre-operative impression was right upper lateral neck mass, to consider metastasis from nasopharyngeal carcinoma, rule out a second primary malignancy from the aerodigestive tract.

Under general anesthesia, the nasopharynx was examined using Hopkin's telescope. There was a bulge noted on the right posterior wall with minimal mucosal irregularities. Punch biopsy specimen were obtained from this bulge as well as from the left side. Laryngoscopy and esophagoscopy were done and findings were essentially normal. On bronchoscopy, there was a smooth-surfaced bulge noted on the lateral wall of the right tracheo-bronchial junction causing partial obstruction. Another specimen was taken from this mass.

On histopathologic examination, sections of all the specimen show mucous membrane lined columnar ciliated cell or stratified squamous epithelium. Contrary to expectations, there is no evidence of malignancy. Instead, within the lymphoid stroma are numerous circular cells about 2-3 times the size of erythrocytes. These cells were surrounded by a clear halo (fig.2) and were identified as encapsulated yeasts. It was read as Cryptococcosis (Cryptococcus neoformans) right and left nasopharyngeal mucosa and right tracheo-bronchial junction.

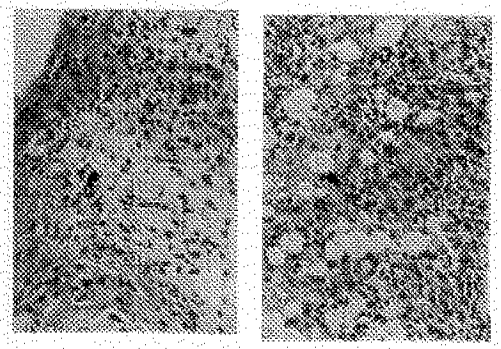


Fig. 2: High power photomicrographs of specimen from nasopharyngeal mass showing numerous round to oval cells with halo.

A retrospective check of the history revealed that for 2 years the window of patient's unairconditioned bedroom was directly beside the neighbor's pigeon coop.

The patient was discharged and started on Fluconazole (Diflucan) per orem. After 2 months, there was further increase in the size of the lateral neck mass despite the

medications given. Aside from the persistence of cough, there was further weight loss of 30 lbs. Another chest x-ray done in January 1995 again showed a right suprahilar mass, without other findings. A CT-scan of the pharynx and neck done revealed the same right pre- and para-vertebral loculated cystic mass, this time extending from the nasopharynx down to the hypopharynx beyond the hyoid bone, consistent with abscess (fig. 3). Still, however, there was no dysphagia, dyspnea or neck pain. A CBC done was normal (Hghb = 11.7, Hct=0.35, N=0.61, L=0.36, E=0.03). AIDS test was negative.

Fig 3: Serial CT scans of pharynx to neck done January 1995 showing cystic mass from nasopharynx to hypopharynx

The patient was readmitted on February 19, 1995 for biopsy of the right lateral neck mass. This time, the mass was 5x4x3 cm, still of the same character. Upon dissection, the mass was first located on the anterior edge of the upper third of the sternocleidomastoid muscle and it extending towards the nasopharynx. The well-delineated specimen was noted to be smooth, grayish and multioculated with friable contents.

The specimen was a pale tan, soft tissue mass measuring 4x2x1.5 cm. On section, it shows fibroadipose and granulation tissues with lymphoplasmacytic infiltrates, aggregates of histiocytes with several round to oval yeasts with halo (fig.4), also consistent with Cryptococcosis.

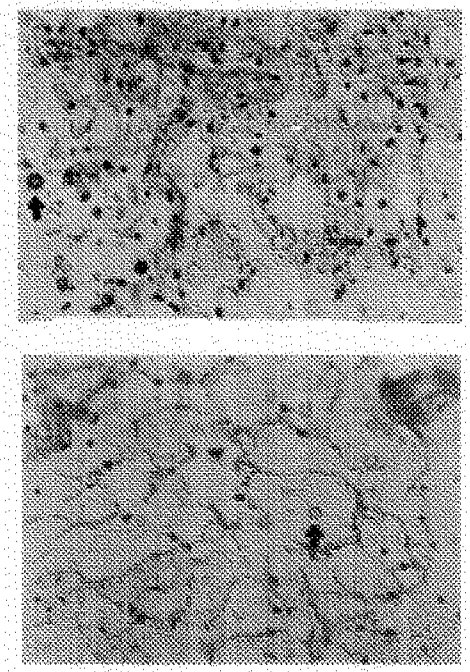


Fig. 4: High Power photomicrographs of specimen from right lateral neck mass also showing numerous round to oval cells with halo.

Post-operatively, there was delayed healing of the surgical drain site, temporarily exuding clear serous fluid (fig.5). The patient's oral Fluconazole regimen was increased. Patient still had cough now productive of light yellowish sputum.

Fig. 5: Post-operative photograph of delayed healing of surgical drain site exuding clear serous fluid.

Considering that this patient had involvement of the lower respiratory tract and potential spaces of the neck, and was

patient was readmitted on March 17, 1995 for co-management with Infectious Disease Service. Repeat chest x-ray showed the same semicircumscribed density on the right paratracheal region (fig.6). Sputum KOH showed big yeastlike structures with capsules. Ultrasound studies of the upper abdomen showed normal liver, pancreas, kidney and spleen studies. A lumbar tap was done on March 22, 1995.The CSF was negative for cryptococcal cells. A cryptococcal antigen latex agglutination serology (CALAS) test done on the CSF was positive at 1:32 (low positive signifying exposure). Serum CALAS was significantly elevated at 1:4096. The patient was then started on regimen of intravenous Amphotericin-B, combined with oral 5-Flucytosine.

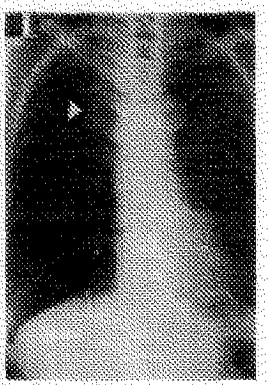
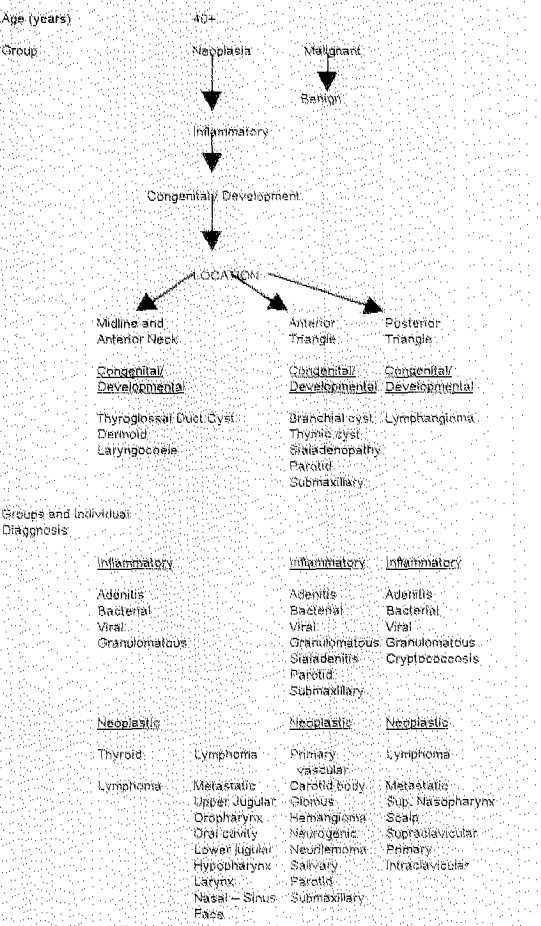


Fig. 6: Chest X-ray done march 1995 showing a semicircumscribes density on the right paratracheal region.

DISCUSSION

Patients who present with a one-sided upper lateral neck mass pose a diagnostic challenge to the Otolaryngology-Head and Neck Surgeon. Cummings has proposed an algorithm to aid in figuring out a diagnosis (fig.7). Management of an adult patient more than 40 years of age with a persistent unilateral cervical swelling should be managed as a malignancy until proven otherwise.

Fig. 7: Diagnostic flow chart for neck masses for patients aged 40 years and above. In as much as cryptococcosis is not included here, we hereby propose its place as above. [modified from Cummings (4)]



In this case, the biopsy results were totally unforeseen - numerous encapsulated yeasts, identified as *Cryptococcus neoformans*. This indeed is very interesting and unique case because of three major reasons:

A. This case of cryptococcosis presented as a one-sided lateral neck mass, a very rare initial manifestation.

B. It involved extensively the retropharyngeal space from the nasopharynx to the hypopharynx, as well as the right tracheo-bronchial junction. Despite this, however, the patient does not experience symptoms of compression or obstruction.

C. While cryptococcus more commonly affects the immuno-compromised, this case a non-immunocompromised patient with foci apart from the brain or lung parenchyma.

Having a one-sided lateral neck mass is certainly an atypical presentation of a cryptococcal infection. Usually, high in the list of differentials for the patient's age group would be a malignant lymph node metastatic from a primary tumor in various areas of the head and neck, especially the nasopharynx. It could also be a primary lymphoma. In the Philippine setting, the tuberculous lymph node is a top consideration among the granulomatous conditions.

The fact that the patient's chief complaint is a lateral neck mass is especially unusual since this particular occurrence had not been encountered despite an extensive literature review. This may well be the first case of cryptococcosis presenting as a lateral neck mass reported both locally and internationally.

There have been very few reported cases in the ENT areas of interest, and these are very localized involvements. Reported involvement of the sinonasal area include that of Kohlmeier about a case involving the right maxillary and ethmoid sinuses in 1955; Littman and Zimmerman, the nasal septum in 1956; Briggs et al., the nasal vestibule in 1974; and Choi et al., pansinusitis in 1988[2,3,9]. Earlier in 1927, Jones reported a case involving the nasopharynx[9]. In 1987, Korvick and Yu reported a case of cryptococcal tonsillitis in a patient with chronic lymphocytic leukemia[7]. There were only three reports of laryngeal involvement in 1975, 1989 and 1992[2,9,10]. Karcher (1963) reports that only 3% of patients with cryptococcosis present with mucosal lesions[9].

This case involved the retropharyngeal space from the nasopharynx to the hypopharynx, another very rare manifestation. Moreover, in spite of this extensive involvement, the patient did not present clinically with any symptoms of pharyngeal compression, such as dyspnea, dysphagia nor neck pain. Most probably, it had been a very slow-growing mass such that the patient was not able to perceive the minute increments in pharyngeal swelling.

Why this particular case of Cryptococcosis manifested as a retropharyngeal and lateral neck mass is indeed intriguing. There is good evidence to assume air-borne mode of transmission of aerosolized droppings, entering through the nose, deposited in the nasopharynx and the tracheo-bronchial junction, with fungus lodging in the terminal airway. From there, it can disseminate to any part of the body by hematogenous, contiguous or lymphatic spread[3].

In this case, the predominant mode of spread might had been lymphatic (Figure 8). The organism must have spread via the lymphatic system to the neck. Since the neck is particularly rich in lymphatics, an extensive involvement is very possible, and, like it would in a malignancy of the upper airway, the condition manifested as lateral neck mass.

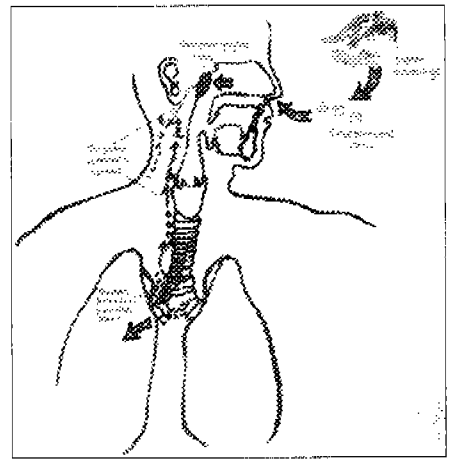


Fig. 8: Proposed route of lymphatic spread of cryptococcal infection in case of patient Z.B.

Another theory of retropharyngeal space involvement would be direct extension from a primary cryptococcal implantation in the nasopharynx. From there, it spreads to the contiguous areas, as well as through the lymphatic system, as it would in a case of nasopharyngeal carcinoma.

However, both of the above mentioned mechanisms of spread are not the most usual ones. More commonly, silent hematogenous spread occurs, with preference for the meninges. In fact, majority of patients have meningoencephalitis at the time of diagnosis. Early signs and symptoms include headache, nausea, staggering gait, dementia, irritability, confusion and blurred vision[9]. There is no clinical evidence to consider this. There were also no cryptococcal cells seen in the CSF study.

Why the infection had not affected the brain despite the extensive respiratory tract involvement is another mystery to explain. Interestingly, in the two other cases of gross respiratory cryptococcosis in non-immunocompromised patients reported earlier[10,11], there was no apparent CSF involvement. The question of whether a medically-sound explanation for this coincidence exists makes further investigation warranted. Perhaps there is a distinct strain of C. neoformans that has a predilection for lymphatic spread. And since the brain has no lymphatics, it would thus be spared from infections of this particular strain.

There is usually no lymphadenopathy in cryptococcosis[4]. This case is a rare instance when the lymphatics is the most likely mode of spread. Although it is often mentioned, there may have been no other case report which provides such convincing evidence of the lymphatic spread of cryptococcosis as this one.

Also a very important point is that the patient is not immunocompromised. This disease rarely affects man as a primary infection. Between 40-85 percent of patients with cryptococcal infections also have severe underlying diseases or immunodeficiencies (120. AIDS, lymphoreticular malignancies (esp. Hodgkin's disease), sarcoidosis, diabetes mellitus, immunosuppression from long term corticosteroid therapy or after renal transplant, cytotoxic drugs and therapeutic irradiation are the common predisposing factors for the development of cryptococcosis.[2,9]. The frequency of cryptococcal disease in steroid-treated patients, allograph recipients, and AIDS victims shows the value of T-lymphocyte-dependent host defenses[12].

In terms of incidence, more than half of the cases of cryptococcosis in the USA are afflicted with AIDS. Among the cryptococcal patients without AIDS, more than half of these are immunosuppressed[5].

The initial mortality rate of disseminated cryptococcosis in immunologically normal patients is 0-15% with a 35% relapse rate. Mortality in relapse cases goes up to 75%. In immunocompromised patients, initial rate is up to 85%, rising to 100% for relapses[3].

This case of cryptococcosis occurred in a healthy, non-immunocompromised patient. There is nothing in the history associated with any of the common predisposing factors for the development of cryptococcosis. Patient has a normal CBS as well as a negative AIDS test.

However, very massive inhalation of cells may result in progressive systemic disease in a normal person[6]. In 1988, Anderson described that external dissemination of intranasally instilled C. neoformans in mice begin 14-28 days after instillation and is still demonstrable 90 days post-exposure. Ten percent mortality was observed in mice receiving 10^6 cryptococci, while no mortality was observed in mice exposed to 10^3 or 10^4 cryptococci[1]. There is certainly evidence that the patient had been exposed to what can be presumed to be a large amount of cryptococcal cells since the bedroom window was located next to a pigeon coop for about 2 years.

The cryptococcal organism has been isolated from dried pigeon droppings and nesting places and this association has been described since the 1950's by Emmons[2]. Pigeon droppings apparently contain nutrients which makes it a good medium for cryptococcal growth[11]. Healthy persons with a history of heavy exposure to pigeons have much higher rate of positive delayed skin tests to cryptococcal antigen or cryptococci[8].

In the literature reviewed, there have been only two cases reported of cryptococcosis focus other than the brain and lung in a non-immunocompromised

patient. Both involved the larynx[2,10,11]. This case would thus be the only one of the very few documented in this category reported internationally, and the first to be reported locally.

(For more details about Cryptococcal infection please refer to Appendix A).

CONCLUSION

In summary, the case of a 49 year old female, with chief complaint of a right lateral neck mass was presented. History revealed chronic non-productive cough and exposure to pigeon droppings. Flexible endoscopy revealed masses in the nasopharynx and the right tracheobronchial junction. CT scan showed a right pre- and para vertebral loculated cystic mass extending from the nasopharynx to the hypopharynx. Biopsy of said masses all revealed Cryptococcal infection.

This interesting case imparts to the Otolaryngologist-Head and Neck Surgeon the following very important lessons:

1. This case serves to temid the Otolaryngologists-Head & Neck surgeon that cryptococcosis albeit more commonly encountered as a pulmonary or neurologic problem, can also present or exist in the ENT realm of interest. A patient with this progressively systemic disease could actually seek consult with an Otolaryngologist-Head & Neck Surgeon first. It thus becomes one's responsibility to be aware of this entity to e able to correctly manage the infection in the early stages.

2. When considering the diagnosis of a lateral neck mass, it is essential to keep in mind the possible differentials, from the more common to the more bizarre. As practitioners of the mysterious art and science of Medicine, one should always be ready to expect the unexpected. When faced with a mass which on CT-scan appears like cyst/abscess, due consideration should be given to a diagnosis of cryptococcosis, even in a non-immunocompromised patient.

3. This case has provided further evidence as to the lymphatic spread of cryptococcal infection. This suggest new directions for investigation into possible different strains of C. neoformans, one of which may have predilection for lymphatic spread.

4. This unique case alerts one to think that Cryptococcosis can present as mass in the retropharyngeal space (without compression symptoms) and tracheo-bronchial junction, aside from a chief complaint of lateral neck mass, in non-immunocompromised patient. This is probably the first locally, if not internationally, documented and reported case of Cryptococcosis with such unusual involvement.

From the bronchus to the nasopharynx via the retropharyngeal space, to a lateral neck mass - this was how the creeping crypt crept.

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APPENDIX A

DETAILS ON CRYPTOCOCCAL INFECTION

Also called torulosis or European blastomycosis, cryptococcosis is caused by *Cryptococcus neoformans. C. neoformans* is seen in vivo as the yeast form surrounded by a thick capsule. The hyphal sexual from is *Filobasidiella neoformans*. The uncollapsed round yeasts are usually from 6-7 um in diameter. Single budding yeasts with narrow necks may also be seen[1].

Its distinct feature is its polysaccharide capsule which is demonstrated as a halo by India ink or mucicarmine in slide preparations. The capsule is a major virulence factor because it may be immunosuppressive, any impair leukocyte migration and may activate the alternative complement pathway in serum. One role of the capsule in pathogenesis depends on its antiphagocytic properties; the efficiency of phagocytosis of an organism by macrophages is inversely to the size of the capsule[5].

Differential diagnosis at this stage include the various deep fungi. *Histoplasma capsulatum, sporothrix schenkii, and Pneumocystis carinni* all do not possess the capsule characteristic of *Cryptococcus*. Furthermore, *H. capsulatum* is smaller and usually intracellular. *S. schenkii* is usually football-shaped, while *P. carinii* is usually boat-shaped. On the other hand, *Blastomyces dermatitides* also possesses a capsule but is distinguished by a wider budding isthmus[1].

The cryptococcal organism has been isolated from dried pigeon droppings and nesting places an this association has been described since the 1950's by Emmons. Pigeons do not rid their nests of excreta unlike other birds[1]. They excrete infective cryptococci without themselves being affected. Healthy persons with a history of heavy exposure to pigeons have a much higher rate of positive delayed skin tests to cryptococcal antigen or cryptococcin[4].

There is good evidence to assume air-borne mode of transmission of aerosolized droppings, entering man via the respiratory tract. Respiratory involvement can occur in one of the three following ways: (a) tracheobronchial colonization in certain patients with chronic lung disease; (b) clinical or subclinical infection in a normal host represented by a subpleural nodule usually in association with ipsilateral hilar adenopathy and (c) disseminated infection in immunosuppressed patients. In the normal host, pulmonary cryptococcosis is most often a subclinical infection. When, clinically or roentgenologically evident, it usually presents as a primary hilar lymph node complex which may resolve spontaneously or remain dormant[6].

Pulmonary cryptococcosis may also cause production of only scant, sometimes blood-streaked sputum. The x-ray findings usually consist of multiple subpleural nodules with or without hilar adenopathy, unilateral of bilateral alveolar or interstitial infiltrates, circumscribed mass lesions, abscesses with fluid levels or cavitary lesions, and unilateral or bilateral pleural effusions[6].

From the lungs, there is silent hematogenous spread to the brain, where clusters of cryptococci collect in the periascular areas of cortical gray matter and basal ganglia since the organism is neutropic. In fact, majority of patients have meningoencephalitis at the time of diagnosis. Early signs and symptoms include headache, nausea, staggering gait, dementia, irritability, confusion and blurred vision[2]. There is no clinical evidence to consider this in our patient. There is usually no lymphadenopathy and no oral mucosal lesions.

Cryptococcosis may involve several other sites outside the CNS and lungs. Single or multiple skin lesions may be found in about 10 percent of patients. Bone lesions resembling tuberculous cold abscesses are also found in about 5-10 percent. Other rarer forms of cryptococcosis include chorio-retinitis, adrenal involvement, myocarditis, endocarditis, peri-carditis, esophagitis, hepatitis, peritonitis, arthritis, bursitis, myositis, renal abscess and prostatitis[4].

Current trends of management preferred I combination therapy of amphoterecin-B with Flucytocine.

THE CASE OF THE CREEPING CRYPT*

FREDERICK Y. HAWSON, M.D.**
GIL M. VICENTE, M.D.***

ABSTRACT

This is a case report involving a 49 year old female with a chief complaint of right lateral neck mass with a history of chronic non-productive cough and exposure to pigeon droppings. Flexible endoscopy revealed masses in the nasopharynx and the right trachea-bronchial junction. CT scan showed a right pre- and para-vertebral loculated cystic mass extending from the nasopharynx to the oropharynx biopsy of which revealed Cryptococcal infection. This unusual feature is made the more significant in that it occurred in a non-immuno compromised patient and lends more concrete evidence as to the lymphatic spread of cryptococcal infection.

This is probably the first case of cryptococcosis with such unusual manifestations in both local and international literature. Awareness of this should help in the early recognition and management of the disease.

Keywords: Lateral neck mass, cystic mass in the nasopharynx, cryptococcosis, lymphatic spread

INTRODUCTION

Of the challenges faced by an Otolaryngologist-Head & Neck Surgeon, few conditions can be as challenging in terms of diagnosis and management as a one-sided lateral neck mass. The possible differential diagnoses are simply too numerous. In general terms, this mass may be neoplastic, congenital/development or inflammatory in nature. But from there, the field is wide open, If one thinks of neoplasm, the possibilities would be the parotid gland as a primary source of the tumor, a lymphoma or a metastatic lymph node. If congenital/development masses, then lymphagiomas or branchial cysts are the more common ones. When considering inflammatory conditions, it may be an adenitis or sialadenitis, bacterial, viral or granulomatous.

However, aside from the aforementioned first considerations the occasional rare surprise diagnosis should be borne in mind. The objective of the following case presentation is to describe and make the Otolaryngologist-Head & Neck Surgeon aware of such diagnosis of an unexpected condition initially manifesting as a one-sided lateral neck mass, with other unique features. It is also the aim of this report to provide sound explanations to account for such features, especially in the aspect of how this condition spread the way it did in this case

The significance lies in its account of an unforeseen condition with an interesting presentation and course of disease development. This report will alert the Otolaryngologist-Head & Neck Surgeon to the existence of such a condition, thereby adding to one's knowledge of possible differentials of a lateral neck mass. There is further significance in its contention that the diagnosis of this patient's neck mass is the first documented in local, or probably even international, scientific literature.

CASE REPORT

The patient is ZB, a 49 year old, female, married, housewife from Metro Manila. On May 1994, a non-tender, non-

*Presented, PSO-Clinical Case Report Contest
April 7m 1995, Subic International Hotel, Olongapo City
**Resident, Department of Otorhinolaryngology, St. Luke's Medical Center
***Consultant, Department of Otorhinolaryngology, St. Luke's Medical Center

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THE CASE OF THE MISSING DENTURES*

EDGAR ANTHONY Q. DELFIN, MD**
EMMANUEL S. SAMSON, MD***

ABSTRACT

This paper reports a case of 27 year oldformer medical student who had recurrent bouts of fever and productive cough of 1 year duration necessitating endotracheal intubation. Chest x-ray revealed a denture consisting of 4 teeth and 2 metal hooks at C4-C5. An endoscopic attempt to remove the foreign body failed but an esophagotomy via a lateral pharyngotomy approach proved successful. The patient apparently swallowed the denture while under the influence of methamphetamine hydrochloride (shabu).

Key words: Missing denture, methamphetamine hydrochloride (shabu), lateral pharyngotomy approach.

INTRODUCTION

Methamphetamine hydrochloride or "shabu" in local parlance is well known for the feelings of fearlessness and well being bordering on near-fatal foolhardiness that it induces. People high on it can stay awake for days without feeling tired and drowsy, or can sleep in total bliss. This case will not attempt to highlight the pharmacology and medico legal aspect of methamphetamine. Instead, an unusual complication which can be attributed directly or indirectly to its effects will be discussed.

CASE REPORT

R. D., a 27 year old male, former medical student, is a self-confessed shabu user. One year before admission, while emerging from the effects of shabu taken the night before, the patient noted that his denture was missing and assumed that it was taken out the night before and placed aside somewhere. A thorough search proved futile and a new set was ordered from the dentist the following day. Except for the slight pain and vague feeling of lump on the throat, the patient had no other symptoms and attributed it to an infection for which amoxicillin 500mg TID was taken with alleged improvement. Case closed, or so it seemed.

One month before admission, the patient developed mild dyspnea associated with productive cough and consulted a physician who diagnosed it as recurrent tonsillitis. Not satisfied, the patient consulted an ENT specialist who did flexible esophagoscopy, diagnosed it as esophageal ulcer, and gave amoxicillin which afforded relief.

Three days before admission, the patient developed on and off fever and a few hours before admission, sudden dyspnea for which the patient was rushed to a government hospital where an impression of bronchial asthma was given. Further deterioration of breathing prompted referral to this institution. He presented at the emergency room as a fairly developed male who was conscious but agitated, coherent and in severe respiratory distress. There were multiple linear scars over the abdomen and forearms. The anterior neck was slightly bulging, more to the left, and tender. Chest examination revealed crackles and wheezes all over the lung fields. The impression---acute respiratory failure, etiology unknown.

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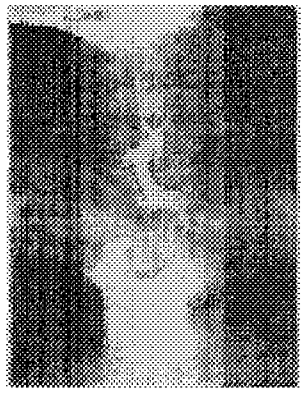
*Presented, PSOHNS Clinical Case Report Contest, Mid-year Convention
April 7, 1995, Subic International Hotel, Olongapo City

**Resident, Department of Otorhinolaryngology, Manila Central University Hospital-FDMTF
***Consultant, Department of Otorhinolaryngology, Manila Central University Hospital-FDTMF

Patient was immediately intubated and was relieved. The white blood cell count was 15.8 x 10/L; electrocardiogram was normal. Arterial blood gas studies showed a compensated metabolic alkalosis and overcorrected hypoxemia. Chest and cervical radiographs showed a set of dentures consisting of 4 teeth and 2 metal hooks, located at C4-C5, surrounded by soft tissue swelling. It was then that the patient was finally referred to ENT for proper management.



After being stabilized, the patient was brought to the operating room with an initial plan to remove it endoscopically and the option to do an esophagotomy via a lateral pharyngotomy approach if endoscopic removal fails.

OPERATIVE TECHNIQUE:

VERTICAL INCISION ANTERIOR TO STERNOMASTOID M.

- Under endotracheal anesthesia, a 40x10 rigid esophagoscope was inserted perorally and into the lumen of the esophagus. At the C4 level, the lumen was severely narrowed by edematous mucosa. Further insertion exposed the denture with the metal hook as the presenting end, enveloped by granulation tissue. The presenting metal hook was grasped with a forward grasping forceps and with a firm but gentle traction and manipulation, extraction was attempted. However, the denture remained fixed and immobile.

The team swung to plan B and, using the light at the end of the scope as a guide, a left vertical incision was made anterior to the sternocleidomastoid muscle, which was deepened down via blunt dissection until the esophageal wall was reached. A 1.5 longitudinal incision was made on the esophageal wall and through it. The denture was finally extricated and the granulation tissues were removed. Further inspection of the esophagus showed absence of perforation. Likewise, no abscess was noted on the adjacent areas. A nasogastric tube (NGT) was placed and the esophageal incision was closed using chromic 4-0.

Extraction of Foreign Body via Esophagotomy

Postoperatively, the patient was placed on massive antibiotics. NGT was retained for two weeks. Patient was discharged asymptomatic and happy.

DISCUSSION

A foreign body is an object or substance foreign to the location where it is normally found. There are two general classes, namely: exogenous, substances from outside the body like dentures, coins, chunks of meat, etc.; and endogenous, those from within like a disimpacted tooth, etc.

At the Philippine General Hospital, a five-year review by Jamir, Tuazon, et al (1989) showed that among adult Filipinos, dentures is the most common cause of esophageal foreign bodies (26%), followed by chicken bones and meat chunks. Among children, coin is the most common, followed by plastic caps and pins.

Ordinarily, diagnosis of the foreign body in adults does not pose any difficulty owing to the presence of a positive history. This is so even in the absence of obvious signs and symptoms like dysphagia, chest pain, regurgitation, and the presence of the objects in the radiographs. In children, however, diagnosis is rendered difficult especially in the absence of clinical and radiographic signs and almost impossible in the absence of witnesses to the actual ingestion or circumstantial evidence (e.g., violent coughing while playing with small objects, drooling with refusal to be fed; etc). It is a widely accepted fact that the failure to recognize the presence of foreign body is due not so much to inability to make the diagnosis as to failure to attach sufficient important consideration to foreign body as a diagnostic possibility. In other words, failure to consider a foreign body as a diagnostic possibility is one of the commonest cause of its oversight.

But how could a 27 year old former medical student miss a positive history of ingestion? Furthermore, what made several physicians and even a specialist on that field miss it out completely? In this patient, several factors came to play:

1. it occurred during sleep, a time when the patient's normal protective mechanisms, like the cough reflex, and gagging, were weak;
2. the recumbent position favored a dislodgment into the hypopharynx and eventually into the esophagus;
3. possibly, a loosening of the denture from its attachment;
4. absence of recollection of patient's activities the previous night, including whether or not dentures were removed prior to sleep, owing to perhaps the effects of shabu.
5. absence of definite signs and symptoms of a foreign body.

What happens when a foreign body remains unrecognized and stays in the esophagus for a long duration?

A foreign body, especially as large and hard as a four-toothed, two-hooked denture may elicit an inflammatory response around it, followed by infection, and ultimately, perforation. If the foreign body is located in the lower esophagus, mediastinal emphysema or abscess may follow a perforation, manifesting as high fever, tachcycardia and retrosternal pain.

If it is located higher up, anterior perforation into the trachea will cause respiratory symptoms that can be mistaken for a primary pulmonary condition. However, mere compression of anterior wall, even in the absence of perforation, can be equally misleading because it can impinge on the tracheal lumen. Spread of infection/ inflammation to either side may irritate the recurrent laryngeal nerve causing hoarseness and laryngeal symptoms.

These explain the development of complications variously diagnosed as

bronchial asthma, pneumonia, tonsillitis and acute respiratory failure. In the absence of an incriminating history of foreign body ingestion, the most rational clinician would be led astray.

The lateral pharyngotomy incision was deemed necessary to extract the foreign body owing to a failure of esophagoscopy. Furthermore, it enabled a better inspection of the status of the esophageal wall and its surrounding structures which rigid esophagoscopy would not permit. Fortunately, neither an abscess nor perforation was present.

CONCLUSION

It must be emphasized that a prolonged sojourn of a foreign body, whether this be from the airway or food passage, will eventually lead to complications and death. There are very few reported cases of long-retained esophageal foreign bodies. Interestingly, the longest sojourn reported was that of a woman who swallowed a wooden button when she was eight years old, but only manifested symptoms 18 years later. That was definitely an exceptional case because these patients usually do not survive for 6 years from the time of ingestion, and usually die within a year.

This patient survived for almost a year but barely, no thanks to the clouded recollections induced by intake of shabu.

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THE OMINOUS SNORE OF A SLEEPING CHILD: OBSTRUCTIVE SLEEP APNEA SECONDARY TO RETROPHARYNGEAL TUBERCULOUS ABSCESS*

FA. ABIGAIL C. DE IMUS, M.D.**
JACOB S. MATUBIS, M.D.***

ABSTRACT

This paper reports a unique case of a 6 year old child with obstructive sleep apnea (OSA) secondary to a tuberculous retropharyngeal mass who presented with a four month history of snoring, gasping episodes and marked intercostal retractions Soft tissue lateral view and CT-scan of the neck revealed a retropharyngeal mass from the first to sixth cervical vertebrae. Fine needle aspiration biopsy of associated right frontal bone and right lateral neck masses were read as necrotic tissue debris. Chest x-ray and other diagnostic tests for tuberculosis were negative except for a positive Mantoux reaction.

The patient underwent tracheotomy to secure the airway. Large bore aspiration and subsequent incision and drainage of the retropharyngeal mass yielded 200 cc of thick, yellow, cheesy, non-foul smelling material from which acid-fast bacilli (AFB) were detected. Histopath report revealed necrotic tissue debris. Repeat aspiration of the associated masses done one week later yielded tuberculosis. The patient was successfully decannulated 20 days post-operatively. Patient is currently on triple anti-TB therapy and sleeping soundly-"snore-free".

Key words: Retropharyngeal mass, obstructive sleep apnea, tuberculosis

INTRODUCTION

Snoring is common in an adult and a curiosity in a child. Few would consider it as portentous of a life threatening situation. This case exemplifies the need to diagnose and determine the cause of obstructive sleep apnea as early as possible. It reveals an unusual retropharyngeal presentation of a locally prevalent disease which plagues ten million new cases in developing countries annually.

Apneic Episode in Patient

CASE REPORT

A malnourished 6 year old female was brought to the ENT Emergency Room for snoring and gasping while asleep. The child was completely asymptomatic when awake.

Four months before admission, snoring was first noted but was attributed by the parents to excessive fatigue. The symptom worsened over the next months and became associated with episodes of gasping and intercostal retractions. These

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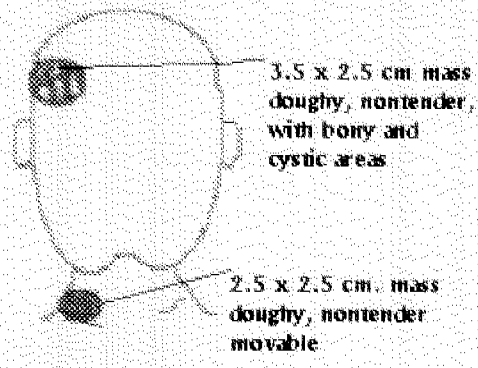
*1st Place, PSOHNS Clinical Case Report Contest
April 7, 1995, Subic International Hotel, Olongapo City
**Resident, Department of Otorhinolaryngology, University of the Philippines-Philippine General Hospital
***Consultant, Department of Otorhinolaryngology, University of the Philippines-Philippine General Hospital

signs were worse when she was supine and in deep slumber and were slightly alleviated by assuming the lateral decubitus position.

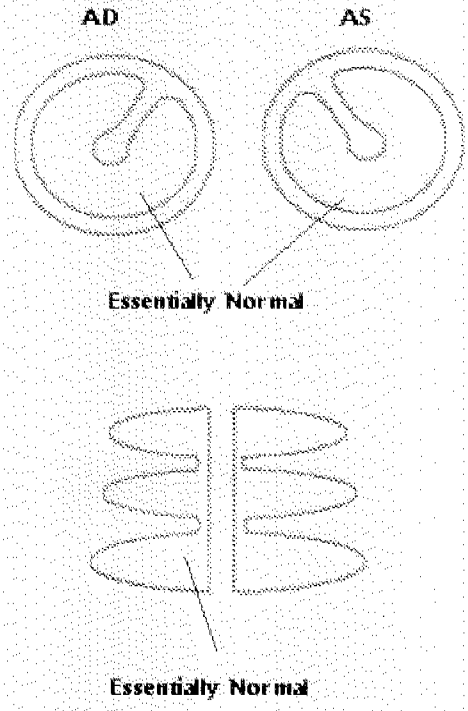
Three weeks before admission, she developed non-productive cough and low-grade fever with worsening of the intercostal retractions and gasping episodes. She was taken to a provincial regional hospital (Out Patient Department) where she was diagnosed as bronchopneumonia by chest X-ray (no tuberculosis was noted). A one-week treatment of Cotrimoxazole brought temporary relief of the cough and fever but gasping and retractions persisted.

When productive cough and low-grade non-spiking fever recurred after one week, she was brought back to the same hospital where a lateral cervical X-ray revealed a soft tissue mass in the retrotracheal area. The child was subsequently referred to our hospital with a diagnosis of upper airway obstruction - etiology unknown.

The patient lost 30% of her weight within two months, placing her 18% short of her ideal weight for age. At the later stage of her disease she began manifesting daytime sleepiness, irritability and difficulty going to sleep at night. In addition, two masses were noted: a 3.5 x 2.5 complex non-tender slowly growing mass on the right frontal area and a 2.5 x 2.5 doughy non-tender slowly growing mass on the right lateral neck area seen at the same time as the start of her initial snoring episodes. Her immunizations were complete. Her father had been partially treated for PTB.



At the emergency room, she was asymptomatic and her vital signs were normal. A pinkish, doughy, non-tender bulge at the posterior oropharyngeal wall was noted (Fig. 2). The right forehead mass was bony with interspersed soft cystic areas. The right lateral neck mass was doughy, movable and non-tender. No other neck masses were felt. The rest of the otolaryngologic exam was unremarkable.



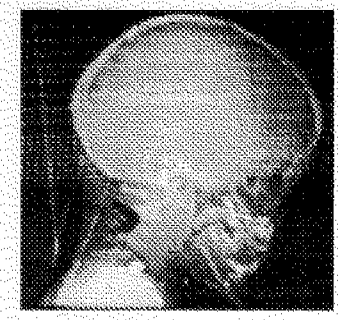
Initial radiologic studies revealed the following:

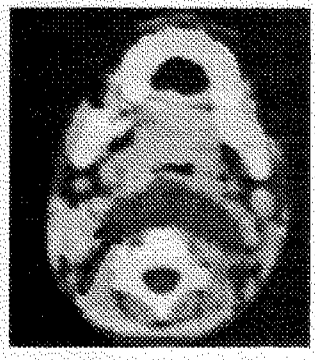
Table 1: Initial Radiologic Studies

x-ray view	Results
CXR PA	no significant chest findings (-) PTB (-) R heart enlargement
Skull lateral	(+) lytic changes in the frontal bone suggestive of metastasis
Neck : soft tissue	(+) retropharyngeal mass

Initial assessment was a retropharyngeal mass, probably an abscess of bacterial origin; tuberculosis and malignancy were also considered.

CT-Scan (head and neck) confirmed the presence of a retropharyngeal mass from C1 to C6 (Fig. A), probably bacterial or tuberculous in nature.

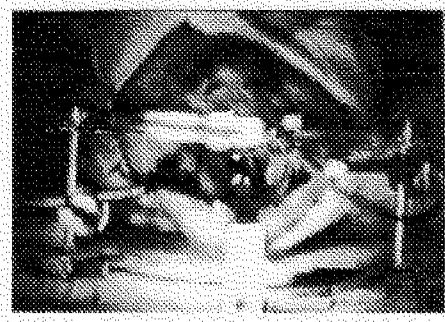


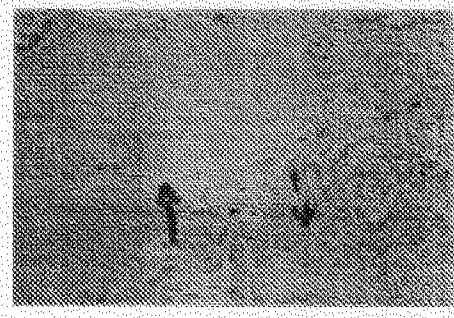


In order to secure the airway for a more definitive procedure, a pediatric tracheostomy was done with insertion of a size 5 metal tracheostomy tube. As expected, once the retropharyngeal mass was bypassed, labored breathing during sleep completely disappeared.

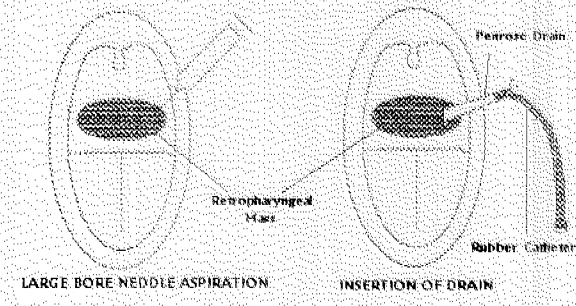
Initial fine needle aspiration biopsy (FNAB) specimens of the right forehead and right lateral neck masses were read as necrotic tissue debris. The Mantoux test was positive (19-79% sensitive and 71-100% specific) [1].

On the 9th hospital day, the patient was brought to the operating room where, depending on the findings of large bore aspiration, either a simple biopsy or a formal incision and drainage (I & D) of the mass was to be performed.





Aspiration with a gauge 19 needle, yielded 0.5 cc of purulent thick yellow cheesy discharge. A 1.5 cm vertical incision at the level of the hypopharynx (Fig. 1) drained approximately 200cc of soft cheesy material, flattening the posterior pharyngeal wall. A penrose drain sutured to a straight catheter was inserted and anchored in place.



Operative Technique

A post-operative soft tissue lateral X-ray of the neck revealed marked shrinkage of the retropharyngeal bulge. Repeat aspiration of the forehead and lateral neck masses done one week after the first biopsy showed findings consistent with tuberculosis. The retropharyngeal aspirate was read as necrotic tissue debris. (The pool of amorphous dead cells seen is compatible with non-specific necrosis be it a bacterial or a tuberculous lesion.) [4,5] Zeil -

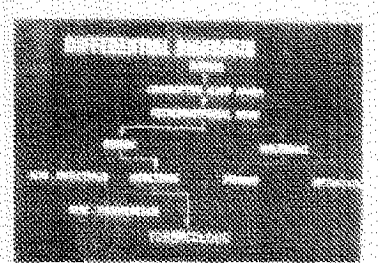
Neilsen stain for acid fast bacilli was positive, clinching the diagnosis of a retropharyngeal tuberculous lesion.

The patient was discharged on the third post-operative day still with a tracheostomy tube in place. She was placed on a one year regimen of triple anti-tuberculosis therapy consisting of isoniazid, rifampicin and pyrazinamide for the first two months and isoniazid/rifampicin for the next ten months.

R-Frontal Bone Mass

The patient was successfully decannulated eight days post-operatively. On the 20th post-operative day, she remained asymptomatic with near-complete healing of the tracheal stoma. There was no bulging in the oropharynx and no report of snoring nor other signs of sleep obstruction. The frontal and neck masses significantly decreased in size. No signs of complications attributable to the tracheostomy were noted. The child did not experience any speech difficulty.

Near Complete Closure of Stoma 20 Days Post-operatively



DISCUSSION

In this case of a 6 year old female who presented with snoring, the clinician's first task was to determine why this child experienced obstructive symptoms only while asleep. Given the slowly growing retropharyngeal mass, progressively narrowing of the air passages increased the velocity of airflow (the Venturi effect), created negative pressures near the pharyngeal wall (the Bernoulli principle)[5] and, once this negative pressure exceeded the tension provided by the dilatory muscles of respiration, led to airway collapse, snoring and the symptoms of obstructive sleep apnea (OSA). Significant decreases in respiratory rate, mucociliary clearance and in muscle tone[6] as well as laxity of the genioglossus further narrowed the air passage, with the lateral decubitus position partially relieving it.

The second problem was to determine the etiology of the retropharyngeal mass. While the history and lateral film of the neck pointed a retropharyngeal abscess, either bacterial or tuberculous in origin, the" lytic lesion suggestive of metastasis " noted in the lateral skull X-ray also suggested a malignancy. The history of 30% weight loss in two months and the relative rapidity of growth of the mass were consistent with this possibility. However, the initial aspiration results of the associated forehead and lateral neck masses read as non-specific necrotic tissue debris gave more credence to an infectious etiology, assuming that the accessible masses were related to the retropharyngeal lesion.

According to Steinkamp, the regular CT scan is not ideal in differentiating a reactive lymph node from a metastatic one. Higher end spiral CT scan better distinguishes a benign from a malignant lesion. Glasier suggests real time ultra-sound to better differentiate retropharyngeal adenitis from abscess in children. Soft tissue lateral films and regular CT scans merely localize retropharyngeal masses. Our experience with this patient supports this view.

The value of fine needle aspiration biopsy (FNAB) in this case was questionable. Though it helped rule out a

malignant process, sampling errors often led to missed diagnosis. In a study by Lee and co-workers, FNAB definitively diagnosed tuberculosis in only 62% of cases. In our patient, only the repeat FNAB of the associated masses yielded the pathognomonic caseation necrosis.

The detection of acid fast bacilli (AFB) still remains as the most reliable evidence for TB. In our case, demonstration of the bacilli in the cheesy material drained from the abscess clinched the diagnosis despite the negative sputum and urine AFB stains, chest X-ray and final histopathologic report. The positive Mantoux test confirmed past exposure to TB, possibly from her partially treated father.

The case presented stresses the need for vigilance in a child who snores. The snoring patient should undergo at least a thorough physical examination and appropriate radiologic studies in order to determine the presence and causes of OSA. A diagnosis made early in the course of the disease may render the illness still amenable to medical therapy and prevent emergency surgical interventions.

CONCLUSION

Tuberculosis, the fifth leading cause of morbidity and the fourth leading cause of mortality in the Philippines, may present with an unusual spread to the retropharyngeal space. The subsequent narrowing of the airway and normal physiologic changes experienced during sleep may cause obstructive sleep apnea, especially in children. Snoring, found in 92% of cases of OSA should, therefore, not be ignored. It indeed can be deemed as an ominous sign of a potentially life-threatening yet increasingly prevalent disease.

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THE OPENED CAN TECHNIQUE A NEW METHOD OF TRACHEOSTOMAL CONSTRUCTION IN TOTAL LARYNGECTOMY*

ANTONIO H. CHUA, M.D.***
WILLIAM U. BILLONES, M.D.**
GIL M. VICENTE, M.D.***
JERRY AB. ROSARIO, M.D.**

ABSTRACT

The paper is an innovative case report that presents a new technique of tracheostomal reconstruction in total laryngectomy done in a tertiary government hospital involving three patients.

This new technique revealed no evidence of stomal stenosis after a long term follow up ranging 20-26 months post-operatively. The technique, based on sound surgical principles, basic biophysical dynamics and simple in design has the following salient features: a) creation of two obtuse angles at the cartilage-muscle junction b) creation of a cuff of posterior membranous wall c) anchorage of posterior membranous wall to superior skin flap d) anchorage of anterior cartilagous wall to inferior skin flap e) horizontal circulation of the stump orifice.

Keywords : Tracheostomal Reconstruction, Total Laryngectomy

INTRODUCTION

Tracheosmal construction is an integral part of total laryngectomy. However, despite the wide experience and variability of techniques available on this procedure, stenosis of the tracheostoma still occurs as a distressing postoperative complication[1] -- spoiling an otherwise successful resection of the primary laryngeal pathology.

Stenosis of the tracheostome may present itself in the immediate postoperative period or years later. Its incidence is as varied as the number of authors defining it, ranging from a low 4% to a high 42%. Loewy and Laker reported only six vaguely defined " benign stomal strictures " in their series of 138 cases[2]. Langenbrunner and Chandler, who defined an "inadequate stoma" as one that required a tube at anytime after the operation or the revision, reported stomal stenosis in 43 of their 124 patients (34%)[3]. Less clear was the definition of Yonkers and Mercurio, taking into account "symptoms preventing normal daily activities or necessitating the prolonged use of a laryngectomy tube ", and thus encountered a stenosis rate of 42%.[4]

The consequences of tracheostomal stenosis are wide ranging in nature and severity, contributing significantly to both psychosocial and physical morbility in the laryngectomee. Optimum air exchange and ability to clear tracheobronchial secretions may be compromised. Stagnation of mucus due to impaired mucociliary transport is a potencial factor in recurrent pulmonary infections. Occasionally, some patients may need to wear a tracheostomy tube or button to keep the tracheostoma patent, usually for 24 hours a day.

With these complications, patients may require another trip to the operating room for tracheostomal revision procedures, which, in addition to being a financial and psychological burden, are not always successful[5]. This failure may be attributable to the presence of excessive scar tissues, short tracheal stump, and the persistence of the original factors which have led to the occurrence of the stenosis in the first place.[5]

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*1st Place, PSO-HNS Surgical Case Report Contest, Mid-year Convention
April 8, 1995, Subic International Hotel, Olongapo City

**Resident, Department of Otorhinolaryngology, Jose R. Reyes Memorial Medical Center
***Consultant, Department of Otorhinolaryngology, Jose R. Reyes Memorial Medical Center

Notwithstanding the different incidences of stenosis reported in the literature, there is definitely a need to address this problem which would require prolonged care and long term follow-up. It is prudent for the Head and Neck surgeon to be cognizant of this complication and utilize a simple and effective technique that can provide an adequate tracheostome. One obviously can ill-afford even one occurrence in one's series of laryngectomies, considering the distress this condition imposes on the patient and surgeon.

Prevention is still the ideal method in dealing with this problem[6]. Preventive measures include careful preoperative planning, meticulous surgical technique and diligent postoperative care. The best time to deal with tracheostomal stenosis is, therefore, right during the initial laryngectomy.

Various techniques have been described for this purpose. The more commonly utilized ones include beveling of the tracheal stump, a variety of complex flap designs and insertion of implantation devises -- each offering its own advantages as well as disadvantages.

The authors shared their experience on a new technique of tracheostomal construction based on sound surgical principles, biophysical dynamics and simplicity of design. A representative case is illustrated to demonstrate the effectiveness of this method.

TECHNIQUE

A standard total laryngectomy via a U-shaped apron flap is done, preceded by a radical neck dissection. Clean surgical margins are ensured by providing a 1.0 to 1.5 cm clearance from gross tumor edge. Fresh frozen section is done if there are doubts regarding the margins.

As a tracheostomy prior to the definitive surgery had been done, an additional tracheal cartilage incomplete ring inferior to tracheostomy incision is removed. The stump is reinspected to ensure that it is grossly free of tumor and inflammed tissues.

Two tracheal cartilage incomplete rings are excised, taking care to spare the posterior membranous wall (FIGURE 1). The incision is made immediately superior to the planned remaining tracheal stump without exposing the perichodrium, and extends obliquely cephalad as it nears the posterior tips of the cartilage half-ring. This cut produces an obtuse angle along both cartilage-muscle junctions of the tracheal ring and serves to break up an otherwise concentric suture line (FIGURE 2). The total result is the construction of a tracheal stump with at least a 1.5 cm cuff of posterior membranous wall, which bears uncanny resemblance to an opened tin can.

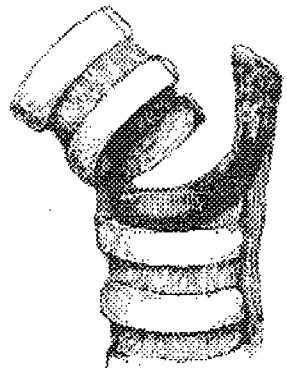


Figure 1

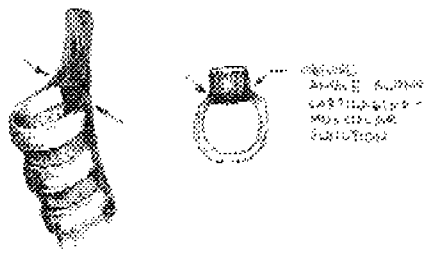
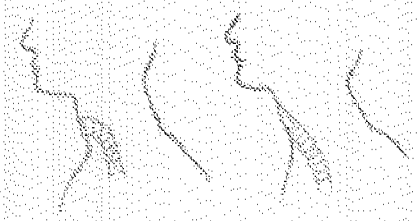


Figure 2

Redundant apron flap skin is excised to provide an elliptical skin stomal edge. Any excess adipose tissue is excised deep to the skin flap edges. The tracheal cartilage incomplete ring is slightly splayed laterally and suture to the inferior skin flap under mild tension. Modified vertical mattress using 2-0 silk is done, traversing the skin (peripherally), cartilage (extramucosally), then skin (medially). The superior flap is attached to the membranous tracheal wall with mild stretching of the

trachealis muscle using simple interrupted 2-0 silk sutures. The final stump orifice assumes an almost horizontal orientation with the longitudinal axis of the trachea maintained in the normal anatomical (vertical) position (FIGURE 3). This lessens undue tension from the pull of the pulmonary ligaments.

Figure 3



In summary, the salient features of this technique are following :

1. creation of two obtuse angles at the cartillage-muscle junction to break the concentric suture line
2. creation of a cuff of posterior membranous wall
3. anchorage of posterior membranous wall to superior skin flap
4. anchorage of anterior cartilaginous wall to inferior skin flap
5. no additional incisions that might unnecessarily expose cartilage
6. horizontal orientation of the stump orifice
7. no complex flap design that requires extra care during manipulation and suturing

RESULTS

Since 1993, this new technique has been employed on 3 patients (Table1). All had total laryngectomies and unilateral radical neck dissection, followed by postoperative radiotherapy. The immediate postoperative dimensions ranged from 2.0 cm x 2.5 cm to 2.2 cm x 2.8 cm. The patients were regularly followed up. As last visit (20-2 months postoperatively), stomal dimensions ranged from 2.0 x 2.4 cm to 2.1 cm x 2.7 cm. Stenosis, defined as patient needing to wear tracheostomy tube permanently or revision of stoma, was not evident at time of follow-up. (Please see photographs)

Table 1

Px	Age / Sex	Dx	Stage	Postop Dia.	Ff-up Dia.
MJ	73M	SCCA	IV	2.0x 2.4 cm	2.0x 2.4 cm
RS	59M	SCCA	III	2.2x 2.7 cm	2.1x 2.7 cm
SP	58M	SCCA	IV	2.1x 2.7 cm	2.0x 2.7 cm

Photograph

DISCUSSION

Taking cues from knowledge and experience on wound healing, the major principles in creating a trouble-free stoma should include 1) careful approximation of skin and mucus membrane, 2) elimination of compressive forces, 3) active tension on the stoma margins, 4) increased circumference and 5) redistribution of forces of scar contraction.[3]

The most common surgical techniques to prevent stenosis include oblique section of the tracheal stump to increase stomal diameter, semicircular and circular incision to increase the circumferene of the skin margin to adapt to the tracheal stump to achieve tension radially on the stoma and complete coverage of the cut edge of the tracheal cartilage with through and through or vertical mattress sutures.[3]

In most cases, stomal diameter is usually increased by beveling the trachea at an angle of 45 degrees which essentially lengthens its lateral dimensions. However, this unnecessarily exposes tracheal cartilage which may eventually give rise to infections along its mucocutaneous junction. Perichondritis and subsequent scarring result in decreased diameter of the stomal aperture. Resection of a relatively longer segment of the trachea is required and, more importantly, the concentric circle of the tracheostoma is not broken up, making

it vulnerable to concentric scarring in the future.

A variety of techniques employing Z-plasty, double V and V-Y flap designs of primary tracheostomal construction had been utilized at the time of the laryngectomy in order to prevent stenosis by enlarging the stoma and redirecting the forces of scar contraction.

A butterfly or bowtie stoma had been developed by Clairmont by excising inferiorly based triangles from the anterior and posterior tracheal stump. Superior and inferior skin flaps, created by lateral skin excisions, are inset into the apex of the tracheal defects.[7]

Trail et al used a method of double rotation flap Z-plasty utilizing the skin posterior to the stoma transposed into an oblique incision in the posterior membranous tracheal wall. A small flap of mucosa of posterior tracheal wall is then transposed into the tumor site of the skin flap.[8]

Isshiki and Tanabe utilize superiorly based double skin flaps, created by a Y-shaped cutaneous incision, each of which is inserted into a separate oblique incision of the posterior tracheal wall.[9]

Hartwell and Dykes created a triangular posterior-superior skin flap by excising a wedge of skin on each side of this flap. The flap is advanced and inset into a vertical incision of the posterior trachea.[10]

These flap designs generally utilized the same basic principle of stomal enlargement and inhibition of circular scarring where the flaps break up the concetric circle of the stoma. Although each had been reported to have favorable results by their authors, these techniques are needlessly complex in design.[6] Additional incisions along the trachea and peritracheostomal area would theoretically result in more scarring due to additional manipulation. Again, cutting through the tracheal cartilage is inherent in the design which may complicate the results.

What is needed perhaps is something that is less complex with less incisions and manipulation.

The technique described herein offers the advantages of the believed and the flap techniques as well as simplicity of design. The primary objectives in the surgical prevention of tracheostomal stenosis are achieved, namely: careful approximation of skin and mucus membrane, elimination of extensive compressive forces, active tension on the stomal margins, increased circumference and redistribution of the force of scar contractions and prevention of undue exposure of tracheal cartilage.

By simply incorporating the posterior membranous trachea to the stump, the anteroposterior diameter of the tracheostoma is increased, simulating a beveled stump. But unlike the latter procedure, resection of tracheal cartilages start from the inflamed tracheostomy site while preserving the posterior wall. This, in effect, spares more normal tracheal segments in increasing the stomal diameter. In addition, there is no exposure of tracheal cartilage that may lead to perichondritis (FIGURE 4).

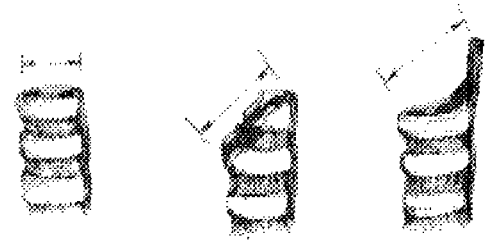


Figure 4

Compressive forces around the stoma are reduced by extensive removal of subcutaneous fat, excision of redundant skin and splaying the trachea with anchorage of the cartilaginous portion on the inferior skin flap. This provides active tension on the stomal margins and further dilates the stomal aperture.

Since the stump orifice is oriented almost horizontally and assumes a more normal anatomical position, less tension is generated on the stump by the pull of the pulmonary ligaments caudally as compared

to other techniques where the aperture had to be positioned vertically to anchor it on the skin flaps. With less caudal pull, there is less tendency for the stoma to close and stenose (FIGURE 3).

Perhaps the most important feature of this technique is the inclusion of the posterior membranous portion in the otherwise circular stump, thereby breaking the concentric circle of the future tracheostoma. This is the basic principle utilized in the flap techniques. Incorporating the trachealis muscle indirectly creates an obtuse triangle on the junction of the cartilage and muscle on both sides similar to inserting bilateral triangular flaps on the stump (FIGURE 2).

This redistributes the forces of scar contraction which eventually prevents narrowing by scar contraction which eventually prevents narrowing by scar tissue in the future.

Finally, with less incision lines and tissue manipulation, postoperative care is easier with minimal crust formation and faster wound healing time.

SUMMARY AND CONCLUSION

In summary, a new method of stomal construction called the OPENED CAN TECHNIQUE is presented. Basically, its salient features are the following:

1. creation of two obtuse angles at the cartilage-muscle junction to break the concentric suture line
2. creation of a cuff of posterior membranous wall
3. 3. anchorage of posterior membranous wall to superior skin flap
4. anchorage of anterior cartilaginous wall to inferior skin flap
5. no additional incisions that might unnecessarily expose catilage
6. horizontal orientation of the stump orifice
7. 7. no complex flap design that requires extra care during manipulation and suturing

This technique offers the distinct advantage of making a trouble-free stoma by observing the following surgical principles: careful approximation of skin and mucus membrane, elimination of extensive compressive forces, active tension on the stomal margins, increased circumference and redistribution of the forces of the scar contractions and prevention of undue exposure of tracheal cartilage.

The three patients on whom this technique was employed showed no evidence of stomal stenosis as of last follow-up (20-26 months post-operatively). A forthcoming prospective comparative study will be reported in the near future.

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THE USE OF FULL THICKNESS CALVARIAL BONE GRAFTING IN FACIAL RECONSTRUCTION*

FELIX P. NOLASCO, M.D.***
ROMULUS A. INSTRELLA, M.D.**
MA. TERESITA R. VILLA-REAL, M.D.**
ARNEL RICO ALVIS, M.D.**

ABSTRACT

This is the case of a 42 year old male who sustained severe maxillofacial trauma a following vehicular accident. The patient sustained multiple comminuted facial fractures. The fractures involved the right lateral orbital wall, medial orbital rim, zygomatic bone, anterolateral maxillary walls and alveolar ridge. Initial open reduction with Internal fixation revealed massive bone loss. This study used a full thickness calvarial graft as source of bone replacement for massive bone loss. The different surgical accesses were the coronal infraorbital rim and gingivobuccal incisions. The advantages of calvarial graft over rib and iliac bone were discussed. Post-operatively, there were no complications and the patient had a more satisfactory and symmetrical face but may still need secondary soft tissue reconstruction for aesthetic purposes.

Keywords: Full thickness calvarial bone graft; multiple comminuted facial fracture; facial reconstruction.

INTRODUCTION

The treatment of old facial bone fractures has always been a very demanding and, oftentimes, frustrating endeavor. More often than not, the fractured or displaced bony fragments has been resorbed due to plain neglect or inadequate management. When a significant part of the facial bones is lost, the original appearance of the face is altered or lost as well. Reconstruction or returning the contour of the once admired face is then a big challenge to every otolaryngologist in this particular field of interest.

Recent advances in diagnostic as well as the therapeutic management of maxillofacial trauma have rationalized and improved treatment approach. Among these advances, the extensive use of immediate or delayed bone grafting, especially the use of split thickness calvarial grafting is becoming very popular because of its advantages over the iliac and rib graft. However, the amount and thickness of this graft is sometimes not enough in reconstructing defects with massive loss of facial bones. In this case, a full thickness calvarial bone graft which adequately replaced the large amount of bony loss was tried.

Other innovations in the management of maxillofacial trauma which were employed in this case to complement the use of the full thickness calvarial grafting were:

1. Three dimensional (3D) CT scan which has revolutionized the diagnosis of facial fractures by accurately detailing the fracture lines, the degree of displacement of the fractured fragments and the amount of bone loss;
2. Extended surgical accesses and internal approaches which allowed wider exposures of the entire facial skeleton while minimizing external incisions and unsightly scars;
3. Internal rigid fixation with titanium plating system which provided accelerated bone healing and functional immobilization of the fractured or grafted bones.

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*4th Place, PSO-HNS Surgical Case Report Contest
April 8, 1995, Subic International Hotel, Olongapo City
**Resident, Department of Otorhinolaryngology, East Avenue Medical Center
***Consultant, Department of Otorhinolaryngology, East Avenue Medical Center

OBJECTIVE

The objectives of this paper is to present the experience of this institution in the innovative surgical management of a patient with extensive bone loss secondary to multiple facial fractures after failed open reduction using full thickness calvarial bone grafting and to evaluate the difficulty and risk of the procedure as well as the psychological and economic considerations involved.

CASE REPORT

This is a case of E.M., a 42 year old male soldier who sustained multiple facial fractures when his jeep suddenly swerved and fell into a ravine. Patient was initially brought to Baguio General Hospital where suturing of the lacerations was done without any fracture management. A month later, the patient was transferred to V. Luna Medical Center and was subsequently referred to this institution. Physical examination revealed the right eyeball to be displaced downward and inward with severe loss of right malar prominence. There was severe nasal bone depression and facial asymmetry. The conjunctivae of the right eye was chemotic and there was ectropion of lower lid as well as limitation of eye movement towards the medial side. The visual acuity was 20/80 (Jaeger) and patient complained of diplopia.

The patient was assessed to have the following comminuted fractures involving the right medial, inferior and lateral orbital walls; nasal bone fracture; zygomatic bone fracture: and right maxillary wall fracture.

The initial surgical management was open reduction with internal wire fixation of the fractures via Weber-Ferguson incision. Intraoperatively, comminuted fractures with some bone loss were noted at the medial orbital wall, zygomatic bone, orbital floor, infraorbital rim, and lateral orbital rim. Adhesions in the fractured segments and on the right eye area were released. Despite some bone loss, meticulous approximation of the available bony fragments with wire fixation was done. The patient was then discharged but was later lost to follow-up.

Two years later, the patient came back to this institution with still an unsatisfactory face. Bone loss was evident, most especially at the malar area, alveolar ridge and infraorbital area. The right lid had inadequate closure, and globe displacement was still evident. The patient had facial asymmetry and a severely flattened malar area and a very pushed back right alveolar ridge. A 3D CT scan was done revealing large bony and soft tissue defects in the region where the right malar/ maxillary fractures have been. There were small metallic fragments in the region of the right mandibular ramus and posterior to the right alveolar ridge. Small bony fragments were also noted in the right infratemporal fossa; the left maxillary and the right frontal sinus were congested/fluid filled. Old temporal bone fractures were noted. The visualized brain structures appeared normal.

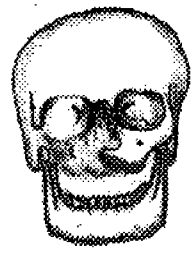
Apparently, progressive bone resorption resulted in an almost missing right bony face. It was clear then that a large bone graft was needed to replace these missing bones. The source of bone graft became the problem since the popular split thickness calvarial bone grafts will surely not suffice. Considering the advantages of the calvarial bone grafts over the rib and iliac bone grafts, a full thickness calvarial graft was harvested to reconstruct the facial bones.

SURGICAL MANAGEMENT

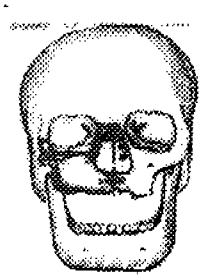
A coronal incision was outlined behind the vertex and infiltration with lidocaine plus epinephrine (1:100,000) was given before the incision was made. The incision was brought inferiorly to the pre-auricular crease at the level of the tragus. Hemostasis of edges was obtained by the use of Raney clips. The initial place of dissection was just above the periosteum over the central portion of the skull. Laterally, the incision was just above the temporalis muscle fascia. The dissection is carried forward until the superior temporal fat pad was visualized under the facia. An incision was then made through the temporalis fascia and the rest of the incision was continued subfascially. This dissection reflects the frontalis nerve anteriorly out of harm's way. When the area of zygomatic

arch and lateral orbital rim was reached, the dissection becomes subperiosteal in the naso-frontal region. The dissection was continued subperiosteally down over the root of the nose and along the medial aspect of the orbit. With a marking pen, the surgeon marked the area of the parietal bone to be harvested, taking care to stay at least 2 cms lateral to the midline to avoid any possibility of injuring the saggital sinus. The dimensions of the graft was 8 x 10 cms. A full thickness calvarial bone was completely removed via a craniotomy procedure. The harvested full thickness calvarial bone was horizontally divided into two with the use of a pneumatic air drill. One half of the bone was split up with the use of a pneumatic air drill and malleable osteotome. The inner bone layer together with the outer bone layer were fixed with 3-D microplates and were used to cover the donor site. The other half of the full thickness calvarial bone graft was used as the source for bone replacement. With the coronal incision, exposure of the lateral orbital rim, medial orbital rim, zygoma, and nasal bone were made possible. The infraciliary incision exposed the infraorbital rim and orbital floor while the gingivobuccal incision exposed the alveolar ridge as well as the maxillary area. With adequate exposure of all areas of bone loss and meticulous analysis of the bones to be replaced, the surgeon started to contour and design the full thickness calvarial bone grafts for the particular area of bone loss. The bone grafts were then properly positioned and fixed with the use of titanium plates and screws as seen in Fig. 1. The coronal flap was returned to its original position. The periosteum and galea were closed with absorbable sutures. The subcutaneous tissues were tacked together by absorbable sutures with penrose drain in place and the skin was closed with staples. Gingivobuccal and infraciliary incision were closed. Light compression dressings of fluffs and expandable bandages were applied to the forehead, scalp and ear areas.

Post-operatively, the patient was placed on IV penicillin 5 million units q 6 hours, chloramphenicol 1 gm q 6 hours, gentamycin 80 mg q 8 hours. Oral hygiene was maintained with mouthwash. Nasogastric tube feedings were started post-operatively. Patient was on general liquids after 5 days, progressive diet thereafter. Patient was discharged on the 10th post-op day. Staples were removed on the 14th post-operative day.



Before the reconstruction with Massive bone loss



After the reconstruction with contoured full thickness bone graft with titanium miniplates

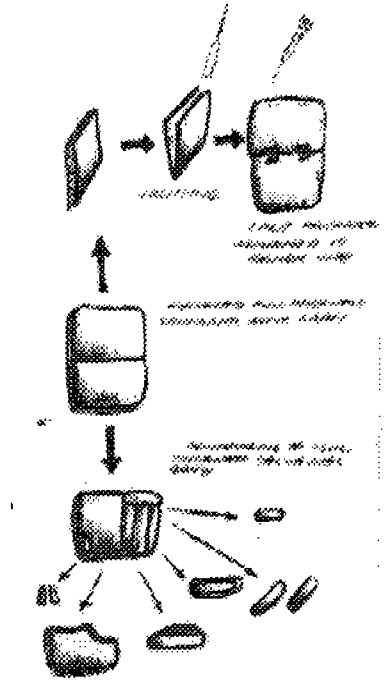


Figure 1

Craniomaxillofacial trauma and facial reconstructive surgery is indeed a very challenging field. As a result of altercation or vehicular accident, patient present with the following givens: a severely fractured face in jigsaw pieces all jumbled. It is easy to say that the pieces of the puzzle can be put back together. But what must be done when several pieces of the puzzle have been lost? What could be done to restore the once admired face?

The advantages of 3D CT scan are indispensable here because it constructs a 3-D model of the skull structure enabling proper evaluation of bone losses and positions of the fractured bones.

Which exact surgical incision will expose fracture sites with least scarring is also part of the challenge in maxillofacial trauma. The coronal incision was used to expose the skull as well as the areas of bone loss in the face thus facilitating harvest of the calvarium. Furthermore, the scars would be all hidden when the hair grew back. The gingivobuccal and infraciliary incisions both provided good exposure and access sans postoperative scars.

The commonly employed iliac bone graft has been associated with complications. Some authors have opined that using the iliac crest as donor site has produced an unacceptably high degree of post-operative morbidity (Canady, 1993). Mathog cited postoperative pain as a disadvantage. This complaint along with numbness, infection, paralysis, or long term disability have been well documented. Most patients were able to return to full activity within 4-6 weeks. Gluteal gait, aside from pain at the donor site were noted by Laurie (1983). The main disadvantage of iliac bone graft, being an endochondral bone, was its propensity for resorption (Harbon, 1991). Frodel and Mohr averred that membranous bones such as the calvarium undergo significantly less resorption. On the other hand, rib grafts have produced pneumothorax and high rates of bone loss immediately after bone grafting (Iore, 1989).

An alternate source for bone grafting is the calvarium. Calvarial bone [illegible] its use has been described in congenital craniofacial surgery by Marahac (1978), Tessier (1982), and Wolfe (1983), calvarial bone grafting has become popular for a great variety of traumatic reconstructive and cosmetic facial deformities. In neurosurgery and spine surgery, the use of full thickness calvarial bone grafts for cervical spine fusions appears to be effective and safe in pediatric patients requiring stabilization of the cervical spine. There was also less morbidity compared to autologous grafts from rib and iliac crest (Chadduck, 1994).

Donovan reviewed 24 patients reconstructed with split thickness calvarial bone grafts and reported an overall success rate of 91.4%. Jackson (1992) reported 229 split thickness calvarial bone grafts done on post-traumatic or congenital deformities in the orbital area, attaining an 86% satisfactory aesthetic and functional result. Minimal donor site morbidity was also seen. In a study of outer table calvarial bone grafts used for the reconstruction of the bony orbital walls in 43 patients, the transplants were harvested in the parietal area above the non-dominant hemisphere. The morbidity and complications rates at the harvest sites were extremely low. The grafts were all uneventfully incorporated (Spitzer, 1994).

Split thickness calvarial grafts are best harvested from the parietal region measuring approximately 8 x 10 cm. In this area, the calvarium is thickest, and the "danger areas" of concern in the midline (saggital sinus) and temporal regions (thinner bone) are avoided (Frodel, 1994). Finkelman, et. al, (1994) showed that split-thickness calvarial bone grafts may have greater survival as donor tissue than bone from other sites. Split thickness calvarial bone has been found to be resistant to osteoporosis since calvarial bone contains growth factors that may play an important role in the regulation of bone repair.

With the help of a neurosurgeon, the full thickness calvarial graft was safely harvested with no complications such as dural tears, meningitis, CSF leak, intracerebral injury, subdural hematoma.

This case made use of the full thickness calvarial bone graft instead of the more common split thickness calvarial bone graft because the latter would not have been adequate to replace massive bone loss. Besides, harvesting split thickness calvarial graft can result to more fractured graft when splitting is done (Frodel, 1994).

Calvarial grafts have been shown to be better accepted than the iliac and rib grafts provided that the grafts are properly fixed and positioned. In this regard, the use of titanium plates for rigid fixation greatly improved the take as well as the designing and contouring of the bone graft for areas with bone loss. It reduced operating time and hastened early rehabilitation. Titanium micro-plates are easily adapted to the bone surface and attains 3-dimensional stability with bone screws. With the titanium micro plating system, the harvest site of the calvarial graft was covered with the split thickness of one half of the calvarial graft. This provided strong and rigid fixation of the split thickness calvarial graft to protect the skull. The other half was contoured to suit the area of bone loss. The plates are flat, avoiding contour defects or bulging. Contouring as well as designing the bone graft are easily done because of the ability of the plating system to adapt to bone contours.

The surgeon's expertise as well as aesthetic judgement are also factors that will help create the aesthetic and functional restoration of the facial features. The facial features of the patient have been appreciably restored since bone contours for the lateral orbital wall, inferior orbital rim, zygomatic area, alveolar ridge and nasal bridge have been created. A more satisfactory and acceptable face has been bestowed on the patient. The patient had an uneventful postoperative outcome and had a happier disposition with the restoration of his facial features. The calvarial graft did not have any complications. In short, the patient's once lost face has been returned.

COMMENTS

1. A full thickness calvarial bone graft can be used safely without any significant morbidity when the bulk of the split thickness calvarial bone graft is not enough for bone replacement in maxillofacial reconstruction.

2. The application of the other advances in the management of maxillofacial trauma is essential in the successful use of the full thickness calvarial bone grafting.

3. The procedure of harvesting the full thickness calvarial bone grafting is not difficult but needs the service of a neurosurgeon.

4. The psychological and emotional status of the patient in relation to the extent of the operation is very satisfactory.

5. Financially, there is an additional expense for the neurosurgeon.

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7. Drooling

Forty seven percent (8/17) of OGT subjects developed drooling compared to the NGT group, 24% (4/17). P value was <0.001 which was significant (see table XI below). OGT group developed more drooling than the NGT group.

Table XI. Occurrence of Drooling

	With Drooling	Without Drooling
NGT	4/17 (24%)	13/17 (76%)
OGT	8/17 (47%)	9/17 (53%)

p value <0.001

8. Gag Reflex

Ninety four percent (16/17) of OGT group experienced gagging compared to 77% (13/17) for the NGT group. P value was <0.001. OGT subjects experienced more gag than the subjects in the NGT group (see table XII below)

Table XII. Occurrence of Gag Reflex

	With Gag Reflex	Without Gag Reflex
NGT	13/17 (77%)	4/17 (23%)
OGT	16/17 (94%)	1/17 (6%)

p value <0.001

C. Overall Subjects 'Preference

Majority of the subjects preferred OGT over NGT.

SUMMARY TABLE

Table XIII. Ease of Insertion Parameters

Parameters	NGT (mean) minutes	OGT (mean) minutes	P Value (paired t-test)
1. Time elapsed	1.8	2.6	<0.001 *
2. Number of Attempts	1.2	1.2	>0.05
3. Discomfort Score	1.76	1.01	<0.01 *

*significant

Table XIV. Bothersome Effects

Bothersome Effects	NGT (mean)	OGT (mean)	P Value (Wilcoxon t-tesy)
1. Nasal Pain	1.65	0.06	<0.001 *
2.Chest/Neck Pain	1/0	0.7	>0.05
3. Oropharyngeal Pain	0.9	1.3	<0.05 *

*significant

Table XV
Bothersome Effects

Bothersome	NGT (%)	OGT (%)	P Value (Mcnemars paired t-test)
1.Nasal Discharge	82%	0	<0.001 *
2.Nasal Obstruction	88%	0	<0.001 *
3.Gag Reflex	77%	94%	<0.001 *
4.Speech Disturbance	29%	47%	<0.001 *
5.Drooling	24%	47%	<0.001 *

*significant

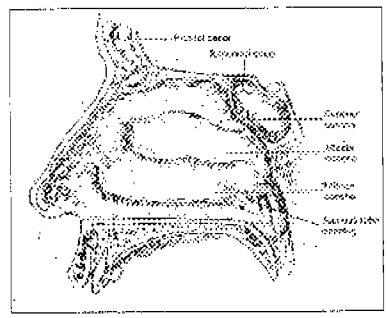
DISCUSSION

Orogastric tube (OGT) has been used especially in the newborns since they are obligate nasal breathers. OGT is a good alternative to NGT. OGT also obviates the problem brought about by: (1) septal deviation/spur, (2) enlarged adenoids, and (3) columellar abrasions.

The following findings were noted in this study:

	Favorable Factors	Untavorable Factors
NGT	Less gag	nasal pain
	less speech disturbance	nasal obstruction
	less drooling	nasal discharge
	less oro-pharyngeal pain	more discomfort during insertion
OGT	easier to insert	gagging
	less discomfort during insertion	speech disturbance
	preferred/accepted the subjects	drooling
		oropharynngeal pain

The nose is the most prominent organ of the face and is a pyramidal structure with its apex projecting anteriorly and its base attached to the facial skeleton. It is a very narrow cavity consisting of bones, cartilage, muscles, soft tissues, meatuses, blood vessels and a rich supply of nerve endings (see appendix IX and X).



B.Bothersome Effects

1. Nasal Pain

Majority, 65% (11/17), of NGT subjects had a score of 2 while 94% (16/17) of OGT subjects had a score of 0. However, 6% (1/17) of OGT subjects developed mild nasal pain (see table V below). There was a significant difference between the two groups, p value <0.05 in favor of NGT.

Table V. Level of Nasal Pain

Nasal Pain Score	NGT	OGT
0	1/17 (5%)	16/17 (94%)
1	5/17 (30%)	1/17 (6%)
2	11/17 (65%)	0

Mean NGT = 1.6
Mean OGT = 0.06
p value <0.01

2. Chest/Neck Pain

Most subjects in both groups developed nasal pain (see table VI below). No significant difference between the two groups was noted.

Table VI. Level of Chest/Neck Pain

Chest/Neck Pain Score	NGT	OGT
0	4/17 (24%)	6/17(35%)
1	9/17 (52%)	10/17(59%)
2	4/17 (24%)	1/17(6%)

Mean NGT = 1.0
Mean OGT = 0.7
p value >0.05

3. Oropharyngeal Pain

Majority, 94%, of OGT group had a score of 1 and 2 against 82% for the NGT group. The p value was <0.05. OGT subjects experienced a greater level of oropharyngeal pain than the NGT group (see table VII below).

Table VII. Level of Oropharyngeal Pain

Oropharyngeal Pain Score	OGT	NGT
0	1/17 (6%)	3/17(18%)
1	10/17(59%)	12/17(71%)
2	6/17(35%)	2/17(11%)

Mean NGT = 0.9
Mean OGT = 1.3
p value <0.05

4. Nasal Discharge (Rhinitis)

Eighty two percent of NGT subjects experienced nasal discharge while none for OGT subjects (see table VIII below). Significant difference was noted between the two groups, p value <0.001. NGT subjects experienced more nasal discharge. However, 11% (3/17) of NGT subjects did not develop nasal discharge.

Table VIII. Occurrence of Rhinitis

	With Rhinitis	Without Rhinitis
NGT	14/17 (82%)	3/17 (18%)
OGT	0	17/17 (100%)

p value <0.001

5. Nasal Obstruction

Eighty eight percent (15/17) of NGT subjects developed nasal obstruction while none did so among OGT subjects. However, 12% (2/17) of NGT subjects did not experience nasal obstruction (see table IX below). Subjects in the NGT group developed more nasal obstruction.

Table IX. Occurrence of Nasal Obstruction

	With Nasal Obstruction	Without Nasal Obstruction
NGT	15/17 (88%)	2/17 (12%)
OGT	0	17/17 (100%)

p value <0.001

6. Speech Disturbance

Forty seven percent (8/17) of OGT group and 29% (5/17) of the NGT group experienced speech disturbance (see table X below). P value was <0.001. OGT subjects had more speech disturbance compared to the NGT group.

Table X. Occurrence of Speech Disturbance

	With Speech Disturbance	Without Speech Disturbance
NGT	5/17 (29%)	12/17 (71%)
OGT	8/17 (47%)	9/17 (53%)

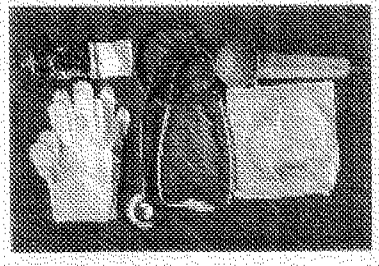
p value <0.001

Persons with the following were excluded from study:

1. Altered mental status
2. Uncooperative
3. Tumors of nose, nasopharynx, paranasal sinuses, and oropharynx
4. History of allergic rhinitis or chronic rhinosinusitis
5. Use of decongestant or antihistamine in the preceding week
6. Inaccessibility of oral and nasal insertion route
7. Continuous gastric decompression required
8. Cardiac problem in which myocardial infarction cannot be totally ruled out
9. Cranial nerves V,IX, X deficit

After getting informed consent (see appendix I) from qualified subjects, complete histories and physical examinations were done. The purpose, method as well as complications were thoroughly explained to them. They were then subjected to the following intubation regimens:

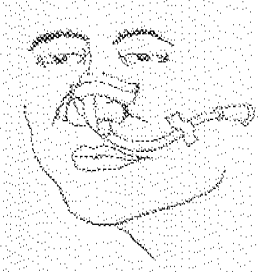
1.NASOGASTRIC TUBE INSERTION

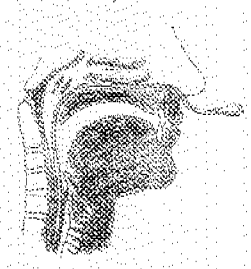


Materials

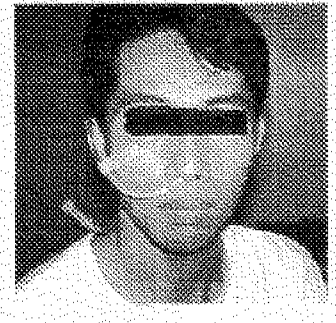
Measurement

With the patient in sitting position, the length of the tube to be inserted was measured from the nose to the ear, and then from ear to the xyphoid process. A well lubricated (using K-Y Jelly) 16-Fr. 80cm. long feeding tube was inserted into a patient naris, introduced along the floor of the nose, and then advanced into the nasopharynx. As it reached the oropharynx, the patient was asked to swallow and each time the tube was advanced 3-5 inches until the marking was at the level of the naris, which indicated that the tube was in the stomach. If coughing or gasping persisted the tube was immediately pulled back. The tube was in the stomach if gastric contents could be aspirated and/or a swooshing sound was heard through a stethoscope placed over the stomach when air was injected into the tube. Once tube placement had been confirmed, it was secured in place at the bridge of the nose with a non allergenic tape (see appendix II-VIII).





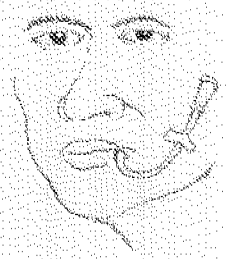
Insertion *Confirmation*

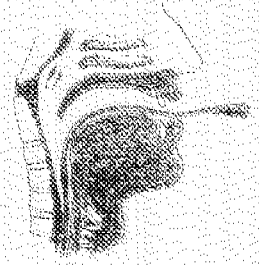


NGT

2. *OROGASTRIC TUBE INSERTION*

With the patient in sitting position, the length of the tube to be inserted was measured from the lips to the ear to the xyphoid process, then marked. A well lubricated (using K-Y jelly) 16-Fr. 80cm. long feeding tube was then introduced into the mouth. As soon as the tube reached the oropharynx, gagging might ensue, this being a normal response triggered by the tube. If at anytime, the patient could not speak or had difficulty in breathing, the tube was withdrawn. The patient was then asked to swallow and each time, the tube was further advanced. The tube was in the stomach if gastric contents could be aspirated and/or a swooshing sound as heard through a stethoscope placed over the stomach when air was injected into the tube. Once tube placement had been confirmed, it was secured in place to the cheek with a non allergenic tape (see appendix II-VIII).



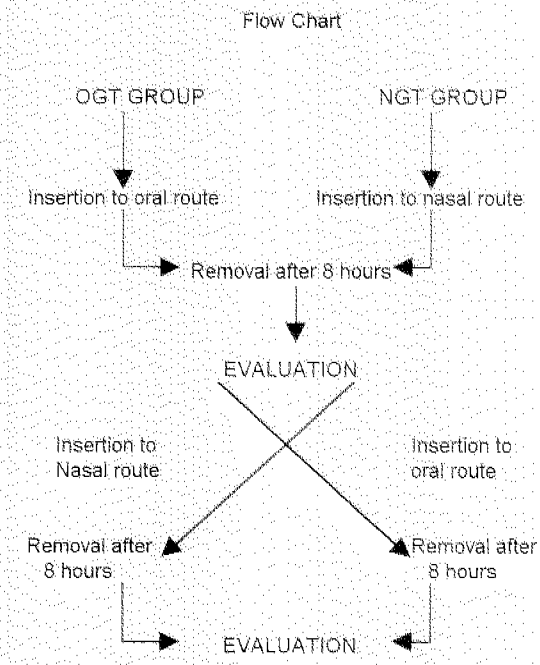


Insertion

Confirmation

OGT

Randomized assignment of subjects to NGT and OGT groups was done. Insertion of NGT/OGT between 9:00 PM-10:00 PM of day 1 was done by a third year resident (not the author). The tubes were then removed after 8 hours and were again reinserted between 9:00 PM-10:00 PM of day 2 by the same resident. The tubes were then removed after 8 hours and the subjects were then evaluated as to the preferred route of insertion.



All subjects were instructed on how to fill up a standard questionnaire or checklist. Comparisons and evaluations for ease of insertion was based on the time elapsed for each respective insertion (time starts upon introduction of the tip of the tube or mouth regardless of the number of attempts and ends upon confirmation of position by auscultation),the number of attempts made by the insertor prior to successful insertion, a subjective discomfort scale for the patient ranging from 0 - none, 1 - mild discomfort, 2 - with pain and discomfort, 3 - severe discomfort and pain with tendency to vomit using a visual analog scale and presence (+) or absence (-) of symptoms. The following were included in the scoring: nasal pain, chest/neck pain, oropharyngeal pain, nasal discharge, drooling, and gag reflex. The checklist wa filled up just prior to the removal of the tube. Actual overall subject's preference

OBJECTIVES

The objectives of the study is to compare nasogastric intubation and orogastric intubation with regard to:

(1) Ease of insertion
(2) Occurrence of bothersome effects
(3) Patients' acceptance and preference

SIGNIFICANCE OF THE STUDY:

Looking for better ways of delivering basic medical services is perhaps an important aspect of medical practice. If a problem exists with NGT, then a search for alternatives is valid. OGT can be a viable alternative which will effect the same end as that of the NGT but with less problems. The significance of this study lies in the eventual search for such an alternative especially for indications such as delivering nutrition to the patients.

PATIENTS AND METHODS

This was a prospective, randomized, cross-over trial. Subjects between ages 15-37 years were included in the study. There were 10 females and 7 males with a mean age of 25 years (see figs. 1-3). There were two subjects however, who were excluded because they were not able to tolerate the procedure. Characteristics of the study population are as follows:

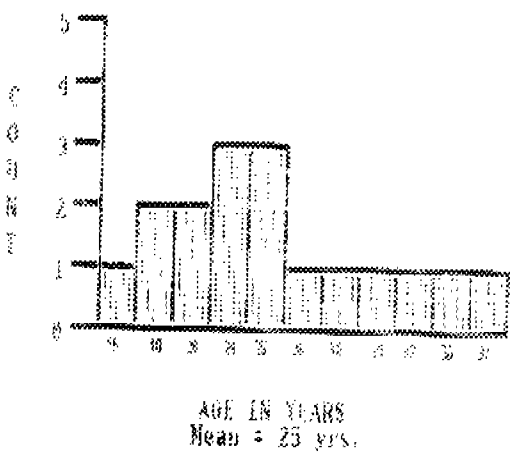


Fig. 1. Age Distribution

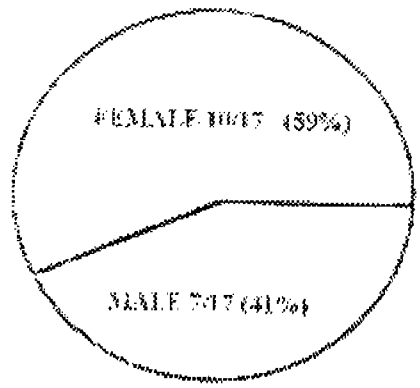


Fig. 2. Distribution of Subjects by Sex

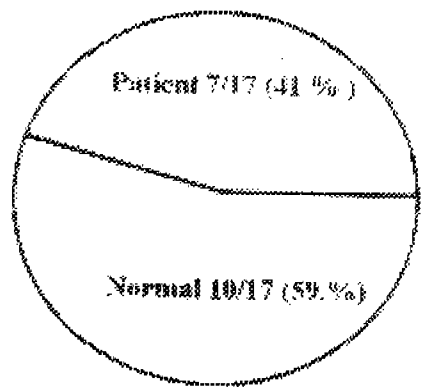


Fig. 3. Distribution According to Type of Subjects

Table I

Subject	Age/Sex	Characteristic
1	31/F	Normal
2	18/F	Normal
3	20/F	Normal
4	30/F	Normal
5	25/M	Chronic Tympanosmastoiditis
6	20/F	Normal
7	18/M	Alveolar ridge fracture
8	36/M	Chronic Tympanosmastoiditis
9	15/M	Chronic Tympanosmastoiditis
10	25/M	Chronic Tympanosmastoiditis
11	24/M	Fracture, tibia
12	37/M	Skin defect, foot
13	24/F	Normal
14	25/F	Normal
15	32/F	Normal
16	28/F	Normal
17	24/F	Normal

Inclusion criteria included:

1. Subjects who signed informed consent
2. Subjects without medical problems
3. Subjects without nasal or introral swelling and or lacerations that would interfere with tube insertion

was then determined by asking preferred route of insertion.

OGT VS NGT DATA FORM

Name:_____ Age/Sex:_____
Address:_____ No./Grp._____
Type of Subject:_____

DAY I (OGT/NGT)

I. Ease of Insertion
Time elapsed (in minutes)_____
No. of attempts_____
Discomport Score_____
Remarks:_____
II. Bothersome Effects:
1. Pain
Nasal _____
Chest/Neck _____
Oropharynx _____
2. Rhinitis [+]___ [-]___
3. Nasal Obstruction [+]___ [-]___
4. Gag [+]___ [-]___
5. Speech Disturbance [+]___ [-]___
6 Drooling [+]___ [-]___
7. Others_____

DAY 2 (NGT/OGT)

I. Ease of Insertion
Time elapsed (in minutes)_____
No. of attempts_____
Discomport Score_____
Remarks:_____
II. Bothersome Effects:
1. Pain
Nasal _____
Chest/Neck _____
Oropharynx _____
2. Rhinitis [+]___ [-]___
3. Nasal Obstruction [+]___ [-]___
4. Gag [+]___ [-]___
5. Speech Disturbance [+]___ [-]___
6. Drooling [+]___ [-]___
7. Others_____

Patient's Preference: [ ] OGT [ ]NGT

Legend:

I Ease of Insertion
0 - none
1 - mild discomfort
2 - with pain and discomfort
3 - with severe pain and discomfort, tendency to vomit

[+] - present
[-] - absent

II. Bothersome Effects:

0 - none
1 - with discomfort, less pain
2 - more pain and discomfort
3 - with severe pain and discomfort, tendency to vomit

[+] - present
[-] - absent

STATISTICAL ANALYSIS

Data analysis was done using the paired t-test, Wilcoxon signed rank test, and Mcnemar's chi-square test.

RESULTS

A. Ease of Insertion

1. Duration of Insertion

Seventeen subjects who underwent OGT insertion and 13 subjects who underwent NGT insertions had both tubes inserted in 1-3 minutes while 4 subjects who were included in NGT insertion needed between 4-6 minutes for the tube to be inserted via the naris. The mean duration for OGT insertion was 2.6 minutes while for NGT insertion, 1.8 minutes (see table II below). There was a significant difference between the two groups p value <0.01 which means that NGT takes a longer time to be inserted.

Table II. Duration of Insertion

Time of Insertion (in minutes)	OGT	NGT
1-3 minutes	17/17(100 %)	13/17 (76 %)
4-6 minutes	0	4/17 (24 %)

Mean OGT = 2.6 minutes
Mean NGT = 1.8 minutes
p value <0.01

2. Number of Attempts

Most subjects in both groups needed only one attempt at insertion (see table III below). The mean attempt for OGT and NGT was 1.20. No significant differencce between the two groups were noted.

Table III. Number of Attempts

Number of Attempts	NGT	OGT
1	13/17(76%)	15/17 (88%)
2	4/17 (24%)	1/17(6%)
3	0	1/17 (6%)

Mean NGT = 1.2
Mean OGT = 1.2
p value >0.05

3. Discomfort Level

Majority, 76% (13/17), of NGT subjects had a discomfort score of 2 while majority, 82%, of OGT subjects had a discomfort score of only 1 (see table VI below). P value was <0.01 which was significant. NGT produced more discomfort than OGT.

Table IV. Discomfort Level

Discomfort Score	NGT	OGT
0	0	1/17 (6%)
1	4/17 (24%)	14/17 (82%)
2	13/17 (76%)	2/17 (12%)

Mean NGT = 1.76, Mean OGT = 1.01, p value <0.01

UNCOMMON CAUSE OF DYSPHAGIA*

FRANKLIN C. ANG, M.D.**
BERNARDO D. DIMACALI, M.D.***
FIDEL P. BURGOS, M.D.***

ABSTRACT

Dysphagia is a common ENT complaint but very seldom does an ENT specialist think of myasthenia gravis as its cause, ptosis and diplopia being the usual symptoms. This is a case of a 31 year old female with myasthenia gravis who presented with progressive dysphagia. A high index of suspicion for early detection and proper management to prevent catastropic sequelae of the disease is emphasized.

Keywords: Dysphagia, Myasthenia Gravis

INTRODUCTION

Myasthenia gravis has been extensively studied for the past 3 centuries but, up to now, still has an obscure etiology. Antibodies to acetylcholine receptor protein from the thymus gland as well as a virus-induced injury on the thymic cells have been considered but what stimulates the production of these antibodies and where they are formed are still unclear. The unpredictability of its onset, the considerable distress that accompanies it and the possibility of bulbar and multiorgan failure make further etiologic studies imperative.

Not all patients with myasthenia gravis have the same type of dysfunction. Most of them have ptosis and diplopia while others have orbicularis oculi muscle involvement and dysphagia.

The primary focus of this paper is the importance of early diagnosis of myasthenia gravis presenting with an uncommon symptom in order to prevent or at least to delay the progress of the disease to myasthenic crises.

CASE REPORT

G.R., 31 years old, female, from Quezon City was admitted for the first time in this hospital on January 22, 1995 because of difficulty in swallowing. The condition presented about 8 months before admission, while patient was 3 months pregnant, as difficulty in swallowing solid foods, incomplete closure of both eyes and nasal twang (worsening as the day wore on), sensation of a mass blocking the esophagus, difficulty in spitting (such that saliva had to be scooped out with tissue paper), headache and yellowish nasal discharge. A private physician diagnosed the patient to have sinusitis and prescribed minocycline (MINOCIN) and phenylpropanolamine Hc1 (DIMETAPP EXTENTABS) which afforded relief of all signs and symptoms. Patient was asymptomatic during the rest of the pregnancy which terminated without any untoward event. Three months before admission, the same signs and symptoms recurred with progression of dysphagia to liquids. Another private physician gave the same diagnosis and prescribed co-amoxiclav (AUGMENTIN 375 mg), ergotamine tartrate, mecloxamine, phenylpropanolamine and cinnarizine but to no avail. She was then referred to an EENT specialist who gave the same diagnosis and prescribed astemizole (HISMANAL), co-trimoxazole, neobromexan and ambroxol. The medications were taken for only 2 days because "it aggravated the signs and symptoms". The patient was referred by an internist to this hospital and was subsequently admitted.

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* Presented, PSO-HNS, Clinical Case Report Contest April 7, 1997, Subic International Hotel, Olongapo City
** Resident, Department of ENT, F.E.U.-N.R.M.F.
*** Consultant, Department of ENT, F.E.U.-N.R.M.F.

Past medical history included a diagnosis of PTB by chest X-ray in 1993 for which she was given SCC kit for 8 months with no follow-up thereafter. In January 1994 patient had a history of forceful vomiting, was diagnosed to have an ulcer and was given ranitidine.

On physical examination there was pooling of saliva at the oropharyngeal area and incomplete closure of both eyelids. Assessment then was esophageal obstruction etiology unknown R/O carcinoma, mild left nasal septal deviation and impacted cerumen, AU.

On admission, a Fr. 16 nasogastric tube (NGT) was inserted without any difficulty and osterized feeding was started at 2,500 cal/day (Carbohydrates = 65%, Protein = 25%. FATS = 10%). Blood count, electrocardiogram, fasting blood sugar and serumcreatinine were normal. The chest X-ray revealed pleural tuberculosis at the left lung apex.

Upon removal of the NGT prior to an esophagogram, patient noticed some improvement in swallowing, swallowed the barium with ease and refused to have the NGT reinserted. Esophagogram revealed satisfactory opacification of the entire esophagus without any filling defect, deformity or obstruction. Esophagoscopy done on the second hospital day showed spastic cricopharyngeus muscle beyond which no abnormality was noted. Patient was then referred to neurology service which considered myoneural junction disease (Myasthenia gravis vs. Guillain Barre Syndrome). Mestinone 30mg QID was started and repetitive nerve stimulation studies suggested.

After giving 2 doses of mestinone, patient was relieved of all the signs and symptoms, recurring only upon physical exertion. Two days later, patient hardly complained of any signs and symptoms and was discharged on the 7th hospital day.

Repetitive nerve stimulation studies on the right ulnar nerve with a stimulation rate of 5 Hz showed a 10% decrement at pre-exercise period, a 7.4% decrement immediately post-exercise and 14.2% decrement 2 minutes post-exercise. Stimulation of the right spinal accessory nerve showed 11% decremental response during pre-exercise, 40% decrement immediately post-exercise and a 26% decrement 2 minutes after exercise. The results are consistent with post-synaptic neuromuscular transmission defects such as myasthenia gravis. Patient's discharge diagnosis was myasthenia gravis, Class IIA.

DISCUSSION

Three centuries ago Thomas Willis described the signs and symptoms of myasthenia gravis (MG). But, it was Erb who called the disease as such and defined it as a bulbar palsy without an anatomic lesion. In 1932 the use of physostigmine as a form of treatment was demonstrated.

MG is a muscular weakness with a grave prognosis. Repeated or persistent activity of a muscle group exhausts its contractile power, leading to progressive paresis. Rest restores strength, at least partially. The demonstration of these two attributes is enough to establish the diagnosis, assuming the patient cooperates fully. The onset is usually insidious, but there are instances of fairly rapid development, sometimes initiated by an emotional upset, infection, some drugs used during anesthesia, pregnancy or the puerperium. In this case, the symptoms first appeared during pregnancy and 3 months post-partum. The fluctuating nature of myasthenic weakness is unlike any other disease. The weakness varies in the course of a single day, sometimes within minutes, and it varies from day to day, or over longer periods. Myasthenic symptoms are always due to weakness, not to rapid tiring.

Another characteristic of MG is the distribution of weakness. The levator palpebrae and extraocular muscles are affected first in about 40% of cases and are ultimately involved in about 85 to 90%. Ptosis and diplopia are the symptoms that result. But, in this patient, it was the orbicularis oculi muscle that was first involved, manifested as incomplete closure of both eyes. There was no diplopia. Weakness tends to increase as the day wears on but patients seldom volunteer this information. The course of the illness is extremely variable. Rapid spread from one

muscle group to another occurs in some, but in others the disease remains unchanged for months before progressing. Weakened muscles in myasthenia gravis undergo atrophy in only a limited number of cases (about 10% in females and 20% in males); the atrophy is rarely marked in degree. Tendon reflexes are seldom affected. Normal pupillary responses to light and accommodation in the face of weakness of extraocular muscles and orbicularis oculi are virtually diagnostic of myasthenia gravis, especially if strength is restored after a period of rest. The tongue may display one central and two lateral longitudinal furrows (trident tongue).

The prevalence of MG is variously estimated at 43 to 84 per million of the population. The peak age of onset in women is between 20 to 30 years, while the male incidence peaks in the sixth or seventh decade. Remissions may take place without explanation, but if the disease remits for a year or longer and then, recurs, it tends to be progressive.

To facilitate clinical staging of therapy and prognosis the following classification was introduced by Osserman:

I. Ocular Myasthenia

II. A. Mild generalized myasthenia with slow progression; no crises; drug responsive.

B. Moderate generalized myasthenia; severe skeletal and bulbar involvement, but no crises; drug response less than satisfactory.

III. Acute fulminating myasthenia; rapid progression of severe symptoms with respiratory crises and poor drug response; high incidence of thymoma; high mortality.

IV. Late severe myasthenia, same as III but progression over 2 years from Class I to II.

Antibodies to Acetylcholine (Ach) receptor protein have been found in approximately 85% of patients with generalized myasthenia and in 60% of those with ocular myasthenia. The nicotinic Ach receptors are located in the crests of the folds of the sarcolemma beneath the nerve fiber terminals, in a density of approximately 30,000 per square micrometer, and are also present in mammalian thymus gland. The receptor substance is a highly specialized glycoprotein, spanning the lipid layer of the postsynaptic membrane, with a molecular weight of 300,000 daltons. Each receptor molecule, which controls an ion channel, has multiple binding sites for Ach. Attachment of the latter to the receptor molecule opens an ionic channel in the receptor membrane for the influx of sodium and the efflux of potassium. The neurotoxin, alpha-bungarotoxin, a small polypeptide, has a high affinity for the binding site and, like the receptor antibodies, blocks the attachment of Ach or destroys in some manner the receptor membrane. C3 complement is also involved in the immunologic blockage.

Diagnosis in patients who present with typical myasthenic facies like unequal drooping eyelids, relatively immobile mouth turned down at the corners, a smile that looks like a snarl, and a hanging jaw supported by the hand can hardly be overlooked. Other tests are:

1. Decrementing response - rapid reduction in the amplitude of compound muscle action potentials evoked during repetitive stimulation of a peripheral nerve at a rate of 3/sec.

2. Edrophonium (Tensilon) Test -

- Adult - IV - 0.2ml (2mg) is injected within 15 to 30 second, the needle is left in situ. If no reaction occurs after 45 seconds, the remaining 0.8ml (8mg) is injected IM. If (+) for reaction (cholinergic reaction like muscle weakness), patient should be retested after 0.5hrs with 0.2ml (2mg) of tensilon IM to rule out false negative reactions. (The dose in children is 1 mg for weight up to 75 lbs. and 2 mg for those over 75 lbs.). If a cholinergic reaction (muscarinic side effects, skeletal muscle fasciculations, increased muscle weakness) occurs after injection, the test is discontinued and atropine sulfate 0.4 to 0.5 mg is given IV.

3. Neostigmine Test - Neostigmine methysulfate is given IM at 1.5mg. Positive test also shows improvement of muscle weakness, but a negative test does not exclude MG.

4. Measurement of Acetylcholine receptor antibodies

Previous belief held that there was a decrease in the amount of acetylcholine but, nowadays most authors believe that there is destruction of the Ach receptor.

Treatment of this disease involves the careful use of three groups of drug - anticholinesterases, immunosuppressants,

and corticosteroids - and of thymectomy and plasmaphoresis. The oral dose of neostigmine ranges from 7.5 to 45 mg every 2 to 6 hours with average maintenance dose of approximately 150mg per day. But, a study done by Breyer et al in 1988 indicated that pyridostigmine (neotigmine) at levels above 100mg/ml may impair neuromuscular function and may produce cholinergic crisis (muscarinic effects like nausea, vomiting, pallor, sweating, salivation, colic, diarrhea, miosis and bradycardia). Thymectomy is recommended in practically all patients with uncomplicated MG who are less than 45 to 50 years of age and who, after a period of treatment with anticholinesterase drugs, are responding poorly and requiring increasing doses of medication.

Prednisone 40 to 45 mg/day may be given twice this dose every other day for the moderately severe myasthenic, in whom a remission has not been induced by thymectomy and who is responding inadequately to anticholinestrase drugs. Striking temporary remissions of 4 to 6 weeks may be obtained by the use of plasmapheresis (5 daily plasma exchanges every 5 weeks) in cases of myasthenic crisis. Azathioprine in a dose of 2.5 ml/kg daily with prednisone in doses up to 1.5 mg/kg per day may increase treatment response compared with prednisone alone. Other cytotoxic drugs such as methotrexate, cyclosporin, with or without antilymphocytic serum, or total lymphoid radiation, are also being tried in patients who continue to do poorly after thymectomy. Eventually, there may be remission, hence the justification for using every possible measure to support the patient until this happens.

CONCLUSION

This case report highlights an unusual presentation of MG and emphasizes the inclusion of MG in the differential diagnosis of patients with dysphagia. This strategy leads to early diagnosis of the disease and better treatment outcomes.

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Y-FLAP AND RIB CARTILAGE GRAFT IN THE INITIAL STAGE OF PARTIAL AURICULAR RECONSTRUCTION AFTER TUMOR SURGERY*

FELIXBERTO D. AYAHAO, M.D.**

ABSTRACT

This paper reports the use of Y-Flap from the pre- and post-auricular areas for tissue coverage of autologous rib cartilage grafts in the reconstruction of the ear of a 72 year old male who had squamous cell carcinoma of the left pinna. The post-operative complication noted was a tip necrosis of the anterior flap which was easily remedied by debridement and further advancement of the flap.

Keywords: Partial auricular reconstruction, squamous cell carcinoma, pinna, y-flap, autologus rib cartilage graft

INTRODUCTION

Cases encountered by otolaryngologists needing auricular reconstruction due to trauma, tumor surgery or congenital defects demand a variety of surgical approaches dependingent on the nature, size, and location of defect, economic factors and social demands. This paper submits for judgment one of the ways to approach this problem.

CASE REPORT

A 72 year old male with a dark discolored ulcerating lesion of the left pinna of 5 years duration was diagnosed to have squamous cell carcinoma by biopsy. Patient preferred radiotherapy to surgery but was later lost to follow-up. One year before admission, the lesion recurred and was again biopsied revealing basal cell carcinoma. Progressive spread of the mass despite herbolario treatment prompted consultation and subsequent admission. MOHS excision was planned with the option to reconstruct the defect with a bilobed flap, rib graft or silastic implant. Ideally, reconstruction after tumor surgery should be delayed for at least one year to observe for tumor recurrence. However, immediate partial reconstruction was planned because the patient still desired an ear but would like as few trips as possible from the province where he lived. Because silastic implants are not readily available and have a high failure rate while bilobed flaps would be inadequate to cover the anterior and posterior surfaces of a reconstructed pinna, an autologous rib graft was considered.

Although proven to be durable in auricular reconstruction, rib grafts can fail due to resorption or warping. This problem, however, can be minimized by minimal sculpting and preservation of some perichondrium for immediate revascularization. The preferred rib donor sites are the 6th and 7th rib contraleteral to the auricle being reconstructed to take advantage of the rib configuration.

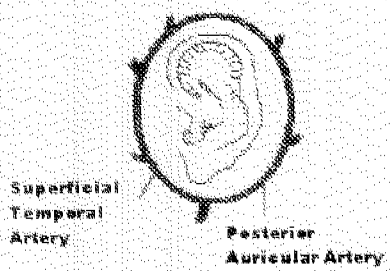
To provide for skin cover, a Y-flap was designed with the superficial temporal and posterior auricular arteries as feeding vessels. The rich blood supply of the periauricular region arises from the external carotid artery by way of the superficial temporal artery anteriorly and from the posterior auricular artery behind. The venous drainage enters the superficial temporal vein in front and external jugular vein below. In most cases, there is an

*2nd Place, PSOHNS Surgical Case Report Contest
April 8, 1995, Subic International Hotel, Olongapo City

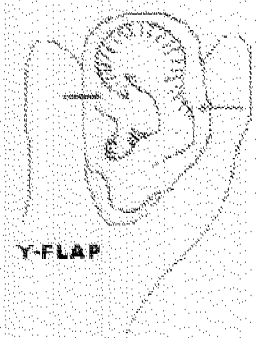
**Resident, Department of Otorhinolaryngology, University of the Philippines-Philippine General Hospital

anastomosis between the two arteries superiorly.

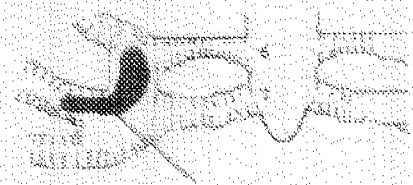
Figure 1: Anatomical Basis



BLOOD SUPPLY AROUND THE EAR



Y-FLAP



Site of Rib. Cartilage Harvest

SURGICAL TECHNIQUE

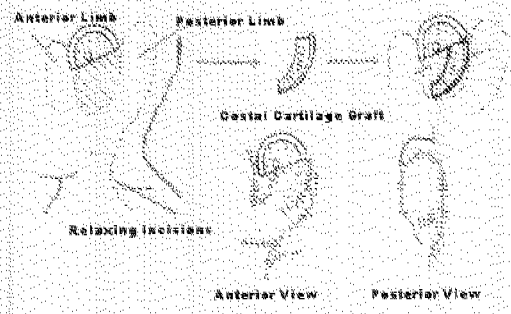
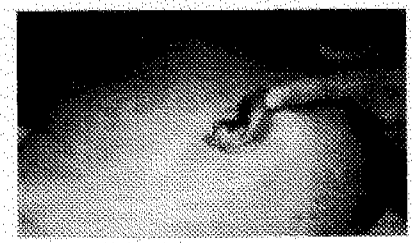
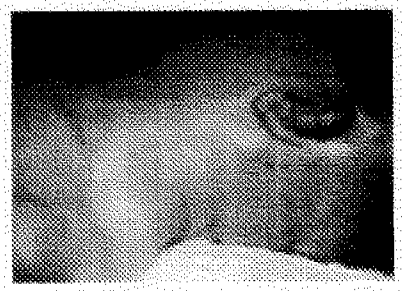


Figure 3: Operative Technique

Upon examination, it was noted that left pinna had an eaten out ear lobule and dark discolored lesions with elevated edges occupying the inferior 2/3 of the anterior surface and 3/4 of the posterior surface. The mass was excised including a 1.5 cm free margin. The diameter of the lesion averaged 3 cm. While the specimen was being processed for frozen section, the costal cartilages of ribs 6 and 7 in the contralateral side was harvested and sculpted to fit the remaining auricle and match the auricle in the opposite side. When frozen section showed tumor cells in the antero-inferior line of resection but none in the other lines of resection, the excision was extended 1.5 cm more toward the postero-inferior ridge of the external ear canal. This additionally excised skin was negative for tumor cells. However, with the wide extent of resection, the graft was already short in length.

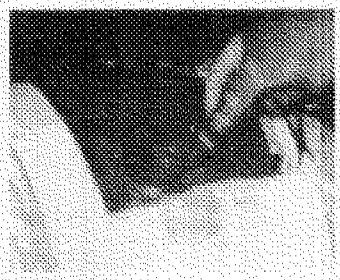




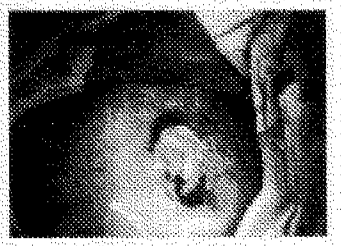
Y-Flap Outlined

The costal cartilage graft, sculpted to fit the contours of the pinna, was attached to the remaining cartilage superiorly with nylon 4-0 sutures. Inferiorly, the cartilage was sutured the periostium of the mastoid bone. To cover the cartilage graft, a pre-auricular and post-auricular rotation advancement Y-flap was made covering the anterior and posterior surfaces of the pinna respectively. The anterior part of the defect in the donor site was closed primarily while

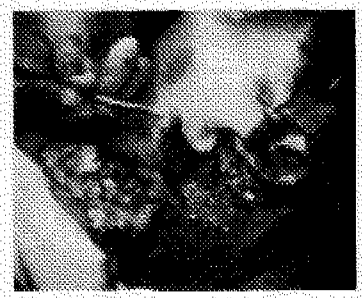
the posterior part was closed with massive undermining and "Z" relaxing incisions in the cervical skin. The posterior margin bore some hairs so the skin was split thinned to leave the hair follicles behind. One layered sutures were used to approximate the auricular flaps while the rest were closed in two layers. Penrose drains were placed.



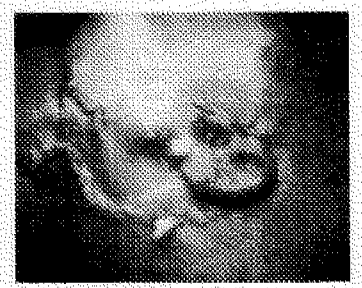
Defect After Excision



Costal Cartilage Graft Sutured in Place



Flap lifted up



Flap in Place

After one week, there was a 0.5 cm necrosis of the tip of the anterior flap and this was attributed to poor blood supply when the flap took a dip at the sculptured curve in the anti-helix and to pressure dressing. This, however, was easily closed later by debridement and further advancement of the flap. Healing was uneventful. The patient and his relatives were very pleased with the results.

Ear Four Months After

DISCUSSION

Auricular reconstruction after tumor ablation can be challenging because the exact safe margins of resection are not known beforehand. If one were to wait for the histopathological report before harvesting the graft, it will extend the OR time by 2 to 3 hours. The dilemma, therefore, is whether to delay the reconstruction and observe for tumor recurrence or do it immediately and harvest a larger graft to provide for more material, taking care of tumor recurrence later if there are any. If reconstruction is delayed, the limiting factor will be the fibrosis and scar tissue formation in the surrounding areas which will hamper reconstructive because of limited tissue elasticity and compromised vascularity of the skin.

If reconstruction is done immediately, the defect is covered with a split thickness skin graft, carefully preserving the superficial temporal artery and using a temporalis fascia as graft lining in the future. The temporalis facia is, in turn, covered with a split thickness skin graft. Immediate excision and reconstruction is possible only if there are negative margins of resections. It is always preferable to utilize virgin areas for reconstruction. In the case of the pinna, if tumor recurrence is

detected early another excision and reconstruction of a smaller defect is easier.

In retrospect, tumor excision and delayed reconstruction to observe for tumor recurrence is ideal. One year of observation is adequate enough. To approximate the normal auricle, multiple stages of reconstruction are required especially if the four basic components of the pinna--- the helix, scapha, antihelix and concha--- are to be reconstructed. In instances where immediate reconstruction is possible, the procedure described in this paper could be used.

SUMMARY

There are many ways of reconstructing the auricle, whether total or partial. Procedures are not uniform as they are on a case to case basis especially with regards to size, location and character of defect.

This paper described the role of a Y-flap based on pre- and post-auricular skin in providing skin cover for cartilage rib grafts used in reconstructing the pinna. The advantage of using the flap is its good vascular supply and excellent skin color match for the auricle.

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