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CLONING AND THE FOUR C's

Cloning is one of the hottest topics in the scientific world nowadays especially with the appearance into the scene by Dolly and her successor. What really is cloning and what does it augur? Is it not but an attempt to reproduce a genetically identical organism? What has brought it all about?

In man's desire to learn about things that do not necessarily concern him and in order to gratify the mind with new discoveries, man has undertaken researches and studies that has far reaching ethical and moral considerations. On the plus side, we can honestly contend that cloning was conducted with the end in view of trying to control or eradicate certain diseases as well as to ensure that succeeding generations of the organism will be free of genetic defects and the attendant disease conditions associated with them. Hence from this, we can say that cloning is but a natural progression of the gene splicing techniques that have been practiced for the past decade or so. As before, these experiments, if we are to consider them as such, are done because of man's desire to alleviate the sufferings of his fellowmen. Those of us in the medical profession are quite conversant with a good number of these studies and its potential applications in the eradication of diseases. There are even attempts to control the big C using genetic transfer techniques. In effect, it arose because of man's compassion to man. This is not really a very bad thing but is a commendable trait instead. If such were the case, why all the hullabaloo about cloning? The United States, through President Bill Clinton, has even found it proper to form a commission to study, analyze, discuss and evaluate this matter thoroughly.

Cloning has become a matter of concern to a lot of people because of the perception that scientists might be tampering with nature. Can you just imagine the effect that cloning might have on a person's temperament and outlook in life? The four horsemen will no longer be able to exercise their influence in bringing about a periodic control on population growth since cloning not only simplifies the process of reproduction but hastens it as well. Can you just conceive of a war of attrition fought mainly by clones? Or the need for additional food necessary for the survival of these clones? If by some fluke of accident, a gene for a terribly infectious condition was present in the clone produced, can you just think and consider the ramifications and havoc it can render to mankind?

These are but some of the matters of concern to the present-day scientists and decision makers. Can we pursue knowledge just for the sake of knowledge? Is there a fine line that science must never cross? If so, who will identify and define this point of no return? Is this a matter that is better left to the discretion of individual scientists? Or is it a matter of concern too for the theologians because of the ethical and moral standards that must be complied with? How much freedom must men of science be given? And conversely, how much limitation can be imposed on scientific inquiry by the state? Who will be the final arbiter, the law as represented by the government or conscience as interpreted by the scientist? Conscience is, of course, a faculty, power or principle of a person which decides on the lawfulness and unlawfulness of an action with a compulsion to do right. Since it contains a judgment of right and wrong, of good and evil, ethical and moral considerations come into play. Furthermore, this may vary from one individual to another and from one culture to another. This then is a subject that has never been resolved by the great philosophers since time immemorial.

These then are the different C's involved in cloning. Curiosity and compassion required in dealing with the big C elicits a concern that even the conscience might not be able to fully resolve to everyone's satisfaction.

JOSELITO C. JAMIR, MD
Editor-in-chief

TUBERCULOUS OTITIS MEDIA*

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ABSTRACT

A 37 year old female who presented with persistent bilateral ear discharge and perforations accompanied by decreased hearing and tinnitus was admitted because of severe dizziness and vomiting. Despite medical management, signs and symptoms persisted this requiring exploratory tympanomastoidectomy of the left ear. Significant intraoperative finding is the presence of abundant whitish, cheesy, granulation tissue on the middle ear and mastoid antrum. Culture and sensitivity, Gram stain, AFB, and KOH staining were negative. Histopath of the said tissue revealed a chronic granulomatous inflammation – Tuberculosis. Triple anti-Kochs therapy was given and follow up six weeks later showed resolution of signs and symptoms with closure of he perforation in the non-operated ear and intact functioning "new ear drum" on the operated ear.

Keywords: Whitish granulation tissue, TB otitis media, Triple therapy

INTRODUCTION

Otolaryngologists commonly see a chronically discharging ear. These patients are initially managed medically with antibiotics covering the most common pathogens causing chronic middle ear infections. Tuberculosis of the middle ear is often overlooked as a differential diagnosis. In fact, in a survey conducted among 2 otolaryngologists in Metro Manila, only six considered TB of the middle ear as a differential diagnosis.[1] Throughout the world, TB of the middle ear is still considered an underdiagnosed disease.[2] The signs and symptoms associated with it may be confused with other acute or chronic middle ear infections. Hence, the tendency of some otolaryngologists to disregard it.

Tuberculous otitis media is rare. The literature has been limited to occasional case reports. Worldwide, the index of suspicion is low.[3] Oftentimes, it is misdiagnosed as a case of chronic otitis media. Locally, only one study on the clinical symptomatology of Tuberculous otitis media has been published. It was established that it is difficult to diagnose Tuberculous otitis media, yet, a high index of suspicion should be kept in mind.[1]

The objective of this paper is to present a case of tuberculous otitis media with an unusual spectrum of signs and symptoms, making the clinician aware of its possibility in a chronically discharging ear. This paper is also presented to illustrate the difficulties in the definitive diagnosis of tuberculous otitis media, in order to institute the proper management.

CASE REPORT

This is a case of N.O., a 37 year old female, married, Filipino from Cavite, who was admitted at this institution because of dizziness and vomiting.

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* 1st Place, PSO-HNS Clinical Case Report Contest
April 30, 1996, Grand Boulevard Hotel, Roxas Boulevard, Manila
**Resident, Department of Otorhinolaryngology, Manila Doctors Hospital
***Consultant, Department of Otorhinolaryngology, Manila Doctors Hospital

The patient's condition started a year PTA when intermittent serous ear discharge developed on the left. Consult was done and unrecalled oral antibiotics were taken providing symptomatic relief. A few months later, bilateral mucopurulent was noted accompanied by left ear tinnitus and decreased hearing. The patient was prescribed Co-amoxyclav 625 mg/tab TID and Metronidazole 500mg/tab TID taken for one week without relief. Consequently, surgical intervention was advised but the patient instead opted for further medical management. Three weeks PTA patient consulted present attending physician. Otoscopy revealed bilateral central perforation of the tympanic membrane with abundant whitish granulation tissue. Patient given Cephalexin 500 mg/cap TID and Celestamine 300mg/tab. Pure tone audiometry was done revealing bilateral mixed hearing loss, more severe on the left and type B tympanogram with negative reflexes (Figure 1). The patient remained symptomatic but experienced severe dizziness and vomiting which prompted hospital admission.

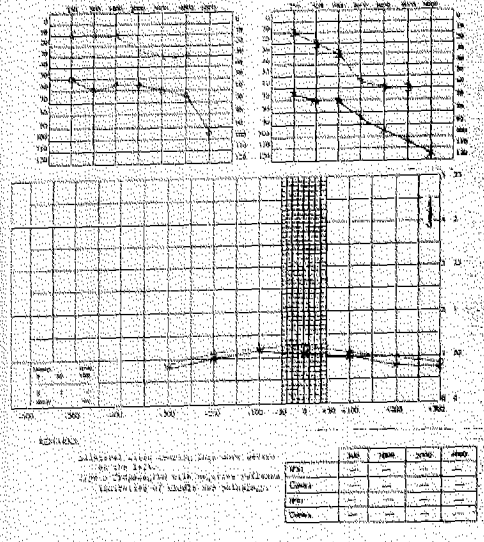

Figure 1. Results of Pure Tone Audiometry, Tympanogram and Acoustic Reflex

Past medical, personal and social histories were unremarkable. Family history revealed hypertension in both her parents.

On admission, the patient was conscious, coherent, oriented, afebrile, stretcher borne, not in cardio-pulmonary distress. Vital signs were stable.

Otoscopy revealed a centrally perforated tympanic membrane, approximately 70 – 80 % with foul-smelling mucopurulent discharge, and whitish granulations in both ears. Other pertinent findings were horizontal gaze nystagmus and positive Dix-Hallpike test. The rest of the neurologic examination were unremarkable.

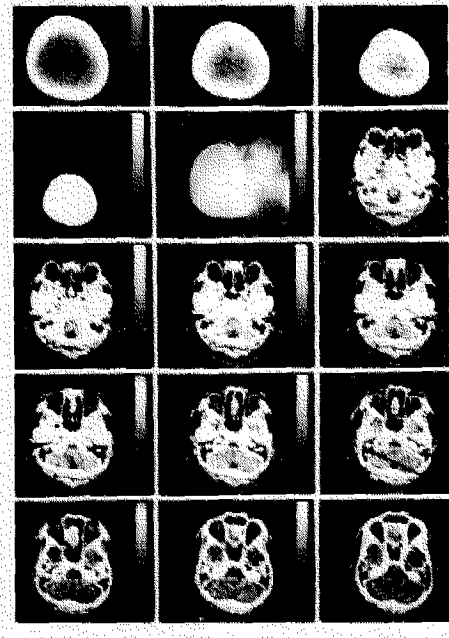

Figure 2. CT Scan showing bilateral mastoiditis and ethmoidal sinusitis

Admitting impression was Chronic tympanomastoiditis, bilateral, to consider Acute Labyrinthitis. Computed tomography (CT) scan was done but only revealed bilateral mastoiditis and ethmoiditis (Figure 2). The rest of the findings were normal. IV medications included Chloramphenicol and Cloxacillin. Vertigo persisted despite Meclizine and Diazepam. Neurologic consult was done. Magnetic Resonance Imaging (MRI) was requested to rule out Cranial nerve VIII intracanalicular tumor. MRI findings were consistent with CT scan findings (Figure 3). Persistence of symptoms prompted exploratory mastoidectomy and tympanoplasty and ossiculoplasty on the left. Operative findings revealed abundant whitish granulation tissue, which does not easily bleed on manipulation on the mastoid antrum and middle ear cavity. The incus tip was eroded. The malleus and stapes were normal. No cholesteatoma was noted (Figure 4 and 5).

Figure 3. MRI showing bilateral mastoiditis

Figure 4. Granulation tissue on the mastoid antrum noted intra-operatively

Figure 5. Middle ear cavity showing granulation tissue

Specimens from the middle ear an mastoid antrum were taken and sent for histopathologic examination. Gram stain, culture and sensitivity, AFB and KOH staining. Histopathologic result showed the mastoid specimen to have fibrotic background with lymphocytic and monocytic infiltrates. A granuloma, composed of epitheloid-type cells and multi-nucleated giant cells was also noted (Figure 6). The middle ear specimen showed fibrous background with lymphocytic and monocytic infiltrated and casseous-like necrosis (Figure 7). Both specimens were read out as Chronic granulomatous inflammation consistent with Tuberculosis.

Figure 6. Histopath result showing a granuloma in the mastoid antrum

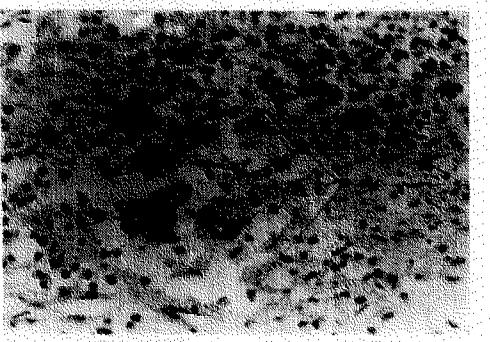

Figure 7. Caseous-like necrosis noted on the middle ear

A triple regimen of anti-Kochs therapy was instituted and on the second post-operative day, patient was discharged improved. Cloxacillin was discontinued. Chloramphenicol was shifted to oral form and maintained for one more week. On follow-up six weeks later, pertinent ENT findings revealed an intact viable graft on the left ear with complete resolution of tinnitus, vertigo and discharge from both ears. The perforation on the right tympanic membrane was noted to be close. (Figure 8 and 9).

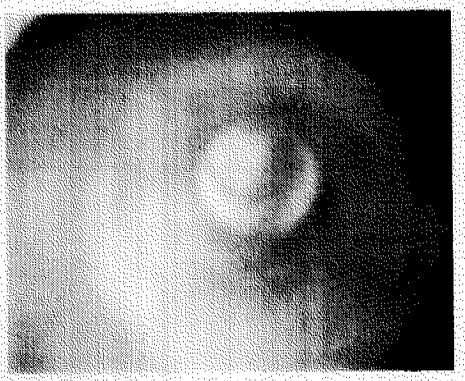

Figure 8. The left ear showing intact graft post-operatively

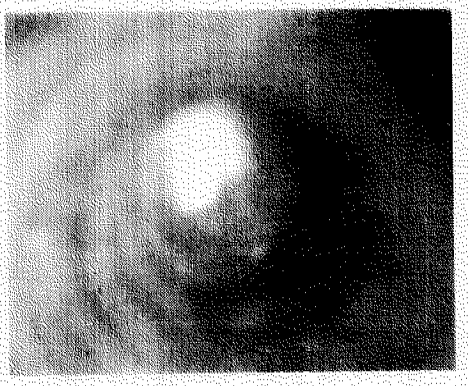

Figure 9. A non-perforated dry right tympanic membrane

DISCUSSION

Tuberculosis remains as one of the most common diseases afflicting humans and yet, tuberculous otitis media is relatively few. Diagnosis and treatment remains difficult. This diagnosis dilemma is not aided by the fact that very few cases and studies have been reported worldwide.

In the U.S., only 22 cases were reported during a 30 year period. Japan reported only 9 cases for the past 12 years. Available records in Great Britain stated that during the period of 1950 – 59, only 11 out of 23,000 cases of suppurative otitis media were tuberculous in origin.[1-4] However, these statistics reflect cases in first world countries. Incidence rates in third world countries could be higher. In a study done in South Africa, 31 cases were reported in a years time, 1984 – 1985.[3-4] Locally, no paper has yet been published regarding the incidence of tuberculous otitis media, although a local study was done in 1992 which described the clinical picture of Tuberculous otitis media among sample Filipinos.

With this background, aural tuberculosis was not a primary consideration when this case of N.O., 37 year old female was admitted in this institution due to severe dizziness and vomiting. Review of the patient's history and physical examination led to the admitting impression of Chronic Tymphanomastoiditis, bilateral, rule out Acute Labyrinthitis. Otoscopic findings of central bilateral perforations and whitish, cheesy, granulations, the hearing loss and

dizziness were not specific of tuberculous otitis media. Chest x-ray revealed normal findings. Management proceeded based in chronic otitis media as the favoring impression. Since the dizziness was persistent, severe and not responsive to medical management, a central pathology and/or a cerebello-pontine angle tumor had to be ruled out. CT scan and MRI were requested and findings revealed bilateral mastioditis. This finding I not consistent with CT scan findings suggestive of tuberculous otitis media as shown by a study in Japan which revealed bone destruction of the otic capsule around the oval window and the promontory.[9]

Also, this patient was already being managed as a Chronic otitis media case for about a year and a review of medical history would show that these was adequate antibiotic coverage for the usual cases of chronic otitis. So how come the infection was resistant to the treatment, persisted and even seemed to have worsened since the patient already developed dizziness probably secondary to Labryrithitis as a result of having chronic middle ear discharge.[10]

With this in mind, exploratory tympanomastoidectomy was done with the primary aim of removing the disease tissue and bone as well as find out the underlying pathology. Significant intraoperative findings revealed even more abundant friable, soft cheesy whitish granulations all over the middle ear and mastoid antrum and

cortex (Figure 5 and 6). Although this finding is not confirmatory of tuberculous otitis media, it may now be highly considered since in the local prospective study done, whitish granulation was a consistent intraoperative finding.[1] Foreign studies also noted abundant tissue as a common feature of aural tuberculosis.[3,4,6-8,11]

Working on the premise that Aural tuberculosis was now highly probable in this case, the granulation tissue specimen was collected and sent for histopathologic examination, gram stain, culture and sensitivity, AFB, and KOH staining revealed negative results. However, a negative AFB stain cannot rule out tuberculous otitis media since it is not considered a reliable test.[1,3,4,6-8,11] Confirmatory diagnosis may now test on histopathologic results. True enough, histopathologic result was read out as chronic granulomatous inflammation consistent with tuberculosis.

With a working impression now strongly based on histopathologic findings, the patient was placed in triple anti-Kochs regimen (INH, PZA and Rifampicin). Patient was discharged improved, dizziness was minimal.

Recalling to mind an interesting and exciting aspect of this case, making it unique was the fact that both ears of the patient was affected, both discharging and perforated, yet only one ear was operated on. Hence, one ear served as a control in the evaluation of two management protocols. Surgery plus anti-Kochs in the left ear versus the anti-Kochs therapy on the right ear. Will the tympanolasty on the operated ear survive? Will the otorrhea in both the operated and non-operated ear resolve? Will the perforation in the non-operated ear heal and finally close?

YES. The answer to all these questions was resounding YES. The final confirmation came six weeks after, upon removal of all the remaining gelfoam in the operated ear. What was left was an intact, functioning "new ear drum". And as an added bonus, the non-operated ear stopped discharging and the perforation healed, closed completely.

The question that comes to mind now is – was surgical intervention indicated? In this particular case, Yes, in order to confirm the diagnosis. The patient did not present with the typical findings of aural Tuberculosis such as serous otorrhea and multiple tympanic perforations.[2] The only positive pre-operative finding was the friable, soft, cheesy, whitish granulation tissue which became more significant on exploratory tympanomastoidectomy, although not confirmatory yet o aural Tuberculosis. However, as illustrated by the non-operated ear, surgical intervention may not necessary. Still, some question persist., So when will Tuberculous otitis media be considered as a primary working impression? When is anti-Kochs therapy indicated, without the benefit of histopathologic results? Is an otoscopy finding of soft, cheesy, friable, whitish granulation an adequate sign that it is probably an aural Tuberculosis? Can the patient be spared of surgery? Is anti-Kochs therapy adequate?

CONCLUSION

This single case report cannot give the final answers that can be taken as facts. This case was reported to present a rare case of tuberculous otitis media with an unusual spectrum of signs and symptoms. This case was also presented to illustrate the difficulties in the diagnosis which is crucial in order to institute the proper the adequate treatment. Early recognition would probably have spared the patient of expensive procedures, that is, the CT scan, MRI and, perhaps, even the surgery.

This report ends with the challenge to everyone – as one sit alone and examine a patient, please remember to ask yourself: Is that whitish granulation tissue in the middle ear tuberculous otitis media or simply chronic otitis media?

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ANNOUNCEMENT

1. ASEAN CONGRESS
   October 5 to 9, 1998, Davao City
   Host: Phil. Society of Otolaryngology-Head and Neck Surgery, Inc.

2. ISIAN CONGRESS
   February 14 to 18, 1999, PICC, Manila
   Host: Phil. Society of Otolaryngology-Head and Neck Surgery, Inc.

3. ASIA-OCEANIA CONGRESS
   February 7 to 12, 2000, PICC, Manila
   Host: Phil. Society of Otolaryngology-Head and Neck Surgery, Inc.

be given, and perhaps improve, if not restore, vision. With this in mind, referral to ENT was done for the purpose of biopsy of the mass.

CASE REPORT

The patient is M.O., a 21 year-old male student from Tagkawayan, Quezon, admitted to the ENT ward for the second time in March 19, 1996, for biopsy of the ethmoidal and intranasal of the choroidal mass, left eye.

Review of History revealed that...

10 months prior to admission (PTA), the patient started to experience eye redness eye pain, blurring of vision and proptosis of the left eye. Symptoms increased until...

5 months PTA, mainly because of the worsening vision, the patient consulted a private ophthalmologist who requested for an ultrasound with the following result: consider choroidal tumor (metastatic) with secondary retinal detachment.

4 months PTA, the patient was referred to the Department of Ophthalmology at this institution. CT scan was planned, with the option that if CT scan could not be done for financial reasons, enucleation, left eye would be done. CT scan was done, however, with the following results: left intraoptic and medial intraorbital mass with ethmoid sinus, left nasal cavity and proximal optic nerve extensions and associated left medial orbital wall erosion; marked mucosal thickening in both maxillary, frontal and sphenoid sinuses; no intracranial spread. The ophthalmologists then decided that intervention will defend on tissue diagnosis, and thus the patient was referred to ENT for biopsy of the ethmoidal extensions.

2 months PTA, the patient was seen the ENT Tumor Clinic at the Outpatient Department with essentially normal ENT P.E. findings excepts for slight bulging of the lateral nasal wall at the region of the middle turbinate in the left nasal cavity. Significant findings were limited to the left eye which had a maximum visual acuity of detecting hand movement, was proptosed, had hyperemic, conjunctivae and swollen lids, limited extraocular muscle movements and dull red-orange-reflex on funduscopy. From the history, the patient had no complaints referable to the ENT specialty. Assessment was the same as the Ophthalmologists', and the patient was subsequently admitted from transnasal endoscopic biopsy.

2 weeks PTA, the patient underwent transnasal biopsy under General anesthesia. Findings were described as "polypoid mass arising from the anterior ethmoids" and punch biopsy was done. The anterior ethmoids were converted into a large space filled with soft, paste-like material. Final histopathology results showed: Necrotic material; suggest re-biopsy.

The patient was thus re-admitted. This time the patient was presented at this institution's Tumor and grand Rounds. The consensus was done to do the repeat biopsy via a combined transnasal and external approach.

On March 28, 1996, With the proper informed consent, the patient was brought to the operating room and placed under general anesthesia. An oral pack was placed and oral skin aseptic preparations were done. Both nasal cavities were decongested with ephedrine for 10 minutes. After such time, the nasal strip was removed from the right nasal cavity. A 30-degree 4 mm diameter scope was introduced into the right nasal cavity with no significant findings. Then the nasal strip was removed from the left nasal cavity, upon which there was significant bleedings. The same scope was inserted but the procedure had to be discontinued after several attempts due to persistent bleeding.

Figure 1. The external incision

An external incision was then marked midway between the attachment of the medial canthal ligament of the left eye and the dorsum of the nose, approximately 2 cm. extending about 0.5 cm. below the level of the medial canthal ligament. A temporary tarsorrhaphy, left, was done. Xylocaine 1% with epinephrine (1:100,000) was infiltrated along the line of incision. After a period of 10 minutes of hemostasis, the incision was made and carried down to the level of the periosteum. The periosteum was then elevated over the frontal process of the maxillary bone medially and the lacrimal bone laterally. Further elevation exposed an eroded lamina papyracea with abundant granulation tissue and a brown mass. Takahashi forceps were then used to grasp the bleeding granulation tissue and the brown mass. Aside from the tissues, brown splinters of what looked like wood were obtained.

Figure 2. Extraction of the foreign body

At this point, the surgeon had the mother contacted and asked about any possibility of the patient having a foreign body in the eye. True enough, the mother clearly remembered that 10 years PTA, the patient suffered a penetrating injury with a barbecue stick to the region a little above the left medial canthus while playing with a sibling. The patient was immediately brought to a general practitioner who merely advised Visine application. The patient was sent home asymptomatic except for slight eye redness, which resolved after 2 days. With this in mind, the surgeon grasped the entire brown mass and obtained a 2.5 cm. x 1 cm. x 0.3 cm. piece of wood.

Figure 3. The specimen

At this point, intraoperative referral to the ophthalmologist was done who inspected the tone of the eyeball and checked for any displacement that nay have occurred in the process of removal of the foreign body. Fortunately, the eye was not displaced and was thus retained. The ophthalmologist then requested for the patient to follow-up with them on an outpatient basis. The ENT surgeon then proceeded with a complete ethmoidectomy via a combined external and transnasal approach. An antrostomy with antral washings was done on the left since there were signs of maxillary sinusitis on CT scan. Hemostasis was achieved. Tube drain was placed into the ethmoidectomy cavity and anchored to the skin. The external incision was closed in layers. An antibiotic-soaked nasal pack was applied. Specimens were then sent for histopathologic studies.

DISCUSSION

Intraocular foreign bodies, with or without extension to the ethmoids or nasal cavity present a multifaceted challenge. The diagnosis may be delayed or missed, most frequently because the foreign body may have penetrated the eye with minimal discomfort and little initial damage. Only much later may the patient present with persistent inflammation, visual blurring, iris discoloration, or an abnormal pupil.

In this case, the diagnosis was missed for entirely different reasons; the most important of which was an inadequate

history. The presence of a foreign body was not suspected because the initial incident of trauma to the eye was not elicited. The successful management, of intraocular foreign bodies, or any medical case or that matter begins with a detailed history. The date, time, place and circumstance of injury have medical value, and, at time, legal importance. The interval from time of injury to the time medical attention is sought may be a determinant of treatment and prognosis. Infection, vitreous organization, retinal detachment (as in this patient), cicatrization and metallosis are all dependent on time. Each dictates its own diagnostic and therapeutic approach. Ten years ago, the patient sought medical attention immediately after the penetrating injury. If only proper treatment had been administered at that time, patient would not be legally blind today.

The material of the foreign body is also very important, as such information will provide the basis for the therapeutic course. Some metallic foreign bodies (iron, copper, lead, and zinc) may be toxic to the ocular tissues; others (aluminum, gold, and platinum silver) are well tolerated. Nonmetallic foreign bodies also fall into the inert and toxic categories: glass, stone and plastic can be tolerated for many years, only rarely causing a reaction; conversely, vegetable matter (lash, thorn, wood, soil) most often induces a severe inflammatory reaction and frequently endophthalmitis. In this patient, the barbecue stick seemed to have been inert for 10 years, which is unusual since it was made out of wood. But when it started to induce inflammation, the course was rapidly destructive.

A second factor for the missed diagnosis was the lack of communication between the specialties. It seems that the referral system was taken for granted such that the receiving doctors accepted the diagnosis of the referring specialty without discrimination. The patient was referred "packaged" with a complete history, work-up and diagnosis such that the otorhinolaryngologist's mind was limited to the task at hand: to biopsy. An important lesson that should be learned is that each patient should be managed as if one were always the physician-in-charge. Ideally, the different specialties managing a particular patient should always confer with one another, sit down, and discuss all the possibilities regarding diagnosis and management of the patient. From this meeting of minds, the ENT specialist could have given himself the chance to evaluate the patient's case in detail and decide for himself whether to agree or disagree with the diagnosis and management of the referring specialist.

Third, this case once again demonstrates the fallacy of relying too much on diagnostic study. In this case, both the ultrasound and the CT scan gave the impression of a "tumor", especially in light of the fact that no history of penetrating injury was obtained in the first place. If the possibility of an intraocular foreign body had been considered, the ancillary studies done would not have been in vain. As such, without the complete history, even the radiologist was deceived.

Radiographic imaging studies have remained the sine qua non of the preoperative evaluation o traumatized eyes. Documentation of the presence, location a number of intraocular foreign bodies may be achieved with the standard "foreign body x-ray series" includes Waters, Caldwell and lateral views. Computed tomography provides much more reliable information as to size, shape, and localization of the foreign body, whether in the posterior or anterior segment. Ultrasonography has proved of great help in determining the extent of intraocular damage, retinal detachment, as well as in detecting foreign bodies not seen on x-ray studies. The role of magnetic resonance imaging remains peripheral in the evaluation of intraocular foreign bodies. Thus, the imaging studies done could easily have pointed to the correct diagnosis. But without the proper history and index of suspicion, these modalities failed to serve their purpose.

The treatment of intraocular foreign bodies involves some general considerations. If the patient had consulted 10 years earlier, several things could have been done. First, protection of the globe is of primary importance. A shield, no matter how makeshift, is ideal; care must be taken to avoid any pressure on the lids or the

THE REFERRED CASE OF A CHOROIDAL TUMOR*

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ABSTRACT

The practice of medicine probably comes second to no other profession in terms of the need for physicians to cooperate with each other in the joint management of patients. We often call on colleagues from other specialties whenever the need arises, a situation not uncommon in the case of the otorhinolaryngologist and the ophthalmologist. This is an example of such a situation. The objectives of our report is to present a case of an unexpected event with emphasis on: the importance of a good history, physical examination and ancillary procedures, weaknesses of the referral system and a surgeons responsibility and preparedness for the unexpected. Our case report focuses on M.O. a 21 year old male referred from the Department of Ophthalmology to the Department of Otolaryngology for biopsy of the intranasal and ethmoidal extensions of a choroidal tumor as seen on Ultrasound and CT scan. Intraoperatively, a foreign body was found and removed instead. From this we are shown the importance of a good and complete history in every case encountered by a clinician, a fact that cannot be overemphasized. Even if the patient has already been seen by another specialty, the ENT doctor must take full responsibility as if he were the physician-in-charge. Ancillary studies cannot substitute a good history and physical examination. The surgeon should be prepared for all eventualities at all times.

Keywords: Choroidal Mass, History taking, Foreign Body

INTRODUCTION

The practice of medicine probably comes second to no other profession in terms of the need for physicians to cooperate with each other in the joint management of patients. In this day and age of specialties and subspecialties, one often call on colleagues from different fields whenever the need arises. This situation is definitely not uncommon in the case of the otorhinolaryngologist and the ophthalmologist, especially since both were grouped under one specialty in the past. This frequent alliance can be attributed mainly to the close anatomic relationship between the eye and the paranasal sinuses.

Thus comes this report stemming from one of the many interactions between the eye specialist and the ENT doctor. The patient to be discussed had been under the management of the Department of Ophthalmology for three months prior to ENT consult with a diagnosis of Choroidal Tumor, OS, with secondary Retinal Detachment, with extension to the Ethmoids and Nasal Cavity, Left. Patient was practically blind in the left eye.

Choroidal lesions such as uveal melanoma, metastatic carcinoma, and hemangioma are frequently associated with exudative retinal detachment. In these conditions, it is postulated the leakage of proteinaceous fluid occurs from the neoplasm, and this fluid accumulates under the retina. Treatment of the neoplasm by irradiation, photocoagulation, or cryotherapy may permit resorption of the subretinal fluid. In this patient, since the ophthalmologists were considering a choroidal tumor, it was imperative to determine the nature of the neoplasm so that appropriate therapy could

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globe. Tetanus toxoid booster, 0.5 ml subcutaneously, is advisable if the patient has not had one in 6 month. Foreign body films and computed tomography are necessary to establish the presence and location of the foreign body. Except in the most extreme cases, no intervention is advisable without such information. Broad-spectrum antibiotics are best started as early as feasible. Mannitol or some other hyperosmotic agent is valuable to shrink the vitreous and decrease the likelihood of vitreous loss. If the foreign body is limited to the eye, then the ophthalmologist is the best doctor to perform the surgery necessary for its removal.

In this particular patient, the intraocular foreign body extended to the adjacent ethmoids and nasal cavity, so that joint management with the otorhinolaryngologist is ideal. Except for the misdiagnosis, the treatment given was appropriate and adequate. Removal of the foreign body was done without additional damage to the adjacent structures. The external approach was valid because of the good exposure it provided; transnasally, the foreign body was shielded from view by granulation tissue, which profusely bled on removal. The performance of a complete ethmoidectomy was also ideal because the foreign body had already caused chronic inflammation and trauma to the ethmoids and adjacent structures. The antrostomy was done based on the premise that inflammation involving the ethmoids most probably involves the maxilla also (and vice versa) due to the proximity of their ostia in the ostiomeatal unit and on the finding of thickened mucosa on CT scan. The lesson that was learned in the treatment aspect was that the surgeon should always be ready for the unexpected, and that one should always be prepared to perform what is necessary to provide the best patient care that the situation call for.

CONCLUSION

From the beginning of medical education, mentors always emphasized the value of a complete history since it contributes 90% to the process of arriving at a proper diagnosis. Referral papers and ancillary studies are not adequate substitutes for each physician's OWN history taking and personal rapport with the patient and family. The case presented is an apt demonstration of this principle.

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EPISTAXIS IN INTERNAL CAROTID ARTERY ANEURYSM*

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ABSTRACT

A 49-year old female presented with five episodes of epistaxis within a span of one and a half months. Though a known hypertensive, the blood pressure was not elevated with each episode. Nasal endoscopy revealed pulsating blood from the right sphenoethmoidal recess, suggestive of a vascular etiology. An angiography of the internal carotid artery revealed an aneurysm. Vascular clipping was contemplated. However, two days before the procedure, patient had a severe episode of epistaxis and subsequently expired.

This case report illustrates the far-reaching consequence of epistaxis. It is presented not to dwell on its rarity but rather to emphasize on the integrity of a thorough history and physical examination, complemented by the proper use of ancillary procedures to arrive at an early and correct diagnosis and prompt management.

Keywords: Epistaxis, Internal Carotid Artery Aneurysm

INTRODUCTION

Epistaxis is a common clinical problem and is rarely serious in its intensity. Estimates indicate that about 90% of all nosebleeds occur in the capillary bed of the septum, known as the Keisselbach's area.[1] Epistaxis affects all age groups without sex predilection. In children and young adults, anterior epistaxis affects is more common due to trauma and lodgment of foreign body. Posterior epistaxis, on the other hand, is more common in older adults who suffer from hypertension and anteriosclerosis.[2,3] The long list of diverse causes serves as a reminder to physicians that a thorough history and physical examination are mandatory in the proper assessment of persistent epistaxis.

Literature rarely mentions an internal carotid artery aneurysm as the etiology of epistaxis. This is of prime importance, since the management is quite distinct from other causes of nasal bleeding. The severity of the hemorrhage (500 cc) favors a possibility that the source is a major vessel.[4]

This case illustrates how epistaxis could present with both diagnostic and therapeutic dilemma. In a patient who is a known hypertensive and in her fifth decade, judicious search for causes of persistent epistaxis other than hypertension and trauma are essential.

CASE REPORT

A 49-year old female with five episodes of epistaxis over a period of one-and a-half months. The first episode, occurring on June 1995, amounted to approximately 5 cc and resolved spontaneously. Subsequent episodes gradually increased in volume (200-500 cc)

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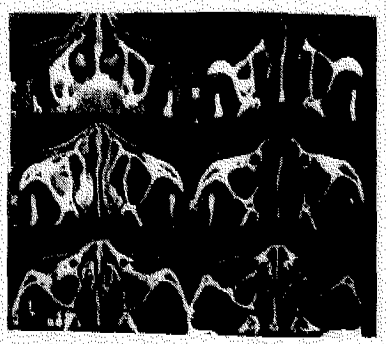
and still with spontaneous resolution. A month later, patient developed epistaxis amounting to approximately 500 cc. and was admitted in another institution where blood transfusion was done. Patient was then discharged improved after three days with a diagnosis of "sinusitis" and was prescribed in recalled take home medications. On August 1995, another episode of severe epistaxis prompted consultation at this institution.

In the emergency room, control of the epistaxis with digital pressure and ice compress was achieved. Initial physical examination revealed blood clots on anterior rhinoscopy with stable blood pressure of 110/70 mm Hg. Nasal endoscopy, likewise, revealed blood clots over the right sphenoethmoidal recess. Neurologic examination was essentially normal with nocranial nerve deficits. The low hemoglobin and hematocrit results (Hgb 88g/L, Hct 27%) prompted the admission and transfusion of three units of packed RBC.

Review of system revealed an intermittent throbbing bifrontal headache. There were no diplopia, no blurring of vision, nor facial numbness. There were several episodes of elevated blood pressure since January of 1995, the highest being 160/100 mmHg but was maintained irregularly on Nifedipine. Patient is a non-smoker and a non-alcoholic beverage drinker. The mother was hypertensive and died of a heart problem.

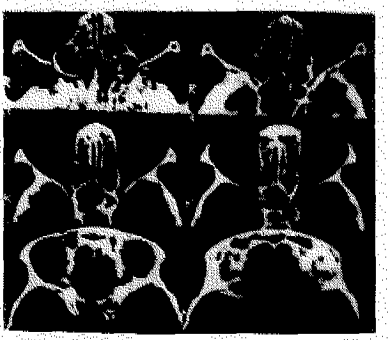
On the second hospital day, epistaxis recurred amounting to 200cc. The bleeding was controlled with cottonoids soaked with oxymetazoline. A CT scan of the paranasal sinuses revealed mucoperiosteal thickening involving the sphenoid and right maxillary sinus (Figures 1-A to C).

A. Mucoperiosteal thickening on the right maxillary sinus



B. Air fluid level on the right maxillary sinus

C. Air fluid level on the sphenoid sinus



Figures 1 A–C. CT Scan of the paranasal sinuses

Anterior packing with Merocel®™ on the right nostrils was done when bleeding recurred on the eleventh hospital day. Patient was referred to Hematology service who suggested further blood examinations such as prothrombin time, activated partial thromboplastin time, clot retraction time, and peripheral smear, all of which yielded normal results.

The anterior nasal pack was removed after three days, and a repeat nasal endoscopy revealed pulsating blood over the right sphenoethmoidal recess. Glefoam®™ was the inserted over the said area. A digital subtraction angiography using the Seldinger technique revealed a lobulated aneurysm involving the clinoid segment of the left internal carotid artery. Neurosurgery section who contemplated on doing surgical clipping of the aneurysm. However, two days prior to the procedure, patient developed profuse nasal bleeding so severe that a vain attempt at control was virtually impossible and eventually expired.

DISCUSSION

General practitioners often encounter epistaxis in their daily practice

most of which can be controlled without the need for an ENT specialist. Only 5 to 10% of patients with less common causes of epistaxis would require an otolaryngologist to control the bleeding. These patients may require hospitalization, blood transfusion, and rarely, surgical interventions of the nasal blood supply. Other factors predisposing to epistaxis include infection, trauma, allergy, hypertension and arteriosclerosis, hereditary hemorrhagic telangiectasia, blood dyscrasia, atrophic rhinitis, tumor, and congenital or acquired nasal defects.[2] The other causes of epistaxis could be ruled out in this patient. There were no signs of infection, no history of trauma, blood examinations ruled out blood dyscrasia; nasal endoscopy revealed no tumors and no nasal defects. A hypertensive cause or an underlying vascular pathology is the two most likely etiology of epistaxis in this case.

Literature rarely mentioned an internal carotid artery aneurysm as the etiology of epistaxis.[4,5]

Severe epistaxis due to ruptured aneurysm is a clinical challenge. This condition is extremely rare and comes last in the etiologic list of epistaxis in most otolaryngological literature.[6] In 70% of cases, epistaxis due to an aneurysm have occurred after severe head trauma. As in this case, non-traumatic aneurysm due to anteriosclerosis accounted for 25%, while the remaining 5% are mainly due to congenital malformations.[6,7]

The final episode of severe epistaxis experienced by this patient may be due to a ruptured internal carotid artery aneurysm, which eroded through the sphenoid sinus. This has been documented from previous literature as the most frequent route, the eustachian tube and the cribriform plate being the other two. This is due to the close proximity of the intracavermous portion pf the internal carotid artery and the sphenoid sinus.[6] (Figure2) Renn and Rhoton in a study, noted that the internal carotid artery was bulging into the sphenoid sinus in 70% of samples and that the internal carotid artery is covered by a thin layer of bone, 66% of which is less than 1mm thick covers. There was even no bony layer seen but only dour and sinus mucosa in 4%.[9,10]

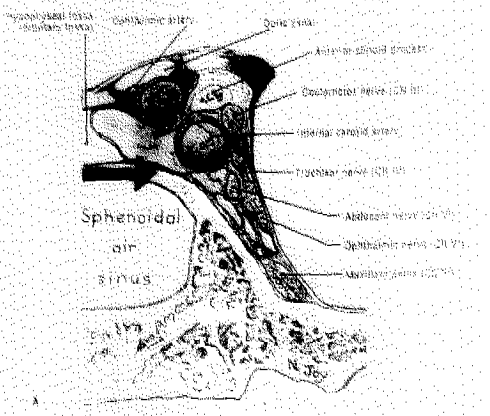


Figure 2. Arrow indicates the proximity of the intracavernous portion of the internal carotid artery and the sphenoid sinus

Bleeding from the eustachian tube can be demonstrated by the proximity of the internal carotid artery with the petrous canal as it enters the skull. (Figure 3) Erosion through the eustachian tube would usually present with an anterior epistaxis, bloody otorrhea and other otologic symptoms which were not evident in this case.[1,9,10]

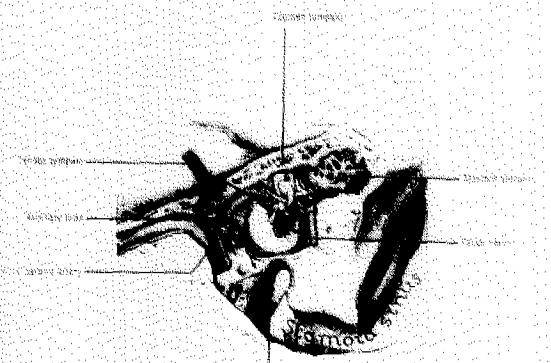


Figure 3. Arrow indicates the proximity of the eustachia tube with the internal carotid artery

Cribriform plate bleeding is least likely to occur and has never been reported yet in non-traumatic rupture of internal carotid artery aneurysm.[9]

Aneurysm is a rare cause of epistaxis, but if present, it can exsanguinate the patient. Bleeding from an intracavernous internal carotid artery is one of the causes of this potentially lethal vascular anomaly. It is, therefore, important to rule out the possibility of an aneurysm especially in-patients presenting with massive, recurrent, and intractable epistaxis after having precluded a systemic cause or

local pathology. In no other time is early diagnosis as important and life saving. Once an aneurysm is ruptured, nasal packing is usually ineffective in controlling the hemorrhage.[5, 8]

Prompt surgical intervention is the only recourse. Options include surgical clipping (Grood, 1977), [6,11] transarterial detachable balloon trapping (Berenstein, 1984), and cervical internal carotid occlusion with extracranial/intracranial arterial bypass (Beremstein, 1984). [12] Transarterial detachable balloon trapping to occlude the ICA to stop epistaxis is suggested as the ideal treatment in emergency situations.[5, 11]

CONCLUSION

Judicious search for the etiology is warranted. Early diagnosis of internal carotid aneurysm is essential if death from exsanguination is to be prevented. An aneurysm of the ICA should be considered as a cause of epistaxis, most especially if the bleeding is massive, with or without associated trauma, and not responsive to standard therapies.

Cerebral anteriography remains as the procedure of choice for the definitive diagnosis of internal carotid artery aneurysm.

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JUGULAR PHLEBECTASIA IN IDENTICAL TWINS*

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ABSTRACT

Neck masses, which appear and disappear during Valsalva maneuver and at rest respectively, almost always prompt physicians to consider disease entities like laryngocele or phryngocele. However, Jugular Phlebectasia, an abnormal fusiform dilatation of the jugular vein can manifest as such and should also be considered as a differential diagnosis. To this date, its etiology and pathogenesis still remains controversial but genetic predilection has been strongly suggested because majority of documented cases of Jugular Phlebectasia have been children or have an onset of affliction that dated back to early childhood. This hypothesis was further bolstered by a reported case of involvement among young siblings (Yokomori, 1990), and this account involving four year old male identical twins. Doppler ultrasonography is the preferred diagnostic modality, which should demonstrate internal jugular vein dilatation on Valsalva. Conservative management is advocated centering on reassurance that it is a benign condition.

Keywords: Neck mass, jugular phlebectasia, identical twins

INTRODUCTION

The diagnosis of neck masses, with the attendant complexities in determining the etiologies and pathogeneses, can be very difficult to the unsuspecting clinician. Even if modern technology has greatly enriched one's diagnostic arsenal, its judicious use will always be based on good clinical judgement. This is so called clinical eye can only be enhanced by being aware of all possibilities, specially those rarely encountered neck masses.

Neck masses which increase in size during coughing, crying and Valsalva maneuver almost always prompt us to think of a laryngocoele or a pharynocoele. In pediatric patients, however, dilatation of the jugular veins can present as such and should be considered as a differential diagnosis.[1]

In 1952, G.H. Gerwig introduced the term "phlebectasia" to describe an abnormal fusiform, saccular dilatation of a vein to differentiate it from the term "varicose" which implies tortuosity plus dilatation.[2] In a recent review, Yokomori et al., in 1990 found only 47 authentic cases of jugular phlebectasia. Most of these cases, have been children or have an onset of illness that dated back to childhood.[2] Despite the considerable number of cases documented, controversies still exist as to its origin and pathophysiology.

Involvement among siblings has already been documented[2] but this report would be first in describing jugular phlebectasia observed in identical twins.

CASE REPORT

R.P. IV and R.P. V, four year old male, Filipino, identical twins were both seen at the ENT Out-patient department due to a right anteromedial neck mass.

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At birth, the younger of the twins was noted to have a marble-sized right anteromedial neck mass upon crying which would spontaneously disappear at rest. The attending physician then gave assurance to the mother that it was a benign condition and would eventually resolve as the child grows. No further evaluation and work-ups were done. However, the mass persisted and 2 years PTC, the elder of the twins started to develop an anteromedial mass of the same character which was noted during crying, shouting and straining. There were no associated signs and symptoms and with time, the neck masses of the twins gradually increased in size prompting consultation.

The twins were born full term to a G3P2 (2002) 24 year old mother by cesarean section. There was regular pre-natal check-up and no history of maternal illness nor intake of teratogenic drugs. Perinatal history was likewise unremarkable. Morphologic and psychomotor developments were at par with age. A review of the family history revealed no other relatives with the same complaint.

On physical examination, a soft, ballotable, non-tender, oval, anteromedial neck mass measuring about 4.0 X 6.0 X 1.0 cms just above the suprasternal notch anterior to the right sternocleidomastoid muscle was noted in the elder while a 4.0 X 7.0 X 1.0 cms mass of the same character was noted in the younger (Figs. 1A and 1B).

Figure 1A. Elder Twin (Shouting)

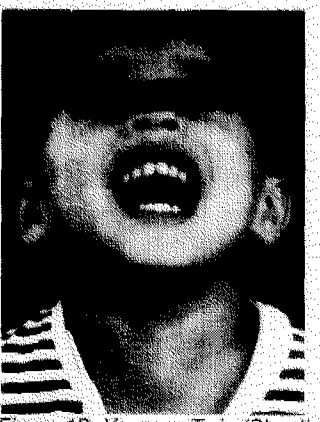

Figure 1B. Younger Twin (Shouting)

These were appreciated only during shouting and Valsalva maneuver and the masses would disappear and were not clinically palpable at rest (Figs. 2A and 2B). Likewise, there were no bruit nor palpable thrills noted. Transillumination test was negative. The rest of the ENT examinations were essentially normal. Examinations of the chest, lungs, heart, abdomen and extremities were also unremarkable.

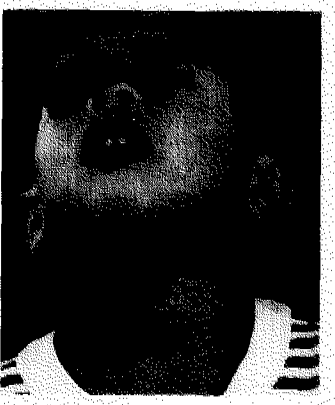

Figure 2A. Elder Twin (At Rest)

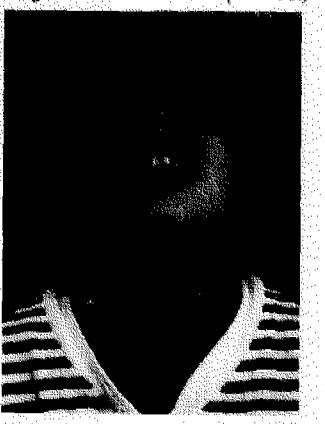

Figure 2B. Younger Twin (At Rest)

Anteroposterior and soft-tissue-lateral views of the neck and upper chest taken separately during resting and shouting states were unremarkable. Ultrasound with doppler color flow studies of the neck were then requested. There were fusiform dilatations of the right internal jugular veins measuring 1.39 cms in the elder and 1.2 cms in the younger in its anteroposterior diameter which were prominently elicited during Valsalva maneuver. There were no thrombi nor stenoses noted. Both left internal jugular veins and surrounding structures were essentially normal. The impression on both studies were right internal jugular vein dilatations and normal color flow doppler of the left internal jugular veins (Figs. 3A and 3B).

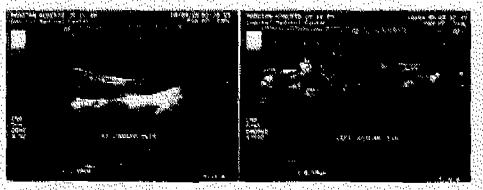

Figure 3A. Ultrasound of R and L IJV (Elder Twin)

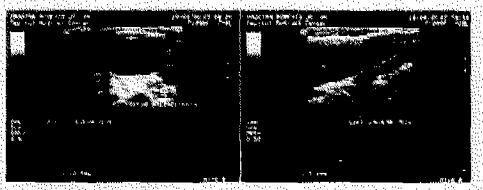

Figure 3B. Ultrasound of R and L IJV (Younger Twin)

DISCUSSION

This a case involving identical twins with soft, cystic, anteromedial neck masses. Malignancies are the least of considerations because most usually manifest as stony-hard masses. Since these are pediatric patients in which the masses were noted at birth and early childhood, the classical congenital masses like lymphangioma, hemangioma, and branchial cleft cyst may be entertained.[5] However, the appearance and disappearance of the mass on Valsalva and at rest respectively, should lead one to think otherwise. The options would include diseases like laryngoceles, pharyngoceles, and arteriovevous malformations.

An external or mixed type of laryngocele and a pharyngocele can be excluded in this case because they are usually acquired anomalies secondary to increased intralaryngeal and intrapharyngeal pressures respectively (e.g. glass blowing, wind instrument playing) and present as a high anterior neck mass at the level of the thyrohyoid membrane and may have associated signs and symptoms like dysphagia, pain, dyspnea, dysphonia, and hoarseness. Both are common in males and usually manifest in the fifth to sixth decade of life.[3,4] Arteriovenous malformation was excluded because of the absence of a palpable thrill and a warm, erythematous discoloration of the skin overlying the mass.[5]

The peculiar presentation of the mass in the pediatric identical twins stirred up interest to search the medical literatures for other possibilities. This finally led us to the awareness that a disease entity called jugular phlebectasia exist.

The appearance of the mass in the right lower part of the neck and anterior to sternocleidomastoid muscle on Valsalva is highly suggestive of jugular phlebectasia.[6] Its causation and mechanism still remains uncertain but several predisposing factors were postulated. La Monte et. Al. In 1976 suggested that inflation of the cupula of the right lung might produce sufficient pressure on the right innominate vein against the head of the clavicle to produce obstruction and temporary distention of the right IJV. The preponderance on the right side was explained by the more lateral anatomic position of the right IJV than the left, and the direct contact of the right innominate vein with the right pleura.[7,8]

However, Yokomori et. Al. in 1990 did manometric and histopathologic studies on two siblings with the right internal jugular phlebectasias. No significant differences were noted between the left and right jugular venous pressures with increased intrathoracic pressure. This findings precluded the suggestion of La Monte, and implied that there was no obstructive process generated with increased intrathoracic pressure. Microscopic examination done showed absence of

muscular layer of the dilated vein and paucity of muscle layer in the other. It was assumed that the congenital structural defects rather than the constitutional mechanical obstruction in the lower neck and mediastinum might contribute to the formation of phlebectasia.[2]

On the other hand, a different view to explain this unlikely phenomenon is presented. Normally, the internal jugular vein is in a collapsed state secondary to the pressure exerted by the atmosphere from the outside. Veins are six to ten times more distensible than an artery so any obstruction of the laminar or streamline drainage of blood towards the heart will produce a turbulence or whorling or blood flow called eddy currents and subsequent dilatation of the vein proximal to the obstruction (Fig. 4A). The right internal jugular vein is nearer and forms a more vertical course towards the superior vena cava than the left, so any form of obstruction distally will naturally cause damming of blood back to the right internal jugular vein (Fig. 4).

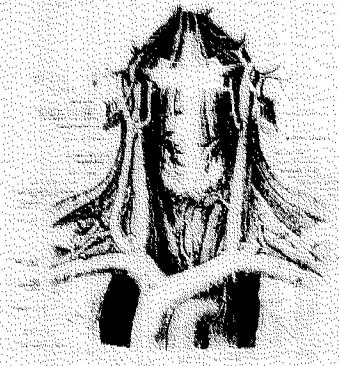

Figure 4. Anatomy of the Neck Veins

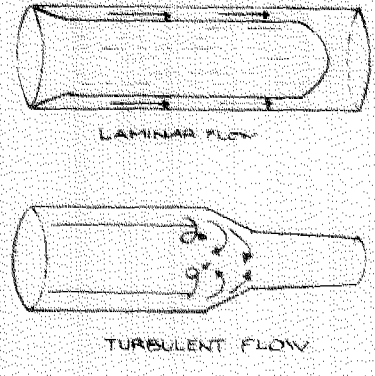

Figure 4A. Pathophysiology of IJV Dilatation

La Monte aptly described the possible site of obstruction and its propensity to occur in the right but failed to explain why the dilatation was fusiform and saccular when no microscopic pathology was noted in the dilated internal jugular veins resected. Yokomori was able to detect the muscular wall defect probably due to availability of higher resolution microscope in recent years. What seems wanting in the report was the explanation on how it came about. Two important questions are raised: 1. Did the dilatation cause the paucity of muscle layer? 2. Did the inherent muscular wall defect cause the dilatation?

There might have been a functional obstruction in the lower neck or mediastinum causing venous dilatation in a pre-existing muscular wall defect. Because the patients are identical twins, it may be presumed that the twins same genetic make-up and the same anatomy. Probably the mass was smaller in the elder twin and not clinically evident so it appeared only after two years of age.

Doppler ultrasonography showing internal jugular vein dilatation manifesting as an echo-free space which enlarges on Valsalva clinched the diagnosis.[7] It is the preferred diagnostic modality as it is widely available, comparatively inexpensive, and accurately defines the extent of the lesion and its relationship with the surrounding structures in the lower neck. More importantly it is a non-invasive procedure. CT scan, MRI and venography are the other options which can be employed to diagnose jugular phlebectasia but, due to their prohibitive cost and limited availability are seldom utilized.[6]

Jugular Phlebectasia is a benign condition and although unsightly, it produces no morbidity nor disability. Management is conservative and should be centered on reassuring the parents or the patient.[2] So far there were no reported cases of spontaneous rupture but unilateral resection of the dilated internal jugular vein can be done for cosmetic purposes or when the lesion becomes large enough to produce pressure symptoms. If both sides are

involved, bilateral resection is hazardous and, therefore, should not be done because of the risk of cerebral edema and its consequences. Such cases are also managed conservatively.

CONCLUSION

An apparently rare condition such as Jugular Phlebectasia has been presented. Physician may have come across cases like this in one's practice but probably due to its benign clinical picture, doctors may have diagnosed it otherwise or simply ignored it. With the unraveling of this clinical entity, it should now be considered as a differential diagnosis of all cystic neck masses specially in the pediatric age group. Otherwise, with its vascular nature, unsuspecting clinicians might become complacent and inadvertently perform unwarranted invasive procedures such as I&D or biopsy which can inflict more damage and prove fatal. Although its etiology is still controversial, involvement among siblings, as previously reported and identical twins as hereby presented strongly suggest a congenital defect. Conservative management is advocated.

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THE MONSTER WITHIN: RETROPHARYNGEAL TERATOMA: A CASE REPORT*

RAUL JERRY Q. ISAQUIRRE, M.D.**

ABSTRACT

A 3-year-old female child presented with a retropharyngeal mass associated with dyspnea of one-year duration. Both inflammatory and neoplastic etiologies were considered for this neck tumor which turned out to be a teratoma on biopsy and CT scan. Although a common old child who had minimal symptoms at the outset.

Keywords: Retropharyngeal mass, dyspnea, teratoma

INTRODUCTION

Neck masses form an interesting group of lesions with diverse embryogenesis And clinical manifestations. These manifestations may stem from the mass itself or as a direct result of its more widespread systematic effects. In certain instances, these signs and symptoms would lead the Otolaryngogists-Head and Neck surgeon to the diagnosis. But, in many other instances, a deeper investigation is needed. Moreso, in cases wherein these are very minimal symptoms as in this case to be presented.

The rarity of its location compounded the difficulty in its diagnosis. Although common and of a benign nature, the occurrence of this mass in the retropharyngeal area is of utmost danger to the patient. Outwardly, no physical signs were apparent but inwardly a " monster" lurks leading to symptoms which increased the morbidity to the patient.

This paper is being presented for the following reasons:

1. The rarity of its occurrence in a 3 year old child.
2. No similar case reported in this institution from the year 1991 to 1996.
3. To aid physicians in recognizing a relatively uncommon location.

This is a case of Frances Mae, a 3-year-old female child who came in because of dyspnea.

CASE REPORT

The condition started one year PTA when patient had occasional dyspnea, especially on recumbent position. There was no cough, fever, nasal or aural discharges. Initially, a consultation was done with a private physician who gave unrecalled medicines that did not provide any relief.

In the interim, dyspnea became progressive but no consultation was done.

Six months PTA, occasional inability to swallow, described by the mother as regurgitation of solid food, was noted. Liquids were said to be tolerated. The mother also noted snoring episodes when the patients was asleep.

One week PTA, dyspnea became severe which prompted consultation with another physician. The patient was diagnosed to have asthma and was given salbutamol with guiafenesin which did not afford any relief.

Two days PTA, patient was seen by another physician who noted a large mass

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obstructing the oropharynx and referred the patient to this institution for further evaluation and management.

The past medical history was unremarkable. Physical examination showed a cachectic, irritable stridorous child with tachypnea and bilateral yellowish mucoid rhinorrhea.

A bulging, firm, non-movable, sessile mass measuring approximately 5x4 cm in its vertical and horizontal dimensions respectively was located at the posterior pharyngeal wall of the oropharynx extending to the nasopharyngeal and hypopharyngeal areas. The soft palate was displaced anteriorly and inferiorly. (Fig. 1 & 2) Faucial tonsils were not enlarged.

Figure 1

Figure 2

There was no cervical lymphadenopahty but suprasternal and subcostal retractions were noted with clear breath sounds.

The rest of the physical findings were essentially normal.

An upper airway obstruction secondary to a retropharyngeal mass was considered. Trachestomy was done with relief of the respiratory distress. Initial laboratory examination only revealed anemia.

DISCUSSION

Presented with a patient with a progressively enlarging pharyngeal mass of one year duration led us to two questions: Is this an inflammation or a tumor? If this is a tumor, could this be benign or malignant? A cervical x-ray was then done which disclosed a soft tissue mass density in the retropharyngeal area with calcific specks.

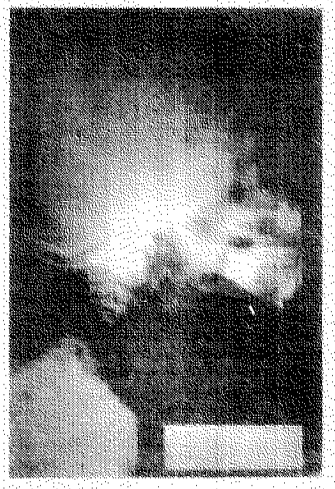
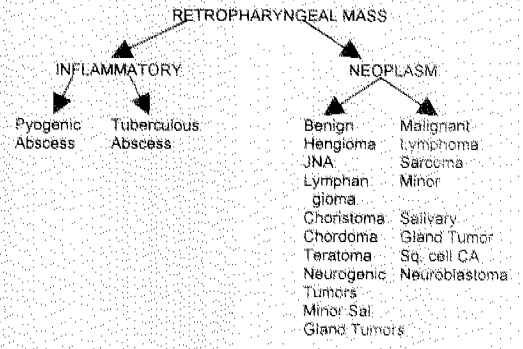


Figure 3

An algorithm is presented to aid us in the differential diagnosis:



Aspiration of the mass was done which revealed neither blood nor fluid aspirated. Thus, retropharyngeal abscesses

as well as vascular tumors like hemangioma, angiofibroma and lymphagioma were easily ruled out.

Nasopharyngeal choristomas, chordomas, teratomas, benign neugenic tumors and minor salivary glands tumors may all present as a mass in the nasopharyngeal area. In all these aforementioned tumors, a biopsy is mandatory to establish the diagnosis.

Lymphomamay arise in any of the primary lymphatic areas in the head and neck. This patient however, did not manifest signs pertaining to lymphoma like enlarged lymph nodes, weight loss and anorexia.

Rhabdomyosarcomas, squamous cell carcinoma as well as neuroblastomas are highly aggressive tumors and are known for their invasion especially to bone. This patient showed no signs of metastasis hence the conditions were excluded.

Figure 4

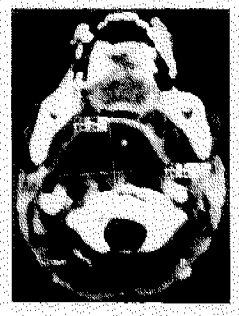


Figure 5

Faced with these considerations, a CT scan was performed which showed a retrophartngeal mass compatible with a teratoma. Furthermore, a wedge biopsy of the mass revealed findings compatible with mature teratoma, finally clinching the diagnosis.

Figure 6

Teratomas are neoplasms composed of tissue elements alien to the organ of origin. In childhood, these tumors are notable for their diversity in anatomic location and biologic behavior.

The word "teratoma" which literally means "monster" denotes, the disturbed and malformed growth and appearance of these tumor. They are classified into four groups namely dermoid, teratoid cysts, teratomas and epignathi.

Histologically, they are composed of tissues from the three germ layers with varying degrees of differentiation.

Teratomas occur in 1400 births but neoplasms of the nasopharynx are rare in neonates and children affecting less than 10% of the head and neck structures. In a 54-year review of teratomas in infancy and childhood t Children's Hospital Medical Center in Boston Massachusetts tumors arose in the following anatomic sites: sacrococcygeal (40%), ovary (37%), head and neck (5.5%), retroperitoneum (4.7%), mediastinum (4.3%), testes (3%), liver (0.78%). Maternal polyhydramnios is reported in 18% of cases. There is no known significant sex difference.

This case is considered a rarity in terms of age of onset of symptoms and only manifested with dyspnea at age 2 years. There was no history of polyhydramnions nor were there signs referable to her tumor.

The most common clinical manifestation of teratomas is a mass lesion with signs and symptoms ascribable to a specific location.

Radiographs of soft tissues of the neck may be helpful in the diagnosis because calcifications may be present. CT scan was found to be most useful investigative method.

Complete surgical resection remains the prime goal in each case but anatomic localization of tumor proved to be the most significant factor in the optimal management and clinical outcome. Encapsulation and pseudoencapsulation is a rule facilitating dissection from the surrounding structures.

Figure 7

Upon establishment of the diagnosis, excision of the mass was done by trans-oral approach and a firm well encapsulated mass in the retropharyngeal area was successfully removed. The "monster" that threatened thee patient's life was successfully removed from within.

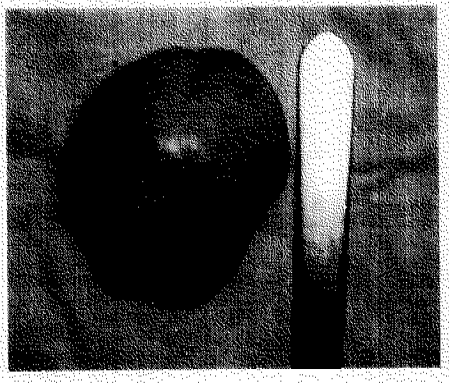


Figure 8

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TUBERCULOSIS OF A WARTHIN'S TUMOR: A CASE REPORT*

ANGELINA P. MOLINA, M.D**
FREDERICK Y. HAWSON, M.D.**
GIL M. VICENTE, M.D.***

ABSTRACT

The authors report an unusual and rare case of co-existing tuberculosis and Warthin's tumor in a parotid gland diagnosed post-operatively. This occurred in a 56 year-old, Filipino male with associated pulmonary tuberculosis. Fine-needle aspiration cytology (FNAC) was consistent with adenoma. Frozen section biopsy revealed granulomatous inflammation consistent with tuberculosis. Final histopthological examination revealed tuberculosis of an intraparotid Warthin's tumor and the adjacent parotid gland. The patient subsequently developed a parotid mass in the opposite right side with FNAC diagnosis of Warthin's tumor. Theories as to the etiopathogenesis of this unusual combination are discussed. Tuberculosis can affect the parotid gland either alone or alongside a Warthin's tumor, and in both instances can mimic a malignancy. A high index of suspicion should therefore be maintained. In line with this, the importance of obtaining a pre-operative diagnosis before embarking on surgery of the parotid gland is hereby emphasized.

Keyword: Parotid gland tumor, warthin's tumor, TB, triple theraphy

INTRODUCTION

Warthin's Tumor (adenolymphoma, papillary cystadenoma lymphomatosum) nearly always occurs in the parotid gland and is reported to occur in 5 to 14% of all parotid tumors according to recent literature.[14,32] The tumor usually manifests in the 4^{th}-7^{th} decade and bilaterality is observed in 10-12 % of tumors. It appears to have undergone a changing clinical pattern in the past decades. The overall incidence has risen with some studies reporting that adenolymphomas comprised as much as one-third of all benign parotid neoplasms. Furthermore, an increase in the incidence in females has been observed. From an initially marked male predominance some studies now claim no sex predominance.[18,32] A significantly higher percentage of all parotid gland tumors, especially Warthin's tumor, has been associated with smoking in both males and females. The incidence of parotid neoplasms are relatively the same throughout the world[44] One local study had rate of 11.4% for Warthin's.[12]

Tuberculosis of the parotid gland is rare, even in countries where the disease is otherwise common.[17,41,46] There have been only 79 reported cases in English literature, of these, the majority were seen before 1941.[9,38,45] Burrow et al. (1983) reported a case diagnosed on September 1980 and claimed that although 34 cases were described in the English literature up to 1965, there were no reference to any cases after that date.[5] In the 1980's, sporadic case reports have appeared in thee literature. In the latest series presented by O'Connel (1993), four of the six cases involved Asian immigrants.[34] Among the third world countries where tuberculosis is endemic, few cases have been reported. In 1992, Singh et al. reported two cases in South Africa.[41] In the Philippines, only two cases of tuberculosis of the parotid have been recorded[24], both involving intraparotid nodes. Since that time no other cases were reported locally.

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The combination of tuberculosis and Warthin's Tumor has been reported only four times in the English literature before 1959. [35,21,11,39] Only one of the four cases involved bilateral adenolymphoma. [39] In the literature on salivary gland tumors and adenolymphomas in general, no reference could be found to the possibility of a concomitant tuberculosis, nor was tuberculosis even mentioned. Coen (1987) in a discussion concerning tuberculosis in the parotid gland wrote " very rarely this infection is associated with neoplasms of the parotid." [9] It seems therefore, that this case is only the fifth reported example of tuberculous parotid adenolymphoma internationally. This may well be the first locally reported case of TB-Warthin's combination in the parotid.

Collins and Shucksmith (1953) argued that any association at all between adenolymphoma and tuberculosis must be accepted as evidence in favour of a lymph node origin for these tumors, based upon the rare occurrence of true salivary-gland tuberculosis, the uncommon finding of adenolymphoma among parotid neoplasm and the relatively common but separate occurrence of salivary tissue or tuberculous follicles in lymph nodes of the parotid region.[11] Shaw and Friedmann (1959) supported these conclusions and added plurality of adenolymphoma as exemplified by the reported bilateral occurrence and multiplicity may be taken as strong circumstantial evidence in favor of lymph node origin.[39]

This case of the concurrence of tuberculosis and Warthin's tumor is presented to make clinicians aware that there have been changing trends in the clinical manifestations, diagnosis and therapy of the two disease entities.

In reporting this case, and in reviewing the previous cases, further support is offered to the validity of the theory of lymph-node origin based on the reports of Collin and Shumrick (1956) and Shaw and Liederman (1959). [11,39] The importance of understanding and accepting the theory of lymph node origin becomes significant since it can modify the manner of therapy.

CASE REPORT

The patient is E.D., a 56 year-old, male, married, farmer from Bulacan. who consulted at the ENT-HNS Out-Patient Clinic with a chief complaint of a left infra-auricular swelling. About 3 weeks PTC the mass had suddenly appeared, and that on two occasions exhibited marked sudden enlargement. The mass was persistent despite consult with four different physicians (two of which were otolaryngologists) and adequate intake of various antibiotics. Surgery was advised and, due to financial constraints, patient was referred to the charity service under the Department of Otolaryngology-Head and Neck Surgery.

Aside from the mass the patient claimed to be asymptomatic and in good health. Patient was diagnosed to have ischemic heart disease in 1991 and had a 40-pack-per-year smoking but drank beer occasionally. Patient denied having contact with cases of tuberculosis.

A complete head and neck examination disclosed the presence of a mass at the left infra-auricular region. The mass, measuring approximately 3.5 x 4.0 cm, was well-circumscribed, slightly mobile, with a firm consistency. There was no evidence of skin or facial nerve involvement. Careful examination of all cutaneous and mucosal surfaces in the head and neck revealed no ulcers or mass lesions. Examination of the oral cavity revealed patent Stensen's duct orifices, with clear watery secretions, no parapharyngeal masses. The remaining ENT examination and general physical examination was unremarkable.

About 3 weeks PTA, Fine needle aspiration (FNA) of the mass was done. The smears showed clusters of epithelial and myoepithelial cells, admixed with benign acinar cells, suggestive of an adenoma.

CBC and urinalysis results were within normal limits. However, ECG showed recent antero-lateral wall MI and chest X-ray showed moderately-advanced pulmonary tuberculosis in both upper lobes with cavitary and cystic changes. (Figure 1) Tuberculin test done was positive after 48 hours. However, two samples of early

morning sputum submitted failed to show acid-fast bacilli. Patient was started on quadruple Anti-Koch's chemotherapy consisting of Rifampicin 450 mg/tab OD, Isoniazid 400 mg/tab OD, Ethambutol 1000 mg/tab OD and Pyrazinamide 500 mg/tab TID.

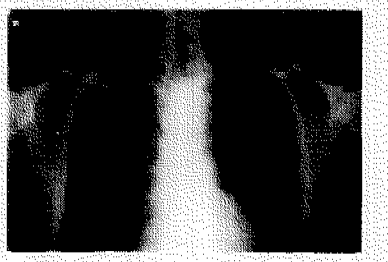


Fig. 1. Chest X-ray showing cavitary/cystic and Fibrotic changes in both upper lung fields.

Plan of the service was surgical excision of the left parotid mass by superficial parotidectomy with possible frozen section pending cardio-pulmonary and anesthesia clearance. Patient remained asymptomatic, but the mass was noted to exhibit slow but progressive increase in size up to the time of surgery.

Five days PTA a second mass developed at the opposite, RIGHT retro-auricular region. It measured 2x2 cm, was well-circumscribe, nontender with a firm consistency and was freely mobile. Fine-needle aspiration of this mass was also performed showed clusters of which epithelial cells with oncocytic changes, few adherent myoepithelial cells and abundant lymphoid cells. Aggregates of histiocytes were also noted. The cytomorphologic findings were suggestive of Warthin's tumor. (Figure 2)

Fig. 2. Photograph of right retroauricular mass: 2cmx2cm, well-circumscribed nontender, firm and freely mobile.

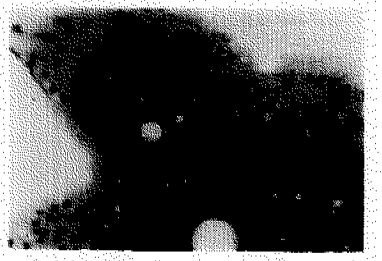
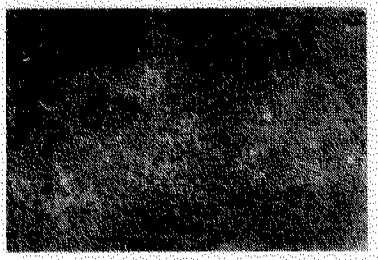


Fig. 3. Fine Needle Aspiration Biopsy Cytologiy of the Right retroauricular mass: Shows clusters of Epithelial cell with oncocytic changes, few Adherent myoepithelial cells and abundant Lymphoid cells suggestive of Warthin's Tumor. (H & E, x400)

On October 11, 1995 with full informed consent, patient underwent surgery for resection of the left parotid mass by superficial parotidectomy under general anesthesia and cardiac monitoring. At surgery, some points of fibrosis was noted between the skin and external capsule of the parotid gland. The main trunk of the facial nerve was identified. The capsule of the parotid gland appeared to be quite adhesive to the subcutaneous tissue with sections exuding brownish serous discharge. Facial nerve branches were identified, there was note of points of adherence of the capsule to inferior branches which were carefully dissected free. The intra-operative findings of involvement of the facial nerve branches lent some doubt as to the benign nature of the lesion. So the entire superficial parotid lobe specimen was sent for frozen section. The frozen section diagnosis was caseating granulomas consistent with tuberculosis. The benign nature of the lesion dictated that superficial parotidectomy was adequate so the procedure was terminated. The surgical site was closed in layers and a drain was left.

Fig. 4 & 5. Frozen section of Left Superficial Parotid Lobe showing central caseation surrounded by multiple granuloma composed of epitheloid histiocytes, some forming Langhans giant cells surrounded by rim of lymphocytes.



The pathological report read as follows: "The specimen submitted for frozen section was the superficial parotid lobe which measured 6x4x4 cm. Section showed a well-circumscribed mass with a reddish brown cut surface exuding a brown cloudy serous fluid demarcated from the adjacent lobulated parotid gland tissue. Microscopic sections from the mass showed a regular array of tall columnar non-ciliated cells with eosinophilic cytoplasm and an incomplete second layer of small irregular basal cells supported by a stroma containing lymphoid follicles. There were also multiple granulomas composed of epitheliod cells, Langhan's giant cells, and wide zones of caseous necrosis. Similar granulomas were seen in the adjoining parotid gland." The final histopathologic diagnosis was. Parotid gland with caseating granulomas. Warthin's tumor with granulomas inflammation consistent with tuberculosis.

Fig. 6. Showing characteristic epithelial pattern and Lymphoid stroma of Warthin's tumor. Note the fibrous capsule separating the tumor and adjacent parotid tissue in this section.

Fig. 7. Discrete lymphoid structure within the parotid parenchyma; Follicles with germinal centers. H & E x 40

Fig. 8. Showing the characteristic epithelial cell pattern and lymphoid stroma containing granuloma

Fig. 9. Showing papillary mass of lymphoid tissue lined by columnar epithelium.

Fig. 10. Details of parotid tissue adjacent to tumor. Note the tubercle with characteristic giant cell of Langhan's. H & E 100

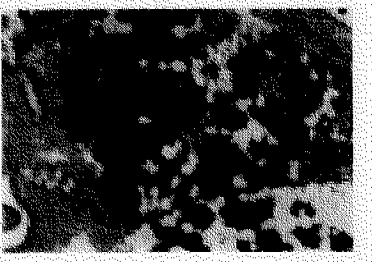


Fig. 11. Parotid tissue adjacent to mass; normal appearance. H & E x 40

The immediate post-operative course was marred by two complications. The development of a dehiscence which drained clear fluid and required suturing and pressure dressings and finally resolved after 1 month. The second complication was facial nerve palsy noted one day post-op. It initially involved all branches of the facial nerve, but it seems to have improved in that

6 months post-op only mild palsy of the

lower branches is apparent.

Fig. 12. Months post-operation
-showed improvement
-still with mild ipsilateral palsy of buccal branch of facial nerve

Fig. 13. 6 months post-operation
-shows scar from post-operative fistula

DISCUSSION

When presented with a mass in the periauricular area, it is good clinical practice to consider the parotid gland as the origin.[3] Diseases of the parotid gland usually present with some kind of enlargement as the primary clinical sign. This enlargement may be a diffuse swelling, a single discrete mass, or several masses. Such a presentation does not initially indicate that a mass is benign or malignant.[28]

Presentation of a parotid mass rapidly increasing in size without typical appearance of inflammation raises the possibility of malignancy, granulomatous diseases as well as other well-recognized causes of cervical lymphadenopathy.[73] The emergence of effective but divergent treatment modalities for these conditions makes distinction between them of utmost importance. The importance of early diagnosis is in the exclusion of the rare case of malignancy and in the detection of tuberculosis which requires medical treatment. The importance involves the treatment since tuberculosis is primarily medical and adenolyphoma is surgical. In general, the clinical features and general investigations one usually requests, including blood count, ESR and chest X-ray, are not sufficiently specific to distinguish between a neoplsm and chronic infections.

Shaw and Friedman (1959) suggested preoperative aspiration biopsy as a means of conforming the clinical diagnosis with respect to Warthin's tumor.[39] The use of FNA is a reliable, accurate, inexpensive, rapid means of obtaining a diagnosis.[13,20,46] A specificity of between 95-100% and a sensitivity of between 91 & 95% have been described for neoplasia[10,20] and for TB a specificity of 93 percent and a sensitivity of 77%[26]. In a local study Villoria et al. 1991 claimed diagnostic value of FNAB for detecting malignancy with sensitivity of 94% and specificity of 93% head and neck masses in general. When the Mantoux test and the FNA cytologic examination were employed together, TB adenitis can be diagnosed in 90% of cases (TBLN) preoperatively.[26]

In this case, the initial FNA was unable to diagnose Warthin's tumor nor chronic granulomatous inflammation in the mass. However, it gave us the pre-operative impression that the mass was more likely a benign adenoma rather than a malignancy. The benign nature of the histodiagnosis done allowed us some time to plan for and prepare the patient for the procedure. It became even more important in this case as the patient, though asymptomatic, apparently had evidence of moderately advanced pulmonary tuberculosis on X-ray and an abnormal electrocardiogram. The tuberculin test done turned out to be positive.

Patient was then referred to cardiology pulmonary medicine for co-management and eventual clearance for surgery. Usually the anesthesiologists require that the patient be on antiKochs

medications for at least two weeks prior to anesthesia.

The subsequent development of a mass in the opposite periauricular region added another interesting element. In this case, the mass has similar characteristics as the first but seemed to be more mobile. Fine-needle aspiration biopsy of this mass was also performed the cytomorphologic findings of which are suggestive of Warthin's tumor. (Fig. 2)

The pre-operative diagnosis of a benign parotid neoplasm was the foremost consideration based on the characteristics of the mass. Pleomorphic adenoma is the most common mass and it has a recurrence associated with inadequate excision the procedure of choice would be at the minimum superficial parotidectomy. The gross configuration of the tumor, the appearance of its cut surface, and the relationship of the neoplastic and normal tissue often provide strong clues to the diagnosis. Most benign tumors consist of a single mass of tissue with well-circumscribed margins. In contrast malignant tumor usually has ill-defined margins and appears to infiltrate the normal tissue.[44] In this case, the intraoperative findings prompted a request for frozen section. The result of " granulomatous inflammation consistent with tuberculosis" was unexpected. But apparently, even grossly intraoperatively, tuberculosis is difficult to differentiate from neoplasm as sometimes it can even be seen surrounding branches of the facial nerve.[41,38]

The final surgical pathology report of Tuberculosis in a Warthin's tumor in itself was interesting, and raised many questions. Collins and Shucksmith (1953) stated that the tuberculous adenolymphoma seems to be recognizable only by its microscopic features.[11] Maynard (1967) states that there is no way to distinguish infections from tumors of the parotid and that diagnosis will always depend on post-operative appearance of granuloma-formation, with Langhans giant cells and caseation.[30] The importance of knowing this fact pertains to a possibility that a surgeon may immediately assume that the mass was malignant and proceed to more radical surgery with possible sacrifice of the facial nerve.

On retrospective review of the FNAB slide, the cytologist claimed that there was evidence of granulomatous disease. With regards to the frozen section (FS), diagnosis of granulomatous disease was given. However upon review, the FS slide revealed evidence of Warthin's tumor. The fact that this was initially missed may be lack of communication or the very human nature of seeing only one thing and not looking for more.

The ultimate value of any diagnostic test such as FNAB is its ability to determine and perhaps modify the patient's further management. Not all salivary gland masses require removal. Some benign parotid tumors or intraparotid lymph nodes can be removed without parotidectomy, as complications increase with the extent of surgery.[18] Another advantage of FNAB is that materials can be obtained for microbiological investigation. [13] Despite the fact that FNA and open biopsies have been implicated in skin breakdown and subsequent fistula formation, FNAB has provided valuable clinical information when there is doubt particularly with respect to malignancy.

Diagnosis is only made histologically after surgery. It is important to attempt to diagnose tuberculosis by finding AFB or by culture. Some authors claim that surgery itself is used to obtain specimens for diagnosis and that treatment would only be started after specimens are obtained. It is true that in majority of cases, one only have the chance to obtain specimens only once. Anti-TB therapy was started based on Chest x-ray and positive PPD.

A question that can be addressed is whether the size of the lesion could have decreased had anti-Koch's medications been given longer. A study claimed that one week of anti-Kochs would significantly decrease the size of the mass as to be diagnostic[41] In this case patient had been on anti-Kochs medication for two weeks with no response in the size of the mass. This was attributed to the large size of the mass. Or perhaps there maybe already a pre-existing Warthin's tumor causing the increased size, which of course will not respond to the medications.

Latest follow-up was 6 months post-operative. Examination showed marked improvement in facial nerve function and patient claims excellent compliance with intake of Antikochs medications and is being monitored by a doctor in the province. Repeat chest films revealed marked diminution of the previously seen upper lobe cavities and densities. With regard to the right sides mass diagnosed as Warthin's by FNAB, it appeared to have remained stable in size 2x2 cm, but had more of a doughy consistency.

Future plans are that Antikochs therapy be continued to complete at least 9 months and observe the right sided mass until the patient sees fit to have it surgically excised. Consider the possibility of doing technetium scanning and DNA to detect presence of non-viable mycobacteria.

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ANNOUNCEMENT

1. ASEAN CONGRESS
   October 5 to 9, 1998, Davao City
   Host: Phil. Society of Otolaryngology-Head and Neck Surgery, Inc.

2. ISIAN CONGRESS
   February 14 to 18, 1999, PICC, Manila
   Host: Phil. Society of Otolaryngology-Head and Neck Surgery, Inc.

3. ASIA-OCEANIA CONGRESS
   February 7 to 12, 2000, PICC, Manila
   Host: Phil. Society of Otolaryngology-Head and Neck Surgery, Inc.

MODIFIED TRANSFACIAL DIASSEMBLY FOR EXCISION OF JUVENILE NASOPHARYNGEAL ANGIOFIBROMA*

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VICTOR JOHN C. LAGMAN, M.D.**

ABSTRACT

The cranial base has long posed a challenge to the otolaryngologist-head and neck surgeon because of it intricate anatomy and proximity to adjacent vital structures. Recent advances in surgical technique have made this previous terra incognita more accessible and allowed relative safety for tumor removal.

At present, extirpation of advance (i.e. infratemporal) extracranial nasopharyngeal masses may now be managed by a wide variety of approaches, among which is the transfacial disassembly. Although the procedure offers a wide surgical field, the technique is nonetheless compromised by a plethora of ophthalmic complications since it entails removal of the entire orbitozygomaticomaxillary process.

The authors have introduced a modification of the standard transfacial disassembly in a 16 year old male diagnosed to have Grade III juvenile nasopharyngeal angiofibroma (JNA). By sparing the orbital rim and floor, this new procedure obviates untoward eye complications while providing excellent exposure.

Keywords: Angiofibroma, transfacial disassembly

INTRODUCTION

Surgical treatment of skull base tumors has long been the goal of most head and neck surgeons. The anatomic complexity of the skull base and the vital structures within its boundaries once made this region surgically unapproachable. Although traditional methods provided access to some areas of the skull base, extensive tumors have limited the surgeons' visualization and control of important neurovascular structures thereby making such procedures dangerous.

Over the past few decades, many advocates of skull base surgery have developed and refined various innovations by combining techniques proven both in the field of otolaryngology and neurosurgery.

These new techniques center on the idea that skeletal structures and soft tissues of the face are significant obstacles to achieve broader exposure for safe tumor removal. Thus, the concept of temporary displacement of the craniofacial skeleton for adequate tumor exposure has assumed a major role in the management of skull base tumors.

At present, many approaches using craniofacial disassembly techniques are available. Accordingly, proper selection not only necessitates determination of exact tumor size and location but should also be based on the following surgical principles: 1) wide exposure, 2) isolation and protection of vital structures, 3) oncologically sound resections, 4) restoration of critical barriers, and 5) functional and aesthetic reconstruction. This report covers the initial experience using a modification of the standard transfacial disassembly in the management of a Grade III juvenile nasopharyngeal angiofibroma (JNA).

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* 1st Place, PSO-HNS Surgical Innovation Research Contest
August 29, 1996, Makati Sports Club, Makati City

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***Consultant, Department of Otorhinolaryngology, Sto. Tomas University Hospital

CASE REPORT

This is a case of a 15-year old male who had a one-year history of left nasal obstruction and recurrent epistaxis. Physical examination showed a large mass occupying the nasopharynx and extending into the left nasal cavity. CT scan (Fig. 1) showed the mass extending into the left parapharyngeal space, obliterating the lateral and medial pterygoid muscles and involving the left infratemporal fossa via the pterygopalatine recess. Digital subtraction angiography with subsequent embolization showed the vascular supply originating from the left external carotid artery via the left ascending pharyngeal artery and both internal maxillary arteries.

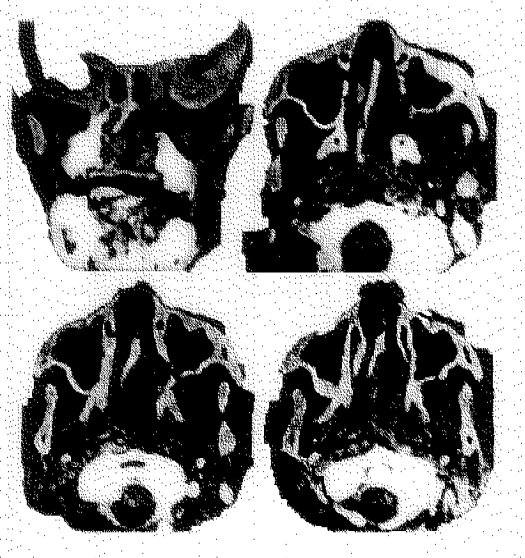

Figure 1. Coronal (upper left) and axial (upper right and bottom views of the angiofibroma appearing as a large homogenous mass arising from the left side of the nasopharynx and extending into the left parapharyngeal space, obliterating the lateral and medial pterygoid muscles. The mass also extends into the nasal cavity and into the left infratemporal fossa via the pterygopalatine recess.

The modified transfacial disassembly was begun with a Weber-Ferguson incision. Tumor exposure was accomplished through the following osteotomy sites: 1) beginning medially from the frontal process of the maxilla, 1 cm below the orbital rim (orbital sparing), extending laterally to the arch of the zygoma, and developed posteriorly until the junction of the posterior maxillary wall and pterygoid plate was reached (Fig. 2), and 2) a second osteotomy beginning at the base of the pyriform aperture, continuing along the nasal floor, traversing the medial wall of the maxillary sinus and extending laterally until separation of the maxilla from the pterygoid plate was achieved. The bony segment was then removed en bloc and placed in normal saline solution. Remnants of the posterior wall of the maxillary sinus and pterygoid plate were removed with a bone rongeur. Finally, a common cavity between the nasopharynx and infratemporal fossa was created by sharp dissection of the lateral nasal mucosa thereby facilitating tumor removal.

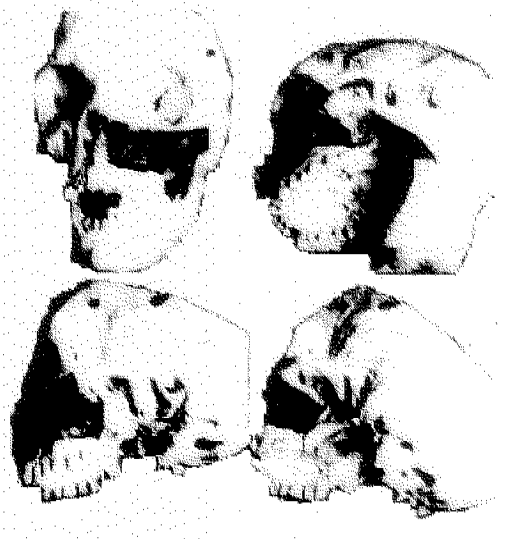

Figure 2. The red shaded area indicates the modified transfacial disassembly, where the orbital rim and floor are spared upon removal of the entire zyygomaticomaxillary process. This modification is accomplished by starting the osteotomy at the frontal process of the maxilla and leaving a 1 cm margin below the orbital rim. This avoids violation of the orbital contents while maintaining adequate exposure.

Reconstruction was achieved by reattaching (Fig. 3) the temporarily disassembled bony segment of the zygomaticomaxillary process with titanium mini-plates (Fig. 4). In the immediate postoperative period, the patient was placed on normal diet and was discharged after five days. Four months later, the patient showed no evidence of tumor recurrence and yielded a satisfactory aesthetic outcome (fig. 5).

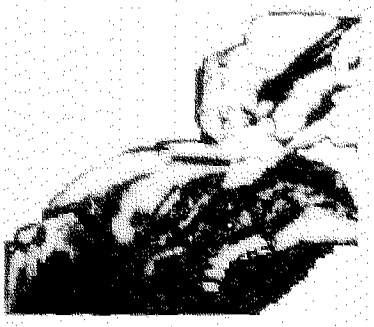

Figure 3. Reattachment of the zygomaticomaxillary process

Figure 4. Stabilization with titanium miniplates. Note orbital sparing

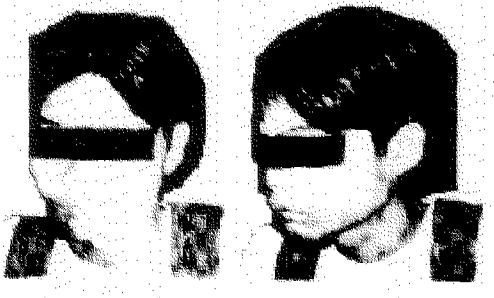

Figure 5. The patient four months after surgery. Excellent exposure with good aesthetic outcome and absence of any orbital complications was achieved because of the modification of orbital sparing. No recurrence has since been noted.

DISCUSSION

The middle cranial base counts among the most anatomically formidable in terms of diagnosis and management. It extends from the posterolateral wall of the maxillary sinus anteriorly to the petrooccipital suture posteriorly. When considering surgical approaches to this region, it is important to subdivide them into three compartments: a single central compartment (bounded laterally by both pterygoid plates and occipital condyles) and paired lateral compartments. This central compartment contains the sphenoid sinus, nasopharynx, pterygopalatine fossa, and clivus, while the two lateral compartments include the entire infratemporal fossa, parapharyngeal space, and petrous portion of the temporal bone. These distinctions between central and lateral compartments are useful in planning surgical approaches prior to actual removal. Nevertheless, it is not unusual for advanced lesions (whether benign or malignant) to extend beyond the borders separating each compartment. In these cases, adequate pre-operative planning to determine exact tumor size and location becomes even more critical for a successful extirpation.

Juvenile nasopharyngeal angiofibroma (JNA) is a benign, highly vascular tumor that is found almost exclusively in adolescent males. It arises from the sphenopalatine fossa and typically invades the vacant spaces in the nasopharynx. Lateral extension of the tumor usually involves the area of the infratemporal fossa. Literature would traditionally recommend that JNA Grades I and II (tumors limited to the nose and nasopharynx) be managed via transpalatal or Le Forte I osteotomy. On the other hand, standard transfacial disassembly with its wide surgical field and access to both central and lateral compartments is best reserved for JNA grades III and IV (tumors with infratemporal fossa or intracranial extention).

This case illustrates a modification of the standard transfacial disassembly (removal of the entire orbitozygomaticomaxillary process). The main features of this modification is twofold. First, it does not utilize a hemicoronal incision, since adequate exposure of the osteotomy sites via a Weber-Ferguson incision is possible. Second, it removes only the zygomaticomaxillary process (orbital sparing), thus preserving the integrity of the orbital contents. The rationale behind this alternative is based on the premise that orbital sparing does not limit infratemporal fossa exposure necessary for JNA grade III tumor removal. In addition to this, inclusion of the orbital rim and floor upon removal of the zygomaticomaxillary process may result

to unwanted ophthalmic complications such as diplopia, enophthalmos, and damage to the lacrimal apparatus. Thus with this modification, surgical management of such tumors need not involve unnecessary manipulation of the orbital structures with an added advantage of decreased operative time.

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POST-AURICULAR FISTULA CLOSURE UTILIZING ELEVATED MASTOID CAVITY SKIN AND A ROTATED PERIOSTEAL FLAP*

NATHANIEL W. YANG, M.D.**

ABSTRACT

This case series presents the evolution of and results with a surgical technique for closing long-stand post-auricular fistulas secondary to chronic suppurative otitis media utilizing elevated mastoid cavity skin and a rotated periosteal flap, based on the author's experience with such cases. Four patients with long-standing post-auricular fistulas of more than three years' duration were treated in a hospital-based tertiary otorhinolaryngologic in-patient care setting. Mastoidectomy via a post-auricular approach with closure of the post-auricular fistula utilizing elevated mastoid cavity skin in the first two patients, and subsequently with an added rotated perisoteal flap in the last two patients was performed. Mastoid obliteration with a temporalis muscle rotation flap was performed on the last three patients. This was achieved with no post-operative dehiscence, no post-auricular soft tissue collapse, and with no alterations in the hairline.

Keywords: Post-auricular fistula, otologic surgery, otitis media, chronic suppurative periosteal flap

INTRODUCTION

Chronic suppurative otitis media continues to be a common health problem in the Philippines. Certain complications, however, present themselves so infrequently that, when such occur, physicians are at a loss as to their proper management. One such problem is the management of a long-standing post-auricular fistula secondary to chronic suppurative otitis media complicated by cholesteatoma and post-auricular subperiosteal abscess.

In this institution, these cases have been managed using two techniques: (1) primary closure of the defect after freshening the skin edges and wide undermining of the adjacent soft tissues, and (2) primary closure after freshening the skin edges and creating a skin rotation and advancement flap. Although some success has been achieved with either of the two methods, certain limitations have been observed. Due to the inelasticity of the skin in the post-auricular and scalp regions, excessive tension develops at a closure line after plain undermining, resulting in an increased tendency to dehisce. On the other hand, the use of skin rotation and advancement flap usually distorts the natural hairline, because the nearest donor sites are hair bearing regions.

Modern textbooks and atlases of otologic surgery have not been very helpful in addressing this problem probably due to the declining incidence of chronic suppurative otitis media in the industrialized countries. In fact, the only reference to this problem was in a textbook written by Bezold and Seibenmann in 1908, which stated that "sometimes it is necessary to leave a temporary or even a permanent opening behind the auricle in order to facilitate the aftertreatment and the control of the whole cavity later on". Such a treatment strategy would be unacceptable today, with the advances made in the surgical therapy of chronic tympanomastoiditis. No local literature exists on the subject.

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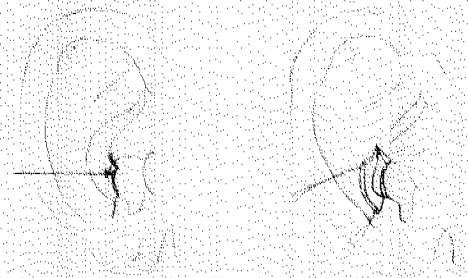
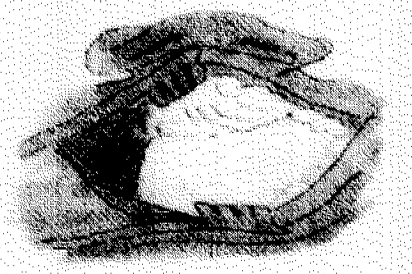
It is the objective of this paper to present the evolution of, and the results with, a surgical technique for the closure of a long-standing post-auricular fistula secondary to complications of chronic suppurative otitis media, utilizing elevated mastoid cavity skin and a rotated periosteal flap. This is based on the author's experience in managing four patients presenting with this complication.

A thorough understanding of the surgical technique is required to understand the management strategy for each case in this series. An outline of the surgical procedure is presented below. Diagrams have been added to further clarify each step.

TECHNIQUE OF OPERATION



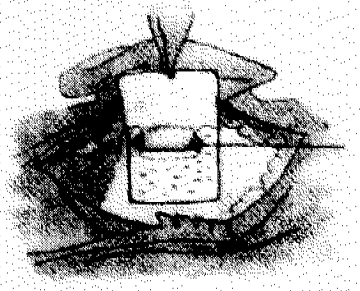
Step 1. Meatoplasty using the incision developed by Schuknecht (Brackmann, 1994) with removal of conchal cartilage and underlying soft tissue.

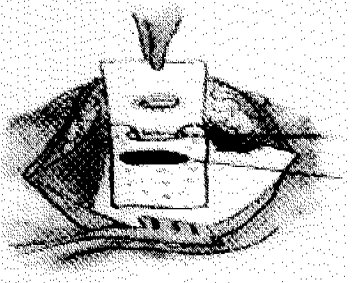


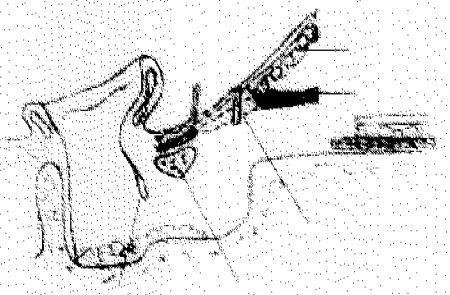
Step 2. Curved post-auricular incision and development of a skin flap. The skin flap is reflected anteriorly up to the posterior edge of the fistula without violating the continuity between thee underlying peiosteum and the skin that has migrated into the mastoid cavity through the edge of the fistula. On the superior and inferior edges of the fistula, skin flap is reflected anteriorly up to the posterior border of the external auditory canal, without violating the continuity between the underlying periosteum and the posterior meatal skin.

Step 3. Harvesting and dehydration of a temporalis fascia graft.

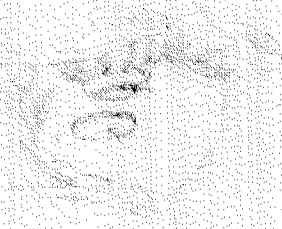
Step 4. Periosteal incision to create an anteriorly-based periosteal flap. The periosteal flap is initially reflected up, nearly to the edge of the fistula. The mastoid cavity skin is then carefully elevated circumferentially, meticulously mainting its continuity with periosteal flap. After elevation of the skin along the anterior border of the fistula, the periosteal flap is then reflected antiriorly in continuity with the meatal skin to expose the posterior external canal wall.





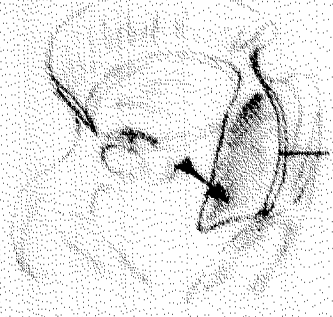


Step 5. Retraction of the skin flap, the periosteal flap, the meatal skin, and the pinna to allow visualization of the superior, posterior, and inferior osseous external canal walls.

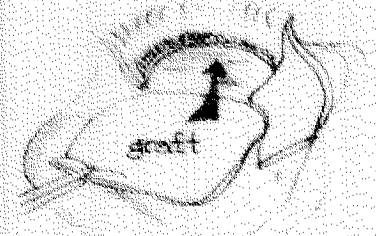


Step 6. Canal-down mastoidectomy with removal of all foci of disease.

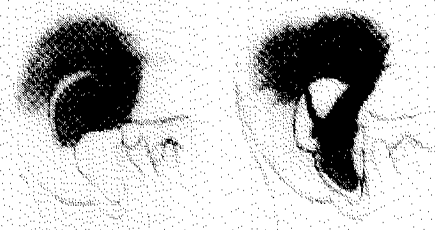
Step 7. Incision of the superior meatal skin from lateral to medial close to its attachment to the squamotympanic suture, creating an inferiorly based flap, which is rotated onto the posteroinferior walls of the surgical cavity (Brackmann, 1994).



Step 8. Tympanoplasty with temporalis facia.



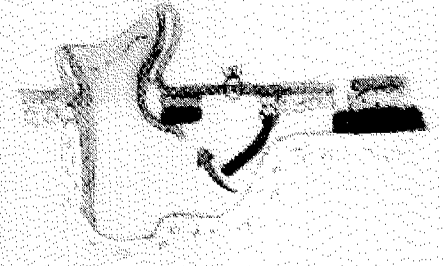
Step 9. Mastoid obliteration with a temporalis muscle rotation flap.



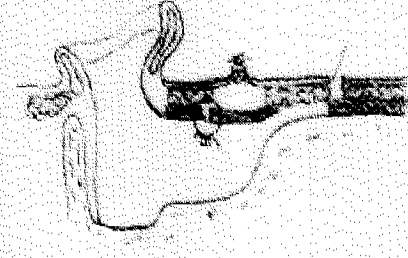
Step 10. Filling of the cavity with gelfoam and gauze impregnated with antibiotic ointment.

Step 11. Circumferential freshening of the skin at the edge of the fistula, with primary closure using non-absorbable sutures.

Step 12. Rotation of the posterior portion of the periosteal flap anteromedially, using thee posterior edge of the fistula as the axis of rotation. The rotated flaps comes to lie directly beneath the closed fistula.



Step 13. Suturing of the rotated periosteal flap anteriorly to the conchal skin flap created during meatoplasty. Suturing is done using chromic sutures.



Step 14. Closure of the skin incision in layers using catgut sutures to approximate soft tissues and silk/nylon to suture the skin edges.

Step 15. Application off a sterile mastoid pressure dressing.

CASE REPORTS

Case 1. T.B., 35/female from Muntinlupa, consulted at in February 11995 for otorrhea of 31 years duration in the left ear, and a ten-year history of left-sided facial paresis. Patient had a post-auricular subpeiosteal abscess eight years PTC. This spontaneously ruptured and formed a persistent fistula. There was also gradual progressive hearing loss.

Otologic examination revealed a post-auricularfistula measuring 1 cm in diameter. A natural mastoidectomy was visible through thee external auditory canal. The mastoid cavity was partly epithelized and contained a partially marsupialized cholesteatoma sac. The middle ear was covered by a layer of granulation tissue with mucopurulent discharge. No osssicles or tympanic membrane remnant remained. There was also note of Hous-Bracjmann Grading system Grade IV-V (Less, 1995) facial nerve weakness on the left.

The patient then underwent mastoidectomy with facial nerve decompression and fistula closure using thee technique outlined, with the exception of Step 9 (mastoid obliteration), 12 and 13 (rotated periosteal flap.) The periosteal flap was sutured back in its original position with chromic sutures.

During the immediate post-operative period, there was note of good approximation of the skin at the edges of the fistula. On follow-up during thee fourth post-operative month, however, there was note of a 1-2 mm diameter dehiscence at the center of the close fistula. There was also note of partial collapse of the post-auricular soft tissues into the mastoid cavity ass evidenced by a depression in this region. The hairline, however, was unaltered. The surgical cavity healed uneventfully and remained dry after complete epithelization. A slight improvement in facial nerve function was likewise observed.

Case 2. G.P., 20/female from Tondo, consulted at our institution in May 1995 for otorrhea of 13 years duration in the left ear, and a post-auricular subperiosteal abscess which developed rupture of the abscess and the formation of a persistent fistula occurred. Hearing loss and occasional otalgia was likewise experienced.

Otologic examination revealed a post-auricualr fistula measuring 5 mm in diameter. A cholesteatoma sac was visible inside the opening. There was sagging of the posterosuperior external canal wall, which precluded complete visualization of the tympanic membrane. Purulent discharge and epithelial debris was noted in the remaining meatal opening.

The patient then underwent mastoidectomy with fistula closure using the technique outlined, with the exception of Steps 112 and 113 (rotated periosteal flap). The periosteal flap was sutured back in its original position with chromic sutures.

During the immediate post-operative period, there was note of good approximation of the skin at the edges of the fistula. On follow-up during the fifth post-operative month, however, there was note of a 1-2 mm diameter dehiscence at the center of the closed fistula. There was also note of partial collapse of the post-auricular soft tissues into the mastoid cavity as evidenced by a depression in this region. The natural hairline was maintained. The surgical cavity healed uneventfully and remained dry after complete epithelization.

Case 3. E.M, 15/female from Tondo, consulted in September 1995 for an opening behind the left auricle and a fourteen-year history of purulent otorrhea from the left ear, with development of a post-auricular subperiosteal abscess and the formation of a persistent and gradually enlarging fistula occurred with complete deafness in the left ear. Occasional tinnitus was also experienced.

Otologic examination revealed an opening behind the left auricle measuring 1.5 cm in diameter. Visualized within was a

natural mastoidectomy lined by a layer of epithelium. There was note of pockets of granulation tissue in the middle ear region with a film of purulent discharge. No ossicular or tympanic membrane remnants were visualized.

The patient then underwent mastoidectomy with fistula closure using the complete technique outlined. Obliteration of the mastoid cavity was performed using a temporalis muscle rotation flap.

During the immediate post-operative period, there was note of good approximation of the skin at the edges of the fistula. On follow-up during thee third post-operative month, a layer of bone was noted to have developed beneath the region of the fistula. This apparently prevented the post-auricular soft tissues from collapsing into the mastoid cavity, preventing the formation of a depression in this region. No dehiscence were noted during the entire post-operative period, and the natural hairline was maintained. The surgical cavity healed uneventfully and remained dry after complete epithelization.

Case 4. J.T., 20/male from Iloilo, consulted in December 1995 for an opening behind the left auricle. Patient had a fifteen-year history of purulent otorrhea from the left ear, and he a post-auricular subperiosteal abscess eight years PTC. This abscess ruptured and caused the formation of a persistent opening through which purulent discharge occasionally drained. There was also gradual progressive hearing loss and occasional otalgia and tinnitus. No vertigo was experienced.

Otologic examination revealed an opening behind the left auricle measuring 1.5 cm in diameter. Visualized within was a large mastoid cavity containing cerumen and desquamated epithelium. After removal of all debris, the cavity was noted to be lined by a thin layer of skin, and it communicated with the external auditory canal through a large break in the posterior canal wall. The middle ear was likewise epithelized, and no ossicles or tympanic membrane remnant were identified. Tuning fork tests revealed a mixed hearing loss on thee left, which correlated with the profound hearing loss demonstrated on pure-tone audiometry.

The patient then underwent mastoidectomy with fistula closure using the complete technique outlined. Obliteration of the mastoid cavity was performed using a temporalis muscle rotation flap.

During the immediate post-operative period, there was note of good approximate of the skin at the edges of the fistula. On follow-up during the first post-operative month, necrosis of the temporalis muscle mastoid obliterature flap was noted, necessitating debridement and subsequent amputation of the flap. Otomycosis and subsequent ipsilateral facial nerve paralysis occurred. The otomycosis was successfully treated with vigorous cleaning, and almost complete recovery of facial nerve function was noted five months post-operatively. Despite these post-operatively problems, no dehisces were noted during thee entire post-surgical course. New bone formation beneath the fistula likewise occurred, as noted by palpation of a bony-hard surface beneath the previous fistula site. The post-auricular soft tissues did not collapse into the mastoid cavity, and the natural hairline was maintained. The surgical cavity was almost completely epithelized by the sixth post-operative month.

A Tabular summary of the management strategy for each of the cases is presented below.

	Case 1	Case 2	Case 3	Case 4
Elevation of Mastoid Cavity Skin for Fistula Closure	+	+	+	+
Mastoid Obliteration with a Temporalis Muscle Flap	-	+	+	+*
Rotation of Periosteal Flap	-	-	+	+

*Although mastoid obliteration was performed, necrosis and subsequent amputation of the flap was done post-operatively in Case 4

A Tabular summary of the post-operative results for each if the cases is presented below.

	Case 1	Case 2	Case 3	Case 4
Closure of Fistula (Immediate Post-op period)	+	+	+	+
Maintenance of Hairline	+	+	+	+
Fistula Recurrence (long-term follow-up)	+	+	-	-
Post-Auricular Soft Tissue Collapse	+	+	+	-*

* The absence of post-auricular soft tissue collapse in Case 4 was noted despite amputation of the mastoid obliteration flap. This feature differentiate Case 4 from Case 3.

DISCUSSION

The idea of utilizing mastoid cavity skin to close a long-standing post-auricular fistula arose from the observation that the migrate in to the mastoid cavity. This epithelial migration probably occurs due to a natural attempt of the human body to line all exposed areas with a protective layer of epithelium. By elevating the epithelial layer off the mastoid cavity in continuity with the normal skin at the periphery of the fistula, an adequate amount of skin would be made available for primary closure of the fistula. This would hopefully be achieved without the tension noted with primary closure after wide undermining, and without the distortion of the natural hairline associated with the use of a skin rotation and advancement flap. Thus, a way of elevating the mastoid cavity skin in continuity with normal skin and similar to the regularly-used technique of reflecting the meatal skin in continuity with a postaurally based soft tissue flap.

In the first case in this series, this method provided more than enough skin to allow tension-free closure of the fistula. In fact, the skin edges had to be trimmed to allow aesthetically pleasing approximate. As expected, the technique allowed preservation of the natural hairline of the patient. The results of the original technique, however, proved to be less than ideal, with note of the formation of a delayed-onset dehiscence and the collapse of the post-auricular soft tissue in to the mastoid cavity. This was probably due to the fact that there was hardly any soft tissues beneath the skin that could support the post-auricular region above the empty space of the surgical cavity.

In the second case, a search for added soft tissues support was initiated. Mastoid obliteration using a temporalis muscle rotation flap was performed, in the hope that this would provide enough bulk to prevent fistula recurrence and soft tissue collapse. The long-term results of this addition to the original technique, however, proved disappointing. It became apparent that natural contraction of the temporalis muscle mastoid obliteration flap allowed the fistula to recur and for thee post-auricular region to collapse in to the mastoid cavity.

With these problems in mind, a search for an alternative source of soft tissue support was initiated. Since a postaurally based periosteal flap was always created in the technique of mastoid surgery, another source of soft tissue was readily made available for experimentation. Thus, instead of returning the periosteal flap to its original position, the author rotated the flap medially and sutured it to the previously created meatoplasty skin flap. This provided a soft tissue lining beneath the close fistula, not unlike the swinging doors of a saloon in an American Western film.

The addition of a rotated periosteal flap was first done in the third case was initially treated with a great degree of skepticism than certainty. However, no dehiscence formed, and new bone actually grew beneath the fistula and prevented the collapse of the soft tissues into the mastoid cavity. In retrospect, this should have been an expected result, since the source of soft tissue, a periosteal flap, maintained its capacity for osteoneogenesis.

Was the success achieved with the third case merely pure luck? Or was it really due to the inherent qualities of the technique? Another patient had to be operated on in order to validate this innovative procedure. A fourth case was added to this series, and it proved that the technique was indeed viable and reproducible. In fact, the presence of post-operative complication requiring removal of the mastoid obliteration flap actually accentuated its qualities, since it proved that the use of elevated mastoid cavity skin in conjunction with a rotated periosteal flap alone could provide enough support to allow tension-free closure and the prevention of dehiscence and post-auricular soft tissue collapse.

CONCLUSION

The treatment of a long-standing post-auricular fistula secondary to chronic suppurative otitis media complicated by cholesteatoma and post-auriculat subperiosteal abscess is hampered not only by the paucity of literature regarding its management, but also by the limitations of often-used techniques brought about by the

quantities of the surrounding tissues. An innovative technique of closing such a fistula using elevated mastoid cavity skin and a rotated periosteal flap has been developed. It provides solutions to the problems associated with other techniques, and it has proven itself to be reproducible. Hopefully the application of this method will not only but will close the opening behind the patient's ear, knowledge regarding its treatment.

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LASER ASSISTED UVULOPALATOPLASTY (L.A.U.P.): A NEW ALTERNATIVE TREATMENT FOR SNORING*

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DOMINADOR M. ALMEDA, JR., M.D.****
CESAR V. VILLAFUERTE, JR., M.D.***
EDUARDO C. YAP, M.D.***

ABSTRACT

Several Surgeries for snoring were introduced since 1964 and with advent of laser surgery in 1990 this method was applied for uvulopalatoplasty.

This paper reports of the first case of laser assisted uvulopalatoplasty (LAUP)) done under local anesthesia in this institution on March 31, 1995. He underwent one session of laser surgery with favorable results. Postoperative sore throat was the only complaint which lasted for one week relieved by intake of analgesics and saline gargle. The surgical technique is also discussed.

Keywords: Snoring, LAUP

INTRODUCTION

Snoring has been a common social problem. It can be a cause of courtship failures, marital difficulties, and socially ostracism by roommates or even housemates. In addition to these, numerous medical complications have been ascribed to snoring without apnea prompting an increasing number of patients to seek medical advice.

Uvulopalatopharyngoplasty is the most widely used surgical procedure done under general anesthesia to treat snoring. However, this procedure carries a high morbidity with permanent nasal regurgitation as the most common complication. It was first designed by Ikematsu in 1964 and was later modified by Fujita in 1981. Since that time much effort has been devoted to improving the surgical treatment for snoring.

With the advent of laser surgery in 1990, Kamami applied this method for uvulopalatoplasty. Majority of patients are treated as an outpatient case under local anesthesia requiring two to five sessions to eliminate snoring. In the United States, it is known as laser assisted uvuloplasty (LAUP) and Dr. Yosef Krespi was the early pioneer in importing and adding refinements to this procedure since 1993.

It is the objective of this paper to introduce as well as recommend LAUP as an alternative surgical treatment for snoring. It is also the purpose of this paper to present its advantages and disadvantages as well as its potential postoperative complications.

CASE REPORT

This a case of W.A., 35 year old, male, married, non--hypertensive, nonobese, dishwasher admitted for the first time in this institution on March 30, 1995 because of snoring.

Present condition started three years PTA when the patient was noted to be

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snoring noisily and loudly and is usually awakened by the wife because of the noise. Who however denies noting pauses in between snores. Patient was later on noted to be restless and irritable and complains of feeling lazy and tired this affecting his job as a dishwasher. Persistence of snoring prompted consult at a government hospital wherein patient was advised undergo laser surgery for snoring and was referred to this institution for further evaluation and management.

Patient has a nonsignificant smoking history and is an alcoholic beverage drinker consuming three bottles of beer/day occasionally for fourteen years. Review of systems and past medical history are unremarkable.

On admission, patient was conscious, coherent, ambulatory with stable vital signs. Examination of the nose, nasopharynx, oropharynx and hypopharynx revealed normal results. The only pertinent otolaryngologic finding is a redundant soft palate and enlarged uvula. While lying in a supine position, a flexible fiberoptic endoscope was inserted at the nasal cavity and Mueller's maneuver was performed revealing negative findings.

Laser Assisted Uvulopalatoplasty (LAUP) has been proposed as an alternative to traditional uvulopalatoplasty. It is an option to be considered by those whose chief complaint is snoring. It is safe, reliable technique to gradually reduce the effects of snoring. The surgical goal is to reduce the length and reshape the soft palate and uvula.

The surgical technique is described as follows:

1. The patient is in a sitting position and standard laser precautions observed.
2. Local anesthesia is done by using 20% lidocaine (Xylocaine) spray in the posterior oral cavity, over the soft palate, tonsils and uvula. Then, infiltration of 1:100,000 epinephrine is done into the junction of the soft palate and uvula bilaterally and into the base of the uvula (Fig. 1).

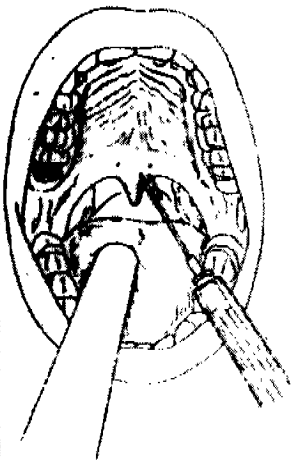

Figure 1. Site of injection for local anesthesia before LAUP

3. A special pharyngeal handpiece attached to the articulated arm of the CO2 laser is used and a backstop tip is used to protect posterior pharyngeal wall. Power is set at 10 watts continuous mode.
4. The tongue is retracted inferiorly with an ebonized tongue blade with an integrated smoke evacuation channel.
5. Through and through full-thickness vertical trenches that measure 1 to 1.5 cm are created on the free edge of the soft palate along both sides of the uvula (Fig. 2.). These trenches are created with use of a focused beam in a continuous mode using the pharyngeal handpiece with the backstop tip.

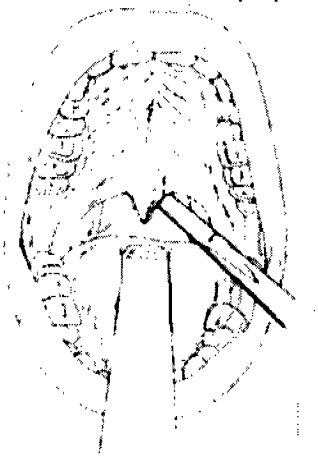

Figure 2. Vertical trenches along both sides of the uvula

6. The patient is instructed to take a deep breath and the laser is activated during very slow exhalation to avoid inhalation of the plume.
7. Shortening and thinning of the uvula is then done using 10 watts continuous mode.
8. The uvula is ablated by 60% to 90% of its original length and thickness (Fig.3). Figure four shows the surgical result after LAUP. Each session usually takes 15 to 200 minutes to perform.

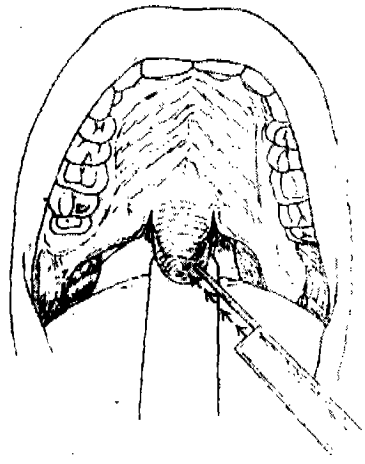

Figure 3. Char-free ablation of the uvula with use of CO_2 "SwiftLase".

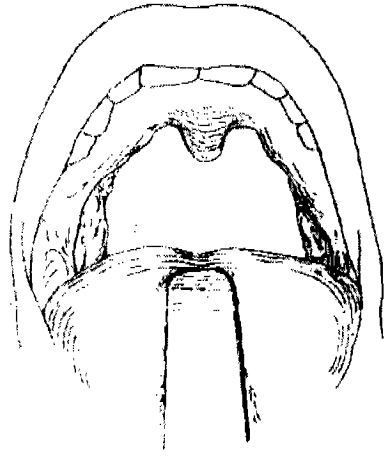

Figure 4. Surgical result after LAUP

Postoperative instructions include a soft bland diet and avoidance of citrus fruits and spicy meals is recommended. Gargling with saline solution is advised to soothe postoperative sore throat. To avoid drying of mucus membrane, excessive hydration, humidification and steam inhalation are advised. The need for analgesics varies according to each patient's tolerance. Prophylactic antibiotics are likewise prescribed.

Healing by formation of an eschar was observed on follow-up which was one-week after the procedure. In majority of cases complete healing is reported to take place in approximately 10 to 12 days.

No bleeding was noted intraoperatively and postoperatively. Patient was given oral Amoxycillin 500/mg cap every 8 hours and Mefenamic Acid 500mg/tablet taken as needed for pain and placed on soft diet and advised saline gargle three times a day. The rest of the hospital stay was unremarkable complaining only of tolerable sore throat and dysphagia. Patient was discharge on the second hospital day.

On follow-up, one week postoperatively, patient's wife claimed there was absence of snoring. Patient is still complaining of tolerable on and off sore throat and minimal dysphagia. Granulation was noted at the postoperative site.

Two weeks postoperatively on subsequent follow-up, absence of snoring as well as sore throat and dysphagia were noted.

DISCUSSION

Snoring has long been ignored by most of the medical community and was referred as a purely social problem primarily disruptive to family life.

High risk individuals are obese and male patients. Pertinent contributing factors to this patient are alcohol consumption and tobacco smoking which are responsible for hypotenia and/or thickening of the posterior and lateral pharyngeal walls.

The patient's complaints of restlessness, irritability and poor job performance can be attributed to the frequent disturbance during sleep which makes it less restful and may also undermine the quality of walking.

Numerous medical complications are believed to be secondary to this condition. These include hypertension,

angina, cerebral infarction, pulmonary hypertension, congestive heart failure, mental and behavioral changes.

Snoring is believed to be a preclinical state of obstructive sleep accompanied by signs and symptoms of hypoxic stress and sleep interruption. However, there was noted episodes of apnea in this patient.

The noise of snoring is caused by vibration of the uvula, soft palate edge, and tonsillar pillars. Snoring in this case can be attributed from the rapid airflow created during inspiration of the redundant soft palate and elongated uvula.

The diagnosis of snoring is made primarily by obtaining patient's history, much of which were obtained from the patient's wife. Any anatomic narrowing or obstruction along the upper airway should be ruled out by doing a complete otolaryngologic examination. Flexible fiber-optic nasolaryngoscopy aids in the performance of Mueller's maneuver which is described as inhalation against a close nose and mouth to create maximal negative pressure. Inspection is done during reverse Valsalva while observing for the collapse of the posterior lateral pharyngeal wall and soft palate.

Multiple options have been recommended for the management of snoring. These range from the most conservative treatment such as avoidance of alcohol and sedatives and weight reduction to invasive surgical interventions such as adenoidectomy, tonsillectomy and presently uvulopalatopharyngoplasty (UPPP).

Advantages of this procedure include ability of an ENT specialist to perform the procedure in an office setting using only local anesthesia with reduced trauma and easier recovery compared to traditional treatments.

Another advantage is that this procedure can be easily combined with other laser procedures such as submucous resection of the septum, laser turbinectomy, laser assisted serial tonsillectomy, or laser lingual tonsillectomy as adjunct treatment to snoring. Immediately post-operatively, patient's are able to resume regular activities.

LAUP is usually done in series of surgical treatment with a minimum of one month apart. Tissue removal is therefore controlled, hence, removal of excessive tissue of the uvula is avoided allowing an easier recovery period. The endpoint is when the snoring is significantly reduced or eliminated as reported by the patient or the bed partner. However, some authors claim that majority of patients improve dramatically with just one treatment with comparable recovery period as can be observed in this case.

Although, it can be a simple alternative to patients who are afraid of surgery, it has the following disadvantages, these are: multiple and successive sessions (majority taking about 2 to 4 sessions) are done, however, this may vary depending on the outcome of the first session. Patients are not monitored in the hospital setting and a high technical training is required.

Occasional bleeding can occur in approximately 3%. However, this can be easily controlled by applying silver nitrate. Postoperative sore throat lasting for 7 to 10 days is the dominant side effect of this procedure. One case of oral candidal infection was reported. Accordingly, the only complication noted in this patient was tolerable sore throat lasting for one week which was relieved by gargling saline solution and intake of analgesics.

CONCLUSION

On the basis of this experience, laser assisted uvuloplasty (LAUP) can be recommended as an alternative procedure to treat patients with loud, habitual snoring. Compared to uvulopharyngopalatoplasty (UPPP), it appears to be a promising new procedure. A high success rate in reducing or completely eliminating the loudness of snoring in all patients has been reported by various experts in the field of laser surgery.

The procedure is safe, reliable and effective and is done as an office procedure. The use of local anesthesia is favorable for patients who are afraid to undergo conventional surgery. Patients may be able

to resume regular activities immediately post-operatively.

The major disadvantages are high technical training in laser surgery is required and patients are not monitored in a hospital setting. However, some patients may need successive sessions but this may vary depending on the outcome of the first procedure

Postoperative sore throat lasting for one week to ten days is the main side effect of this procedure. This can be easily managed with saline gargle and oral analgesics. Minimal bleeding can be easily controlled using silver nitrate cauterization. Successive sessions may not be needed if initial surgery yields a favorable outcome

Since this is a very procedure, long term results are not available and many papers written on the treatment were based on subjective rather than objective results. With the availability of this new treatment modality, the first and only one existing in the country to date, snoring, therefore, need no longer to be the social problem that it is today.

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ANNOUNCEMENT

1. ASEAN CONGRESS
   October 5 to 9, 1998, Davao City
   Host: Phil. Society of Otolaryngology-Head and Neck Surgery, Inc.

2. ISIAN CONGRESS
   February 14 to 18, 1999, PICC, Manila
   Host: Phil. Society of Otolaryngology-Head and Neck Surgery, Inc.

3. ASIA-OCEANIA CONGRESS
   February 7 to 12, 2000, PICC, Manila
   Host: Phil. Society of Otolaryngology-Head and Neck Surgery, Inc.

THE CART WHEEL TECHNIQUE: A MODIFICATION OF MOHS SURGERY IN THE TREATMENT OF BASAL CELL CARCINOMA OF THE HEAD AND NECK*

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CONRADO A. PABICO, M.D. **
GIL M. VICENTE, M.D. ***

ABSTRACT

This paper present a modification of Moh's Techniqque with the following salient features: a) evaluation of a cartwheel like compartment with a 1.0 cm. base, b) incision at 90^0 angle at the 0.55 cm. margin up to the subcutaneous tissue, c) creation of a 0.5 cm. margin from the clinical border of the tumor and d) reconstruction is deluged for 6 months. The patients treated with this modification have no evidence of tumor recurrence up to 3 years post-operatively.

The technique offers the distinct advantage based on sound surgical principles and is simple to perform and accurate. Further studies must be done to evaluate its applicability and effectiveness.

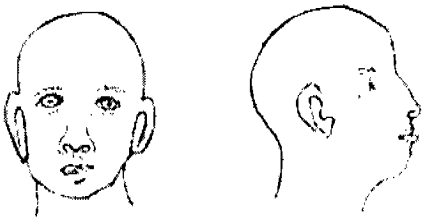
Keywords: MOHS surgery, basal cell carcinoma, head and neck

INTRODUCTION

Skin cancer is the most common of malignant neoplasms and is, as a result, familiar to all physicians. Basal cell carcinoma (BCC) is a malignant skin tumor arising from basal cells of the surface epidermis or external root sheath of the hair follicle. It is composed of one or a few small, waxy, semitranslucent nodules forming around a central depression that may or may not be ulcerated, crusted, and bleeding. The edge of larger lesions has a characteristic rolled border. Telangiectasis course through the lesions. Bleeding on slight injury is a common sign. It is estimated that there are 300,000 new cases of skin cancer each year in the United States.

While skin malignancy in blacks and other colored races is considered rare, earlier local reports indicate that it is common in Filipinos. BCC was the most common skin cancer in Filipinos constituting 39% of cases (out of 186). More women (58%) than men had the disease. Majority of the patients were elderly (59%). BCC in Filipinos appeared to be a slow-growing tumor, 32% had the disease for five years or longer before it was diagnosed. Most often affected were the head and neck (in 95% of cases), primarily the nose (31%). Lesions were mostly localized (58%). BCC was most frequently mistaken for moles or melanoma which presented as a pigmented papule or nodule. The majority of cases (59%) were treated by surgery.

Many patients with basal cell carcinoma undergo multiple surgical procedures in an attempt to cure the tumor. In spite of these efforts, some are still left with persistent tumor. Midface basal cell carcinoma (H-zone) (fig. 1A, 1B) that involves vital structures is particularly challenging to the physician in the effort to achieve a cure while preserving cosmetic and functional integrity whenever possible.



* Presented, Surgical Innovation Research Contest
August 29, 1996, Makati Sports Club, Makati City
** Resident, Department of Otolaryngology-Head & Neck Surgery, Jose Reyes Memorial Medical Center
*** Consultant, Department of Otolaryngology-Head & Neck Surgery, Jose Reyes Memorial Medical Center

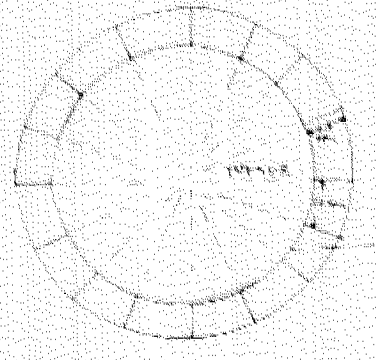
There are several accepted methods for treating cutaneous neoplasms, including surgical excision, radiation therapy, electrical desiccation, curettage, cryosurgery, and Mohs' surgery. With conventional surgical techniques, large areas of tissue that are free of tumor must often be removed to achieve adequate surgical margins. Because of the frequency of microscopic local extension of basal cell carcinoma, areas of tumor can be missed with conventional excision, thus leading to persistence and recurrence.

In an effort to overcome these problems with maximum preservation of normal tissue, an interdiciplinary approach has been utilized in the most challenging areas of basal cell carcinoma, i.e., nasalabia fold, forehead. Mohs surgery has been modified in excising cutaneous tumors and tracing their extent to achieve precise but conservative excision.

REPORT OF CASES

A. TECHNIQUE

This can be done under local or general anesthesia. The tumor is carefully stretched and the gross border is palpated to determine the clinical extent of the tumor edge. A 0.5 cm. tumor margin is marked out around the periphery of the tumor, several compartments of the tumor margins are made and designed like a cartwheel with each base measuring around 1.0 cm (fig. 2) A series of numbers are assigned to each compartment (fig. 3, 4, 5, 6).



Lidocaine 2% with 1:100,000 epinephrine is then injected at the previously marked out tumor margin (fig.7)

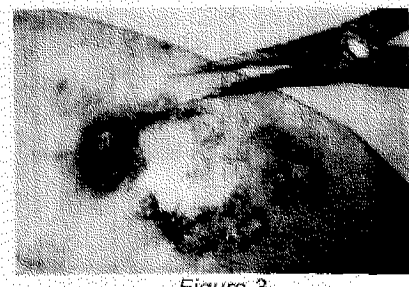


Figure 3

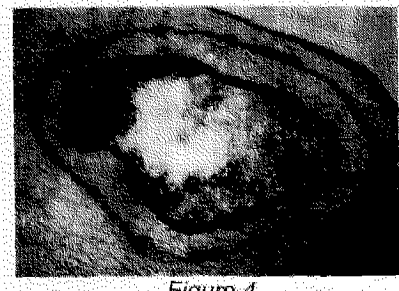


Figure 4

Figure 5

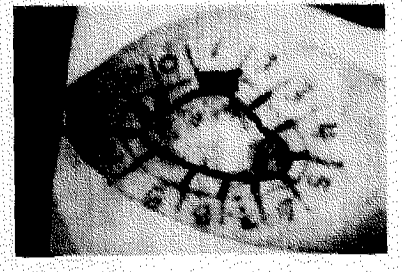


Figure 6. Black box indicated is sent For histopathology

Figure 7

Hatch marks are placed on the patient and the piece of tissue and the tumor is excised with the knife perpendicular (90 degree angle) to the tumor up to the subcutaneous tissue. The piece of tissue is elevated and the scalpel is moved across the bottom of the tissue parallel to the skin surface (fig. 8, 9). Hemostasis is achieved using electrocautery.

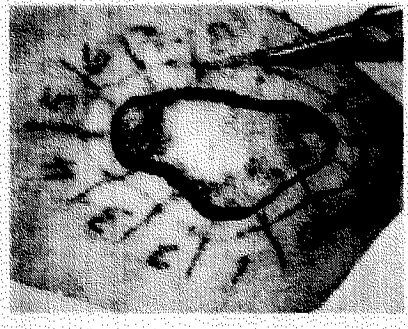


Figure 8

Figure 9

A map of the area is drawn on a sterile paper to show the location of the piece of tissue as well as to re-create its exact form and the hatch marks that were placed on it (fig. 10, 11, 12. The specimen is then sent to the laboratory for frozen section analysis of tumor margins along with the map.

Figure 10

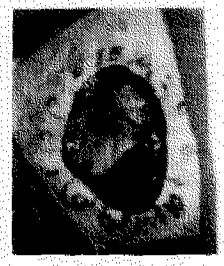


Figure 11

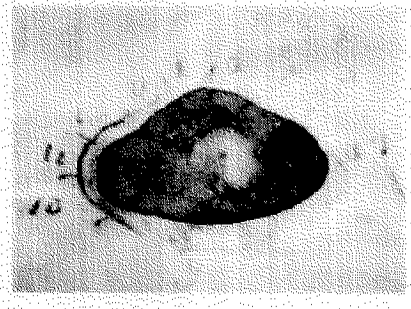


Figure 12

In the laboratory, the tissue compartments are cut into smaller, more manageable pieces that will fit on a microscope slide. Each piece is flipped so that its cut surface is facing upward on a cryostat chuck (fig. 13, 14, 15). It is then fixed in an optimal cutting temperature (OCT) embedding compound for frozen specimens, while a heat extractor is pressed onto the tissue (fig. 16, 17, 18, 19). When the tissue is flipped and placed on the chuck and pressure is applied, its two sides tend to flatten so that a three-dimensional piece of tissue becomes two dimensional without loss of any of its margins (fig. 20)

Figure 13

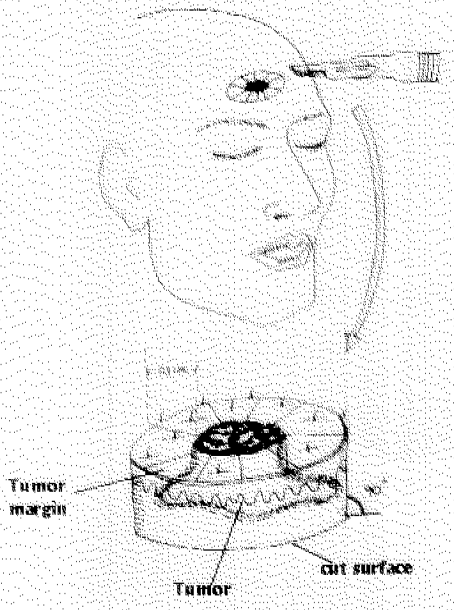


Figure 14

Figure 15

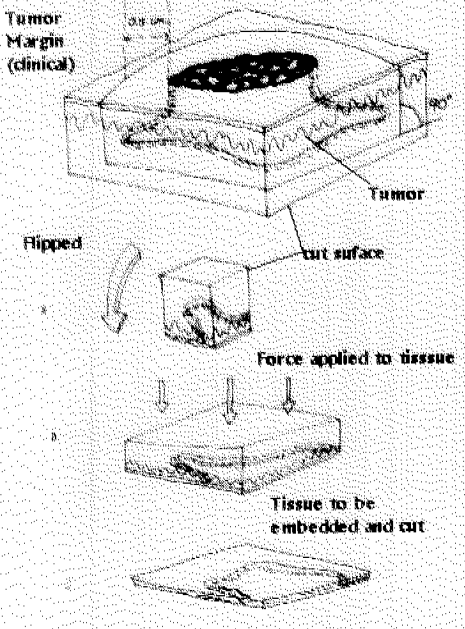


Figure 16

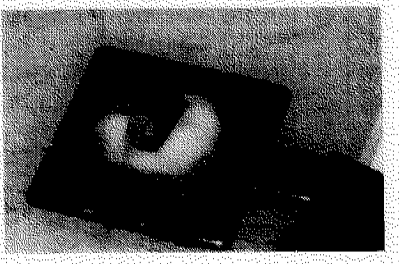


Figure 17

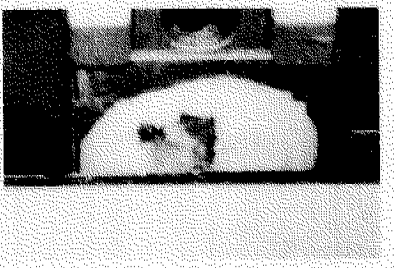


Figure 18

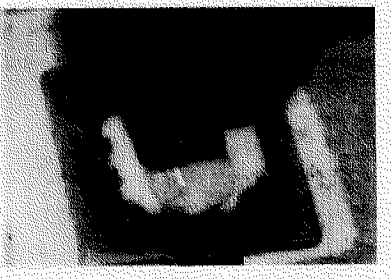


Figure 19

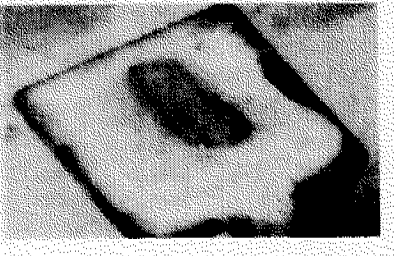


Figure 20

Each specimen, once adequately frozen, is cut into horizontal slices 6 to 10 microns thick, and placed on a microscope slide. Usually several slices from different depths are taken, allowing the pathologist to track suspicious structures throughout the piece of tissue.

The slide is then stained using hematoxylin and eosin and then examined under the microscope. Using the numbered

compartments and the hatch marks as guides, any suspicious spot can be located with relative accuracy at the operative site. Further tissue is then removed only at positive sites and the entire process is repeated until there is no remaining tumor on the slides.

Postoperative management includes antibiotics, analgesics, daily wound cleaning with hydrogen peroxide and povidone-iodine, and application of antibiotic dressing (Framycetin sulfate-Sofratulle) over the wound. The wound is allowed to heal by secondary intention.

B. CASE 1

A 63 year old male referred for a blackish discoloration at the nasolabial area measuring 2x1 cm. Punch biopsy was done revealing basal cell carcinoma. Excision was done using the cartwheel technique with planned delayed reconstruction.

After 6 months follow up, no recurrence was noted. No reconstruction was done since there was complete healing by secondary intention.

Three years post-op, there was still no recurrence and complete cure was achieved.

C. CASE 2

A 47 year old female consulted due to a non-healing wound on the left naso-maxillary area. Present condition started 10 years PTC a 1x1 cm. brownish nodule on the left naso-maxillary area which was scraped by a faith healer. No relief was noted and an ulcerated area developed at the operative site which continuously enlarged accompanied by occasional bleeding. Physical examination revealed a 3 x 1 x2 cm. necrotic ulceration with rolled-up borederes and induration near the medial canthal region and the left alar area. Skull Xray was unremarkable and punch biopsy revealed basal cell carcinoma. Patient underwent excision using this technique. During the course of the excision under total microscopic control (cart wheel surgery), it was found out that the tumor had deeply invaded the underlying muscles of the face which were taken out and that the right alae was also involved. Only 1 mm tumor margin from the left alar area was taken out so as to preserve the anatomic and functional status of the nose. The nasal cavity was not entered. There was no evidence of recurrence at 1 month follow up. The patient did not opt for immediate reconstruction and was comfortable with the defect. Planned reconstruction will be made after 6 months provided the margins are already free of tumor.

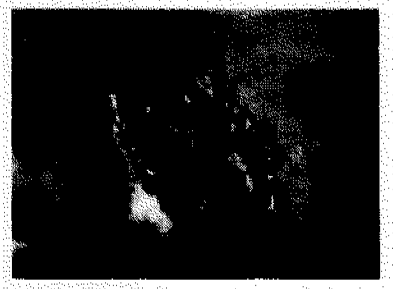


Figure 21. Pre-op

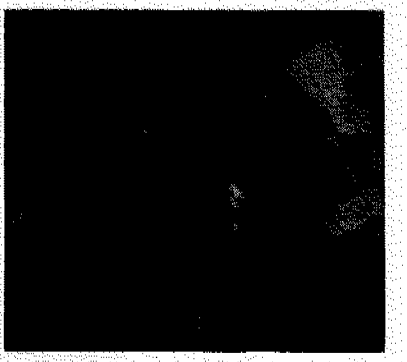


Figure 22. Post-op

Figure 23. Histo-path result BCCA (black arrow)

Note: Proliferation of cells with relatively large Basophilic nuclei and scant cytoplasm

D. CASE 3

An 83 year old female was referred by the Dermatology department due to a non-healing wound on the right forehead. Present condition started about 4 years PTC as a blackish, nodular, 0.5 x 0.5 cm. mass on the right forehead which easily bleeds whenever the hair is combed. The mass was excised by a physician and 4 months later a whitish patch appeared around the area which continued to enlarge associated with blackish ulcerations, and brownish, elevated borders. Physical examination revealed a 4.5 x 3.0 cm. whitish patch with rolled-up borders and blackish ulcerations. Skull Xray was unremarkable and punch biopsy revealed basal cell carcinoma. Although this appeared to be a superficial lesion with no induration, during Cart wheel surgery however, the tumor has extended far laterally as NO. 11 compartment which was positive for tumor, so, 1 mm. of tissue was re-excised. The underlying musculature however, was not involved by the tumor. The patient is already retired and does not desire immediate repair of the defect. Patient was advised to wear sunscreens i.e. hat while gardening. No recurrence was noted as of 3 weeks follow up. Reconstruction will be after 6 months provided that the margins are negative for tumor.

Figure 24. Pre-op

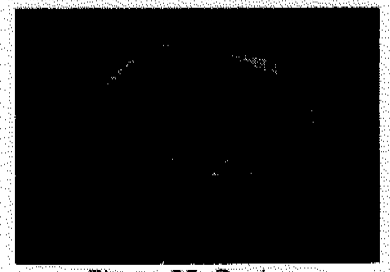


Figure 25. Post-op

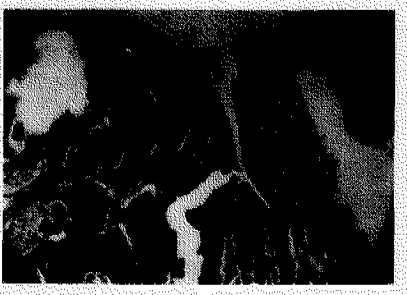


Figure 26. Histopath, BCCA (black arrow)

DISCUSSION

Case 1 illustrates a small tumor which was adequately excised by this technique. Much tissue conservation was done and no recurrence was noted after 3 years follow up.

Case 2 illustrates the extensive microscopic spread of basal cell carcinoma. While the tumor appeared small clinically, it had microscopic extensions that extended up to the muscles and beyond the indurations. Conventional excision alone would not have found the deep extension of this tumor into the muscles especially along the embryologic fusion plane of the nasolabial fold. Very minimal tissue excision should be done on the nasal area to preserve its anatomic and functional status and this region has very thin skin and thus, difficult to reconstruct. No immediate reconstruction of the defect was done since this region is along the 'H zone' of the face which has a very high incidence of recurrence. Any type of immediate reconstruction using flap or graft would conceal tumor recurrence at which time tumor involvement would have been very extensive and reconstruction would be very difficult.

Case 3 defines the inadequacy of conventional surgery for basal cell carcinoma. Tumor margins were not mapped out and as a result recurrence was far wider. Even though no induration was noted, the tumor has extended a great distance. Immediate reconstruction was not advocated since this is a large, recurrent lesion and situated on the 'H zone' of the face.

Treatment of basal cell carcinoma varies with the size, type, and site of the lesion as well as the age and sex of the patient. No single type of treatment is ideal for all lesions. The goal of therapy is permanent cure with the best cosmetic results.

Basal cell carcinoma may grow in discrete or anastomosing lobules of neoplasm, with pushing 'thread-like' margins and random 'silent' extensions away from the grossly visible tumor. Some basal cell lesions will infiltrate and extend microspically for great distances even though there is little evidence of gross tumor at the surface. Thus, standard methods of excision are often inadequate in that some of the 'silent' extensions of the tumor are left behind which are not clinically visible. Likewise, conventional methods are often wasteful of considerable amounts of normal tissue, in an attempt to ensure the removal of all the carcinoma.

Basal cell lesions of the midface seem to have particular predisposition for recurrence. Treatment of these lesions requires multiple procedures in many instances, each with increasing morbidity, need for wider excision, and sacrifice of adjacent structures.

Therapeutic options include electrodesiccation and curettage, cryosurgery, ionizing radiation, excisional surgery and Mohs surgery. Curettage with electrodesiccation and cryosurgery is the technique most commonly used to remove BCC by dermatologists. This is fast and cost-effective however, the disadvantages include (a) it is inappropriate for large and recurrent tumors, (b) it does not provide a tissue specimen for margin checks, (c) healing time takes 2-4 weeks. Radiation therapy may be indicated for patients who cannot withstand a surgical procedure; therefore, it is an excellent form of palliative therapy for large tumors in the elderly. Disadvantages include (a) no tissue specimen is obtained for analysis, (b) the adequacy of treatment is difficult to determine. Excisional surgery is commonly employed by surgeons including otolaryngologists. The excision may be followed by a simple closure, flap, or graft. However, margins are difficult to determine due to the subclinical extensions of the tumor and recurrence rate is 33% to 41% when tumor cells are found at the margins of excision.

More than 50 years ago, Frederic Mohs developed a technique for chemical fixation of a cutaneous tumor followed by serial excision and microscopic control of margins. This procedure has become widely accepted and is very effective for basal cell carcinoma. Its success lies in three critical points that distinguish it from standard excision with frozen section margin control. First, the tissue is removed in the shaped of a pie pan (fig. 27) with its sides cut at 45 degree angle to its base with 1-2 mm margins. Second, once the tissue is excised in this manner, its entire cut surface can be examined for margin control, in contrast to the 'bread-loaf' technique used by most pathologists, in which only a percentage of the margin is sampled (fig.28). Third, the surgeon and the pathologist are one and the same person. Other features are enumerated in Table 1. Current indications for the use of Mohs' surgery include, (1) recurrent and incompletely excised basal cell carcinomas, (2) large tumors, (3) tumors with poorly defined clinical borders, and (4) tumors in high-recurrence locations.

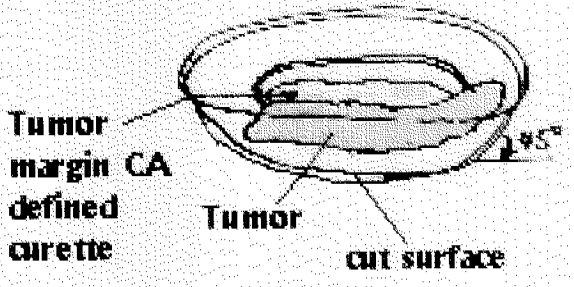


Figure 27

Figure 29. MOHS SURGERY

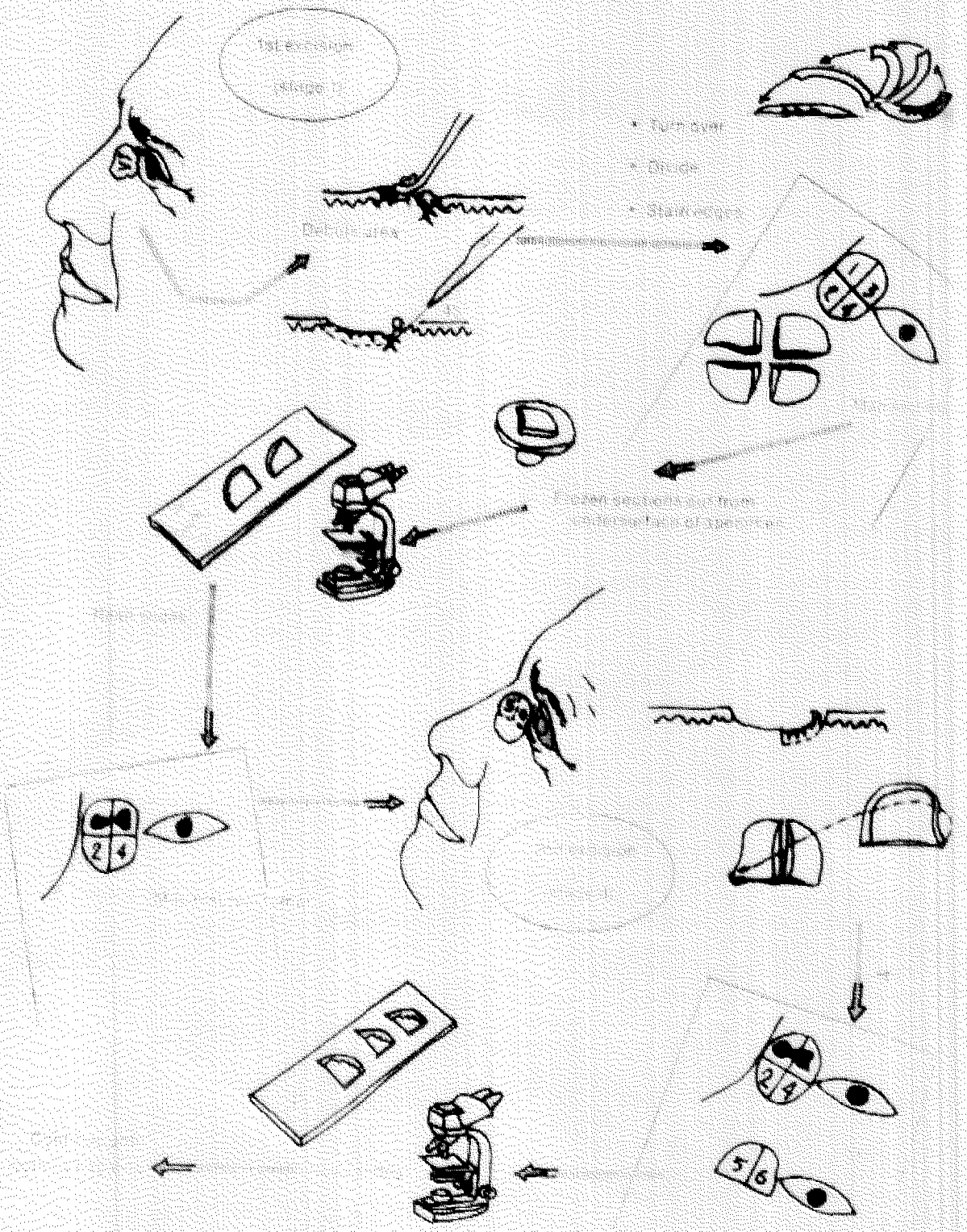
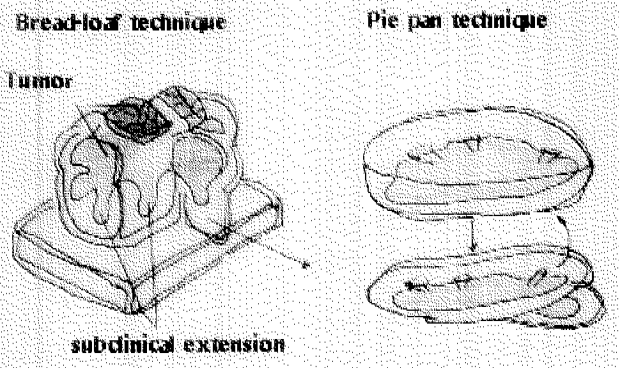


Figure 28. The Pie Pan Technique allows complete examination of the cut surface of the tissue



The Mohs' technique, however, is rather complicated and needs a trained surgeon to interpret the findings of the histo-pathologic sections. Therefore, a simple, modified technique is being proposed.

Figure 29. MOHS Surgery

Figure 30. The Cartwheel Technique allows complete tumor removal with maximal amount of normal tissue conservation

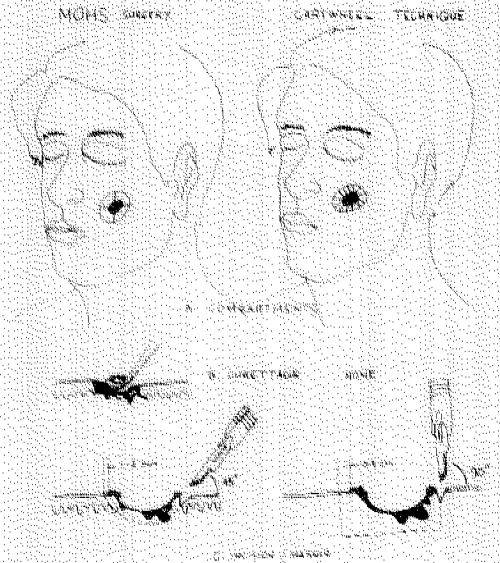


Table 1. (see also fig. 29, 30)

COMPARISON BETWEEN MOHS SURUGERY & CART WHEEL TECHNIQUE

Factor	MOHS Surgery	Cart Wheel Technique
Margin	1-2 mm	0.5 mm
Compartmentalization		
a) number	4	>4 (depending on the size of the lesion)
b) size	Bigger	Smaller
Incision	beveled (45°)	Perpendicular (90°)
Curettage	Yes	None
Tumor staining (prior to freezing)	Yes	None (numbered)
Number of stages	More	Less
Precise anatomic control	Good	Better
Mapping of tumor	Good	Better
Slide interpretation	Good	Better
Slide interpreter	Surgeon	Pathologist
Conservation of normal tissue	Good	Excellent
Repair	Immediately possible	Delayed

The beveled incision (45 degrees) used in Mohs surgery will catch much of the finger-like projections of basal cell carcinoma but will require more normal tissues to be excised if the margins turns out to be positive. A 90 degree angle of incision perpendicular to the surface of the tumor and dividing the margins into more compartments in the 'Cart wheel technique' would greatly spare additional excision of normal tissue since the subclinical extnsions of the tumor would already be included in the tumor margin (fig. 31).

Also, doing curettage of the tumor prior to excision in Mohs' surgery would push the subclinical extensions of the tumor to the margin thus sacrificing additional normal tissues in addition to adding more trauma to the surrounding soft tissues which was not done in this technique.

There has been a lot of controversies regarding tumor margins since the likely presence of tumor beyond the clinical margin has been well documented, normal appearing skin must be removed or destroyed to achieve acceptable cure rates. Weatherly-White and Lesavoy and Goodnight have recommended that a 5-mm margin of normal appearing skin be resected with the tumor. Macomber et al, based on their treatment of 853 lesions over a 12-year period, have also suggested that a margin of 5 mm or more of normal tissue be resected around the lesion. Albright recommended a 2-to-3-mm margin for a tumor measuring 5

mm or less, a 10-mm margin for tumors greater than 20 mm, and a margin of 10 mm for 'most other' lesions. Thus, a 1-to-2-mm tumor margin by Mohs would be inappropriate since this is likely to contain tumor cells.

No tumor staining (i.e. mercuchrome, india ink or any other colored dyes was done since the pathologist were simply able to correctly identify the sections since they have an accompanying map of the tumor. This technique provided precise anatomic control and complete mapping of the tumor thus preserving a lot of normal tissues. Complete mapping of tumor and slide interpretation was accomplished more readily due to a smaller piece of tissue being examined.

Although this technique needed a pathologist to interpret the slides, this is important in order to elminate the bias and to provide accurate reading since most if not all surgeons are not very well adept in interpreting microscopic sections.

With the cart wheel technique, getting a piece of one compartment, freezing, staining, and reading it would already represent the histologic margin of the tumor (fig. 32).

Figure 31 and 32. MOHS SURGERY AND CARTWHEEL TECHNIQUE

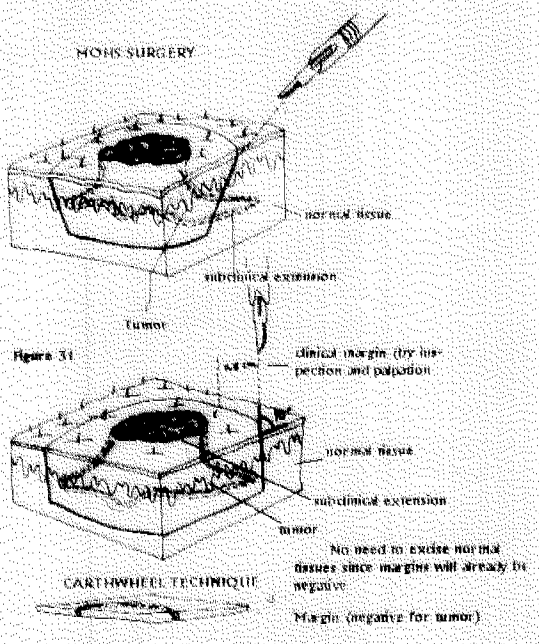


Figure 32

However, the compression and the horizontal sectioning of the tissues used in mohs surgery was retained as opposed to the breadloaf technique used by most pathologists since the former has been shown to completely map the tumor areas.

This approach appears to involve more time and cost to the patient, and the need for more personnel than traditional techniques. However, when none considers the cost of multiple operations that patients may have to undergo for recurrent midface basal cell carcinomas, this method can save the patient additional procedures, substantial morbidity, loss of cosmetically and functionally important structures and, in the long run, additional expense. It is necessary to have particularly close coordination between the surgeon and the pathologist who is willing to be patient and spend much time tracing the various microscopic extensions of tumor.

Immediate reconstruction after excision of basal cell carcinomas has been advocated by many surgeons. Reconstruction, if done at all, is postponed for at least a year. By leaving the wound open, recurrent or persistent basal cell carcinoma is not hidden under reconstructed flaps or skin grafts. Reconstruction would be appropriate after a waiting period of 3 months to allow the wound to completely heal and to prevent further wound contracture. A frozen section of the margins using this technique be again made to assure that the margins are already free of tumor.

Sometimes reconstructions not needed at all because, after excision, healing by secondary intention is already appropriate as in case 1.

The risk of delay is that it might provide the opportunity for infection. The Mohs' modification wound, however, is a clean surgical wound and with a simple home routine, no interval infections were encountered.

From the patients' perspective, the wounds were easily cared for and well tolerated. Patients have better appreciation

of the reconstructive options available when the options are discussed in consultation with the surgeon during the delay period. There is an opportunity to see the wound so the discussion is more meaningful.

For the surgeon, delay allows time for consideration and planning of the reconstruction. It also allows time for further diagnostic evaluation if the need for this becomes apparent after the Mohs' modification procedure. Finally, it allows the reconstructive procedure to be scheduled as an elective procedure so that time can be used more efficiently.

CONCLUSION

In summary, a modified surgery called, 'CART-WHEEL TECHNIQUE' has been presented. The salient features of the technique are as follows:

1. Creation of a cart wheel-like compartment with 1.0 cm. base of each compartment
2. Incision at 90-degree angle at the 0.5 cm. margin up to the subcutaneous tissue
3. Creation of a 0.5 cm. margin from the clinical border of the tumor
4. Reconstruction of the defect after 6 months using flaps

This technique offers the distinct advantage based on the following sound surgical principles, (a) preservation of maximal amounts of normal tissue, (b) adequate margins, (c) trauma to the surrounding normal tissue because of no curettage, (d) total anatomic control and mapping of the tumor margins and, (e) easier slide interpretation and, (f) reconstruction of the surgical defect after 3 months of careful observation and follow up without evidence of recurrence.

The patients that were treated with this technique have no evidence of tumor recurrence from 1 month to 3 years post-op. Follow up will be closely monitored. Although the success rate (based on absence of recurrence) of this technique will not be fully known until about 1 or 2 years, this technique is simple and accurate and can be tried by other surgeons even from the other specialties.

A prospective, comparative study will be done.

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ANNOUNCEMENT

1. ASEAN CONGRESS
   October 5 to 9, 1998, Davao City
   Host: Phil. Society of Otolaryngology-
   Head and Neck Surgery, Inc.

2. ISIAN CONGRESS
   February 14 to 18, 1999, PICC, Manila
   Host: Phil. Society of Otolaryngology-
   Head and Neck Surgery, Inc.

3. ASIA-OCEANIA CONGRESS
   February 7 to 12, 2000, PICC, Manila
   Host: Phil. Society of Otolaryngology-
   Head and Neck Surgery, Inc.

THE USE OF VASCULARIZED FREE FLAP FOR MANDIBULAR RECONSTRUCTION*

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ABSTRACT

This paper aims to describe three cases in which oromandibular reconstruction via vascularized free flaps was done after tumor ablative surgery. Three patients with ameloblastoma of the mandible were treated in a hospital-based tertiary otolaryngologic in-patient care setting. Wide excision of the tumor was done by an ENT team while the flap was harvested and connected by a specially-trained microsurgical team from another department of the same institution. Two patients received vascularized free flaps, one received a vascularized iliac flap. All reconstructed mandible survived with acceptable function and commission on post-operative follow-up.

Keywords: Vascularized free flap, manddibular reconstruction

INTRODUCTION

"Every man should eat and drink and enjoy the good of all his labor, it is the gift of God." This is also the aim of oromandibular reconstruction. Up to the present, mandibular arch reconstruction remains a functional and aesthetic challenge to the head and neck surgeon. The loss of mandibular segment can result in impairment of mastication, swallowing, articulation, control of salivation and aesthetics. A large responsibility is, therefore, in the hands of the surgeon. It is fortunate that numerous techniques have been made available and one of these is the use of vascularized free flaps. With the advent of microsurgery, the use of free osseous flaps using microvacular techniques to recipient sites has been studied and applied with note of very high success rate of about 90%. This despite the fact that these grafts have been generally reserved for more difficult reconstruction when a large defect exists or where the bed has been compromised by radiation, infection or scarring. In developed countries, this type of tissue transfer has been widely used. In the Philippine setting, however, only a limited number of cases have been documented owing perhaps to the lack of specially-trained microsurgical surgeons.

This paper documents three cases in which microsurgical techniques were utilized to reconstruct mandibular defect following tumor ablation with vascularized osseous free flaps.

MATERIALS AND METHODS

PATIENTS

Three patients underwent mandibular reconstruction utilizing free tissue transfers - two from the fibula and one from the iliac bone. Procedures were carried out primarily after tumor ablation. One patient has previous reconstruction with a simple osseous graft which failed twice. All reconstructions followed wide excision of ameloblastoma. Flaps were harvested and connected to recipient site using

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microvascular techniques provided by a specially trained Orthopedic-Microsurgery Team.

Average defect length of bone was 16 cm. All had primarily defects of bone with only limited adjacent soft tissue within the oral cavity.

FLAP DISSECTION

While excision of the primary bone tumor is being done an Orthopedic-Microsurgery Team harvests the flap. Procedure is as follows for the iliac bone and the fibula.

Iliac Bone

Patient is in a supine position. Femoral vessels identified by palpation and using Doppler probe, the course of the superficial circumflex iliac artery is outlined parallel to the inguinal ligament toward the iliac crest. Inferior epigastric vein is identified and dissection continued superiorly to the inguinal ligament. Deep circumflex iliac artery and vein are identified as they arise from the external iliac artery and vein. The artery coursed 2.5 cm inferior to the iliac crest on its internal margin. Flap is outlined based on the deep circumflex artery and osteotomy is performed beginning on the lateral surface of the iliac crest using an oscillating saw.

Fibula

Lateral approach to fibular harvesting is done. Donor extremity is flexed at the hip and knee and foot is internally rotated slightly. Pneumatic tourniquet applied at 400 mmHg to maintain a bloodless field. Skin and subcutaneous tissues are incised to the superficial fascia over the interval between peroneus longus and soleus muscles. Aponeurosis is incised and dissection proceeds longitudinally posterior to the peroneous longus muscle and anterior to the soleus.

Dissection is continued until the origin of the soleus muscle at the proximal fibula. At this point, peroneal vessels lying just deep to the soleus and nearby vein in contact with the fibula are identified. Dissection is continued until the anterior muscle compartment is retracted. The bone is osteotomized proximally and distally; the peroneal artery and vein are then divided and ligated distally. The tibialis posterior muscle and flexor hallucis longus are released from the fibula leaving a thin layer of muscle adjacent to the peroneal vessels.

SHAPING THE GRAFT

Graft osteotomies are planned so the portion of the vascular pedicle is at the angle of the new mandible. This procedure maximizes pedicle length. Multiple subtotal osteotomies are made on the graft with an oscillating saw. Sections are carefully extended to the inner periosteal surface which is left intact. Bone is then bent to the appropriate shape. Gaps formed by osteotomies are filled with corticocancellous bone block. Measurements taken from the surgical specimen and templates formed assit in accurately shaping the graft. The graft is irrigated with saline and the vessels and periosteum carefully protected throughout this process.

GRAFT INSETTING AND REVASCULARIZATION

The flap is transferred to the mandibular defect and rigidly fixed in place using further miniature bone plates. After fixation, the graft is revascularized; in fibula flaps, the peroneal vessels are attached and in iliac bone grafts, the deep circumflex iliac vessels are anastomosed end-to-end to the facial artery and nearby vein using 10-0 nylon sutures under microscopy.

CASE REPORTS

Case 1:

R.C., 21/F with a 1 1/2-year history of a mass at the right mandible with associated gum protrusion at the area. Patient sought consult for gradual enlargement of the mass for one year with displacement of the teeth. The mass was biopsied and result showed ameloblastoma. The patient underwent wide excision of the mass with vascularized iliac bone graft reconstruction of the mandibular defect. Postoperative course was unremarkable. After two months, the patient underwent angiography with note of good vascularity of

the graft and was subsequently readmitted for shaving and contouring at the mental are for better cosmesis. On last follow-up, the patient was advised dental prosthesis.

Figure 1. Exposure of area of mandible with tumor, Intraoperatively

Figure 2. Gross specimen after removal

Figure 3. Shaped iliac graft with osteotomies And miniplates

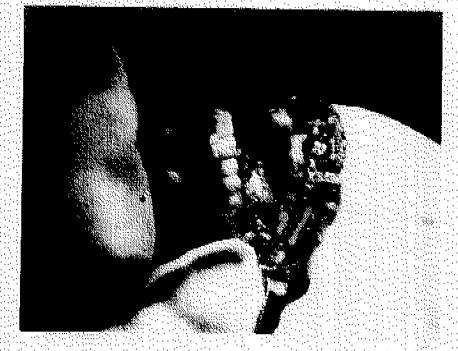

Figure 4. Iliac graft fixed to recipient site

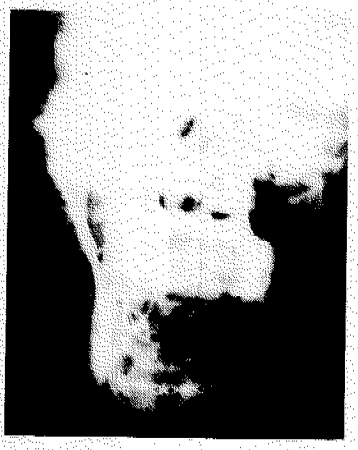

Figure 5. Postoperative angiography of patient showing Opacification of the branches of the external Carotid artery specifically vessels to the graft.

Figure 6. Post-operative picture of patient prior to Contouring of the mentum.

Case 2:

N.B., 58/F, 8 years PTC underwent mandibular resection for ameloblastoma. Infection set in after several months for which another operation was done and an iliac bone graft was inserted onto the defect. Infection again set in so previous graft was removed and replaced with another iliac bone graft from the other side. The patient was asymptomatic for 6 months until another right gingival swelling was noted. CT scan showed tumor recurrence involving the left and right mandibular bodies and also the ramus and angle of the right mandible. The patient was readmitted for mandibular resection and reconstruction with vascularized fibular flap. Reconstruction of the mandible required approximately a 24 cm fibular graft with four osteotomy sites. A

condylar prosthesis was likewise inserted since disarticulation was done at the right side. Soft tissue defect was closed primarily. Postoperative course was uneventful. Graft survival was assessed by follow up panorex view and by cosmetic appearance of the graft site. The patient is for dental prosthesis.

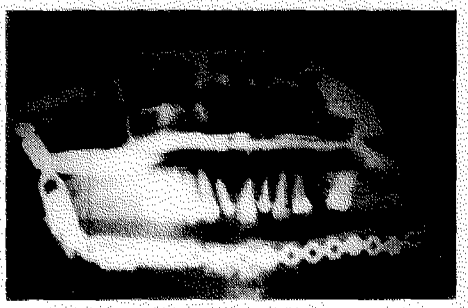

Figure 7 & 8. Postoperative x-rays of patient showing Starting callus formation. Note the Presence of a condylar prosthesis at The right.

Case 3:

J.L., 53/F with a 3 year history of a left mandibular mass. A biopsy was done which showed ameloblastoma. The patient underwent mandibulectomy with vascularized fibular graft reconstruction. The 14 cm of mandible gap was replaced with a fibular free flap. Three osteotomies were done on the graft. Soft tissue defect was closed primarily. The patient was discharged after 18 days. One month post-operation patient developed a fluctuant mass at the mental area along the incision site. Assessment was suture granuloma. The mass was drained and one silk suture and one chromic suture were removed. Postoperative Doppler showed persistent pulses detectable along the length of the graft. The patient is still for post-operation x-rays to assess bone union and callus formation.

Figure 9. Preoperative panorex view showing extent of tumor of the mandible

Figure 10. Patient prior to exposure of the mandible showing size of tumor.

Figure 11. Fibular graft shaped with osteotomies and Miniplates

Figure 12. Graft fixed to recipient site.

Figure 13. Patient about 3 mos. Post-op

RESULTS

All flaps survived. Immediately postoperative, no complications were noted for all three patients.

Patients were discharged without problems and advised constant follow-up. After an interval of approximately two months, one patient has an angiography done of the external carotid artery at the side of revascularization with note of opacification of all branches. The two other patients are still for follow-up angiography. Repeat x-rays were done on two patients with note of good formation and bone union. One patient is still for post-operative x-rays.

All flaps were noted to be cosmetically acceptable. Two caused slight protrusion of the mental area. One patient underwent shaving and contouring of the graft with acceptable results. Intraoperative finding for these patients was bleeding of the graft on manipulation showing good vascularity. One patient developed a suture granuloma which resolved after removal of the causative factor. Mandibular range of motion was not significantly affected and patients noted only slight impairment of chewing. To date, patients have no dental prosthesis but are for fitting once intraoral area is free of fibrous bands and have an acceptable soft tissue bed. One patient is a candidate of osseointegrated implants.

No donor site morbidity was noted from any of the patients and site healed after one to two weeks.

DISCUSSION

Primary reconstruction of mandibular defect following ablative surgery remains a challenge to the head and neck surgeon despite significant advances in techniques over the last two decades. The immediate treatment of mandibular defects is the achievement of a solid arch that will articulate properly with the upper jaw and thereby restore good function, aesthetics and quality of life. Several techniques have been used for mandibular reconstitution. Autogenous bone for mandibular reconstruction was initially harvested from the rib or tibia in 1892. In 1916, iliac bone was successfully utilized to reconstruct large defects. Many surgeons since then have used both block and particulated marrow graft in primary and secondary rehabilitation with unacceptable results with extrusion of the mandible. This increased failure rate was noted due to recipient bed contamination. To illustrate, one patient experienced recurrent infection of nonvascularized iliac bone graft.

Osseomyocutaneous pedicled grafts have also been used with fair success rate of approximately 35% in some non-irradiated beds in a study by *Synder and Conley*, 1970. Ina study by *Panje et al.* (1980), success rates obtained were from 50%-80%. But due to the unreliability of this technique it has not been an attractive method.

Significant advances and technical+ refinements in craniomaxillofacial surgery have resulted in more reliable internal fixation devises. Durable mandibular reconstruction plates held out the possibility of reconstituting the mandibular arch without need for autogenous bone. The advantage of using prosthetic material include ease of application and shaping, decreased operative time, donor site sparing, immediate full strength masticatory function,

facilitation of postoperative radiation and subsequent reconstruction with vascularized bone (if necessary). But if metallic plates are used, rejection or the implant may occur and with high mechanical loading, repeated stress across an implant ultimately results in implant failure.

Another form of reconstruction which has gained popularity is the free vascularized bone transplant. *Ostrup and Frederickson and Doi et al.* were the first to report experimental success using microvascular techniques to transfer rib as bone graft to the mandible of dogs. Their work demonstrated that vascularized bone grafts remained viable based on the medulary and periosteal circulation. Since then, there have been numerous reports regarding the use of osseous free flaps. Over 90% success rate has been demonstrated for mandibular reconstruction using different types of osseous free flaps. This increased survival due to compatibility and graft survival is bases on a definite blood supply that promotes rapid healing and bone union and decreased risk of infection. Oromandibular reconstruction by free tissue transfer has rapidly become the "gold standard" against which other techniques are presently compared.

Choice of donor site would depend on several factors and each of these have significant limitation resulting from either the length of bone available, reliability of associated soft tissue or donor site considerations such as undesirable location or the potential for significant morbidity. There does not seem to be a consistent rationale that favors the selection of one donor site over another. The most commonly used free flap is the forearm flap according to Yang et al, in 1981. It can provide up to half of the thickness of a length of radius but problems can be encountered: fractures of the radius, loss of sensation on the dorsum of the hand and cosmetic defect on the forearm. Other vascularized bone used include rib, clavicle, iliac crest and fibula.

One patient received an iliac vascularized graft. Advantages of this donor would include a curved shape which may be advantageous for angle or mentum defects. The vascular pedicle is reliable although dissection of the deep circumflex vessels may be tedious. If skin is needed for reconstruction, the iliac graft can provide this. Length of bone available for use is only 8-10 cm and can only be used to reconstruct defects approximately this length. Iliac grafts, however, can causes some degree of morbidity which includes inability to ambulate the patient early and the possibility of developing abdominal wall hernia and neuromas in the cutaneous nerve stump. The patient in the series did not complain of leg pain or hernia.

Two patients received vascularized fibular grafts and this donor site has a number of characteristics that make it an attractive alternative for mandible reconstruction. There is ample bone length available of up to 26 cm to reconstruct any defect unlike other donor sites. The fibula is a straight bone stock with consistent (and ideal) cross-sectional dimension. Osteotomies can be performed wherever necessary along the length of the graft since there are no major variations of bone shape such as those seen with the iliac bone. These features of the fibula permit graft flexibility in contouring the graft to simulate the shape of the mandible. Peroneal vessels parallel the course of the bone throughout its length and blood supply is abundant permitting multiple osteotomies to be performed. Dissection of the flap is superficial and straightforward. Complications are minimal especially if peroneal nerve end tibial vessels are protected.

This donor site location has two advantages - the flap may be raised in the supine patient and a two-team approach can be used with ample room for both teams to maneuver. Skin, however, is not available from composite grafts.

But the use of vascularized grafts is not without its advantages. Because it is microvascular surgery, increased operating time is a consequence. This somehow excludes patients in the older age group. Likewise, a specially trained microsurgery team is required in centers where almost each department has their own trained microvascular surgeon, there is no need to

seek the help of team from a different department to do the work on the harvesting and revascularization of the graft. There is no trained microvascular surgeon in this department, hence the need to seek help from the Department of Orthopedics. This interdepartmental endeavor fostered good working relations but contributed to the delay of operation due to the referral system. Specialized postoperative care is also a concern. To document graft survival it is recommended that patients undergo Doppler study, angiography of the external carotid artery and serial x-rays to note the functioning of the vessel and callus formation and bone union. There are also some donor site morbidity reported but these were negligible in this series.

CONCLUSION

The use of a vascularized free graft to repair mandibular defects after ablative oncologic surgery, although widely used in developed countries, has shown good results in the limited number of cases done in the Philippine setting. Because the aim of head and neck surgeons in mandibular reconstruction is to restore proper function and cosmesis as early as possible after tumor excision, the availability of this option is indeed attractive based on reliability and feasibility. Although the experience is limited to two donor sites, the results have proven to be favorable and the sites used are considered the most advantageous.

RECOMMENDATIONS

Because of the favorable results, it is recommended that a prospective study be done with a larger patient population to document the success rate of vascularized free graft for mandibular reconstruction. Furthermore, the application of this reconstructive technique should not be limited only to patients who have undergone wide excision for ameloblastoma. This technique may be used for patients with other mandibular tumors or for those patients with irradiated oral cavities. In relation to this, a protocol of diagnostics for postoperative follow-up of patients should be formulated to document graft survival.

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PRIMARY EAR CARE PROGRAM: A SURVEY AMONG MOTHERS OF THE DEAF FOR EPIDEMIOLOGICAL STUDIES*

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ABSTRACT

To develop effective preventive, promotive, and rehabilitative programs on hearing impairment, more accurate and efficiently collected epidemiological assessment is required. This information can guide national decision-makers to incorporate a Primary Ear Care Program as an integral part of the primary health care program. It is the objective of this study to establish a dependable data on the epidemiology of hearing impairment in preparation for a nationwide primary ear care program. Five hundred twenty mothers of the deaf from six different schools for the deaf in Metro Manila were respondents for the study. A questionnaire was formulated inquiring on general data, mother's reliability, child's clinical history, awareness of and a need for a hearing impairment prevention program. Various data were obtained, including the data on the common causes of hearing impairment which were mostly due to infectious illness during gestation and childhood. From the gathered data, preventive measures on deafness were recommended and classified as follows: primary prevention, actions aimed at preventing the impairment from occurring; secondary prevention, actions taken once the impairment is present; and tertiary prevention: action aimed at rehabilitation.

Keywords: Primary ear care, primary health care, hearing impairment, deafness

INTRODUCTION

Hearing impairment remains an inadequately understood disability. According to the World Health Organization (WHO), there are at least 42 million people (over the age of three years) with either profound, severe or moderate hearing impairment.[1,2] Statistics show that one child in 1000 is born deaf, while two children in 1000 becomes deaf by childhood. The developmental implications are devastating, particularly if diagnosis is delayed.[3]

The inadequacy of national statistics on hearing impairment and the indistinct point in classifying deafness as a disability are obstacles to form a national health care strategy. The national Council for the Welfare of the Disabled has no data on the real extent of hearing impairment in this country, since few detailed population-based epidemiological studies exist on hearing impairment's prevalence and etiology. Its actual extent is unknown to the government and the public, and both financial and humanitarian supports have become scarce.[4]

It is the objective of this study to establish a dependable data on the epidemiology of hearing impairment in preparation for a nationwide Primary Ear Care Program as an essential part of primary health care.

METHODOLOGY

Subjects:

A survey was conducted among mothers of deaf children enrolled at six different schools for the deaf within Metro

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Manila. Respondents were from The Philippines School for the Deaf in Pasay City - a government subsidized institution, and five private schools namely: the Southeast Asian Institute for the Deaf in Quezon City, the Philippine Institute for the Deaf in Manila, Ma. Lena Buhay Memorial Foundation also in Quezon City, the St. Agustine School for the Deaf in Muntinlupa City, and the Bible Institute for the Deaf in Valenzuela.

MATERIALS AND METHODS

A questionnaire (Appendix A) was formulated and pretested among 50 respondents. After analysis of the results, the final form was reproduced. The first part dealt with questions pertaining to the mother's reliability. The child's clinical history on the other hand, was answered by questions pertaining to age at the time of onset of the hearing impairment, presenting symptoms, initial consultation, initial impression and/ or diagnosis, age of gestation, presence of ear discharge prior to onset of hearing impairment, hereditary factors, probable cause of hearing impairment awareness program was asked of the mothers to confirm its necessity and need for support. Approval from the principal of each institution was obtained and participation was solely on a voluntary basis. A descriptive statistical analysis using the frequency, distribution, mean and mode were used to treat the data.[5]

RESULTS

A total number of 520 mothers of deaf children were respondents for the study. Two hundred thirty two respondents were from the Philippines School for the deaf (PSD), 97 respondents from the Southeast Asian Institute for the Deaf (SAID), 57 respondents from the Philippine Institute for the Deaf (PID), 56 respondents from the Bible Institute for the Deaf (BID), and 40 from St. Agustine School for the Deaf (SASD) (Table1)

Table 1. RESPONDENTS

SCHOOL	No. of Respondents	Total no of students
Philippine School for the Deaf	232	722
Southeast Asian School for the Deaf	97	128
Philippine Institute for the Deaf	57	116
Ma. Lena Buhay Memorial Foundation	56	92
Bible Institute for the Deaf	38	85
St. Agustine School for the Deaf	40	55
TOTAL	520	1,198

There were initially 578 respondents, 58 of whom were excluded from the study because of their answers in questions number 1, 2, 3, and 4 which were measures of reliability (see Appendix A).

APPENDIX A

Name of patient: *Pangalan ng bata*				Date: *Petsa*	
Sex: *Kasarian*		Age of child: *Gulang ng bata*		Birthdate: *Kaitan ipinanganak*	
Name of mother /caregiver *Pangalan ng ina/tagapag-alaga*				Age: *Gulang*	
Occupation: *Trabaho:*				Educ. Attainment: *Pinag-aralan*	

Check the box that corresponds with your choice:
Markahan ang kahon ng napiling sagot:

1. How many hours per day do you usually spend with the child?
   Ilang oras sa isang araw ang inuukol mo sa iyon nga anak?
   ☐ 0 – 4 hours (oras) ☐ 15 –19 hours (oras)
   ☐ 5 – 9 hours (oras) ☐ 20 – 24 hours (oras)
   ☐ 10 –14 hours (oras)
2. Have you taken care of the child since birth?
   Inalagaan mo ba ang iyong anak mula nang siya ay isilang?
   ☐ yes *(oo)* ☐ no *(hindi)*
3. If answer to number 2 is "no", who took care of the child?
   Kung ang sagot sa bilang 2 ay "hindi", sino ang nag-alaga sa iyong anak?
   ☐ yaya others *(iba)*_____
   ☐ child's grandparents *(lolo o lola)*
4. Do you often play or converse with the child?
   Madalaas ka bang nakikipaglaro o nakikipagusap sa bata?
   ☐ yes *(oo)* ☐ no *(hindi)*
5. Was the child born prematurely?
   Ang bata ba ay ipinanganak ng kulang sa buwan?
   ☐ yes *(oo)* ☐ no *(hindi)*
6. If answer to number 4 is "yes", at what month of the mother's pregnancy was the child born?
   Kung ang sagot sa bilang 4 ay "oo", anong kabuwanan ipinanganak ang bata?
   ☐ 6 months *(buwan)* ☐ 8 months *(buwan)*
   ☐ 7 months *(buwan)* ☐ more than 8 months but a few weeks premature *(mahigit sa 8 buwan ngunit kulang sa linggo)*
7. Who first suspected the possibility of a hearing impairment?
   Sino ang unang nakaepuna na mahina ang pandinig ng bata?
   ☐ parent *(magulang)* ☐ relative *9kamag-anak)*
   ☐ sibling *(kapatid)* ☐ friend *(kaibigan)*
   ☐ doctor others: *(iba)*_____

8. Why was hearing impairment suspected?
Bakit napuna na mahina ang pandinig?
☐ doees not startle with loud noises
(hindi nagugulat ng malalakas na ingay)
☐ ignores people *(hindi namamansin ng tao)*
☐ doees not turn when called *(hindi lumilingon kapag tinatawag)*
☐ delayed speech function *(huli sa pagsasalita)*

9. What was the onset of hearing impairment?
Paano nagsimula ang mahinang pandinig?
☐ sudden *(bigla)* ☐ gradual *(dahan-dahan)*

10. At what age was the hearing impairment suspected?
Ano ang edad ng bata nang mapansin ang mahinang Pandinig?
☐ 0–4 months *(buwan)* ☐ 1–3 years old *(taong gulang)*
☐ 5-8 months *(buwan0* ☐ 3-5 years old *(taong gulang)*
☐ 9-12 months *(buwan)* ☐ 5 and above *(pataas)*

11. Where was the child brought for initial consultation?
Saan unang dinala ang bata para magpa-konsulta?
☐ general practitioneer ☐ ear specialist (ENT/EENT)
☐ pediatrician ☐ child psychologist
☐ barangay health worker ☐ hearing center
others: *(iba)*_____

12. What was the initial impression?
Ano ang unang pinanghihinalang sakit?
☐ normal ☐ delayed speech
☐ deaf *(bingi)* *(huli sa pagsalita)*
☐ not known *(hindi alam)*
others: *(iba)*_____

13. Did you notice ear discharge prior to the onset of hearing impairment?
May napansin ka bang luga bago humina ang pandinig?
☐ yes *(oo)* ☐ no *(hindi)*

14. What was the probable cause of hearing impairment?
Ano ang maaring sanhi ng panghina ng pandinig?
☐ prematurity and complications
(kulang sa buwan ng ipinanganak)
☐ hereditary *(minana)*
☐ infectious illness during mother's pregnancy like maternal rubella
(sakit ng ina noong siya ay buntis gaya ng tagulabay)
please specify illness *(pakibangit ang sakit)*:_____
☐ infectious illness during childhood *(sakit ng bata)*
please specify illness *(pakibangit ang sakit)*:_____
☐ drugs taken during mother's pregnancy
(gamot na ininom ng ina noong siya ay buntis)
☐ drugs taken by patient *(gamot na ininom ng bata)*
☐ trauma *(aksidente)*

15. What was the advise given after consultation?
Ano ang ipinayo matapos magpakonsulta?
☐ immediate hearing test *(mag-patesting ng pandinig agad)*
☐ observation *(oobserbahan muna)*
☐ no test needed *(walang kailangang eksaminasyon)*
☐ referral to an ear specialist (ENT/EENT)
(mag-pakonsulta sa espesyalista sa tenga)

16. Was there anyone in the family with similar problem?
Meron ba sa paamilya na may kaparehong prubleema?
☐ yes *(meron)* ☐ none *(wala)*

17. If answer to number 17 is "yes", then who?
Kung ang sagot sa bilang 17 ay "meron", sino?
☐ sibling *(kapatid)* ☐ parent *(magulangg)*
☐ relatives *(kamag-anak)* others: *(iba)*_____

18. Are you aware of any hearing impairment prevention program?
Meron ka bang nalalaman na programa para maiwasan ang Panghihina ng pandinig?
☐ yes *(meron)* ☐ no *(wala)*

19. Is there a need for a hearing impairment prevention program in Our country?
Kailangan bang may programa upang maiwasan ang Panghihina ng pandinig?
☐ yes *(oo)* ☐ no *(hindi)*

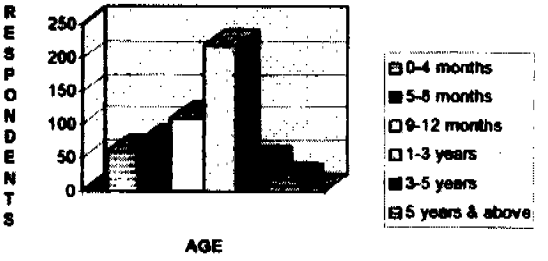
20. Are you willing to support this kind of program?
Sumasangayon ka bang suportahan ang ganitong uri ng programa ?
☐ yes *(oo)* ☐ no *(hindi)*

The mothers' age range was from 22 - 62 years old, with a mean age of 39 years old, while the deaf children's age range from 2 - 27 years old, with a mean age of 12 years old. There were 246 (47%) males and 274 (53%) females in the study.

Thirty four percent of the respondents estimated that the time spent with their children was between 15-19 hours per day , 22% estimated it at 5-9 hours per day, 19% estimated it at 10-14 hours per day, 13% estimated it at 20 - 24 hours per day and 11% estimated it at 0 - 4 hours per day.

Hearing impairment was initially suspected by the parents of the child in 88%, by the doctor in 4%, by a relative in 4%, by a sibling in 1%, and by a friend in 1%. The suspicion of hearing impairment was noted between the ages of 1-3 years old (43%), 9-12 months old (21%), 5-8 months old (14%), 0-4 months old (11%), 3-5 years (8%) and 5 years

Fig. 1. AGE WHEN HEARING IMPAIRMENT WAS INITIALLY NOTED.



The earliest sign that lead them to suspect the hearing impairment was that the child would not turn his head when called (38%), would not startle when exposed to loud noises (30%), would have a delay in speech (22%), and would usually ignore people (6%). The onset of deafness was sudden in three fourths of the population, while the rest had gradual (Table 2).

Table 2. SIGNS AND SYMPTOMS CAUSING RESPONDENTS TO SUSPECT HEARING IMPAIRMENT.*

Signs & Symptoms	
Would not turn head when called	251 (38%)
Would not startle when exposed to loud noise	198 (30%)
Delay in speech	144 (22%)
Ignored people	39 (6%)
Ask statements to be repeated	10 (2%)
Hyperactive	5 (1%)

Answers were multiple where applicable

In four out of ten respondents, the initial consultation would be with an ear specialist (EENT or an ENT). One fourth would see a pediatrician, while 12% would go to a hearing center. Less than 10% would consult a general practitioner, a barangay health worker, or a child psychologist (Table 3).

Table 3. PERSON SOUGHT FOR INITIAL CONSULTATION ONCE HEARING IMPAIRMENT WAS SUSPECTED*

Person	
Ear specialist (ENT/EENT)	237 (45%)
Pediatrician	142 (27%)
Audiologist/Hearing Center	63 (12%)
General Practitioner	36 (6%)
Barangay Health Worker	32 (5%)
Child Psychologist	7 (1%)

Answers were multiple where applicable

More than half of the patients were diagnosed as deaf, almost a fourth diagnosed with delayed speech, and the rest were either idiopathic or normal (Table 4). Management at first consultation consisted of immediate hearing test upon diagnosis in 47%, a referral to an ear specialist (EENT/ENT) in 30%, observation in 19%. In 4%, the patients were told that there were no tests needed (Table 5).

Table 4. PROBABLE DIAGNOSIS GIVEN ON FIRST CONSULT*

Initial Impression	
Deaf (congenital)	289 (55%)
Delayed speech	145 (28%)
Idiopathic	59 (11%)
Normal	18 (4%)
Otitis media	9 (2%)

Answers were multiple where applicable

Table 5. ADVICE GIVEN AFTER INITIAL CONSULT*

Advice	
Immediate hearing tests	263 (47%)
Referral to an ear specialist (ENT/EENT)	163 (30%)
Observation	105 (19%)
No tests needed	21 (4%)

Answers were multiple where applicable

The most common cause of hearing impairment in the child was attributed to infectious illness during gestation, e.g. rubella 173 (31%), followed by infectious illness during childhood, e.g. otitis media, meningitis, bronchopneumonia 101 (18%), through administration of ototoxic, drug e.g. aminoglycosides 77 (14%), drugs taken by the mother during pregnancy 68 (12%), hereditary cause 57 (10%), prematurity 40 (7%), and trauma 32 (6%) (Table 6). Otorrhea was observed in 10% of the population prior to the onset of hearing loss.

Ninety six (18%) of the respondents claimed to have a similar hearing problem in the family. Most of them, 48% were noted among relatives outside of the immediate family. Deaf parents comprise 27% of the population while the remaining 26% are noted among siblings.

Table 6. PROBABLE CAUSES OF CHILD'S HEARING IMPAIRMENT.*

Cause	
Infectious illness during gestation e.g. rubella	173(31%)
Infectious illness during childhood e.g. otitis media, meningitis, measles, bronchopneumonia	101(18%)
Drugs taken by the child – ototoxic agents e.g. aminoglcosides	77(14%)
Drugs taken during pregnancy e.g. abortifacients, antibiotics	68(12%)
Hereditary	57(10%)
Prematurity and complications	40(7%)
Trauma	32(6%)
Unknown	7(2%)

Answers were multiple where applicable

Also included in the survey were questions pertaining to Primary Ear Care Program. The majority of the mothers who responded were aware that a hearing impairment prevention program was inexistent. Almost all respondents agreed that such a program was needed in the country and would be willing to extend their support (Table 7).

Table 7. REPONDENT'S VIEW ON PRIMARY EAR CARE PROGRAM.

Question	Yes	No
1. Does a hearing impairment prevention program exist?	48 (8%)	472 (92%)
2. Is there a need for a hearing impairment prevention program?	509 (98%)	11 (2%)
3. Are you willing to support this kind of program?	510 (98%)	10 (2%)

DISCUSSION

If the statistics of infants born deaf seem appalling, it is because the numbers speak for themselves. More surprisingly, these data were based on children from industrialized countries, and the incidence would undoubtedly be far greater in developing countries.

It is rather unfortunate that no

reliable figures on hearing impairment exist, and, at most, only sporadic studies have been conducted by either private institutions or government agencies in collaboration with NGOs. To date, government has yet to come out with published reports on the true picture of deafness in the Philippines.

Local medical reports necessarily depend either on foreign statistics culled from journals abroad or from Philippine studies with a restricted sampling owing to limited resources. Truly it is a vicious cycle of disease, ignorance, poverty.

All is not lost, nonetheless. For many years efforts have been made to alleviate this problem, ranging from the preventive, curative, to the rehabilitative. If the Philippines is to develop an effective primary ear care program geared towards management of ear disease even before its onset, an accurate and efficiently collected assessment of the incidence, prevalence, severity, causes, consequences, and potential treatment for hearing impairment is required.[6] This information can guide national decision-makers to incorporate a primary ear care program as an integral part of the primary health care program of the Department of Health.

American studies account approximately 50% of all hearing loss to congenital genetic (in contradistinction to non-genetic cause) inheritance.[7] Contrary to foreign findings, results from this survey showed that congenital causes due to non-genetic hearing loss from this study account for as much as half of the hearing loss, with high 31% of the respondents implicating maternal rubella during the first trimester of gestation.[8] Other equally important congenital non-genetic contributory factors for deafness include drugs taken during pregnancy (12%) and prematurity (7%).

Because of the need to identify hearing impairment in infants, the formation of a high-risk registry was instituted in the 1970s. Among the identifying risk criteria were a suspected maternal infection, post natal infectious illnesses, ototoxic drug use, family history of deafness, prematurity and complications, and trauma. In the United States, the Joint Committee on Infant Hearing recommends auditory brainstem response (ABR) screening to those infants identified as high risk. The ABR is indispensable in the confirmation of hearing impairment, most especially in the pediatric age group.[9]

The clinical application of the ABR in high risk infants and neurologically impaired newborns can not be overemphasized. The foremost advantage is that it is noninvasier; it is simple, convenient, and highly reliable as well. Although the ABR is well beyond the realm of primary ear care, it remains an integral tool in establishing early diagnosis of hearing impairment once its presence is suspected.[10,11,12] Ideally, the Philippines should require nothing less, but the problem of financial scarcity again is an obstacle for more sophisticated diagnostic testing. Dr. Suchitra Prasansuk., in 1990, suggest "applying suitable community-based early detection and management technologies by changing high-technology into appropriate technology".[6]

Notably, more than half (55%) of the respondents would first consult a non-ear specialist (e.g. pediatrician, general practitioner, barangay health worker, etc.) upon suspicion of hearing loss. Furthermore, about half (45%) of all the deaf children were initially misdiagnosed either as normal, having speech delay, or whose etiology of hearing loss could not be determined altogether. The overall significance of these data translates to a greater need to disseminate information that deafness can now be identified early and accurately. More sophisticated audiologic instruments allow ear and non-ear specialists alike a new dimension in ear care and it becomes imperative to educate these primary health care givers on the existence of these recent advances and the possibilities that these tools can offer. In this aspect, the ABR, a hitherto seldom used hearing test, is an ancillary procedure whose potential should be tapped for wider mass-based use especially in high risk infants. This strengthens the contention of performing the ABR routinely at neonatal intensive care units (NICU) in Europe and in the United States.[7]

Interestingly, the survey revealed that in 46% of the time, deafness was

usually suspected before the first year. Another 43% would suspect the haring loss before, be diagnosed before the onset of language development. It is essential to realize the profound implication of early identification of hearing impairment on speech therapy, auditory amplification, educational placement, and behavioral problems.[11]

In a local study conducted in 1988 among 598 students, otitis media was cited as the most common cause of hearing impairment in 50.6%. Otitis media, on the other hand, was associated in only 10% of the survey population. Whereas the previous study was concerned with identifying schoolchildren (enrolled in mainstream school) with hearing impairment and their varied causes (e.g. impacted cerumen, otitis media, etc.), the survey focused more on the etiology of deafness by utilizing mothers of deaf children as respondents instead.[13]

The WHO, in fact, has already designed a medium-term program for the prevention of deafness and hearing impairment. The program, already implemented in industrialized countries, are backed by powerful national health policies, programs, and non-government organizations (NGOs).[14] For developing nations such as the Philippines, these resources and services remain rare to non-existent. In any case, the program advocated by the WHO classifies management of deafness into Primary Prevention, Secondary Prevention, and Tertiary Prevention.[6]

PRIMARY PREVENTION

These include measures aimed at preventing the impairment from occurring. From the data gathered, primary prevention can effectively reduce over 80% of the causes of deafness, the most common causes of which is maternal rubella. By simply providing a comprehensive immunization program, German measles need not be contracted during pregnancy. Reports show that it has long been eliminated in many developed countries.[8]

Another major preventable cause of hearing loss is the indiscriminate use of drugs, i.e. medication given at ototoxic doses. Such drugs, especially aminoglycosides, should be avoided, and study on the use of alternative non-ototoxic drugs should be undertaken.[8]

Prematurity, responsible for 7% of deaf children included in the study, remains unavoidable. Nevertheless, maternal education and regular pre-natal check-up have proven to minimize neonatal auditory impairment.[7,15]

SECONDARY PREVENTION

Should disease be already present, the next level of prevention requires methods to cure, stop its progress, or to compensate for the hearing impairment.[6] If the health workers aims to eradicate disease, this can be achieved by prompt treatment of ear infections, either by medical or surgical means. Hearing loss due to otitis media, for example, is preventable.[16,17] If, on the other hand, the goal is to arrest further damage, as in cases of ototoxicity by streptomyucin administration, immediate withdrawal of the offending agent upon onset of ear symptoms is mandatory. It is further recommended that certain antibiotics, especially aminoglycosides, be titrated. Drugs known to exert their adverse effects on the inner ear should be cautiously dispensed and signs of hearing loss and tinnitus carefully monitored.[8]

Lastly, compensation can be obtained by providing means for hearing amplification – a must, especially in young children during their formative years. This can provide them proper speech training so as to achieve language skills.[11,15,18] Most of the private schools for the deaf encourage the use of hearing aids among their students. It is even a requirement of the two "oral schools" for the deaf, namely the Maria Lena Buhay Memorial Foundation and the Philippine Institute for the Deaf, to wear hearing aids prior to their enrollment. Unfortunately only 9% of deaf children enrolled in the public school – The Philippine School for the Deaf – possess a hearing aid. The reason again is economic. It is important to provide hearing aids at a very low cost, which is possible with mass production. The government may perhaps initiate a program to manufacture locally

made or improvised hearing appliances.[6]

TERTIARY PREVENTION

Estimates would place 500,000 as the number of deaf Filipinos. Of these, barely 10,000 are in school. At present, there are sixty-six schools and special educational centers for the deaf all over the Philippines offering education services to the hearing handicapped. These institutions are included in a vast network of special education, whose universal aim is to educate the hearing impaired children so that they may be productive members of society.[19] Progressive reforms need to be legislated to render more employment assistance and to intensify coordination among agencies to provide facilities, thereby enabling wider access for the deaf into the mainstream. The third phase is thus aimed at rehabilitation.[20]

CONCLUSION

A local data on the characteristics of hearing impairment from a survey conducted among mothers of deaf children enrolled at six different schools for the deaf in Metro Manila was created. Epidemiological studies on deafness as to etiology, signs and symptoms, age and the onset of diagnosis, initial consultation, advice given after consultation, and the need for a hearing impairment prevention program was established. The importance of having a Primary Ear Care Program as an essential part of primary health care was likewise explained.

RECOMMENDATION

It is strongly recommended by the authors, that steps should be taken by organizations concerned in lobbying "Primary Ear Care Program". To convince health care authorities that otologic health is a legitimate and pragmatic objective, results obtained from this paper should facilitate its implementation.

To be able come up with a more accurate and reliable data, a nationwide survey using the same questionnaire should be utilized.

Finally, a nationwide campaign should be undertaken to promote early diagnosis and treatment of hearing impairment through the current use of the primary health care program of the Department of Health.

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ANNOUNCEMENT

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DEMOGRAPHIC PROFILE OF CHEILOPLASTY AND URANOPLASTY PATIENTS AT DR. JOSE FABELLA MEMORIAL HOSPITAL*

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ABSTRACT

A program to help children with cleft lip and palate congenital anomalies was undertaken at Dr. Jose Fabella Memorial Hospital in December 1991. A total of 166 patients underwent cheiloplasty and/or uranoplasty from the start of the program to December 1995. Considering the relatively not uncommon occurrence of these anomalies, it is but pertinent to evaluate and present the demographic characteristics in terms of morphological type, sex, and classification of these patients. This retrospective, descriptive cross-sectional study included (111) males and (55) females, of 166 subjects with ages ranging from (3) months to (14 years). Results showed 89.76% underwent cheiloplasty and 10.24% underwent uranoplasty. In the latter group, more has an isolated cleft palate, despite the reported higher incidence of combined anomalies in the literature, and as well as in the study subjects, as a whole. In this study, combined cleft lip and palate was most common, followed by left sided unilateral cleft lip, then bilateral cleft lip, right sided unilateral cleft lip, and lastly the isolated cleft palate. Males predominated at a 2:1 male to female ratio in all types. Majority of the patients belonged to the (1) to (6) year old age group. These results consistently reflect trends and incidence rates reported in foreign and local literature, except in the isolated cleft palate group where males predominated despited an expected female predominance. Most of the subjects underwent surgery at ages 1 to 6 years old. Notable was the low number of uranoplasty cases done despite the higher incidence of the combined type. It would be not only interesting but relevant to further assess the reasons behind this.

Keywords: Cheiloplasty, uranoplasty, demographic profile

INTRODUCTION

The congenital anomalies cleft lip and cleft palate were first described in writings of ancient Egypt and first recorded attempts to repair was reported in AD 1000. The French dentist, Le Monnier performed one of the first surgical repairs in 1746. Since then, various techniques were tried and reported by different doctors over the centuries, in the different institutions of Europe, America and other parts of the world considering the anomalies disregard for racial differences. [1]

Incidence rates vary from one country to another, among the different races, and between male and female. Although race affects the frequency off isolated Cleft Lip and combined Cleft Lip and Cleft Palate, it has no bearing on isolated Cleft Palate defects. In order of frequency, cleft lip ad cleft lip and palate registered the highest frequency among native Americans, followed by Orientals, Whites and American Blacks showed the lowest.[2] The trend of increasing incidence rates has been noted and reported, the range now is from 0.5% to as high as 2 per 1000 births.[1,2,3]

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The specific deformities vary also in frequency. Isolated cleft lip and combined cleft lip and palate is more common than isolated cleft palate which has an incidence rate of half of the former. The former is also more common among males at a male to female ratio of 2:1; which is reversed in isolated cleft palate with a 1:22 male to female ratio.[1,2]

Filipinos have not been spared of these anomalies and a lot of doctors have dedicated their services to its treatment. A cleft lip and cleft palate does not only mean dealing with an anatomical disfigurement but also the concomitant social stigma, emotional trauma on the parents and child, and, of course, the impaired speech and growth development of the child. Hence, the value of a team approach in its management.

With these considerations in mind, the Department of Pediatrics of Dr. Jose Fabella Memorial Hospital thought of starting a program which will deal with these children. The hospital is primarily a center for maternal and child care and quite a number of babies delivered in the institution were noted to have the anomaly. The services of an otorhinolaryngologist was then solicited and in 1991, the first stage of the rehabilitation of these children with cleft anomalies was undertaken.

With the generic, developmental, social and economic implications of cleft lip and cleft palate anomalies, it is but pertinent to publish a report on the statistics gathered five years after the program for cleft lip and cleft palate was started. The objective of this paper is to present the demographic profile of patients admitted at Dr. Jose Fabella Memorial Hospital for surgical repair of cleft lip and cleft palate anomalies from 1991 to 1995.

METHODOLOGY

Records of 166 patients, 111 males and 55 females, admitted at Dr. Jose Fabella Memorial Hospital and who subsequently underwent surgical repair for cleft lip and cleft palate from December of 1991 to December of 1995 were retrieved. Data was accordingly tabulated and graphed. Inconsistencies in the existing records made it impractical to classify the cleft anomalies according to specific types described by Cummings (1993).[2] Patients were then grouped according to the three major morphological types of anomalies namely: 1. Cleft lip only (unilateral or bilateral); 2. Cleft lip and cleft palate combined; and 3. Cleft palate alone.[3] Patients were further distributed according to sex predominance of the various morphological type of cleft deformity, and also according to specific age groups. From the tabulated data, percentages were calculated and compared with published figures of incidence rates from other countries and local studies.

RESULTS

In five years 166 cases were done: 89.76% (149) of these were cheiloplasties and only 10.24% (17) were uranoplasties. Among those who underwent cheiloplasty, only 38.25% (57 out of 149) had an isolated cleft lip anomaly, while the majority 61.75% (92 out of 149) had a combined cleft lip and cleft lip and cleft palate defect. On the other hand, among those who underwent uranoplasties, more patients with an isolated cleft palate, 11 out of 17 uranoplasty cases underwent surgical repair as compared to 6 cases with combined cleft lip and cleft palate anomaly. The total number of patients with cases (59.04) out of 166, making it the most common morphological type; followed by isolated cleft lip anomalies comprising 57 cases (34.34%) out of 166; and lastly, the isolated cleft palate making up 11 cases (6.63%) out of 166.

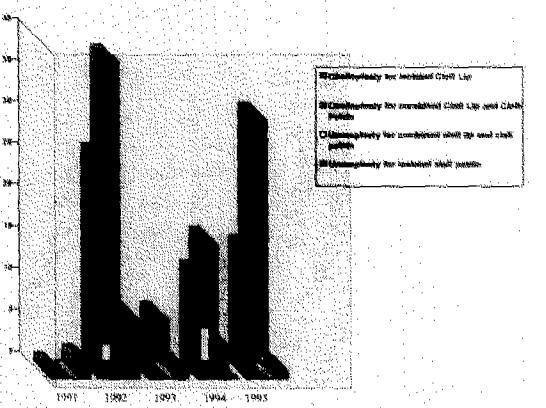


Fig. 1. Distribution of cases done according to specific anomaly

Patients with isolated cleft lip anomaly were further classified and those with a unilateral cleft lip consistently predominated at 78.95% (45 out of 57 cases), and lastly unilateral right cleft lip at 8.77% (5 out of 57 cases).

Fig. 2. Distribution of cleft lip cases done in Patients with isolated cleft lip anomaly

Among the 57 cases of cheiloplasties done with isolated cleft lip anomalies, more males underwent the operation at 68.42% (39) compared to females at 31.56% (18), showing a 2:1 male to female ratio. With unilateral cleft lip, there were also more males at 66.66% (30 out of 45) compared to 33.33% (15 out of 45) with the females, at a consistent 2:1 male to female ratio. More males also had bilateral cleft lip at 85.71% (6 out of 7) compared with 14.29% (1 out of 70 with the females. There were only a few Right unilateral cleft cases (5 cases), distributed to 60% (3) males and 40% (2) females.

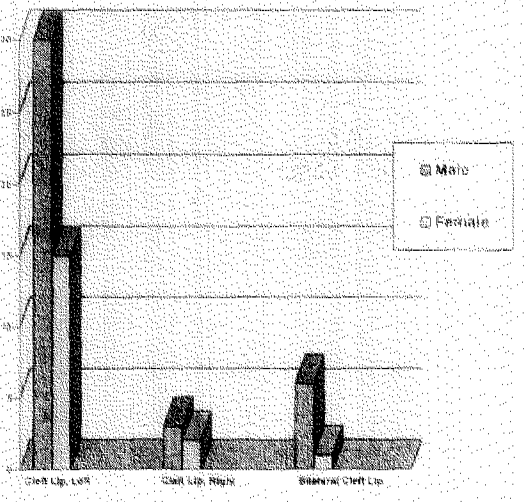


Fig. 3. Sex Distribution of Isolated Cleft Lip Anomalies

Out of 166 cases operated on from 1991 to 1995, a combined cleft lip and cleft palate anomaly predominated registering 98 cases (59.04%); followed by unilateral cleft lip anomaly with 57 cases (34.34%); and the least were the isolated cleft palate with 11 cases (6.63%). The same trend was observed in both sexes. Male predominated among those with combined cleft lip and cleft palate (65 cases: 66.32%) compared to the females (33 cases: 33.67%) at a consistent 2:1 male to female ratio. Almost the same 2:1 Male to female ratio was noted with isolated cleft lip with (68.42%) 39 male cases compared with (29.82%) 17 female cases. However, with the isolated cleft palate defect, the difference between the sexes was no significant, with (54.54%) 6 male cases compared to (45.45%) 5 female cases; almost a 1:1 male to female ratio.

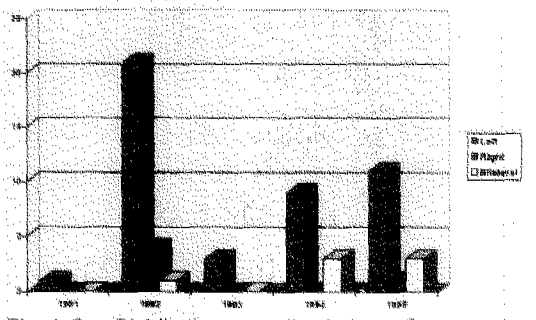
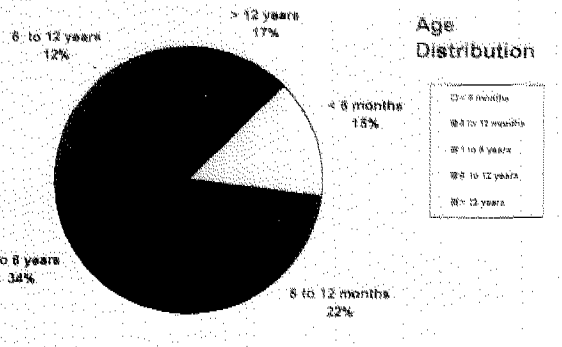


Fig. 4. Sex Distribution according to type of Cleft Anomaly

The ages of the 1166 patients ranged from 3 months to 14 years of age. Majority of the patients belonged to the 1 to 6 year old bracket, followed by the 6 to 12 month age group. From these figures it seems that parents probably favor these ages as appropriate for surgery, which is slightly delayed based on recommended ages for repair of clefts. Majority of the patients underwent cheiloplasty, and this can be done ass early as 10 weeks of age.

Fig. 5. Age Distribution



DISCUSSION

The program for patients with cleft lip and cleft palate anomalies was started December of 1991, and this report covers the cases operated on from that year up to December of 1995. In 1991, the group initially had only 3 cases done as seen in Fig. 1. To introduce the program to the community, a surgical mission was conducted in 1992 and the extensive campaign paid off as noted in the significant rise of the census for that year, shown in Fig. 1. After this period, the census leveled then showed a steadily rising trend from 19933 to 1995 (Fig. 1). These figures, collected over the five year period are based on the actual number of patients who underwent surgical repair for cleft lip or cleft palate in Fabella.

As stated in the methodology, the patients were classified according to the three major morphological types of cleft deformity: cleft lip alone (left/right/bilateral); cleft lip and cleft palate combined; and cleft palate alone. Results in Fig. 1 showed that majority of the cases operated on were for cheiloplasty (89.76%) and of these patients, more that half had a combined cleft lip and cleft palate anomaly (611.75%). From the graphs in Fig. 1, it is evident that of the total 166 subject, 98 (59.04%) were the combined type of anomaly making it the most common, followed by the isolated cleft lip (34.34% or 57 out of 166), and lastly cleft palate alone (6.63% or 11 out of 166).

The data in figure 1 consistently reflects reported incidence rates. Foreign literature reports an incidence rate as high as 2/1000 births for combined cleft lip and cleft palate, 1/1000 births for cleft lip alone and less than 0.5/1000 births for cleft palate alone.[1,2,3] According to Cummings (1993) the combined type of cleft lip and palate anomaly is more common at 35% - 55% of cases, seconded by the isolated cleft lip at 10% - 30%. Of course incidence rates varies between the different races. Local published reports on the incidence rates of cleft lip and cleft palate among Filipinos and the range is from 1.38/1000 live births,[4] 1.48/1000 live births, to 1.7/1000 live births. In the report of Castano, babies born in Fabella with these anomalies showed that the combined cleft lip and cleft palate was most common comprising 51.8% of the study population, followed by cleft lip alone at 30.7% and cleft palate alone at 17.2%. The cases operated on from 1991 to 1995 in Fabella does not only include babies born in the hospital. Thus, true incidence rates cannot be calculated from the data. However, the figures and percentages still consistently reflected the same trends: there were more cases with the combines anomalies who were operated on.

With regards to the isolated cleft lip cases local incidence rates reported by Castano (1994-1995)[5] showed left unilateral cleft lip as more common than right, isolated cleft lip as more common than isolated cleft palate. This study reports the same trend with left sided unilateral cleft lip as most common at 78.95% (Fig. 2), followed by bilateral cleft lip at 12.28% and, lastly, the right sided unilateral cleft lip. These figures are also consistent with foreign reports.[1,2,3,]

Sex consistently showed a predilection of these anomalies among males at a 2:1 male to female ratio for both cleft lip alone and combined cleft lip and palate. Castano also showed the same ratio reporting a percentage rate of 69.2% among males and 30.8% among females. In this report, male and female ratios were further determined among the three major morphological types of anomalies as shown in Fig. 4 where 66.32% were males and 33.67% were females among those with combined cleft lip and cleft palate; 68.42% males and 29.82% females for cleft lip; and 54.54% males and 45.45% females for cleft palate. Among thosse with isolated cleft lip (Fig. 3), males (at a 2:1male to female ratio) also predominated among the three classifications: left unilateral cleft lip 66.66% males and 33.33% females; right unilateral cleft lip 60% males and 40% females; and even with bilateral cleft lip at 85.71% males and 14.29% females.

From the above discussions, figures reported in this paper have consistently reflected foreign and local literature. An unexpected finding was shown among those with isolated cleft palate anomalies wherein more males underwent uranoplasty than females. Foreign literature reports a female

predilection for isolated cleft palate. Although the figures in this report may not be regarded as true incidence rates for Filipinos, not still this difference has to be noted.

The patients were also distributed according to specific age groups. Fig. 5 showed the majority of the patients belonged to the 1–year-to-6-year-old age group. Although, repair of a cleft lip can be done as early as 10 weeks, it seems majority of parents feel more comfortable to subject their child to surgery when he is around 1 to 6 years old. There are varied opinions regarding the right timing of surgical repair. However, this differences in opinion will remain one for the books if parents themselves have their own concepts and feelings toward appropriate timing of the operation. Their knowledge and attitude towards the anomaly, its social and psychological implications and effects on the health, growth and development of the child, would greatly influence their decision making with regards to timing and need for treatment.

At the onset, when this paper was being written, the authors had preconceived ideas of the expected results. It was not a surprise then that results reflected the trend shown by incidence rates published by different authors from different countries. However, a conspicuous finding became evident. Reviewing the results shown in Fig. 1, of the total 166 cases done, 89.76% (149) where cheiloplasties, and of this 61.75% (or 92) had a combined cleft lip and cleft palate defect. The combined type of anomaly consistently topped the charts. In contrast, it is notable that despite the significant number of these patients registered since 1992, there was no corresponding increase in uranoplasty cases in the succeeding years. Logical reasoning would favor a concomitant increase in uranoplasty cases considering that after eight (8) or more months, the patient who underwent cheiloplasty would now be ready for uranoplasty which is ideally done when the child is 9 to 18 months old.[1,2,3] During the five year period of the program, only 10.24% (or 17 cases out of a total of 166) were uranoplasties. This finding is more disturbing considering that, aside from the significantly low number of cleft palate cases repaired, only 6 cases had a combined cleft lip and cleft palate defect, and more cases (11 patients out of 17) had an isolated defect (Fig. 1). What happened to those patients who initialiy underwent cheiloplasty but still needed uranoplasty? What happened to the 92 cases or 55.42% (92 out of 166) with the combined type? How come there was no follow up? There could be several reasons for this: Perhaps the parents are 1. More concerned with aesthetics and do not see the importance of repairing a cleft palate; 2. Not aware of the feeding, growth, developmental and otologic complications; 3. Consulted another doctor or institution. Simply reasoning out cannot dismiss the findings in this study. The significantly low percentage of uranoplasties done does not mean there are only a few patients with palatal defects. On the contrary, as shown on the graphs, majority of the cases operated on for cheiloplasty had the combined type defect. It would be gross irresponsibility to take for granted that patient naturally follow-up during he designated age for uranoplasty. Apparently, realities shown by actual figures indicate otherwise. A lot of palatal defects mot probably remain hidden from sight forgotten after the visual distortion of a cleft lip has been repaired.

Knowing the full implications on health, growth and development of an unrepaired cleft lip and especially a cleft palate, a problem has been identified. Hence its probable cause has to be evaluated. Is it an economic question considering the social and economic status of these patients? But the parents are aware that medical services are almost free. Perhaps it is an attitude problem. Probably the utmost concern is the implications and social stigma of a visual facial disfigurement. Perhaps the typical hesitancy of parents to subject a baby to further surgery prevails, being ignorant of the complications. Surgical advance in the repair of palatal defects would pointless if the actual patients are not coming back for the repair.

SUMMARY

This report cannot give conclusions on true incidence rates of cleft lip, cleft lip

and cleft palate and cleft palate among Filipinos. However the results showed that figures were consistent with published reports, both local and foreign literature. Among the three major morphological types, the combined cleft lip and cleft palate defect was most common 59.04% (98 out of 166), followed by cleft lip alone 34.34% (57 out of 166), and lastly the isolated cleft palate (11 out of 166) anomaly. For isolated cleft lip deformities, left sided unilateral was most common, followed by the bilateral cleft lip and lastly the right sided unilateral cleft lip. As to sex predominance, for cleft lip and cleft palate combined, more males were operated on at a 2:1 male to female ratio. Even for the isolated cleft lip (left/right sided; bilateral), there were more males with the same 2:1, male to female ratio. Not consistent with published reports was the data on cleft palate cases wherein there were more males with an isolated cleft palate, instead of the expected female predominance. From the age classification, most patients operated on belonged to the 1-year-to-6-year old bracket. Of particular interest noted from this report, is the relatively significantly low number of uranoplasties done considering the great volume of patients with combined cleft lip and cleft palate who initially underwent cheiloplasty. It should be kept in mind that the cheiloplasty is only the beginning of the treatment of these patients, neither does it end with the uranoplasty.

Comprehensive rehabilitation of these patients entail a multidisciplinary approach which should also include full cooperation and understanding of the parents to ensure effective management. Incidence rates and percentages will only be academic statistical figures, and, to reiterate, the best surgical advances in the repair of these anomalies will remain one for the books if the patients themselves do not follow up.

RECOMMENDATIONS

This paper has raised certain observations and a number of questions. Recommendations can only be forwarded to further evaluate not only the medical, surgical, psychosocial management of cleft lip and cleft palate patients, but also the knowledge and attitude of parents towards these anomalies, its concomitant complications, and general and specific effects on speech, health, growth, emotional and psychosocial development of the child.

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RADIOGRAPHIC VISIBILITY OF "RADIOLUCENT" FOREIGN OBJECTS*

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Keywords: Foreign bodies, aerodigestive tract, exposure factors

INTRODUCTION

Radiographic studies are commonly requested in Maxillofacial injuries primarily for the purpose of identifying fractures. As for foreign body ingestion or aspiration, radiographic examination is requested to locate the site of the foreign body. Little emphasis is given to detect translucent foreign bodies embedded in soft tissue. Radioopaque objects are easily seen. However, not all radiolucent substances will be visualized in an X-ray study using soft tissue technique. Radiologic detection of a foreign body requires a high index of suspicion.

The absence of demonstrated foreign body in such X-ray studies, however, does not prove that there is indeed no foreign body in the patient. This latter situation is an interesting one, and encouraged these researchers to conduct in vitro studies to investigate the radiovisibility of common objects whose radiolucency or radioopacity have not been satisfactorily determined previously in the local setting.

MATERIALS AND METHODS

Commonly encountered "radiolucent" foreign bodies (objects with questionable radioopacity) in head and neck and aerodigestive tract were collected, namely:

1. roasted peanut with shell
2. peanut without shell
3. fried peanut
4. colored bottle fragment
5. colorless bottle fragment
6. eyeglass lens
7. flexible toy fragment
8. rigid toy fragment
9. aluminum can pull-up tab
10. old aluminum-like 10 centavo coin
11. plastic button
12. rubber eraser
13. styropor
14. balut white
15. tamarind seed
16. used cigarette filter
17. unused cigarette filter
18. plastic ball pen cap
19. boiled pork meat
20. windshield glass, non-tinted
21. pork barbecue
22. acrylic prosthesis without metal implants
23. chicken cartilage

The test objects were placed in a slit cut horizontally in the sides of a two-inch-thick slice of meat and also in a four-inch-thick slice of meat to simulate pediatric and adult soft tissues respectively.

Corresponding markers were placed to identify each object.

The two-inch-thick slice of meat was then placed atop the X-ray cassette and X-ray exposure done with different factors listed below with a distance of 36 inches from the X-ray tube.

	Kilovoltage peak (KVP)	Milliam perage (MA)	Time (sec)
Factor I			
a) Gridded	70	50	.100
b) Bucky	70	100	.150
Factor II			
a) Gridded	65	50	.067
b) Bucky	70	100	.100

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Factor III			
a) Gridded	55	50	.050
b) Bucky	60	50	.067

The four-inch-thick slice of meat was then also exposed to the following different factors, again with a constant distance of 36 inches from the X-ray tube:

	Kilovoltage peak (KVP)	Milliam perage (MA)	Time (sec)
Factor I			
a) Gridded	70	50	.083
b) Bucky	70	100	.150
Factor II			
a) Gridded	60	50	.083
b) Bucky	70	100	.083
Factor III			
a) Gridded	60	50	.083
b) Bucky	65	100	.067

All test objects were then graded according to their relative radiopacities:

Grade 0 – not visible
1 – slight visibility, shadow not distinct
2 – distinct shadow

RESULTS

A. Two-inch-thick meat slice

OBJECT	FACTOR					
	I		II		III	
	Bucky	Grid ded	Bucky	Grid ded	Bucky	Grid ded
1. roasted peanut w/ shell	1	1	1	2	1	1
2. peanut w/o shell	1	1	1	1	1	1
3. fried peanut	1	1	1	1	1	1
4. colored bottle fragment	2	2	2	2	2	2
5. colorless bottle fragment	2	2	2	2	2	2
6. eyeglass lens	1	1	1	1	1	1
7. rigid toy fragment (plastic)	0	1	1	1	1	1
8. flexible toy fragment	1	1	1	1	1	1
9. aluminum can pull-up tab	1	1	1	2	1	2
10. old 10 centavo coin	1	2	2	2	2	2
11. plastic button	0	1	1	1	1	1
12. eraser	2	2	2	2	2	2
13. styropor	0	0	0	0	0	0
14. balut white	1	1	1	2	1	1
15. used cigarette filter	0	0	0	0	0	0
16. unused cigarette filter	0	0	1	1	1	1
17. tamarind seed	1	1	1	1	1	1
18. ballpen cap	0	0	1	1	1	1
19. windshield (non-tinted)	2	2	2	2	2	2
20. boiled meat	1	1	2	2	1	1
21. chicken cartilage	1	1	1	1	0	0
22. pork barbecue	1	1	2	2	1	1
23. dental prosthesis (without metal)	1	1	1	2	1	2

B. Four-inch-thick meat slice

OBJECT	FACTOR					
	I		II		III	
	Bucky	Grid ded	Bucky	Grid ded	Bucky	Grid ded
1. roasted peanut w/ shell	0	1	1	1	1	1
2. roasted peanut w/o shell	1	1	1	1	1	1
3. fried peanut	1	1	1	1	1	1
4. bottle fragment-colored	2	2	2	2	2	2
5. colorless bottle fragment	2	2	2	2	2	2
6. eyeglass lens	1	1	1	1	1	1
7. flexible toy fragment	1	1	1	1	1	1
8. rigid toy fragment	1	1	1	1	1	1
9. aluminum can pull-up tab	1	1	1	1	1	1
10. old 10 centavo coin	2	2	2	2	2	2
11. plastic button	0	0	1	1	1	1
12. eraser	2	2	2	2	1	1
13. styropor	0	0	0	0	0	0
14. balut white	1	1	1	1	1	1
15. tamarind seed	1	1	1	1	1	1
16. used cigarette filter	0	0	1	1	1	1
17. unused cigarette filter	0	0	1	1	1	1
18. ballpen cap	1	1	1	1	1	1
19. windshield non-tinted	2	2	2	2	2	2
20. boiled meat	1	1	1	1	1	1
21. chicken cartilage	0	0	0	0	0	0
22. dental prosthesis (without metal)	1	1	1	1	1	1
23. pork barbecue	1	1	1	1	1	1

DISCUSSION

Foreign bodies in the upper aerodigestive tract are an important cause of morbidity and mortality in the two extremes of life. It usually happens to a person eating, who suddenly stops breathing, cannot vocalize, and grasps at one's larynx. The incidence of foreign bodies in the aerodigestive tract is higher in older adults who commonly have a piece of meat stuck in the esophagus. The older patient may have dentures and , thus, unable to detect a piece of meat as easily as a person with normal dentition. Children under three years require special attention, particularly while playing, since children are likely to put small pieces of toys in the mouth.

Contrast material in the evaluation of esophangeal foreign bodies should be used with caution. With complete obstruction by a non-radiopaque foreign body, the contrast material maybe aspirated into the respiratory tract. Thus, the need for a less dangerous form of radiologic evaluation is warranted. Plain radiographs of the neck and chest may identify radiopaque foreign bodies in the esophagus. A normal chest radiographs does not, however, rule out a foreign body as 35% of bronchial foreign bodies may not be apparent on radiographs. (Mu,et al, 1991)

In this study, the foreign objects were placed in a two and a four-inch-thick

slices of pork meat to simulate a pediatric case and that of an adult case. (Initially, the use of a fresh infant cadaver was contemplated on, however, due to some technicalities and the question of morality regarding the matter, this was not done.) The slices of meat were placed either on a Bucky or a Gridded cassette. The purpose of the grid is to remove or absorb a considerable quantity of the secondary (scattered) rays and some primary rays which cause unnecessary density in radiograph. Grids are used where the use of the Bucky is either impractical or impossible. Grids are light and portable. The Bucky is beneath the x-ray table top and moves a flat grid in the direction of the short axis of the table. The purpose of the Bucky is to facilitate radiographic exposure of thick or dense anatomic parts and to decrease the scattered or secondary rays that strike the film. As a result, a Bucky improves detail possibility and contrast.

The exposure technique factors used in this study are: kilovoltage peak, milliamperage, time, distances.

The kilovoltage peak determines the penetrability, and is probably the most important influence on subject contrast. Milliamperage and time are usually controlled and used as one factor, mAS, in radiographic technique selection. MAS determines the number of x-rays in the primary beam and therefore, principally controls radiation quantity. The mAS is the key factor in the control of density on the radiograph. The distance of 36 inches was used as a constant, standardized for soft tissue technique.

The combination ordinarily used in routines soft tissue x-ray techniques are a KVP of 70, and MA of 100 and a time factor of 0.150. This paper utilized different combinations of these mentioned factors to determine the best possible combination available for optimum radiovisibility of the different test objects.

Given the different levels of these factors, most of the objects were radiographically seen except for the styropor. Bottle fragments (colored or colorless), windshield fragments, the rubber eraserhead, both the barbecued and boiled pork meat; were the most visible in all combinations of factors used in the study. The balut white, acrylic dental prosthesis, aluminum can pull-up tab, and the peanuts showed moderate visibility relatively while the plastics (toy fragments both rigid and flexible, and the eyeglass lens and button) showed vague, indistinct borders, although still visible as radioopacities.

In general, the combination of Factor II, with ***a KVP of 65, MA of 50 and time of 0.067 seconds, gridded*** will give the best and optimum visibility for most of the objects in a two inch tissue. Thus, the use of this combination of factors for soft tissue techniques in the newborn and infant as a guide may be considered. While in the four-inch-thick slice of pork meat, a combination of factors ***with a KVP of 70, MA of 50 and a time of 0.083, gridded*** showed the best visibility. This combination may be considered in taking soft tissue radiographs in older children and adults. Size and shape of an object was proven to have no significant contribution and were not factors in determining the radiographic visibility of an object as exemplified in this study by the rubber eraser head (small) and that of balut white.

CONCLUSION

Results of this study clearly that glass splinters, whether colored or colorless, are generally visible in a soft tissue technique and that a specific combination of factors is needed to be able to best visualize these foreign objects was earlier mentioned. Lowering the factors to the described combination will enhance the visibility of radiolucent objects, specially organic materials.

Organic materials like the pork barbecue, boiled pork and balut white are visible specially seen when the following combinations of radiologic factors are utilized. Factor II combination, with a KVP of 65, MA of 50 and a time of 0.067 seconds, gridded is best for reviewing soft tissues.

Using the specified combination of factors, inorganic materials made of dense material as exemplified by the rubber eraser and acrylic dental prosthesis may also be seen radiographically.

Results indicate that all of the test objects seen radiographically in the two-inch thick slice of pork meat were also all readily demonstrated in the four-inch-thick slice of pork meat, albeit, enhanced using a different set of combination of radiologic factors as stated above.

RECOMMENDATION

The results of this paper may well serve as a guide in future requests for soft tissue X-ray techniques by specifying the radiologic factor combinations to be able to best demonstrate the visibility of foreign objects.

Aside from the usual skull series requested in cases of maxillofacial trauma, physicians are encouraged to routinely requests for soft tissues x-ray technique with the recommended adjustments in radiologic factors to determine any glass splinters unnoticed during physical examinations.

This paper has demonstrated that different types of common objects likely to be ingested by a child can be best seen on Xray with a specific combination of exposure variables in pig meat. But in in vivo situation, the presumption may not hold true. Therefore, another recommendation is to perform a similar study using fresh cadavers of a small infant and a much larger child with the test objects inserted sequentially in the neck and upper aerodigestive tract of the cadaver with consent by the relatives.

APPENDIX

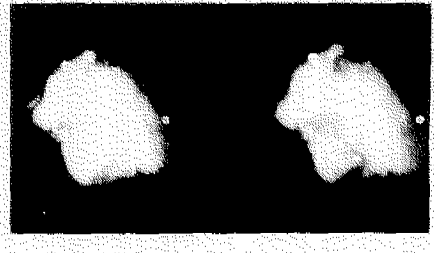

Fig. 1: LEFT: Gridded casette with four-inch thick slice of meat, KVP of 60, MA of 50 and time of 0.083 sec.
RIGHT: Bucky, with four-inch thick slice of meat, KVP of 70 of 100 and time of 0.083 sec.

Fig. 2: LEFT: Gridded casette with a two-inch thick slice of meat, KVP of 65, MA of 50 and time of 0.067 sec.
RIGHT: Bucky, with a two-inch thick slice of meat, KVP of 70 of 100 and time of 0.100 sec.

Fig. 3. Four-inch thick slice of meat on a Bucky set-up

Fig. 4. Four-inch thick of meat on a Gridded casette set-up

Fig. 5. Test objects laid out on a Gridded Casette

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FOREIGN BODY LODGEMENT IN THE AERODIGESTIVE TRACT: A DETAILED EPIDEMIOLOGIC ANALYSIS*

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VIRGILIO R. DE GRACIA, M.D.***

ABSTRACT

The records of 146 cases of children who had inhaled/ingested foreign bodies and treated in UERMMMC Department of Otorhinolaryngology from January 1993 to December 1995 were reviewed to establish the relationship between the incidence of foreign body inhalation/ingestion with certain epidemiological factors and to detect the factors that would predispose foreign body lodgment in order to prevent them. The study found that foreign body inhalation/ingestion occurs with highest incidence in children between 2 to 3 years of age. Furthermore, the most common site of lodgment was found in the nostrils, with peanuts and seeds being the most commonly found inhaled while fish spines was the most commonly ingested foreign body. It was also noted that the majority of cases were not brought to the attention of a physician for the first 24-hours. The study concluded that a referral to an otorhinolaryngologists in mandatory to ensure proper removal of the foreign body to reduce morbidity.

Keywords: Foreign bodies, aerodigestive tract, epidemiology

INTRODUCTION

Foreign body lodgment in the aerodigestive tract is an extremely serious problem in childhood, sometimes resulting in sudden death. The current mortality rate from inhaled/ingested foreign body is reported to be in the range of 0-1.8% and constitute about 20-30% of all Otorhinolaryngologic ER calls. In spite of this, unsuspected and undiagnosed cases still occur.

In studies such as this, in order to establish a detection program for certain cases, it is necessary to develop a tracking system which is applicable to a great number of persons and capable of identifying, with great probability and diagnose accurately the pathology concerned. That the diagnosis should yield a result for prevention and treatment?

This retrospective study attempts to offer detailed epidemiological data concerning the inhalation/ingestion of foreign bodies in 146 children encountered in this department from 1993 to the present.

OBJECTIVES

1. To establish a relationship on the incidence of foreign body inhalation/swallowing with certain epidemiological factors.
2. To detect the factors that could predispose to foreign body lodgments so as to prevent them.
3. To reiterate on general practitioner the importance of a referral to an ENT specialist.

MATERIALS AND METHODS

From January 1993 through December 1995, 146 children who had inhaled/swallowed foreign bodies were treated in the Department of Otorhinolaryngology, Head and Neck

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* Presented, PSO-HNS Descriptive Research Contest
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Surgery of the University of the East Ramon Magsaysay Memorial Medical Center. Their records were reviewed. The following factors were noted for each patient: the patient's sex and age; the geographic origin; the time lag between the inhalation/swallowing and the diagnosis; the presenting symptoms and signs; the nature, size and location of the foreign bodies; whether they were a referral from general practitioners; certain psychiatric factors and the manner of removal of the foreign bodies.

RESULTS

A yearly increase in the total number of cases of aerodigestive foreign body inhalation/swallowing in children was noted in this department.

Ninety eight (67%) of the one hundred forty six parents came from the lower income group, and only forty eight (33%) came from the higher income group or the better-educated group. Table 1 summarizes the age and sex distribution. One hundred thirty five of the patients were under four years of age, and 35% of the cases were between the 2 and 3 years of age. The patients ranged in age from 8 months to 12 years. Boys outnumbered girls, with a ratio of 1.9:1.

The foreign bodies were lodged for varying lengths of time. The interval between inhalation/swallowing and diagnosis ranged from one hour to forty days: fifty four (37%) of the patients presented at the hospital within 24 hours after inhaling/swallowing the foreign body; 122 (84%) of the cases presented within one week; and 24 (16%) presented more than one week after inhaling/swallowing the foreign body (Table II).

A definite history of foreign body inhalation/swallowing was obtained from 140% (96%) patients. Table III shows the incidence of symptoms according to the sites of lodgment of foreign bodies. The most common presenting symptoms were unilateral rhinorrhea (56%) and nasal stuffiness (54%). The foreign bodies were more commonly located in the right nostril (56%) than the left nostril (33%) followed by the less common sites; tonsils (5%) and both nostril (3%). Multiple foreign bodies account for 4(3%) of the cases.

Age and Sex Distribution of Children Inhaling/Swallowing Foreign Bodies

Age (Years)	Male	Female	No. (Cases)	% (Cases)
0-1	1	2	3	2
1-2	20	24	44	30
2-3	36	15	51	35
3-4	28	9	37	25.25
4-5	6	0	6	4
5-6	2	0	2	1.5
6-7	2	0	2	1.5
7-12	0	1	1	0.75
	95	51	146	1.00

Time Lag From Inhalation/Swallowing or Onset of Symptoms to Diagnosis

No. of Days	No. (Cases)	% (Cases)
0-1	54	37
2-3	45	31
4-7	23	16
8-14	15	10
15-21	4	3
22-30	3	2
>30	1	1
	Total = 146	100

Incidence of Symptoms by Lodgment Site of Foreign Bodies

Symptoms	Right Nostril (N=83 [53%])	Left Nostril (N=48 [33%])	Both Nostrils (N=5 [33%])	Tonsils (N=7 [5%])	Vallecula (N=2 [1%])	Cricopharyngeus (N=1)
Nasal stuffiness	60	76	5	0	0	0
Rhinorrhea (non foul)	37	39	0	0	0	0
Rhinorrhea (foul smelling)	46	42	5	0	0	0
Headache	15	13	5	0	0	0
Fever	18	11	3	0	0	0
Odynophagia	0	0	0	7	2	1
Dysphagia	0	0	0	3	2	1
Drooling	0	0	0	3	2	1

Table IV summarizes the types of inhaled/swallowed foreign bodies. Most foreign bodies were organic (87%), and 65% of all foreign bodies were nuts and seeds, of these, 116 (79%) were rounded objects, 15 (10%) pointed objects and 15(10%) were irregularly shaped. Majority of these foreign bodies were small of which 88 (60%) were of which between 1-2 centimeter in diameter/ length.

Of the foreign bodies removed, only two were done in an operating room and 144 (99%) were removed using the

conventional ENT instruments. Patient seen in this department are almost always previously seen by a general practitioner who have tried removing the foreign body but failed in 92(63%) of the cases.

Types of Inhaled/Foreign Bodies in 146 Cases

Types of Foreign Body	Foreign Body (N)	Percentage (%)
1. INHALED		
A. Organic		
Nuts and Seeds	102	70
Moth Ball	9	6
Candy	6	4
Bone Chip	4	3
B. Non Organic		
Stone	6	4
Plastic Toy	5	3
Styrofoam	4	3
Earring	1	0.7
2. SWALLOWED		
A. Organic		
Fish Spine	7	5
B. Inorganic		
Coin	1	0.7
Wire	1	0.7
	Total = 146	100

DISCUSSION

This study showed that there has been a yearly increase in the number of cases with aerodigestive foreign bodies removed in this institution. This can probably be attributed not so much to the fact that absolute number of foreign body inhalations/ingestions is increasing, but to the fact that this hospital has been increasingly becoming a referral center for such cases from various health centers, private practitioners and even other institutions.

The facts that two thirds of the children were from the lower income group indicates that the accidents seem to be related to the level of the education of the parents.

Age and Sex Distribution

This review confirmed the earlier findings of the some investigators that the highest incidence of foreign body inhalation/ingestion is in children between 2 and 3 years of age As well as the male-to-female ratio 2:1, which had been reported by several authors. The finding of male preponderance for aerodigestive foreign bodies in children is consistent.

The factors contributing to the inhalation/ingestion of foreign body in this age group are as follows: [1] Small children have the habit of putting things in their mouth and noses; [2] Because these children have no molars, things placed in the mouth cannot be adequately chewed, making smaller pieces to be ingested/inhaled easily; [3] The habits of shouting, talking, playing, running, crying and laughing during meals constitute some predisposing factors: [4] Anatomic relations of the larynx and inadequate control of deglutition in the children are related to foreign body inhalation/ingestion; [5] The circumstances under which a foreign body is Inhaled/ingested involve either playing or eating; [6] The carelessness of parents to thump or spank their children for acts of naughtiness at eating time, and [7] Certain psychopathic factors such as autism.

Approximately 50% of accidents were caused by the carelessness of the parents. Many parents often give some edible objects or toys to soothe a crying child. This seems that some parents are still unaware that some food products and toys can be hazardous to the very young. Therefore, parents should refrain from giving food products/toys when their child is crying. If this advice were followed, the overall incidence of foreign body ingestion/inhalation in children would be reduced markedly.

Types of Foreign Body

Most of the inhaled/ingested foreign bodies were organic (87%). In this series over half of the foreign bodies were peanuts (57%) followed by corn kernel (12%). The difference in the nature of the foreign bodies reflect the eating habits of people in different localities.

Sixty percent of foreign bodies between 1-2 cm. Therefore, as recommended by the Consumer Product Safety Commission (CPSC) a safe toy should have a dimension of greater than 30mm for this could not easily pass within the widest opening of a 3 year old's anterior jaw/dental segment and lodge in the hypopharynx. Also a length of at least 60mm was suggested to allow sufficient dimension to prevent slender objects from choking a child.

Organic foreign bodies incite a more violent mucosal reaction thereby causing the secretion to be purulent and foul smelling in nature. In contrast, a metallic (non organic) foreign body will produce at most, only a slight congestion of vessels in the part of the mucosa in contact with it or localized swelling in the mucosa.

Lodgment Site of Inhaled Foreign Bodies

Inhaled foreign bodies were more commonly located in the right nostril (56%) than the left nostril (33%) owing to their anatomic accessibility and also reflect the handedness of the individual. Meanwhile, foreign bodies ingested were most commonly located in the tonsils (5%) because of a more reactive lymphoid tissues in childhood. The incidence of multiple foreign bodies is about (4%).

History and Incidence of Symptoms

A positive history was obtained from 96% of the cases. The most common presenting symptoms were rhinorrhea (56%) and nasal obstruction (54%) which are related to the site of lodgment.

Time Lag from Inhalation and Diagnosis

It is significant that 54(37%) of the patients presented within 24 hours after ingestion/inhalation of foreign body and 122(84%) of the cases presented within a week. Delay in diagnosis of greater than one week occurred in less than one fifth of the case. Therefore, some authors have recognized the importance of any delay in the diagnosis.

Referrals

Ninety-two (63%) of the cases were previously seen in a health center (n=35[24%]) or by a private physician (n=57[39%]), but failed to demonstrate the presence of a foreign body (n=24[16%]) or if found was not able to remove it (n=58[40%]). Frequently, a general practitioner may overlook the presence of a foreign body because: 1) Failure to consider the possibility of a foreign body (n=24[16%]); 2) failure to elicit the history (n=46[31%]); 3) absence of a history of foreign body (n=46[31%]); 4) apathetic attitude of the practitioner; 5) skepticism as to the possibility of the presence of a foreign body; 6) the symptomless interval; 7) multiplicity of foreign body (n=5[4%]); 8) waiting for spontaneous expulsion of the foreign body (n=37[25%]); 9) simulation of cases of foreign body, of the signs and symptoms of relatively common diseases such as upper respiratory tract infections (n=136[93%]); 10) lack of emphasis in medical teaching, on exclusion of foreign body in every case of acute/ chronic disease; 11) groundless assumption that the foreign body has been passed by bowel (n=5[4%]). Failure to remove the foreign ingested/inhaled maybe due to inexperience concerning the proper way of removing foreign bodies or the lack of necessary instrument for removing the lodged foreign bodies.

CONCLUSION

The results from this study contribute to the following conclusions:

1. The peak incidence of foreign body inhalation/ingestion occurs between 2 and 3 years of age. Peanut and seeds being the most commonly inhaled foreign body ad fish spine as the most commonly ingested foreign body. Foreign bodies were most commonly located in the nostrils with a male predominance usually of the low socioeconomics status. Not all foreign bodies can be detected in the first 24 hours upon ingestion/inhalation of foreign bodies.
2. The clinical manifestation depend upon the type, size and location of the foreign body.
3. A. referral to an Otorhinolaryngologic specialists is mandatory to ensure removal of foreign body and reduce the morbidity from foreign body inhalation/ingestion.

RECOMMENDATIONS

The study recommends patient education and instructions on the proper handling of cases of foreign body

ingestion/inhalation. Since it was found that the peak incidence of such cases occurs between 2 to 3 years of age, parents must be warned to keep potentially hazardous objects in places that cannot be reached by children. Furthermore, since most cases of ingestion/inhalation of foreign bodies were not brought to the attention of a physician within 24 hours of occurrence, parents must be made aware that it is mandatory that the child be referred to an otorhinolaryngologist in order to avoid its complication.

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THE KIRSCHNER WIRE IN MANDIBULAR RECONSTRUCTION: REVISITED*

VITALIANO R. DE GALICIA, M.D.**

ABSTRACT

Sigmental Mandibular Reconstructive and Reconstruction was perform in 8 patients from 1995. Post operative follow-ups range from 13-15 months of which only 5 were available for re-assessment. Overall functional assessment was acceptable in terms of diet tolerated, temporo-mandibular function, speech and occlusion. Cosmesis is acceptable even with asymmetry in majority of cases. None had drifting or fracturing of the K-wire. Only 2 patients had post-operative complications, one due to PMMP failure and another developed infection. This experience reinforces the belief that the K-wire is still a viable option in mandibular reconstruction.

Keywords: Mandibular reconstruction, kirschner wire functional and cosmetic assessment

INTRODUCTION

Mandibular reconstruction following ablative surgery for head and neck tumors and other disease conditions remains a challenge to surgeons. The search for the ideal reconstructive prosthesis remains elusive considering the gamut of requirements that must be satisfied such as absence of tissue reaction, non-interference with vascular stability of surrounding tissues, non-absorbance, conformity to the dimensions of the defect, provision of total stability, non-interference with assessment of recurrent disease, simplicity to perform at the time of primary operation and affordability of a reasonable and rapid rehabilitation.* Aside from the above requirements, factors commonly considered are cost-effectiveness, affordability and acceptability of patients.

Through the years, many autogenous and allographic reconstructive materials have been evaluated to change the so called " Andy Gump" deformity as well as the attendant problems of impairment in mastication, articulation, poor control of salivary secretions and cosmetic disfigurement*. The prosthetic materials included the Kirschner wire (K-wire), metallic or plastic trays with cancellous bone, bone grafts, microvascular transfer of bones and soft tissue, pedicle and free osteomyocutaneous flaps, bank bone, metallic plates, use of resected mandible after liquid nitrogen freezing and various combinations of the above*.

Presently the state of the art mode of mandibular reconstruction involves the use of vascularized bone grafts. However, points against its use in the country are the lack of well-trained surgeons, need for an additional surgical team, added operative time, high cost, donor site morbidity and need for specialized instruments 2,4.

In the Philippine setting, however, the cost of new generation titanium reconstruction plates make these devices out of reach. The uses of microvascular free flaps requires from the surgeon a high degree of technical know-how and skill which, is still very limited to a few centers and practitioners. With some of the above-mentioned limitations, this institution has been using the Kirschner wire as an alternative prosthesis in mandibular reconstruction. The Kirschner wire is a

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simple, inexpensive and versatile appliance that can be conformed easily to the defect.[1,4,5] With the modifications of its application by Lore et al, the K-wire provided more stability to the resected mandible[3]. Aside from these, minimal soft tissue is necessary for closure, minimal time is required for operation and no special instruments or additional surgical team is necessary[3]. The K-wire also allows for immediate and delayed mandibular reconstruction. Its use Has resulted in good to excellent functional outcome allowing patients to resume a near normal capacity as well as acceptable cosmetic result[1]. The use of K-wire for mandibular reconstruction has not yet been perfected and, as with other implants, is not free of complications. However, considering the above advantages and the good outcomes reported by several investigators from its use as well as its affordability, the Kirschner wire is a viable alternative to the costly and highly specialized mandibular prosthesis in our setting.

This study then aims to review the cases of patients who underwent mandibular reconstruction using Kirshcner wire in this institution from 1990-1995. In particular, this paper aims to review the outcome as it its stability, cosmesis, function as well as complications resulting from its use.

PATIENTS AND METHOD:

The course of 8 patients who underwent segmental mandibular resection and reconstruction using Kirschner wire in this institution from 1990-19955 were retrospectively reviewed (see Table 1 for summary patients-next page). There were 5 males and 3 females with ages ranging from 13 to 71 years old. All patients underwent primary reconstruction using Kirschner wire as mandibular prosthesis for various pathologies such as squamous cell carcinoma, adenosquamous carcinoma, adenocarcinoma, benign hemangiopericytoma, osteomyelitis and gun shot injury. The post-operative follow-up ranged from 3 months to 15 months. Mandibular resection resulted in 6 anterior and 2 lateral defects. Of the 8 patients, 4 had primary soft tissue closure while the remaining 4 underwent closure using various flaps like the pectoralis major myocutaneous flap (PMMF), deltopectoral flap and tongue flap. Three of the patients underwent post-operative irradiation. On follow-up, 2 have already died, 2 are alive and free of disease, 1 had recurrence of disease and 3 could not be reached for follow-up.

DISCUSSION OF RESULTS

Of the 8 reviewed cases, only 55 were followed-up while the remaining 3 patients could not be reached for reassessment. Two patients have already died, one of the disease and the other of myocardial infarction. Both were assessed prior to their demise.

Overall functional assessment was acceptable in terms of diet tolerated, temporomandibular function, speech and occlusion (see table 2 for summary of functional and cosmetic outcome).

Table 2. Summary of the Functional and Cosmetic Results

CASE	[illegible]/S	DIET	TMJ FUNCTION	SPEECH	OCCLUSION	COSM [illegible]
1	51,M	Soft	Normal	Sl. Impairment	Dievoclusion	Asymmetrical
2	46, M	Soft	Normal	Sl. Impairment	Normal	Symmetrical
3	71, M	**				
4	65, F	NGT	Normal	Sl. Impairment	Edentulous	Asymmetrical
5	[illegible]	**				
6	13, M	Regular	Normal	Normal	Normal	[illegible]
7	51, F	**				
8	57, F	Liquid	Normal	Sl. Impairment	Edentulous	Asymmetrical

**Lost to follow-up

The 3 patients who remained on soft to liquid diet had extensive floor of mouth and tongue resection while the patient who was unable to tolerate any oral feeding had

CASE #	AGE AT SURGERY	SEX	POST-OP FOLLOW-UP	PATHOLOGY	SEGMENT INVOLVED	DEFECT	RADIATION	STR
1	61	M	15 Months	SCCA			(+)	Tongue flap
2	46	M	10 Months	ADENOCA			(+)	Primary
3	71	M	**	OSTEOMYELITIS			(-)	Primary
4	63	F	3 Months	ADENOSQUAMOUS			(-)	PMMF
5	22	M	**	GSW			(-)	Primary
6	13	M	15 Months	BHP			(-)	Primary
7	51	F	**	SCCA			(+)	DPF
8	53	F	9 Months	SCCA			(+)	PMMF

SUMMARY OF PATIENTS: * Deceased on follow-up ** Lost to follow-up
BHP - Benign hemangiopericytoma
PMMF - Dectoralis major myocutaneous flap
DPF - Deltopectoral flap

flap failure and extensive soft tissue resection. Speech was judged to be good on the same patient with regular diet while remaining 4 had some impairment, which were related to the extent of soft tissue resection. All of the 5 patients have no interference on opening and closing their mouth. Occlusion on the 3 patients cannot be assessed because they were fully edentulous at the time of surgery. Of the 2 patients who had dentition, one was noted to have disocclusion while the other one had no occlusal complaint.

Overall cosmesis is acceptable even with asymmetry in the majority of the patients. With contouring of Kirschner wire, the anterior arch is reconstructed fairly well.

However, this factor is also influenced by the extent of mandibular resection, location of lesion, extent of soft tissue resection, soft tissue reconstruction and radiation therapy.

None of the patients had drifting or fracturing of the K-wire which was noted to be stable on bimanual palpation and during biting. In the 2 patients where mandibular films were taken, stability of the K-wire was apparent.

Of the 8 patients who underwent mandibular reconstruction using K-wire, only 2 patients has post-operative complication. The first patient was a 13-year-old male who developed infection at the post-operative site on the 77th post-operative day but was readily controlled with appropriate intravenous antibiotics. However, 11/2 months post-operatively, a portion of the K-wire protruded from the submental area accompanied by granulation tissue formation and serosanguinous discharge. The patient was readmitted and on exploration, the left distal segment of the K-wire was noted to be loosely attached to a friable portion of the mandible. The left mandible was resected up to its angle and K-wire was reattached. Five months after primary resection, the patient noted recurrent soft tissue swelling which eventually ruptured exuding yellowish, non-foul smelling discharge. The patient was again readmitted and given intravenous antibiotics which resolved the problem. The patient refused further surgical management and is satisfied with the outcome.

On the other hand, PMMF failure was the cause of complication on the 63-year-old female and not due to the presence of the K-wire. The patient had arteriosclerosis preoperatively and was believed to be the cause of flap failure due to its poor vascularity.

None of the patients experienced fracturing of the K-wire nor underwent any operation for removal of K-wiring.

Many authors who have attempted mandibular reconstruction using Kirschner wire have reported different outcomes from its use. In the series done by Gaisford et al., 85% of their patients had to go another operation to remove the K-wire. Others have reported a much lower rate ranging from 23-48%. However, these complications were attributed to inadequate stabilization of the K-wire resulting in rotation, dislocation and migration.

In this study, the modification by Lore et al. of K-wire stabilization was applied. In this series, only 1 patient had a post-operative complication related to the K-wire and this was due to over correction of the defect and inadequate resection of the involved mandible.

Overall functional outcome for this series was acceptable. Among the 5 patients followed-up, 1 patient was able to enjoy a regular diet and had no speech impairment. The remaining 4 patients who had extensive soft tissue resections were able to speak understandably and were able to tolerate a soft to liquid diet except for 1 patient wherein flap failure occurred. Temporomandibular joint function was all assessed to be normal with none of the defects involving the condyle. Occlusion was not considered in overall assessment since 3 of the patient were edentulous at the time of surgery.

Cosmesis is acceptable for all patients with adequate reconstruction of the

anterior arch especially in patients with anterior defects.

In this series, the K-wire has again proven to be a simple, useful and stable prosthetic device in primary mandibular reconstruction. With lesser soft tissue required for closure, bulk is avoided for easy assessment for recurrence of disease. There was no tissue reaction, no interference with vascular supply for the surrounding tissues and no interference in patient's recuperation.

SUMMARY AND CONCLUSION

In summary, this experience with the modification of K-wire reconstruction reinforces the belief in the K-wire as still a viable option in mandibular reconstruction. It s a good alternative to the presently preferred but costly and highly specialized methods of mandibular reconstruction using plates, trays and microvascular techniques. This experience has proven once again that K-wire can provide the necessary stability to the resected mandible with acceptable functional and cosmetic outcome.

RECOMMENDATIONS

In previous years, this institution has attempted to modify the technique of mandibular reconstruction using Kirschner wire by utilizing a second K-wire to fill in the gap. The second K-wire is positioned as the mirror image of the first wire. While the first wire reconstructs the contour of the inferior mandibular margin, the second wire approximates the contour of the superior margin.

Theoretically, utilizing this recommended technique, the reconstructed site should be more stable thus preventing drifting. This added strength prevents fracturing of the K-wire. The double K-wiring would also give added support for the lower lip. Pressure points will be distributed to a larger area of soft tissue and this prevents pressure necrosis and wound dehiscence. The added bulk and height it provides the resected gingiva could help prevent drooling. It also approximates the original shape of the resected mandible.

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ANNOUNCEMENT

1. ASEAN CONGRESS
   October 5 to 9, 1998, Davao City
   Host: Phil. Society of Otolaryngology-Head and Neck Surgery, Inc.

2. ISIAN CONGRESS
   February 14 to 18, 1999, PICC, Manila
   Host: Phil. Society of Otolaryngology-Head and Neck Surgery, Inc.

3. ASIA-OCEANIA CONGRESS
   February 7 to 12, 2000, PICC, Manila
   Host: Phil. Society of Otolaryngology-Head and Neck Surgery, Inc.

AN ANALYSIS OF MANEUVERS DURING OTOLOGIC EXAMINATION BY INTERNS AND MEDICAL CLERKS: ITS ERGONOMIC CONSIDERATIONS*

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ABSTRACT

Three groups of interns and medical clerks (n=17) undergoing their Clinical Rotation at the Department of Otolaryngology-Head and Neck Surgery of the Jose R. Reyes Memorial Medical Center were evaluated as to the ergonomic aspect of the positions assumed when asked to perform otoscopy on a seated patient. The subjects were then asked to perform and evaluate 3 different otoscopy positions according to the degree of physical stress experienced while performing each maneuver. Data from 13 subjects were included in the analysis after female subjects wearing skirts and those with diagnosed back problems were excluded. The study revealed that without any instructions most interns and clerks assumed relatively stressful examination positions that involved high degrees of back flexion and head rotation. When the same subjects were asked to rate and rank 3 otoscopy positions according to the degree of physical stress experienced while performing each maneuver, the theoretically more ergonomic and least physically stressful maneuver C was unanimously preferred. Comparing the rank data for the 3 maneuvers, maneuver C was ranked the least physically stressful by the subjects, with a high degree of concordance ad agreement at .01 level of significance using the Kendall coefficient of concordance W and the Kendall coefficient of agreement u. The subjects as a group also showed very strong agreement with the criterion ranking defined by the authors when subjected to the Correlation between several judges and a criterion ranking Tc.

Keywords: Ergonometric considerations, otoscopy

INTRODUCTION

ENT examination postures are determined by a multitude of material and subjective factors, and the modification of these postures to suit one's preference can usually be done at will by the examiner in the ENT OPD setting. However, if a person is not aware of good biomechanical and ergonomic practices in the workplace, it often takes the occurrence of noxious stimuli such as pain before this person takes steps to modify his working position.

A previous study by the authors involving 24 junior ENT Residents in Metro Manila regarding ENT examination postures revealed that the most number of biomechanically unfavorable and potentially stressful lower back and neck positions were most commonly observed in otoscopy[4]. This could be attributed to the fact that higher degrees of trunk and neck twisting and flexion movements are often necessary to gain close access to a patient's laterally located ears.

Based on currently accepted biomechanical and ergonomic principles, the authors reexamined the usual methods of ENT examination taught to medical interns and clerks and designed a study that will serve to compare the 2 most common methods of performing otoscopy with a

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method that is, in theory, less physically stressful and more ergonomically sound.

Trainees in the medical profession still have limited exposure to the daily routine at ENT Out Patient Clinics and are largely unaware of the physical stresses that accompany the maneuvers involved in performing the ENT examination. In pursuit of a better training program for Interns and clerks, it is, therefore, but proper to analyze and correct the maneuvers of novice medical practitioners at an early stage in their training.

Another aim of this study is to make the subjects more aware of the ergonomic aspects of the ENT professional in particular and the medical profession in general, and in the process, increase their efficiency and productivity, preserve their well-being, and prevent troublesome back problems from setting in early.

OBJECTIVES

1. To describe and evaluate the maneuvers during otoscopic examination by interns and clerks according to some biomechanical and ergonomic principles.
2. To compare the effect of an ergonomically sound otoscopic maneuver to other maneuvers assumed by the subjects while performing otoscopy.

REVIEW OF RELATED LITERATURE

The determinants of posture are legion. The world's experts on the subject have long recognized the difficulty in standardizing criteria to evaluate postures that Colombini et. al., in an extensive review of literature, suggested a combination of several analysis methods such as psychosocial and subjective methods, electromyography, discal pressure studies, and biomechanical analysis.[3,6,11,12,14,15] It was also stressed that a good assessment of posture should include an assessment of posture tolerability.[7]

The contribution of posture in recurrent backs problems has been established by several studies on the etiology and epidemiology of back pain[1,2,3,5,9,10,17] Nachemson, Anderson, and several other authorities in the field of biomechanics and ergonomics have extensively described postural effects on the spine and have agreed that increasing degrees of flexion specially if combined with rotation and/or lateral bending produce increasing degrees of stress to the spinal musculature as well as to the intervetebral discs.[2,3,18]

An unpublished preliminary study on ENT examination postures in 1995 utilized a modification of the method of Okada (1970) to evaluate static forward bending postures using estimate of the angle formed between the vertical and a line connecting the ipsilateral acromion and trochanter to determine the degree of trunk flexion. They were able to tabulate the frequency of certain lower back, head, and sitting leg postures from 138 examination procedures done by 24 ENT residents from 5 Hospitals in Metro Manila, and evaluate these postures according to their conformity or violation of some currently accepted biomechanical principles.

In the 1995 study by the authors, it was observed that the most common sitting leg positions in performing Otoscopy, laryngoscopy and Rhinoscopy (N=108) were the side-by-side leg position (61%) and the open-in-front leg position (36%). The authors then argued that this leg position imparts more stress to the back of the examiner in that this position resulted to more lower back rotation and more lateral bending as compared with the open-in-front leg position.[2]

MATERIALS AND METHODS

3 Groups of Medical Interns and Clerks (n=17) undergoing their ENT Clinical Rotation at the Department of Otorhinolaryngology-Head and Neck Surgery of this institution were included in the study. Female subjects wearing skirts and subjects with diagnosed back problems were excluded from the analysis of data. subjects were called in separately to the ENT treatment room at the ENT Ward where each subject was asked to perform

Otoscopy on a seated patient of the same sex as the examiner, and to take careful note of their otoscopic findings. The general examination position as well as the lower back and neck postures assumed while looking at the eardrum were recorded on a Data sheet (Appendix A). All observations were made by only one researcher.

Appendix A
DATA SHEET

Subject_____Age/Sex_____ No.____
Height_____ Weight_____
School Graduated_____
Length of Previous ENT rotation_____

MANEUVER

	0	A	B	C
	(INITIAL)			
Randomized		___	___	___

I. General Position
1. sitting [ ]
2. standing [ ]
3. others (specify)_____

II. Low Back Position
1. upright [ ]
2. flexion (degrees) [ ]
3. extension [ ]
4. lateral bending [ ]
5. rotation [ ]

III. Head Position
1. upright [ ]
2. flexion [ ]
3. extension [ ]
4. lateral bending [ ]
5. rotation [ ]

IV. Comment

After being informed of the existence of the study, the subjects were asking to evaluate 3 standardized sitting positions for Otoscopy according to the degree of physical stress experienced and the tolerability of the postures they assumed using a 4 point scale. (Appendix B)

Appendix B
QUESTIONNAIRE

Name_____ Age/Sex____No.___
Height_____ Weight_____
Length of prior ENT clinical rotation_____

(Part I)

Please indicate the degree of stress or difficulty you experienced in each of the 3 positions.

1 - almost effortless (very mild exertion needed; sutained posture does not produce discomfort; position could probably be maintained for 1 minute without pain)
2 - slightly stressful (sustained posture produce slight discomfort; position could probably be maintained for 30 seconds without indue discomfort)
3 - some stress (sustained position produces some pain; position could be maintained for about 15 seconds without the dire need to change position)
4 - quite stressful (getting into position produces discomfort; maintaining position for a few seconds is painful and would almost immediately prompt a position change)

Maneuver 1 _____
Maneuver 2 _____
Maneuver 3 _____

(part II)

After going through the 3 Maneuvers, which is the least physically stressful for you?_____
Which do you prefer ?_____
Do you prefer this position over your initial position?_____
Do you a diagnosed back problem ? _____

Comments:_____

The subjects were then made to perform Otoscopy on both ears for 7 seconds per ear and to score the maneuvers immediately after each examination. The time of examination was based on the results of the mean time of performing Otoscopy (15.04 sec) determined by the authors in a previous study. Subjects were uniformity instructed on how to perform the maneuvers in random order (Appendix C).

Appendix C
INSTRUCTIONS

POSITION A

The patient was seated facing the examiner.
The examiner sat in front of the patient with hi/her legs in the closed position and was instructed to place them side by side with the patient's legs and to proceed with the Otoscopy. The patient's legs are almost parallel with the examiner's legs. The subject was instructed to look at the eardrum for 7 seconds each. Minor adjustments to make the patient closer like making the patient bend forward, and make some adjustments with his head were allowed.

POSITION B

The patient was seated face to face with the examiner.
The examiner was instructed to sit in front of the patient with his/her legs in the open position. The patient's legs were semi closed and placed between the open legs of the examiner. The subject was instructed to look at the eardrum for 7 seconds each, adjustments to make the patient closer were allowed.

POSITION C

The patient was seated with his AP axis perpendicular to that of the examiner.
The examiner sat in front of the patient with his/her legs in the open position. The patient's legs were semi closed and the patient was rotated on the stool from left to right as Otoscopy was performed. The subject was be instructed to look at the eardrum for 7 seconds each.
Adjustments to make the patient closer were allowed.

The subjects were then assisted by the author in answering part II of the questionnaire. In cases where there was a tied score for the remaining non-preferred maneuvers, the subjects was made to determine the more stressful of the two. A short interview session followed and instructions and clarifications were made regarding stressful postures and discrenpancies between the least stressful maneuver chosen and the preferred maneuver of the subjects. The subjects were also made to state their preference between their initial examination position and their newly preferred maneuver in Part II of the questionnaire.

The observed postures during the initial Otoscopy performed by the interns were then tabulated and were classified according to the lower back posture, neck, and sitting leg position categories described by the authors (see Table 2).

The stress scores were tabulated and were assigned ranks from 1 to 3 from the least stressful to the most stressful and subjected to the following non-parametric measures of association:[19] 1. The Kendall coefficient of concordance W, 2. The Kendall coefficient of agreement for ranking u and Wr, 3. The correlation between several judges and a criterion ranking Tc with the following biomechanical criterion ranking (C> B> A)defined by the authors:

Maneuver A - Assuming patient factors, examination equipment, and instruction methods are equal , this is the most theoretically stressful and potentially harmful maneuver of the 3 test positions on the basis that the side - by - side leg position, even at the outset, places the lower back in a rotated position, which when combined with the forward flexion and lateral bending positions required to gain access to the farther ear, would theoretically impart more physical stress to the back and place it at a position of high risk. The added stress of neck rotation is also very likely to occur since the AP axes examiner and patient are almost parallel to begin with.

Maneuver C - is the least theoretically stressful maneuver for the examiner because the patient - examiner AP axes are almost perpendicular to each other, thereby placing the examiner in a position where there is very little or no need of back rotation movements to gain close access to the patients ear for Otoscopy.

Maneuver B - is intermediately ranked because the open-in-front leg position of examination limits the amount of rotation accomplished or needed by the lower back to gain access to the patient's ears although it would still require some degree of neck or lower back rotation for good access.

Equipment used for the study included a Welch Allyn rechargeable Otoscope, a screw type steel examining stool without wheels, and a traditional wrought iron ENT Chair with rotating screw type seat with a treatment cabinet situated at the left hand side of the chair.

The patients used in the examinations were, for male subjects, a 55 y/o male, 5'5" in height, ectomorph and a 20 y/o male, 5'4" height and for female subjects a 47 y/o female, 5'2" in height and a 17 y/o female, 5'2" in height were utilized. All patients had otoscopically unremarkable ears and were in generally good health.

RESULTS

Table 1. Subject Profile

Sample Size	13
Male	10
Female	3
Mean age	25.2+/-0.9
Age range	24-27
Mean weight (Kilograms)	65.9+/-9.0
Mean height (centimeters)	168.2+/-6.5
Composition	
Intern	10
Medical Clerk	3
Prior exposure to ENT clinics	1-4 weeks

13 subjects undergoing their ENT clinical rotation were included, 3 of whom

were females and 10 of whom were males. Ten of the subjects were medical interns while 3 were medical clerks from various medical schools. Of the 17 subjects identified for the study, 3 females were excluded because of diagnosed back problems (2-scoliosis, 1-sacral instability). Another female subject was immediately excluded for wearing a skirt at the time of the trial. The subjects ages ranged from 24 to 27 years with a mean of 25.2+/-0.9. The subjects had prior ENT clinical exposure ranging from 1 to 4 weeks. The mean height of the group was computed at 168.23 cm and the mean weight at 65.9 kilograms.

The subjects all performed bilateral otoscopy on the same patient. Seven subjects performed the examination in the standing position. All of the lower back postures observed involved flexion of more than 20 degrees (category 2) with higher degrees of flexion noted for standing subjects. These high flexion postures were also accompanied by rotation and lateral bending (combined) postures.

Rotational movements of the head were noted for all examinations done. Among the 6 subjects who were seated, 4 utilized the open-in-front leg position and the two others utilized the side-by- side leg position.

Table 2. Observed Frequencies of General, Lower back, Head, and Sitting leg Examining Positions of Subjects n = 13

	Frequency
I. General Position	n=13
Standing	7
Sitting	6
II. Low Back Position	n=13
1.Flexion of less than 20 degrees	-
a. without other movement	-
b. with rotation	-
c. with lateral bending	-
d. with both	-
2. Flexion of greater than 20 degrees	-
a. without other movement	1
b. with rotation	-
c. with lateral bending	2
d. with both	10
III. Head Position	n=13
Extension + rotation	3
Extension + rotation + lateral bending	1
Rotation + lateral bending	6
Rotation	2
Lateral bending	1
IV. Sitting Leg Position	n=6
open leg	4
side by side	2

Table 3. Stress level scores assigned by 13 Medical Trainees to 3 Otoscopy Maneuvers

Subject number	maneuver A	Maneuver B	maneuver C
1	4	1	1
2	3	2	1
3	4	2	1
4	2*	2	1
5	3	2	1
6	3	2	1
7	4	2	1
8	2*	2	1
9	4	2	1
10	3	2	1
11	3	2	1
12	4	2	1
13	3	4	1
sum of scores	42	27	13

Italics represent the least stressful position chosen by subjects after completion of scoring
* most stressful position chosen after completion of scring

Tabulated above are the stress scores given to the 3 otoscopy maneuvers (in increasing order of stress) by the subjects immediately after performing each maneuver in random order. Among the 13 subjects, only 2 subjects had to be asked to indicate the most stressful maneuver since identical stress scores were given to maneuver A and B. Position C has the lowest sum of scores while position A has the highest.

Table 4. Preference of the subjects for either the initial examination position or one of the new maneuvers

(the shaded cells represent the subjects' preference)

Subject Number	PREFERENCE	
	Initial	New
	Position	
1	Stand	C
2	sit	C
3	sit	C
4	stand	C
5	sit	C
6	sit	C
7	stand	C
8	stand	C
9	sit	C
10	sit	C
11	stand	C
12	stand	C
13	stand	C

The table above represents the answer of the subjects to the question " Do you prefer this maneuver over your initial position?" which was asked after the patient had graded and ranked all 3 maneuvers. All 13 subjects preferred maneuver C over their old position of examination.

Table 5. Ranks assigned to 3 Otoscopy Maneuvers by 13 Medical Trainees according to least degree of Physical stress experienced

	Maneuvers (N)		
subjects (k)	C	B	A
1	1	2	3
2	1	2	3
3	1	2	3
4	1	2	3
5	1	2	3
6	1	2	3
7	1	2	3
8	1	2	3
9	1	2	3
10	1	2	3
11	1	2	3
12	1	2	3
13	1	3	2
sum of ranks	13	27	38

The raw score values and the subjects' least stressful maneuver preferences were converted to ranks in preparation for the battery of non parametric statistical tests applied to them.

The sum of ranks or the average of the sum of ranks provides the "best estimate" of the true ranking of the 3 positions provided that W is significant. The table above shows that according to the sum of ranks, the best estimate for the least physically stressful position C and the most physically stressful is position A.

The Kendall coefficient of concordance W was computed to be 0.95 which was significant at 0.01 level of significance. This can be interpreted to mean that the subjects are in good agreement with each other and are applying the same standard in ranking the 3 maneuver.

The Kendall coefficient of agreement for ranking U was computed to be 0.897 and the Kendall coefficient of agreement between judges WT at 0.828. At 2.748 degrees of freedom, the computed chi squared statistics X2 was significant using a 0.01 level of significance. This reinforces the results and interpretation of the computed W.

The correlation between the subjects' rankings and the criterion ranking defined by the authors Tc was computed at 0.948 with a z = 5.21 which was significant at 0.01 level of significance, indicating that there is very strong agreement between the ranking of the subjects and the criterion for ranking defined by the authors.

DISCUSSION

The positional requirements inherent to the performance of a good Otoscopic examination often leave the ergonomically unaware examiner with few low - stress position options. The need to get an eye up close to the patient's ears somehow makes trunk flexion positions and back rotation positions highly probable in Otoscopy.

Data from a local study showed that 42% (n=48) of otoscopies in an OPD setting were done in the standing position. The examination set - up was such that the space on the left hand side of the patient was cramped by the Treatment cabinet and therefore inaccessible to the examiner. This resulted in more lower back and neck twisting specially when the standing subjects examined the Left ear since they could not position themselves as well as they could from the Right.

Although the standing position results in better mobility and less spine loading as compared to a sitting position, the greater angle of forward flexion needed to examine a seated patient or one whose ear level is very low added stress to the spine.[1,15] This also places the spine at a position of risk to "locking" during the derotation and reextension phase, specially if combined with lateral bending and rotation, as in the case of most of the subjects.[17] None of the subjects were observed to make the ambulatory patient stand or change the position of the patient's AP axis in order to facilitate their standing otoscopy position, which would have been good orgonomic practice.

As expected, all seven of the standing subjects were observed to have high degrees of low back flexion of more than 20 degrees. Nachemson, in a pioneering study of intradiscal pressures, tabulated the relative and absolute stresses brought about by increasing degrees of forward flexion and often utilized data for the 20 degree lower backion in the charts.[18] The sitting subjects, on the other hand, were

observed to have lesser degrees of lower back flexion.

In the seated examiner, the degree of lower back flexion could be analyzed as being a function of the horizontal distance between the trunk of the examiner and the ear of the patient. A larger distance would result in greater compensatory forward flexion. Maneuvers to decrease this distance, such as what was accomplished in this study when the subject and patient was made to perform Maneuver C. The subject was able to move closer to the patient by virtue of the patient's legs not being in the way.

With regard to the head positions observed, rotation combined with other positions were observed in all examination done. Data from a local study revealed an 85% prevalence of head rotation positions in all otoscopies observed (n=48). The need to rotate the head in otoscopy positions usually arises because the AP axis of the patient's head is not perpendicular to that of the examiner's trunk. Therefore, biomechanically efficient adjustments in the relationships of these 2 axes should prevent too much head rotation. One way to accomplish this would be to move the examiner as in standing up and walking around a patient, or "wheeling" around a patient in an examining stool with wheels. Another option, as what was done in maneuver C is to rotate the patient so that the head's AP axis is in a more favorable position. The same arguments could be applied analyzing maneuvers that would prevent too much lower back rotation from taking place.

The other combined movements of the head such as flexion, extension, and protrusion could be thought of as functions of the differences in the vertical height between the patient's ear and the examiners height. A screw type of adjustable stool or chair is simply too cumbersome to be a practical maneuver to employ for height differences (none of the subjects of this study nor any of the subjects in the 1995 study were observed to make use of height adjustments on their screw type stools), A better solution would be to have motorized ENT chairs or the more affordable alternative of having a gaslift examining stool which could probably adequately correct minor height differences.

The leg positions assumed by both examiners and patients also contribute to the amount of stress a maneuver produces. Data from an unpublished local study showed the side-by-side leg position (maneuver A) and the open-in-front leg position (manuever B) of examination were the most common sitting leg positions observed for otoscopy at 57% and 43% respectively. There was only one observation where a maneuver similar to maneuver C was executed. In this series, the open-in-front leg position of examination (maneuver B) was expected to yield a better ranking compared to the side-by-side leg position (maneuver A) because the former does away with the lower back rotation inherent to the latter. Comparing the sum or average of the sum of ranks indeed show that maneuver A was ranked as being the most stressful of the 3 maneuvers. Exceptions to the ordered stress criterion included two male subjects who initially gave equal stress scores to maneuver A and B, and Subject number 13, a female, ranked position B as being more stressful compared to position A. A possible explanation regarding this phenomenon could be the subjective (cultural factors) discomfort of some female subjects at having had to open their legs in front of a patient. From the biomechanical standpoint, a possible explanation could be that the horizontal distance between the patient and examiner was not as effectively closed by maneuver B owing to failure of the subjects to effectively straddle the patient, thereby increasing the need for more forward flexion. From the statistical point of view, a possible explanation could be that the actual stress differences between maneuvers B and A might be small enough so as not to be properly reflected by the sum of ranks given our small size, or maneuver A might actually impart less stress compared to maneuver B. Objective methods of stress and posture analysis would help resolve the issue. However, the high-end technical and equipment requirements for such a study are beyond the capabilities of the researches at this time.[3,5,11,13,14,15]

The significant Kendall coefficient of concordance W and the Kendall coefficient og agreement u and WT computed for this

series allowed the generalization that at least, the subjects are applying essentially the same standard in ranking the positions. Although these tests do not allow outright that maneuver C is truly and objectively the least stressful of the three positions, a high degree of concordance and agreement among the subjects is established thereby allowing a best estimate of the "true rank", based on the sum of ranks, for the least physically stressful maneuver which is maneuver C.

The correlation between the subjects rankings and criterion ranking defined above (C > B > A) was computed at Tc = 0.948. Testing the significance of Tc, a high Z value of 5.21 was computed and the probability of obtaining a value of z > 5.21 is less than 0.00001. Therefore, it can be concluded with a high degree of confidence that the subjects as a group show strong agreement with the criterion ranking which was based on a subjective biomechanical analysis of the relative stress level of the different maneuvers. This further strengthens the contention that maneuver C is the "true" least stressful maneuver among the 3 maneuver and lends support to the biomechanical criterion set.

The last query in the questionnaire making the subjects indicate their over-all preference between their initial examining position and their chosen least stressful position serves the purpose of reinforcing the attempt to make them aware of sound ergonomic and biomechanical practices and to check for discrepancies between preferences and tree scores. The query also served to establish a link between the two operational objectives and establish further that through this study, the subject have gained something new and useful that they could be applied to their continuing medical education. The overwhelming preference of the subjects for maneuver C further strengthens the contention that what is more ergonomically sound is probably more preferable.

SUMMARY AND CONCLUSION

In summary, the study revealed that without any instruction to modify their postures, most interns and clerks assumed relatively stressful examination positions that involved high degrees of back flexion and head rotation. When the same subjects were asked to rate and rank 3 otoscopy positions according to the degree of physical stress they experienced while performing each maneuver, the theoretically more ergonomic and least physically stressful maneuver C was unanimously preferred. Comparing the rank data for the 3 maneuvers, maneuver C was ranked the least physically stressful by the subjects, with a high degree of concordance and agreement at .01 level of significance using the Kendall coefficient of concordance W and the Kendall coefficient of agreement u. The subjects as a group also showed very strong agreement with the criterion ranking defined by the authors when subjected to the Correlation between several judges and a criterion ranking Tc.

RECOMMENDATION

It is thus recommended that ENT Ergonomics be included in the present training program for interns and clerks in order that examination positions which are relatively stressful can be improved early in their training.

To further strengthen the results of this study, bigger sample size and, if feasible, objective means of measuring physical stress should be employed. Future studies on ENT Ergonomics should involve the other branches of ENT-HNS practice that have not yet seen advances in ergonomics—FESS, endoscopy, mastoidectomy, ear microsurgery.

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CYANOACRYLATE ADHESIVES (MIGHTY BOND®™) AS A BONDING AGENT FOR FIXATION OF LARYNGEAL FRACTURES IN ANIMAL MODELS*

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ABSTRACT

Cyanoacrylate adhesive (Mighty Bond®™ and Histoacryl®™) were evaluated as bonding agents in laryngeal fractures. Wire sutures were used as the gold standard in the absence of the more expensive titanium plates.

A simple fracture on both sides of the thyroid laminae were created via a linear incision on sixty (60) cats which were divided in two groups. The fracture on the first group was reapproximated with menthyl-2-cyanoacrylate (Mighty Bond®™) on the left side and wire suture on the other, while the second group was repaired in the same manner with butyl-2-cyanoacrylate (Histoacryl®™). The animals were sacrificed, and the larynxes were harvested on the 3rd, 7th, and 30th post-operative day. Specimens were then subjected to tensile strength testing before being submitted for histologic examination under single-blind conditions.

Both Mighty Bond®™ and Histoacryl®™ proved superior in tensile strength over the more cumbersome wire sutures. Tissue reaction was less with Histoacryl®™ (moderate tissue reaction) as compared with Mighty Bond®™ (severe tissue reaction), but this subsided after 30 days without causing any tissue necrosis. In spite of these results, Mighty Bond®™, being more commercially available and less expensive, clearly held an advantage over Histoacryl®™.

Keywords: cyanoacrylate, tissue adhesives, and laryngeal fracture

INTRODUCTION

No century perhaps has witnessed a more remarkable advancement than the present. Inseparable from this, however, is the dramatic rise in incidence of injuries as a result of vehicular accidents and urban crime. Motorcycle accidents, high and low velocity missiles, and anterior blows to the exposed neck area secondary to automobile collisions and contact sports have largely been responsible for laryngeal fractures, an injury that has gained considerable attention only recently.

Repair of laryngeal fractures with conventional materials such as wire sutures and titanium plates, although possible, is cumbersome and expensive, owing to the materials' in availability. A more resilient, less expensive, and more manageable alternative should be the material of choice for the reduction and fixation of laryngeal fractures. Tissue-bonding adhesives such as cyanoacrylate derivatives seemingly meet these criteria but have been an untapped resource. Although it is widely accepted as an excellent adhesive for industrial and commercial use, its medical application remains in its infancy.

Cyanoacrylate adhesives were first by Ardis[2] 1949. This was accomplished by reacting formaldehyde and alkyl-cyanoacetate to create a prepolymer which when heated, resulted into a liquid adhesive. The first cyanoacrylate compounds to be marketed were of the short chain variety (methyl-2-cyanoacrylate). This attained

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instant popularity due to their ease of application, short polymerization time (quick drying), polymerization in the presence of moisture (bonds even moist surfaces), and creation of a strong yet flexible bond.

In 1959, Coover et al[3] suggested the application of crynoacrylate compounds as a surgical adhesive. An important aspect in the medical application of crynoacrylate adhesives is the invariable effect of histotoxicity. Coover's early reports and those of others that came much later dealt with the possible tissue toxicity of these compounds. The main products of degradation of cyanoacrylates are formaldehyde and cyanoacetate, both of which are histotoxic. Toriumi[15] in 1990 observed that tissue reaction was directly proportional to polymer bonds degradation time.

Thus, short-chain adhesives, whose degradation time is likewise shorter (i.e. cyanoacrylate breaks down at a faster rate to its two toxic by-products), will cause a more adverse degree of tissue toxicity. This led to the development of long chain cyanoacrylates where alteration of the alkycarbonyl group (-COOR) of the molecule from a short chain $R=CH_3$ (methyl-2-cyanoacrylate, marketed commercially as Mighty Bond®™) to a longer chain $R=C_4H_9$ (butyl-2-cynoacrylate, commercially know as Histoacryl®™), resulted to less tissue reaction by virtue of the latter's ability to release smaller amounts of toxic by-products over a longer period of time and can thus be more readily cleared by the host tissues. In another study by Toriumi[16], it was demonstrated that host tissue vascularity also contributed to the degree of tissue reaction. Therefore, cyanoacrylate adhesives, when applied on vascular structures (such as muscle and subcutaneous tissue) had more pronounced histotoxic effects than when applied on bone and cartilage.

Review of literature indicates the diverse application of cyanoacrylate adhesives on experimental studies. Albes[1] utilized these adhesives for refixation of dissected aortic layers, while Sachs[12] found success using them in augmentation rhinoplasty. Its flexibility knows no bounds. With these very same adhesives, Tabb[13] in 1968 reconstructed the middle ear ossicular chain, cerebrospinal fluid leaks were later sealed by Maxwell[8]. Presently, the most accepted medical application of these adhesives is for sutureless skin closure.

In the field of maxillofacial trauma surgery, the gold for the management of laryngeal fractures is by means of titanium miniplates. Their unavailability and high cost, however, have essentially limited their use. The conventional material for fixation of laryngeal fractures have therefore been wire sutures, but tissue bonding adhesives such as crynaocrylate derivatives are now proposed as an alternative material for the reduction and fixation of laryngeal fractures. To date, no investigation has yet been undertaken on the use of cynoacrylate adhesives for the stabilization of laryngeal fractures, particularly of the thyroid cartilage.

The aims of this effort is threefold: 1) to determined the effectively of cyanoacrylate adhesives as bonding material for fractures of the larynx (as measured by tensile strength) when compared to wire suture fixation; 2) to determine the degree of tissue toxicity (by means of histologic examination) upon application of cyanoacrylate adhesives; and 3) to determine the difference in tensile strength and degree of histotoxicity between short and long chain cyanoacrylates using the same parameters.

MATERIALS AND METHOD

Sixty (60) adult cats weighing between 3.5 to 4.5 kgs. were sedated under general anesthesia using ketamine hydrochloride (30mg/kg) by intramuscular injection and maintained with sulfuric ether via drop method. The surgical field was shaved and prepared with povidone iodine solution prior to draping and the operation was carried out under sterile conditions. The animals were divided into two groups, depending on the type of adhesive used. Group I received methyl-2-cyanoacrylate (Mighty Bond®™), while butyl-2-cyanoacrylate (Histoacryl®™) was used on Group II (fig. 1). An incision was made over the submental area, and all the strap muscles were retracted laterally until the thyroid cartilage was exposed. Using a Zeiss

microscope enhanced visualization. On the left thyroid lamina, a linear incision was done until a simple fracture was achieved (Fig.2) After complete separation of the cartilage was done, the pieces were reapproximated using .05 ml each of Mighty Bond®™ and Histoacryl®™ for Groups I and II (Fig.3), respectively. The same incision was carried out on the opposite side, where the edges were reapproximated using 3-0 wire, which were sutured at three different points. The incision was closed with chromic 3-0 catgut, and the skin was closed with 4-0 silk. Ten of the animals from each group were sacrificed on the third day post-operatively, and the specimens were subjected to tensile strength testing before being submitted for histologic examination. The procedure was repeated on the seventh and 30th days. The histologic findings were described as acute inflammation (a histotoxic reaction primarily composed of neutrophils) and foreign body giant cell reaction (responses primarily composed of foreign giant cells). Histotoxic responses were graded as mild, moderate, severe, or severe with tissue necrosis. This grading system was done under high-power magnification and reviewed by two pathologists under single-blind conditions.

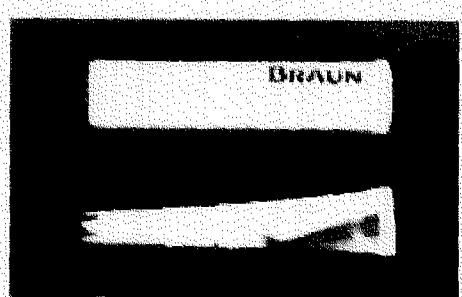

Figure 1. Mighty bond and Histoacryl

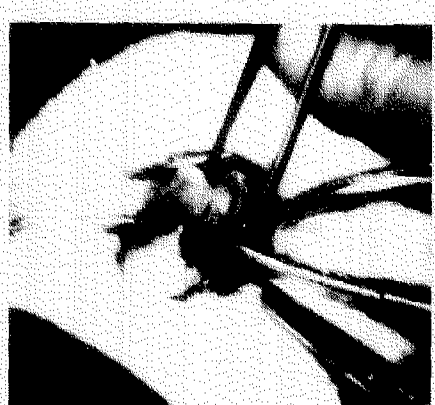

Figure 2. Creation of simple fracture

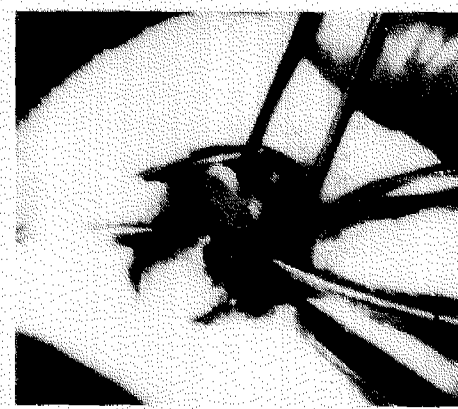

Figure 3. Bonding with cyanoacrylate adhesive

A. Test for Tensile Strength

A modified tensiometer was created using a handheld weighing scale graduated in grams with a 1/1/2 inch screw (1cm head diameter) fixed to the weighing pad of the scale. This was utilized to determine the stability of the bonded cartilages. The larynx was immobilized on a 6in.x9in. wooden board. The examiner held the scale and the screwhead placed on the middle of the left thyroid lamina. Slow forward pressure was applied until a break was achieved. The reading on the scale at the time of refracture was recorded as the tensile strength in grams/cm. The same procedure was done on the right side, and the data collected were submitted for statistical analysis.

B. Microscopic Examination

The larynx was fixed en bloc and placed in 10% formalin. After fixation, the larynx was serially cross-sectioned and submitted for tissue processing. This consisted primarily of formalin fixation, dehydration with increasing strengths of alcohol, infiltration, and embedding in paraffin. The hardened paraffin blocks were cut into section 4 microns in thickness. The sections were then stained with conventional hematoxylin and eosin.

RESULTS

A. Mode of Data Analysis

To test for tensile strength, three different hypotheses were tested. The first

test was the difference between the mean tensile strength of the wire suture and that of methyl-2-cyanoacrylate (Tables 1,2,3,). Second, the difference between the mean tensile strength of the wire suture and butyl-2-cyanoacrylate (Tables 4,5,6) were likewise tested, and lastly the difference between the mean tensile strength of methyl-2-cyanoacrylate were determined. (Tables 7,8,9)

Table 1. Comparison of Tensile Strength Between Wire Sutures and Methyl-2-cyanoacrylate (Mighty Bond®™) on the 3rd Postoperative Day

Wire Suture	Methyl-2-cyanoacrylate
910 g/cm	910 g/cm
912 g/cm	910 g/cm
918 g/cm	912 g/cm
915 g/cm	920 g/cm
916 g/cm	915 g/cm
914 g/cm	917 g/cm
915 g/cm	918 g/cm
910 g/cm	915 g/cm
910 g/cm	914 g/cm
910 g/cm	918 g/cm

Table 2. Comparison of Tensile Strength Between Wire Sutures and Methnyl-2-cyanoacrylate (Mighty Bond®™) on the 7th Postoperative Day

Wire Suture	Methyl-2cyanoacrylate
915 g/cm	920 g/cm
914 g/cm	916 g/cm
916 g/cm	918 g/cm
918 g/cm	916 g/cm
914 g/cm	916 g/cm
918 g/cm	915 g/cm
915 g/cm	920 g/cm
918 g/cm	915 g/cm
915 g/cm	920 g/cm
914 g/cm	915 g/cm

Table 3. Comparison of Tensile Strength Between Wire Sutures and Methyl-2-cyanoacrylate (Mighty Bond®™) on the 30th Postoperative Day

Wire Suture	Methyl-2-cyanoacrylate
918 g/cm	920 g/cm
920 g/cm	918 g/cm
916 g/cm	922 g/cm
918 g/cm	918 g/cm
918 g/cm	920 g/cm
920 g/cm	918 g/cm
920 g/cm	920 g/cm
918 g/cm	918 g/cm
918 g/cm	920 g/cm
920 g/cm	922 g/cm

Table 4. Comparison of Tensile Strength Between Wire Sututes and Butyl-2-cyanoacrylate (Histoacryl®™) on the 3rd Postoperative Day

Wire Suture	Butyl-2-cyanoacrylate
915 g/cm	912 g/cm
910 g/cm	10 g/cm
912 g/cm	915 g/cm
914 g/cm	917 g/cm
910 g/cm	914 g/cm
910 g/cm	918 g/cm
918 g/cm	916 g/cm
915 g/cm	915 g/cm
915 g/cm	910 g/cm
915 g/cm	920 g/cm

Table 5. Comparison of Tensile Strength Between Wire Sutures and Butyl-2-cyanoacrylate (Histoacryl®™) on the 7th Postoperative Day

Wire Sutures	Butyl-2-cyanoacrylate
915 g/cm	920 g/cm
916 g/cm	916 g/cm
915 g/cm	915 g/cm
920 g/cm	915 g/cm
916 g/cm	916 g/cm
914 g/cm	920 g/cm
915 g/cm	916 g/cm
914 g/cm	915 g/cm
916 g/cm	920 g/cm
914 g/cm	915 g/cm

Table 6. Comparison of Tensile Strength Between Wire Sutures and Butyl-2-cyanoacrylate (Histoacryl®™) on the 30th Postoperative Day

Wire Suture	Butyl-2-cyanoacrylate
918 g/cm	920 g/cm
920 g/cm	918 g/cm
918 g/cm	920 g/cm
916 g/cm	918 g/cm
920 g/cm	916 g/cm
919 g/cm	922 g/cm
920 g/cm	920 g/cm
918 g/cm	922 g/cm
918 g/cm	920 g/cm
918 g/cm	918 g/cm

Table 7. Comparison of Tensile Strength Between Butyl-2-cyanoacrylate (Histoacryl®™) and Methyl-2-cyanoacrylate (Mighty Bond®™) on the 3rd Postoperative Day

Butyl-2-cyanoacrylate	Methyl-2-cyanoacrylate
912 g/cm	910 g/cm
910 g/cm	910 g/cm
915 g/cm	912 g/cm
917 g/cm	920 g/cm
914 g/cm	915 g/cm
918 g/cm	917 g/cm
916 g/cm	918 g/cm
915 g/cm	915 g/cm
910 g/cm	914 g/cm
920 g/cm	918 g/cm

Table 8. Comparison of Tensile Strength Between Butyl-2-cyanoacrylate (Histoacryl®™) and Methyl-2-cyanoacrylate (Mighty Bond®™) on the 7th Postoperative Day

Butyl-2-cyanoacrylate	Methyl-2-cyanoacrylate
920 g/cm	920 g/cm
918 g/cm	915 g/cm
915 g/cm	918 g/cm
915 g/cm	916 g/cm
916 g/cm	915 g/cm
920 g/cm	915 g/cm
916 g/cm	920 g/cm
915 g/cm	915 g/cm
920 g/cm	920 g/cm
915 g/cm	915 g/cm

Table 9. Comparison of Tensile Strength Between Butyl-2-cyanoacrylate (Histoacryl®™) and Methyl-2-cyanoacrylate (Mighty Bond®™) on the 30th Postoperative Day

Butyl-2-cyanoacrylate	Methyl-2-cyanoacrylate
920 g/cm	920 g/cm
918 g/cm	918 g/cm
920 g/cm	922 g/cm
918 g/cm	918 g/cm
916 g/cm	920 g/cm
922 g/cm	918 g/cm
920 g/cm	920 g/cm
922 g/cm	918 g/cm
920 g/cm	920 g/cm
918 g/cm	922 g/cm

Since both the wire suture and the adhesives were applied on the same cat population, a paired t-test was used on the first two hypotheses. On the other hand, the third hypotheses were tested using the t-test for independent samples, since methyl-2-cyanoacrylate and butyl-2-cyanoacrylate were applied on different cat populations. Each hypothesis was tested using data for the third, seventh, as well as the thirtieth post-operative day separately. Another test was also done using all the data from the three days combined. The tests of hypothesis were done using a 5% level of significance.

B. Wire Suture vs. Methyl- and Butyl-2-Cyanoacrylate

The mean tensile strength of methyl-2-cyanoacrylate was higher than that of the wire suture by 1.9g/c. on the 3rd post-op day. The mean difference decreased with time, so that by the 30th post-op day, the mean tensile strength of methyl-2-cyanoacrylate was higher than that of the wire suture by only 1.0 g/cm. That paired t-test applied to the data however showed no significant difference between the two at each of the post-op days. When the data from the three post-op days were combined together, the mean tensile strength of the wire suture differed from that of methyl-2-cyanoacrylate by 1.4 g/cm. This difference was found to be statistically significant (t=2.339,p=.02). The results are shown in Table10. For butyl-2-cyanoacrylate no significant differences were also established when the tests were applied separately. However, when the data for the three days were combined, A statistically significant difference was established between the mean tensile strength of the wire suture and butyl-2-cyanoacrylate, with the tensile strength the latter being higher by 1.2 g/cm. The details of the test results are shown in Table 11.

Table 10. Summary of Paired T-Test Results for the Difference in Tensile Strength Between Wire Sutures and Methyl-2-cyanoacrylate (Mighty Bond®™)

Post Operative Day	Sample Size	Mean Difference (g/cm)	Standard Deviation (g/cm)	t-value	p-value	Significance
3	10	1.9	4.1	1.458	0.17	Not significant
7	10	1.2	3.2	1.203	0.26	Not significant
30	10	1.0	2.4	1.342	0.21	Not significant
Combined	30	1.4	3.2	2.339	0.02	Significant

Table 11. Summary of Paired T-Test Results for the Difference in tensile Strength Between Wire Sutures and Butyl-2-cyanoacrylate (Histoacryl®™)

Post Operative Day	Sample Size	Mean Difference (g/cm)	Standard Deviation (g/cm)	t-value	p-value	Significance
3	10	1.9	4.0	1.027	0.32	Not significant
7	10	1.3	3.1	1.314	0.22	Not significant
30	10	0.8	2.4	1.174	0.27	Not significant
Combined	30	1.2	3.1	2.034	0.05	Significant

C. Methyl-2-Cyanoacrylate vs. Butyl-2-Cyanoacrylate

The t-test applied to determine if there is a significant difference between the mean tensile strength of methyl-2-cyanoacrylate showed that there is no

significant difference between the two regardless whether they were considered independently or combined the summary of which is shown in Table 12.

Table 12. Summary of Independent T-Test Results for the Difference in Tensile Strength Between Methyl-2-cyanoacrylate (Mighty Bond®™) and Butyl-2-cyanoacrylate (Histoacryl®™).

Post Operative Day	Sample Size	Mean Difference (g/cm)	Standard Deviation (g/cm)	t-value	p-value	Significance
3	10	-0.40	8.2	0.310	0.76	Not significant
7	10	0.20	3.0	0.260	0.80	Not significant
30	10	0.10	1.7	0.170	0.86	Not significant
Combined	30	-0.03	9.0	0.040	0.96	Not significant

D. Histological Analysis

Upon microscopic examination of the slides from Groups I and II moderate tissue reaction was noted for Group II (fig. 4) from the third up to the 30th post-op day. This was characterized by the presence of neutrophils without any evidence of cartilage necrosis. For Group I, a severe tissue reaction was initially noted on the left side, which persisted until the seventh post-op day. This reaction, however, subsided by the 30th post-op day without any reaction except on the 30th post-op day without any cartilage necrosis (fig. 5). On the right (both for Groups I & II) showed no or minimal tissue reaction except on the 30th post-op day, when granulation tissue formation was noted around the areas where the wires were sutured (fig. 6).

Figure 4. Moderate inflammation

Figure 5. Severe inflammation without tissue necrosis

Figure 6. Granulation tissue formation

DISCUSSION

For the ear, nose, and throat surgeon, laryngeal trauma associated with maxillofacial injuries presents potential airway difficulties which is largely due to blunt external trauma caused by blows to the anterior neck. Laryngeal fractures, particularly those of the thyroid cartilage, present certain problems in terms of surgical management. Presently, the best approach to simple linear (which are seen in the younger age group) and comminuted fractures (which are more common adults) is the of titanium miniplates which are easier to use than wire sutures. Nevertheless, the high cost and unavailability of these materials usually offset its widespread application. Furthermore, special training is required to acquaint the surgeon with the instruments and principles associated with the use of titanium miniplates to achieve optimum results. Thus, wiring has been the more popular method of stabilizing laryngeal fractures in most centers.

In recent years, innovative materials have been explored. The use of cryanoacrylate adhesives, a proven

industrial bonding agent, offers a new avenue for the management of laryngeal fractures. Nevertheless, theclinician's primary concern is the resultant histotoxicity. Contact of cyanoacrylate adhesives into well-vascularized tissue results in intense inflammatory reaction, especially when using short-chain cyanoacrylate adhesives. Quatela[9] compared the effects of different cyanoacrylate adhesives on cartilage graft viability. It was determined that the shorter chain variety caused cartilage necrosis and that the longer chain cyanoacrylates had more success in cartilage graft viability. Thus, two parameters--tensile strength and histotoxicity were deemed necessary for evaluation of overall effectively.

A. Tensile Strength

Paired t-test showed that Mighty Bond®™ and Histoacryl®™ had no significant difference in tensile strength when compared with wire sutures. This means that both adhesives were comparable with the available gold standard (wire suture) in terms if fixation of laryngeal fractures. In fact, when all data were combined (i.e. the entire population is considered regardless of date of harvest), it was found that both adhesives were even superior to wire suture fixation. Furthermore, independent t-test proved that tensile strength was not statistically significant between Mighty Bond®™ and Histoacryl®™. Either adhesive, therefore, was just as effective as the other.

B. Histotoxicity

Having established that Mighty Bond®™ and Histoacryl®™ had approximately identical tensile strength, the other parameter to be determined was histotoxicity. Histoacryl®™ exhibited moderate tissue reaction (determined by pathologic grading), whereas Mighty Bond®™ had a severe tissue reaction. This is due to the fact that long-chain cyanoacrylate adhesives (such as Histoacryl®™) require 12-18 months for complete degradation, while short-chain adhesives (Mighty Bond®™) take 30 days to degrade. This allows the short-chain adhesives to accumulate a much greater amount of toxic by-products, which the host tissue can not clear over a shorter period of time. However, in spite of this, Mighty Bond®™ did not cause any tissue necrosis, and this reaction subsequently subsided on the 30th day. Consequently, wound healing was unimpaired. This finding plays a major role in the acceptance of Mighty Bond®™ as an alternative tissue adhesive.

CONCLUSION AND RECOMMENDATIONS

It can therefore be inferred that:

1) cyanoacrylate adhesives, when compared with wire sutures, were better in terms of tensile strength, 2) cyanoacrylate adhesives have the distinct advantage of being easy to apply, no special training requirement, and economical, 3) regardless of cyanoacrylate chain length, the end result was a superior bonding material with no clinically significant tissue necrosis, and finally, 4) the choice of Mighty Bond®™ over Histoacryl®™ was based on availability and cost-effectiveness.

At present, the authors feel that methyl-2-cyanoacrylate (Mighty Bond®™) is an alternative material for fixation of laryngeal fractures. Previous limited clinical use in animals and humans of these adhesives showed no undue adverse reaction. However, their long term effects on cartilage have yet to be determined on a larger population. Nevertheless, if used in conjunction with certain precautions, the medical application of cyanoacrylate adhesives can offer the clinician a high degree of success.

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   February 7 to 12, 2000, PICC, Manila
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COMPARISON OF CLINICAL CRITERIA AND PLAIN MASTOID RADIOGRAPHS IN THE DIAGNOSIS OF CHOLESTEATOMA*

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ABSTRACT

This paper reports the finding of the study conducted in a tertiary hospital involving 84 patients with chronic otitis media, the clinical criteria utilized in diagnosing cholesteatoma mass composed with plain mastoid radiograph regarding its predictive value in finding a cholesteatoma operatively.

This study showed that clinical criteria have a much higher sensitivity than plain mastoid radiograph (95.3% & 27.9% respectively) and is a better screening procedures. Likelihood ratios were also computed for each of the criteria and results are as follows: epithelial debris as through the perforation (28.60), squamous epithelium over the promontary (6.67), polypoid middle ear mucosa (4.45), sure-profound mixed having loss (3.81) and marginal perforation (3.711). Significant livelihood ratios were found for foul-smelling discharge, marginal perforation and epithelial debris.

Keywords: Cholesteatoma, clinical criteria, radiographic features

INTRODUCTION

Cholesteatoma formation is the most common complication of chronic otitis media. Although it is only a benign epithelial cyst-like lesion that generally grows progressively in the middle ear and mastoid, its presence is nevertheless considered seriously because of its great potential to cause erosion of the surrounding bone. This process leads oftentimes to hearing loss and, if left untreated, may also result in various extracranial or intracranial complications. Hence, the presence of cholesteatoma is an indication for surgery. In addition, surgery done on patients with cholesteatoma is more complicated especially if the surgical procedure includes middle ear reconstruction to improve hearing. In this regard, it is then quite important to detect the presence of cholesteatoma in every case of chronic otitis media.

Cholesteatomas may be diagnosed clinically or radiologically. Although clinical diagnosis is often reliable, mastoid x-rays are still requested for confirmation especially when doubts exist. On the other hand, some believe that such x-rays are unnecessary and only adds to the patient's expense. Such diverging opinions presently exist in the ENT Department of this institution. This controversy remains unsettled because no systematic investigation has been carried out to determine the better way to diagnose cholesteatoma formation. Thus, the important question is asked: Are the current criteria employed.

At present, there has as yet been no randomized double-blind study of this nature reported in local or foreign literature. Recent foreign literature on the diagnosis of cholesteatoma has exclusively centered on the use of CT Scan and MRI. Even with the

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use of these sophisticated imaging modalities, however, for the most part, the radiologic diagnosis of cholesteatoma still remains unreliable with disappointing inter-observer agreement (Bie, et.al., Koltai, et al., 1988).

OBJECTIVES

A. General:

To compare the accuracy of clinical criteria and plain mastoid radiographs in the diagnosis of cholesteatoma.

B. Specific:

1. To determine the sensitivity, specificity, false positive and false negative rates of the clinical criteria currently employed at this institution; and of plain mastoid radiographs in the diagnosis of cholesteatoma.
2. To determine the positive and negative likelihood ratios of each relevant physical findings for diagnosing cholesteatoma.

MATERIALS AND METHODS

Clinical Evaluation

Eighty-four patients aged eighty years or older (range = 10-54) with a diagnosis of chronic media were evaluated pre-operatively as to the presence of cholesteatoma using the clinical criteria currently employed at this institution. Informed consent was obtained from each patient prior to inclusion in the study. All patients should have undergone pure tone audiometry with speech test and standard plain mastoid x-rays. Only patients scheduled for surgery were included in the study. Only one senior resident performed the pre-operative clinical evaluation for all patients.

The clinical criteria utilized at this institution are as follows:

Major criteria

1. Epithelial debris seen through the perforation
2. Squamous epithelium over the promontory

Minor criteria

1. Polypoid middle ear mucosa
2. Mucopurulent foul-smelling ear discharge on ear examination
3. Moderate to severe conductive/mixed hearing loss

Outcomes of Clinical Evaluation

(+) for cholesteatoma
presence of either of the major criteria
(-) for cholesteatoma
absence of the major criteria and only of the minor criteria is present
Suspicious for cholesteatoma
absence of the major criteria but at least 2 of the minor criteria are present.

Prior to the inception of the study proper, the above clinical criteria, which were formulated by the Otology section at this institution, were validated in 120 patients with operable cases of chronic otitis media. During this period, the senior resident involved in the study was trained by a single otology consultant with regards to the proper diagnostic method and relevant findings to be considered during otoscopy.

For the purposes of this study, chronic otitis media was defined as an inflammatory condition of the middle ear which may or may not be infectious and has persisted for twelve weeks or longer. This implies that the tympanic membrane is perforated and the ear may or may not be discharging at the time of examination.

The standard plain mastoid radiographs utilized in this study include the three most commonly requested radiologic views, namely, the Schuller's, Towne's and Mayer's views.

Excluded from this study were: 1) patients without the full complement of mastoid x-rays. This facilitates standardization of radiologic evaluation. However, this resulted in the exclusion of patients with acute complications due to the inavailability of the full mastoid series on an emergency basis at this institution; 2)

patients whose x-ray plates are not evaluable for technical reasons; 3) patients who had undergone a previous mastoid or inner ear operation; and 4) patients with a chronic postaural fistula, in whom the skin can be clearly seen ingrowing into the mastoid cavity.

Radiologic Evaluation

A consultant of the Department of Radiology evaluated the mastoid radiographs of each of the patients included in the study. A reading of positive or negative for cholesteatoma was given for each.

Relevant radiologic findings considered were the following:

1. Radiolucency greater than 1 cm in the mastoid antrum
2. Sclerosis surrounding the visualized lucency
3. Radiologic evidence of bone erosion

The consultant who performed the radiologic evaluation was blinded to the results of the clinical evaluation, and vice-versa.

Evaluation of Outcome

The operative findings were utilized as the gold standard for confirming the presence or absence of cholesteatoma. The participating surgeons were necessarily unaware of the clinical and radiologic evaluations done by the corresponding investigators.

Analysis of Results

2x2 tables were constructed for the clinical criteria and the mastoid radiographs. The corresponding sensitivity, specificity false positive and false negatives rates were then calculated.

Likelihood ratios were computed for each of the following physical findings:

1. foul-smelling discharge
2. moderate-severe conductive/mixed hearing loss
3. severe-profound mixed hearing loss
4. epithelial debris seen through the perforation
5. squamous epithelium over the promontory
6. polypoid middle ear mucosa
7. marginal perforation

RESULTS

Of the 84 patients who underwent ear surgery, 43 were found to have cholesteatoma, while 41 had no cholesteatoma.

The measures of accuracy obtained for the clinical criteria for diagnosing cholesteatoma were as follows: sensitivity = 95.3%; specificity = 97.4%; false positive rate = 2.6%; and false negative rate = 4.7%.

Table 1. Measures of Accuracy for the Clinical Criteria

	Operative Findings (+)	(-)
Clinical test (+)	36	1
(S)	5	0
(-)	2	38

Sn=36+5/43=95.3% Sp=38/39=97.4%
False(-)=2/43=4.7% False(+)=1/39=2.6%

The measures of accuracy obtained for the plain mastoid radiographs in the diagnosis of cholesteatoma were as follows: sensitivity = 27.9%, specificity = 94.9%; false positive rate = 5.1%; and false negative rate = 72.1%.

Table 2. Measures of Accuracy for Plain Mastoid Radiographs

	Operative Findings (+)	(-)
Radiologic Test (+)	12	2
(-)	31	37

Sn=12/43=27.9% Sp=37/39=94.9%
False (-) = 31/43 = 72.1%
False (+) = 2/39 = 5.1%

Calculated positive likelihood ratios for each relevant physical finding were as follows: foul-smelling discharge = 1.82; moderate-severe conductive/mixed hearing loss = 0.83; severe-profound mixed hearing loss = 3.81; epithelial debris = 28.60; squamous epithelium over the promontory = 6.67; polypoid middle ear mucosa = 4.45; and marginal perforation = 3.71.

Table 3. Likelihood Ratios for Foul-smelling Discharge.

	Operative Findings (+)	(-)
FS (+)	42	22
(-)	1	19

+LR=Sn/F.P. = 42/43/22/41 = 1.82
-LR=Sp/F.N. = 19/41/1/43 = 19.93

Table 4. Likelihood Ratios for Moderate-Severe Conductive/ Mixed Hearing Loss.

	Operative Findings (+)	(-)
Mod-Sev CHL (+)	20	23
(-)	23	18

+LR=Sn/F.P. = 20/43/23/41 = 0.83
-LR=Sp/F.N. = 18/41/23/43 = 0.82

Calculated negative likelihood ratios for each relevant physical finding were as follows: foul-smelling discharge = 19.93; moderate-severe conductive/mixed hearing loss = 0.82; severe-profound mixed hearing loss = 2.38; epithelial debris = 3.23; squamous epithelium over the promontory = 1.17; polypoid middle ear mucosa = 2.45; and marginal perforation = 4.20.

Table 5. Likelihood Ratios for Severe-Profound Mixed Hearing Loss

	Operative Findings (+)	(-)
Epith. Debris (+)	30	7
(-)	13	34

+LR=Sn/F.P. =28/43/7/41 = 3.81
-LR=Sp/F.N. =34/41/15/43 = 2.38

Table 6. Likelihood Ratios for Epithelial Debris

	Operative Findings (+)	(-)
Epith. Debris (+)	30	1
(-)	13	40

+LR=Sn/F.P. = 30/43/1/41 = 28.60
-LR=Sp/F.N. = 40/41/13/23

Table 7. Likelihood Ratios for Polypoid Middle Ear Mucosa

	Operative Findings (+)	(-)
Polypoid MEM (+)	28	6
(-)	15	35

+LR=Sn/F.P. = 28/43/6/41 = 4.45
-LR=Sp/F.N. = 35/41/15/43 = 2.45

Table 8. Likelihood for Squamous Epithelium Over Promontory

	Operative Findings (+)	(-)
Sq. Epith. (+)	7	1
(-)	36	40

+LR=Sn/F.P. = 7/43/1/41 = 6.67
-LR=Sp/F.N. = 40/41/36/43 = 1.17

Table 9. Likelihood Ratios for Marginal Perforation.

	Operative Findings (+)	(-)
Marginal Perf. (+)	35	9
(-)	8	32

+LR=Sn/F.P. = 35/43/9/41 = 3.71
-LP=Sp/F.N. = 32/41/8/43 = 4.20

DISCUSSION

A cholesteatoma of the middle ear and mastoid can be defined as the presence of keratinizing squamous epithelium medial to the normal position of the tympanic membrane with the accumulation of keratin debris adjacent to the epithelium (Chole, 1994). Despite its benign nature, it is capable of substantial expansion and growth, which together with its surrounding infection and granulation tissue, causes erosion of adjacent bone. The propensity for bone destruction is largely responsible for the various extracranial and intracranial complications with which it is associated, and which makes the cholesteatoma particularly dangerous. A cholesteatoma also trends to erode and envelop the ossicles, making ear surgery, particularly reconstructive surgery, more difficult. Since failure to detect cholesteatoma may lead to significant disability and even death, it is imperative to diagnose its presence in each and every case of chronic otitis media.

While many authors agree that the diagnosis of cholesteatoma is primarily clinical, no clinical criteria have been presented as a guide to its diagnosis. Furthermore, the reliability and accuracy of the clinical diagnosis of cholesteatoma have never been quantified in terms of sensitivity, specificity, false positive and false negative rates. Lacking objective proof of the accuracy of clinical parameters, many otolaryngologists have turned to mastoid x-rays to confirm its diagnosis, especially since the radiologic criteria for the diagnosis of

cholesteatoma are well-known and widely accepted (see Materials and Methods).

Other otolaryngologists, however, see mastoid radiographs when used to diagnose cholesteatomas as an unnecessary expense. It is in the hope of settling this controversy that this study was born. At present, this is first study to propose specific clinical criteria for the diagnosis of cholesteatoma, and the first to quantify its accuracy and reliability in terms of sensitivity, specificity, false positive and false negative rates.

The findings of this study show that the proposed clinical criteria have a much higher sensitivity than plain mastoid radiographs (95.3% and 27.9% respectively). For lesions with potentially catastrophic consequences, such as a cholesteatoma, utilizing a diagnostic technique with high sensitivity as a screening procedure is very important so that as few as possible of those who have the disease will remain undetected. Based on these results, relying on mastoid x-rays may actually be dangerous, since in 72.1% (31/43) of patients with cholesteatoma, the diagnosis will be missed.

It was expected mastoid radiographs to miss cholesteatoma less than 1 cm. in diameter, since the radiologic criteria provided for a diagnosis of cholesteatoma only if these is a radiolucency greater than 1 cm. in diameter. Contrary to expectations, however, only 3 out of 31 (9.68%) missed cholesteatomas were 1 cm or less in size. About 32.26% (10/31) were described as "filling the entire mastoid cavity and extending to the middle ear". The rest of the missed cholesteatomas were of moderate size (1-2 cm). One possible explanation for this could be found in an observation by Koltai, et al. (1989) that even computed tomography " did not consistently differentiate between cholesteatoma and associated granulation tissue".

The cases of cholesteatoma missed by the clinical criteria (2/43 = 4.7% false negative rate) are worth noting in that they are illustrative of its shortcomings. The first case had an attic perforation with no obvious epithelial debris and only a mild conductive hearing loss. The second case involved a severely retracted tympanic membrane with a central perforation of only 10% and moderate conductive hearing loss. These 2 cases were missed because 2 known risk factors for cholesteatoma formation, i.e. attic perforations and retraction pockets, were not included in the criteria. Perhaps the inclusion of these 2 findings as minor criteria will further enhance the clinical criteria's sensitivity.

The proposed clinical criteria were also found to have high specificity, comparable to that of mastoid radiographs (97.4% and 94.9% respectively). This is important since the treatment for cholesteatoma is primarily surgical. With a high specificity, the corresponding false positive rate is low (2.6% and 5.1%); thus the risk of a patient without cholesteatoma undergoing unnecessary surgery is low for either test. This finding is not surprising for just as the characteristics radiologic picture is difficult to reproduce by another disease process; it is likewise difficult to find epithelial debris, for example, in any other disease process affecting the ear.

In uncomplicated cases of chronic otitis media, the main indication for surgery is the presence of cholesteatoma. In fact, many of the factors that point to a surgical ear point to the possible presence of cholesteatoma, which then warrants surgery. Thus, a screening procedure is needed to detect cholesteatoma in these cases. This study aims to determine whether the proposed clinical criteria or mastoid radiographs better fulfills that function.

Based on calculated sensitivities, specificities, false positive and false negative rates for each procedure, it is clear that the clinical criteria currently in use in this institution would be the better screening procedure. Aside from possessing characteristics of an ideal screening procedure, i.e. high sensitivity and high specificity, it is cost-effective as well. Since it is part and parcel of the physical examination of an ear patient, it entails no additional cost.

The findings of this study should not be taken to mean that mastoid radiographs have ceased to be useful. On the contrary, x-ray continue to be necessary prior to surgery as a means to detect a contracted antrum, to gauge the position of the lateral

sinus and to estimate the level of the tegmen tympani and mastoideum. What this study does suggest is that mastoid x-rays should not be routinely used in an outpatient setting to detect cholesteatoma as an indication for surgery. Routine mastoid x-rays for this purpose would not be cost-effective and could actually be dangerous as discussed above. Rather, mastoid radiographs should be reserved for pre-operative planning of surgical cases.

A secondary objective of this study was to determine likelihood ratios for each of the relevant findings in on otologic examination. Likelihood ratios serve to modify a physician's index of suspicion of a disease, either positively or negatively. A likelihood ratio for a positive test (+LR) and a likelihood ratio for a negative test (-LR) were computed for each physical finding. A (+LR) increases the index of suspicion and a (-LR) decreases the index of suspicion of a disease by a factor equal to its numeric value.

Likelihood ratios were calculated on the premise that only one of the clinical criteria may be present for a particular patient, or that some other physical finding apart from the clinical criteria may be present. In these situations, the likelihood of cholesteatoma in a patient with chronic otitis media can still be determined using likelihood ratios.

Based on the results, the most significant likelihood ratios for a positive test (+LR) were found with: epithelial debris seen through the perforation (28.60), squamous epithelium over the promontory (6.67), polypoid middle ear mucosa (4.45), severe-profound mixed hearing loss (3.81), and marginal perforation (3.71).

A high (+LR) for epithelial debris and for squamous epithelium over the promontory is not surprising since both of these are major criteria. What is noteworthy are the high (+LR)'s for the remaining three physical findings. The presence of polypoid ear mucosa alone already increases the likelihood of cholesteatoma by almost four and a half times. Moderate-severe conductive hearing loss has a low (+LR) with 0.83 probably because other conditions such as tympanosclerosis can have the same finding. Severe-profound mixed hearing loss, however, has a much higher (+LR). 35/44 (79.54%) of patients with marginal perforations were found to have cholesteatoma which accounts for the high (+LR) of this finding.

The most significant likelihood ratios for a negative test (-LR) were found with: foul-smelling discharge (19.93), marginal perforation (4.20), and epithelial debris seen through the perforation (3.23).

Although foul-smelling discharge is a non-specific finding resulting in a low (+LR), only 1/20 (5.00%) of patients with non-foul-smelling discharge had a cholesteatoma; thus the high (-LR). In other words, a non-foul-smelling discharge will decrease the likelihood of having cholesteatoma by almost 20 times. A central perforation will make the likelihood of cholesteatoma 4.20 times less likely; and the absence of epithelial debris will make it 3.23 times less likely.

An illustrative case will best demonstrate the application of these likelihood ratios. A 24-year old male consults because of right ear discharge, described as mucopurulent, foul-smelling, intermittent, of 4 years duration. Patient has decreased hearing for 2 years but denies any other symptoms. On physical examination, a 40% marginal perforation is noted with hyperemia but smooth middle ear mucosa. No epithelial debris nor squamous epithelium over the promontory is noted.

With these equivocal findings, the physician estimates that the probability of having a cholesteatoma in this case is 0.40 (40% pretest probability). Before applying likelihood ratios, the pretest probability is first converted to pretest odds with the result being 0.67. Since the patient has a marginal perforation, the pretests odds are modified by multiplying it with (+LR) for a marginal perforation (3.71) with the result being 2.49 (pottest odds). Reconverting this to a probability gives 0.71 (71% probability of a cholesteatoma). A subsequent finding of a severe-found mixed hearing loss (+LR=3.81) would result in posttest odds of 2.49 x 3.81 = 9.49 which results in a probability of 0.90 (90%) of having a cholesteatoma. Based in this probability, the patient decides to undergo surgery.

The use of likelihood ratios can make the diagnosis of cholesteatoma less intuitive and more objective. It can likewise make the decision to undergo ear surgery more rational and scientific.

LIMITATIONS AND RECOMMENDATIONS

A possible source of bias is the exclusion of cases of chronic otitis media with complications since a full mastoid series cannot be obtained on an emergency basis at this institution. It is hope that the study be extended to include complicated cases once emergency facilities are upgraded at our institution.

Similar studies at other institutions is recommended to determine reproducibility of the results obtained in this study.

SUMMARY

The clinical criteria for diagnosing cholesteatoma currently employed in this institution was found to be both highly sensitive (95.3%) and highly specific (97.4%). Findings suggest that clinical criteria may be a better screening procedure for cholesteatoma as compared with plain mastoid radiographs.

Significant positive likelihood ratios were found for epithelial debris, squamous epithelium over the promontory, polypoid middle ear mucosa, severe-profound mixed hearing loss, and marginal perforation. Significant negative likelihood ratios were found for foul-smelling discharge, marginai perforation and epithelial debris.

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ANNOUNCEMENT

1. ASEAN CONGRESS
   October 5 to 9, 1998, Davao City
   Host: Phil. Society of Otolaryngology-Head and Neck Surgery, Inc.

2. ISIAN CONGRESS
   February 14 to 18, 1999, PICC, Manila
   Host: Phil. Society of Otolaryngology-Head and Neck Surgery, Inc.

3. ASIA-OCEANIA CONGRESS
   February 7 to 12, 2000, PICC, Manila
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DEFECTIVE MUCOCILIARY CLEARANCE IN THE H.I.V. INFECTED PATIENT: A PRELUDE TO ACUTE MAXILLARY SINUSUTIS*

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ABSTRACT

A saccharin test was performed on 15 HIV seropositive patients and 155 seronegative patients to determine if there was a difference in the mucociliary transport time (MTT) between the two groups. The results revealed the MTT-MEAN of HIV (+) patient was 11.085 mins. Sd+/- 2.38 mins. compared to the MTT-MEAN of HIV (-) patients was 5.513 mins.sd+/-1.34 mins. this difference suggested a prolonged mucociliary transport time among the HIV (+) seropositive patients. Such abnormalities affect the nasal/paranasal drainage and ventilation which progresses to the occurrence of acute sinusitis.

Keywords: HIV patients, mucociliary clearance, sinusitis

INTRODUCTION

Human immunodefiency virus (H.I.V.) infection has been present for more than a decade. Presently, HIV infection knows few limit and knows no cure. Since then, the disease has progressed into an exponential growth of cases. According to the local statistics provided by the Department of Health-AIDS Registry, in thee year 1984, their data revealed 2 cases of HIV seropositive, 2 cases of AIDS and a death toll of 2 cases secondary to AIDS. As of October of this year, 279 AIDS cases and a death toll of 148. These data do not include unreported cases which are estimated to be ten to a hundred fold.

Otolaryngologists, have to face this challenge headstrong for this disease has its share of pathology in the head and neck region. In the nasal/paranasal region alone, HIV infection is often associated with maxillary sinusitis. The true incidences of sinusitis in this population is unknown but as many as 68% of H.I.V. patients develop sinusitis during the course of the disease. Many suffer recurrent episodes of mucopurulent rhinorrhea and facial pain at a higher rate than their non-H.I.V. counterparts. This study explores the basis for the increased incidence of sinusitis among the HIV seropositive population and possible etiopathologenesis that contribute to their existence.

General Objective:

To determine if abnormal mucociliary clearance exist in HIV infected patients.

Specific Objectives:

To determine if the incidence of abnormal mucociliary clearance is higher in HIV infected patients that in the controls.

To determine the value of mucociliary transport time (MTT) among HIV infected patients.

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CASE CONTROL STUDY

Setting:

This study was performed in Manila in 2 distinguished institutions: Ospital ng Maynila Medical Center and San Lazaro Hospital from February '96 to January '97.

Patients:

Eighteen HIV (+) patients were evaluated. However only 15 HIV (+) patients and, 15 HIV seronegative patients who served as controls completed the study. Nasal saccharin test was done to determine the nasal mucociliary clearance in the cases and control group.

MATERIALS AND METHOD

A. *Subject selection:*

This study was performed in Manila from February '96 – January '97. HIV seropositive patients were gathered from the AIDS ward of two government institutions. Eighteen HIV positive patients were evaluated. A complete clinical history and serologic exam were obtained and each patient was subjected to an oro-nasal examination by anterior rhinoscopy and nasal endoscopy.

A written consent was secured from each of the case group and their identity were protected.

Excluded in the study were patients with a history of recent drug abuse, topical nasal medications, history of active infectious sinusitis, active smoking, septal perforation, purulent middle meatal discharge and chronic sinusitis.

Thus, from the eighteen HIV seropositive cases, 2 patients were excluded because of present active infection of the paranasal sinuses. While 1 was excluded because of active smoking.

Eighteen seronegative control were gathered from ENT-OPD of our institution completed the study. They underwent the same evaluation and were subjected to AIDS testing in a private laboratory.

B. *Methodology: (Measurement of MTT)*

Saccharin granules in small amount were introduced on the antero-inferior aspect of the inferior turbinates of the non-congested side as evaluated during anterior rhinoscopy. Time record were taken: (T1)=Introduction of saccharin granules in the inferior turbinates and (T2)=time when the patent declared subjective sweetness. The patients remained sitting during the procedure and were asked to swallow occasionally. The MTT was formulated by: T2-T1 and expressed as mean +/- standard deviation.

RESULTS

Thirty patients completed the study. Fifteen HIV and fifteen HIV negative as controls. Each control underwent the same procedure.

Study Group Patients:

Fifteen cases of HIV seropositives.
Patients age ranged from 21-45 years old.
The mean MTT was 11.085mins.+/- 2.38mins.

Control Group Patients:

Fifteen cases of HIV seronegatives
Patient's age ranged from 27-45 y/o
The mean MTT was 5.51mins+/-1.34mins.

Table 1: HIV (+) Seropositve (Case Group)

CASE	SEX	AGE	MTT
1	F	36	10.15
2	M	45	13.40
3	F	33	11.20
4	F	31	10.15
5	M	30	9.45
6	M	33	14.20
7	F	32	9.45
8	F	31	7.00
9	F	31	12.30
10	F	31	14.00
11	F	21	10.45
12	F	31	7.30
13	M	34	10.00
14	F	36	13.20
15	M	27	14.20

- Age range from 21-45 y/o
- MTT means was 11.085mins.+/-2.38mins.

Table 1: HIV (-) Seronegative (Control Group)

CASE	SEX	AGE	MTT
1	M	36	5.20
2	F	37	7.40
3	F	34	7.00
4	M	28	5.10
5	M	42	7.00
6	F	40	7.30
7	M	45	6.30
8	F	41	6.30
9	F	32	5.40
10	F	30	5.30
11	M	27	4.30
12	F	32	3.50
13	F	30	5.20
14	F	41	4.10
15	M	34	3.30

- Age range from 27-45 y/o
- MTT means 5.51+/-1.34mins.

Statistical Analysis:

Hypothesis Test for MTT Mean

Statistical Significance

1. Ho: MTTS of HIV (+) = MTTS of HIV (-) controls.
   H1: MTTS of HIV (+) not equal MTT of HIV (-) controls
2. LEVEL OF SIGNIFICANCE = 0.05
3. T-Test
4. Degrees of Freedom = 14
5. Tabulated value of T = 1.761
6. HIV (+) MEAN = 11.08 min. standard deviation = 2.38 min.
   HIV (-) MTT MEAN = 5.513 min. standard deviation = 1.34 min.

   STANDARD ERROR = 0.6950

   Absolute computed value of T = 7.9453
   Absolute computed value of T = 7.9453 is GREATER THAN the tabular value of T = 1.761

Therefore we reject the null hypothesis and accept the alternative hypothesis that states that there is a difference of MTT's of HIV (+) patients compared to MTT's of HIV (-) patients.

DISCUSSION

Rhinosinusitis is a common problem on the HIV infected population. Prospective studies have placed the prevalence of sinusitis anywhere from 20%-68%. The entire spectrum of sinunasal inflammatory disease may be present, including acute sinusitis, recurrent acute sinusitis, chronic sinusitis of mucosal thickening, or chronic rhinitis indicated by nasal congestion and thick, mucopurulent postnasal discharge.

The bacteriology of acute sinusitis in this population included the same organisms normally considered in the immunocompetent patient namely, Staphylococcus aureus and Pseudomonas aeruginosa. These organisms were also described in acute sinusitis but are more commonly associated with chronic sinusitis, often in association with anaerobic bacteria or fungi.

In general, the pathophysiology of cute sinusitis commences with the obstruction of sinus ostium secondary to mucosal swelling and increased viscosity of mucus. The mucosal glands together with the entire mucosal surface may be partially destroyed or paralyzed and thus unable to provide its mucociliary clearance function. Ostial obstruction is followed by decrease in oxygen tension, which leads to an anaerobic environment that acts as an incubator for bacterial flora to grow.

Other important factors as mentioned include nasal potency, allergic state, alteration in mucus production and mucus blanket abnormalities. Pathogens such as Streptococcus and Haemophilus exerts a dysfunctional effect on the nasal cilia directly through the production of toxins causing abnormalities in cilia motility and mucociliary clearance.

It is now getting more demonstrative that the population of HIV infected patients have an increased incidence of acute and recurrent episodes of sinusitis.

According to Prof. Heinz Stammberger, the mucous blanket that covers the nasal mucosa is continually produced by the mucoserous nasal glands and intraepithelial goblet cells. This mucus film has two layers: an inner serous layer (sol phase), in which the cilia beat and an outer more viscous layer (gel phase), in contact with inspired air which are suited for trapping particulate matter and which are transported by the ciliary microvilli beat. The cilia and microvilli beat in a coordinated fashion toward the nasopharynx and propel the gel layer. However, alteration in this system by obstruction of the sinus ostia, decreased seromucous secretion and ciliary

dysfunction can lead to mucus stasis and eventually to sinusitis.

In this study, mucociliary clearance was evaluated using saccharine test. There was a significant increase in mucociliary transport time in HIV seropositive individuals as compared to the control group and, therefore, there exist MTT abnormalities in HIV infected individuals. There are a lot of possible reasons for a prolonged MTT among the HIV seropositive patients which include: abnormal basal metabolic rate or body metabolism; increased susceptibility to sinonasal inflammatory disease. However, there are still no studies available to confirm such inferences.

CONCLUSION

In this study, there exist a difference in the MTT's of patients who are HIV seropositive compared with those who are seronegative. A prolonged MTT was noted among HIV (+) patients.

Abnormalities of the mucociliary clearance system may affect proper drainage and ventilatory function of the nasal mucosal system which may eventually lead to acute and recurrent sinusitis.

Though this study is not the gold standard as a parameter to the occurrence of acute sinusitis, awareness of such methodology may influence one to perform management into a more holistic approach.

Early diagnosis may benefit the patient since it ensures an effective treatment is given when there is minimal burden of the disease.

LIMITATIONS

This study may adhere to more substance if biopsy, e.g. brush cytology could have been done. However, invasive procedures are only allowed as a means of therapy and not for diagnostics alone.

Though this study has served its objective, the number of cases are still insufficient to adhere to the results with substance.

This study may further be advanced to determine the specific factors contributing to a prolonged MTT among the HIV seropositive population. Then from such effort, can the Otorhinolaryngologist proclaim: *'AD LUCEM PER CRUCEM'* – From the sacrifice flashes forth the light.

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JETSCRUB ™ ENDOSCOPIC LENS CLEANING SYSTEM*

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ABSTRACT

In spite of the advances in endoscopic techniques, difficulty in instrument handling is still commonly encountered in the absence of the more advanced equipment. Special skills are required to maneuver the rigid telescope within the narrow surgical field especially inside the nasal cavity. Such procedures must be coupled with the use of an incorporated lens cleaning mechanism that offers an unimpeded view during endoscopic procedures. It is the objective of this paper to come up with a simple, portable, easy to use and inexpensive endoscopic surgeries, was essentially commendable and comparable to the more advanced endoscopic lens cleaning system.

Keywords: Rigid endoscopy, lens cleaning mechanism, jetscrub

INTRODUCTION

The use of the rigid telescope has been widely incorporated in most otorhinologic procedures and, for some ENT specialists, has been an indispensable tool in performing rhinologic procedures such as functional endoscopic sinus surgery, septoplasty, dacryocycrhinostomy and others.

It was not until 1879 that Nitze introduced the use of an endoscope employed as a cyctoscope designed with the conventional lens system (small lenses placed at certain intervals). Its breakthrough diagnostic nose and sinus endoscopy and minor surgical procedures was employed in the early 1900's by Reichert *1902), Hirschman(1908), Valentin (1903), and Sargon (1908). Endoscopy received a further boost in the 1960's with the introduction of the rodbased telescopes. With this, the diagnostic and surgical capabilities of the instrument were considerably enhanced and photographic archiving was made possible (Timm 1964,Messerklinger 1972, Draf 1973).

In spite of the advances in endoscopic techniques, difficulty in instrument handling is still commonly encountered in the absence of the more advanced equipment. Special skills are required to maneuver the rigid telescope within the narrow cavity. Constricted spatial anatomy somehow restricts the passage of the telescope as is usually encountered in patients with deviated nasal septum, conch bullas, hypertrophied turbinate or polyposis. These resultant narrow passages led to problems concerning the endoscopic image of the surgical field. Such procedures must lens cleaning mechanism that offers an unimpeded view during endoscopic procedures.

Today, problems which hinder optimum endoscopic visibility has been dealt with through the use of wet cotton swabs and irrigating solutions that somehow result in a considerable delay in diagnostic or operative procedures. With the introduction of the more advanced Endoscrub®™, an endoscopic lens cleaning system which quickly clears the endoscope lens in the surgical field, such problem was eliminated.

However, there are some disadvantages, one of which is its cost.

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GENERAL OBJECTIVE

1. To devise a simple, portable, easy to use and inexpensive endoscopic lens cleaning system

SPECIFIC OBJECTIVE

1. To develop a detachable endoscopic lens cleaning system designed to fit a 4mm 0 and 30 nasal endoscope

MATERIAL AND INSTRUMENT DESIGN

The device crafted using a 9cm, gauge 18, stainless steel stylet from an epidural catheter fashioned with an angulated diamond tip (fig. 1) and metal spring clips for telescope attachment (fig.2). The posterior end was connected to plastic tubing (epidural catheter) of a smaller caliber inserted within the full length of the steel tube. The proximal end of the plastic tubing was fitted with an adaptor to which a 10cc syringe was attached (fig.3).

Figure 1

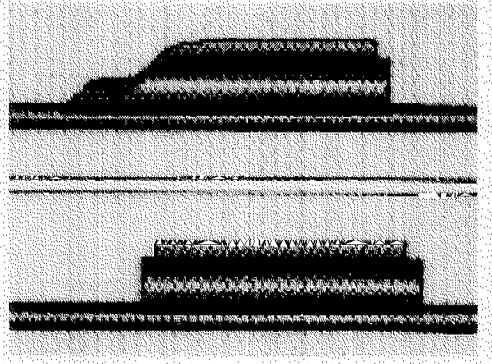

Figure 2

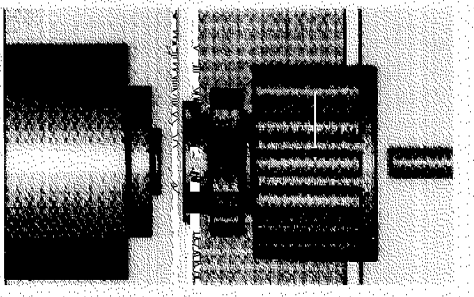

Figure 3

The instrument occupies the distal portion of the telescope of which the main shaft was affixed ventral to the telescope including the plastic tubing. Its over all size only add just a little of around 1.5-mm to the vertical diameter of the telescope. Its angulated end rests 0.5 mm anterior to the ventral edge of the telescope with the diamond tip pointing upwards changing the direction of its bore toward the endoscopic lens (fig.4).

Figure 4

This simple, portable, easy to use and inexpensive endoscopic lens cleaning system has become to be known as the JETSCRUB™.

MECHANISM AND PRINCIPLES

The JETSCRUB™ is a manually operated lens cleaning system that works by means of water or saline solution propulsed in a jet-like fashion from a 10 cc reservoir to the telescope lens. The syringe held vertically in tip-down position by a surgical assist serves as the main motor unit which functions as an irrigator as well as a suction apparatus (depending on the direction of the plunger)(fig.5).

The syringe is filled with 8 to 9 cc of water or saline solution to give room for aspiration in the process of plunger retraction. The water or saline solution is forcibly pumped to the gauge 18 stainless steel cylinder JETSCRUB™ unit attached to the telescope via the indwelling plastic tubing connected with an adaptor to the syringe having a maximum capacity of 10cc. The size of the syringe allows less exertion and strain while introducing water or saline solution into the lens cleaning system. The angulated tip of the JETSCRUB™ unit redirects the water or saline system stream toward the endoscopic lens immediately clearing it of strains and debris from endoscope-surgical field contacts. The velocity of the water or saline stream from a notably small bore creates sufficient force to generate an effective wash. A consequent blur brought about by water or saline remnant is then suctioned out from the field of view by way of simple syringe aspiration by the surgical assist. In addition, the ventrally placed JETSCRUB™ unit allows the water or saline remnant to drip in the direction of its angulated tip while aspiration is in process thereby reenhancing endoscopic image for optimum field visibility.

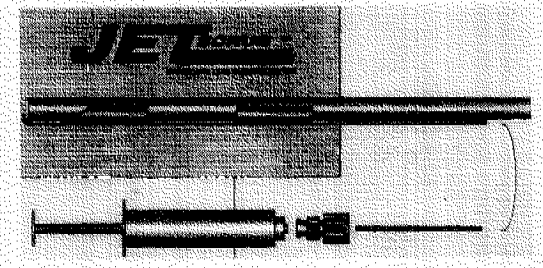

Figure 5

USE AND APPLICATION

The JETSCRUB is basically for intraoperative use. Its lightweight framework and compact size practically does not interfere with telescope handling in nasal and paranasal endoscopic procedures. Its performance on actual nasal and sinus endoscopic surgeries was essentially commendable and almost comparable to the more advanced lens cleaning system. Its application somehow makes the surgeon's task less difficult. However, its non-use will not compromise the outcome of the procedure.

INSTRUMENT COST

The expenses incurred in the production of the JETSCRUB was substantially less, with an approximated cost of 1,000.00 Pesos as compared to the standard cost of the more advanced lens cleaning system, e.g. Endoscrub at 82,200.00 Pesos.

CONCLUSION

The JETSCRUB lens cleaning system is a simple, portable, easy to use and inexpensive endoscopic lens cleaning device. Its use has proven to be a practical adjunct to nasal and paranasal endoscopic operations.

RECOMMENDATIONS

It is recommended that the device be tested using different sizes of tubing to determine the diameter of which it will work optimally. The idea of having the instrument be controlled by the surgeon himself, either by hand or foot control, enabling one to clear the lens at one's discretion is also highly entertained. Lastly, it is also encouraged that the JETSCRUB be utilized in other field of specialty requiring the use of a rigid telescope.

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MULTIFUNCTIONAL RIGID ENDOSCOPE ADAPTOR (MUREAD)*

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ABSTRACT

This multifunctional rigid endoscope adaptor expands the features of the rigid fiberoptic endoscope by the use of simple, inexpensive, commercially available components. This instrument possesses practical features commonly required in the doctor's clinic or operating room. It adds angulated visualization into the nasopharynx or larynx when an oblique andoscope is not available. It also allows scanning of the surrounding area with ease. The instrument can also be adapted to a suction tip for simultaneous control of endoscope and suction, allowing the surgeons other hand free for extra instrumentation. This instrument can also be adapted to a laser fiber likewise allowing hands free extra instrumentation for laser turbinectomy procedures. With proper patient selection this instrument has practical benefits. This gadget, however, is not intended to replace tried and tested surgical technique.

Keywords: Rigid scope adaptor, multifunctional attachments, MUREAD

INTRODUCTION

Since the introduction of fiberoptic endoscopes, Otolaryngology-Head and Neck Surgeons have found several applications for this technology, and allowed great ease in diagnostic & therapeutic procedures. Available technology at present allows greater visualization of problems requiring medical intervention and, when necessary, accurate culture and biopsy (1), also evaluation of airways patency and mucosal condition plus diagnosis of other specific and non-specific diseases. The development of the endoscope can be traced back to the early 1800's when Phillip Bozzini, in 1806 published an article describing the first " Light conductor, or description of a simple device and its use for the illumination of the internal cavities and spaces of the live animal body". This device can "see around the corners, inside cavities of the human body"(2). Now the endoscope has come a long way since its first use, even so, the basic features still remain to be the golden essentials of the fiberoptic endoscope. Several features have been added to improve performance, starting from straight forward zero degree to oblique telescope, to special endoscopic attachments and to the more sophisticated flexible fiberoptic endoscopes. These high tech features is however costly and at times unavailable. Since there is a need to improvise with the use of ready and commercially available components and at the same time reduce expense, an instrument was designed to allow attachment of several clinic instruments to expand the basic features of the rigid fiberoptic endoscope.

The objectives of this paper are: a) to describe a rigid fiberoptic endoscope clinic instrument adaptor that is easily assembled using ready and commercially available components, b) to describe a device that would expand the basic features of the rigid fiberoptic endoscope by attaching instruments available in the clinic, c) to discuss is features, applications, and technique for use.

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DESCRIPTION / DISCUSSION

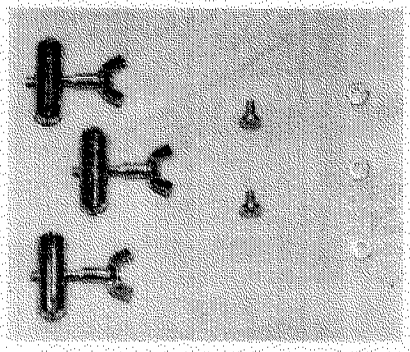

Figure 1. 3 Headmirror joints, 2 metal screws, and 3 metal nuts.

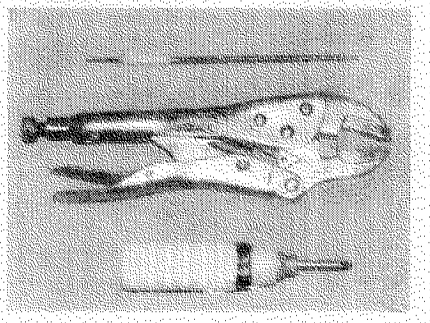

Figure 2. Tools used to manufacture adaptor

The endoscopic adaptor requires 8 basic components; 3 headmirror joints from throwaway headmirrors and 2 metal screws and 3 metal nuts (Fig. 1) which are available in hardware stores or electronics shops. Assembly of the instrument requires 3 tools; a small round metal file, a vise grip or pliers, and a philips screwdriver (Fig2). This adaptor can be manufactured right at home or in clinic, without the need for expensive machine shop operation. Sturdiness of the instrument is assured since there are no plastic parts and no metal welded pieces. Once assembled the Karl Storz rigid fiberoptic endoscope (4mm) with light source can be adapted to a nasopharyngeal mirror, a laryngeal mirror of different sizes for angulated visualization, a flexilase laser nasal fiber (with 30 degree endoscope), and a suction # 10 which may be alternately used for irrigation (Fig.3).

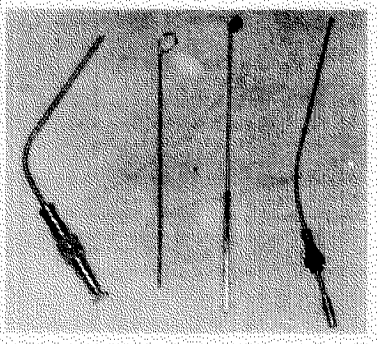

Figure 3. Instruments attached to rigid endoscope

Broken down head mirrors were put to good use by removing there joints including screw knobs. These joints were filed on both inner sides using a round metal file to create a groove that would allow the fixture of the endoscope and instruments. The grooves were of different sizes. 2 joints had 2 grooves, while 1 joint had 3 grooves. The joints that had only 2 grooves namely " mini joint I" and " mini joint II" were locked by 2 small screws and were ground down to an acceptable size to afford compactness and ease of handling. The joint that had 3 grooves was the "stabilizer joint" and retained the original size and knob (Fig. 4).

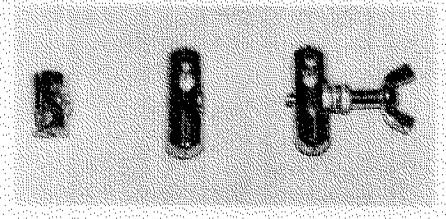

Figure 4. "mini joints I, II" and "stabilizer joint"

This allowed easy manipulation and quick locking action of the mirror when 180 degree scanning of the nasopharynx is done. The "stabilizer joint" retained the most proximal position in the endoscope and was placed permanently while using the adaptor (Fig5).

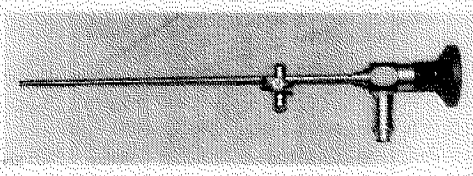

Figure 5. "Stabilizer joint" attached to the Endoscope

The 2 "mini joints" where used interchangeably depending on the type of instrument to be adapted. Mini joint I was used for nasopharyngeal and laryngeal mirrors of different sizes or flexilase laser nasal fiber (Fig.6), while Mini joint II was used for suction tip # 10 (Fig.7).

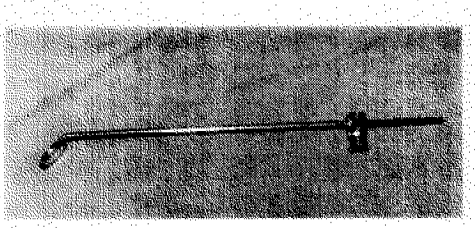

Figure 6. Mini joint I-for mirror exam and flexilase laser Nasal fiber attachment

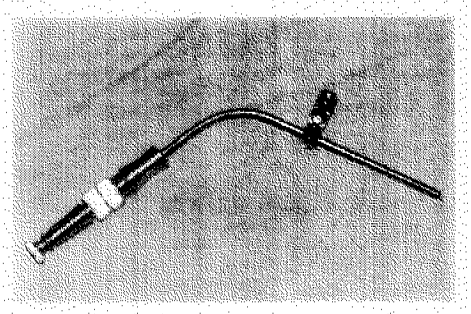

Figure 7. Mini joint II – for suction

The Multifunctional rigid endoscope adaptor (MUREAD) can be used in the following setting:

1. Examination of the nasopharynx and larynx when an oblique endoscope is not available. The (MUREAD) attaches a nasopharyngeal mirror or laryngeal mirror to the endoscope and allows 90 degree angulated vision (depending on angulation of mirror) and 180 degree horizontal scanning with good visualization of the nasopharynx and larynx by slightly unlocking the stabilizer joint and manipulation of mini joint I (Fig.8). The mini joint I however is not intended for use in FESS procedure due to the bulk of the mirror.

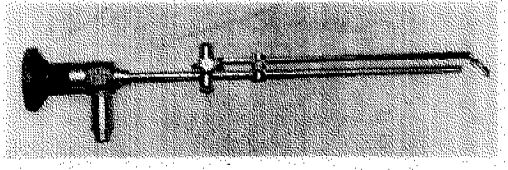

Figure 8. Combination for nasopharyngeal and Laryngeal exam

2. Attachment of a suction tip # 10 to the endoscope for use in suctioning of nasal discharge and nasopharynx or in FESS procedure. This allows hands-free manipulation of the suction tip since it is already attached to the endoscope, bringing the other hand access to other instruments. The suction tip can also act as an irrigator if so desired (Fig.9).

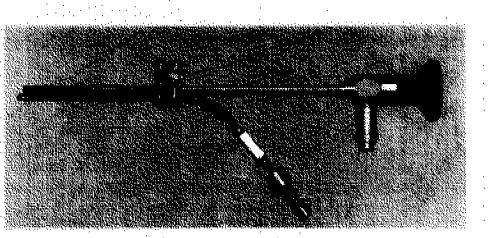

Figure 9. Combination for simultaneous suctioning and Endoscopic visualization

3. Attachment of a flexilase laser nasal; fiber to the endoscope (with 30 degree endoscope) and allow carbon dioxide laser procedures of the turbinate (Fig. 10)

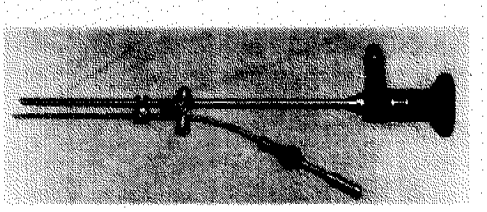

Figure 10. Combination for laser turbinectomy procedure

The MUREAD was used in the out-patient clinic and proved to be a useful instrument in properly selected cases for the examination of the nasopharynx and larynx with good visualization. It can used in patients who cannot tolerate conventional mirror examination (i.e. hypergag, limitation of mouth opening, redundant soft palate mucosa). Area scanning of the nasopharynx or larynx by manipulation of mini joint I provided an added feature not found on oblique endoscopes.

Though not actually tested in the FESS setting, the MUREAD using mini joint II was used to suction off discharge present in the nasal cavity (after decongestion). The adaptor allowed the opposite hand free for extra instrumentation. As an alternative to using the microscope (3), laser turbinectomy procedures can be done under endoscopic guidance. With the fiber tip is always in view during laser emission, use of the attachment would avoid accidental blind firing.

The main limitation of the instrument would be the increased bulk of the combined instrument and the adaptor especially in deep narrow areas, which is why proper patient selection is essential. Sterilization of the device is done the same way as any other metal instrument (i.e. soaking, autoclaving).

CONCLUSION

In the field of Otolaryngology-Head and Neck Surgery, the importance of a thorough and accurate physical examination is vital. Like in other fields of medicine, the ORL-HNS surgeon requires special armamentarium for expert care, but this does not come cheap. Resourcefullness is a character that every surgeon should have. One must be able to make use of what available without compromising patient safety and quality of medical care. This instrument proved useful in properly selected cases. This locally manufactured instrument is easy to make and definitely cheaper than the commercially available models. However, this device neither intends to replace the more high tech instruments if indeed so available, nor complicate any diagnostic or surgical technique.

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FLEXIBLE SUCTION TIP FOR NASAL AND ORAL SURGERY*

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NOEL MOPERA, M.D.**
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ABSTRACT

A flexible suction tip with intermittent or continuous function was devised to solve the problem of blood pooling in oro-nasopharyngeal surgeries.

Eleven surgeons who performed 46 procedures (tonsillectomy, polypectomy and nasal cauterization) were asked to evaluate the instrument. Pooling of blood in oro-nasopharynx was minimized in 95.65% of cases. In 69.57% of cases, surgeons had minimal difficulty in inserting and removing the flexible suction tip. The surgical time was shortened by 25% in 71.74% of cases. The study showed that suction potential of the flexible suction tip is superior than the conventional suction tip. Mild swelling and mild nose bleeding were the only complications noted after the procedure.

Keywords: Flexible suction tip, nasal surgery, oral surgery

INTRODUCTION

Tonsillectomy and polypectomy are still the two most common procedures performed by the otorhinolaryngologists. The majority of the procedures are performed without difficulty. Occasionally, brisk intraoperative bleeding can occur. Accumulation of blood can also create problems with regards to identification of proper tissue plane and frequently, may slow down the dissection time. A solution to this problem is to do intermittent or continuous aspiration of blood in areas where pooling occur. The authors devised an instrument, a modified flexible suction tip for oro-nasopharyngeal surgery, that can reduce such an incidence.

OBJECTIVES

To evaluate the use of the instrument with regards to :

1. prevention of pooling of blood at nasopharyngeal and oropharyngeal areas.
2. providing the surgeon a clear surgical fields and plane of dissection.
3. shortening of surgical time.
4. complications
5. ease of use

MATERIALS

Saliva ejector	- P100.00
2 Suction catheter	
with stop cock	- P 35.00
without stop cock	- P 25.00
6mm screw (metal or plastic)	- P 5.00
rubber tubing	- P 30.00
Y-connector	- P 25.00
Total cost of materials	- P 220.00

The suction tip is made of a flexible, non-collapsible, smooth and soft transparent plastic tube measuring 15cm in length with an inner diameter of 5 mm. A wire was incorporated inside this tube to perform it in any angulation. The tube was modified by installing two (2) types of plastic regulator valves. The first valve functions for continuous and interrupted suctioning while

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the other valve serves for continuous regulated suctioning. A 6 mm plastic screw is used to regulate the vacuum pressure and the volume of fluid aspirated in a particular area. An irrigator port is also installed for flushing the tube during times of obstruction. Another added feature is a Y connector so that a surgeon can use this simultaneously with another suction tip and machine (e.g. Yankawer and intra nasal tips). The suction tip can be used with any type of suction machine. It is provided with a stop cock that can close the ORAL circuit in just two (2) seconds. This will cause the vacuum pressure to concentrate its force in the surgeon's handpiece suction tip. The tip of the tube is provided with a fenestrated smooth rounded nuzzle with an outer diameter of 5.5mm. The fenestrated tip will reduce the incidence of obstruction from clotted blood and will limit trauma to the mucosa it is in contact with. See illustration 1.1 and 1.2.

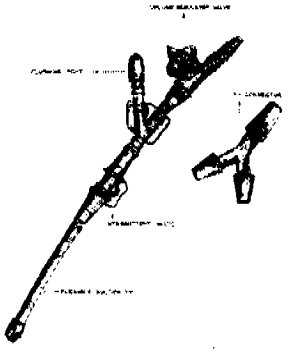

Illustration 1.1

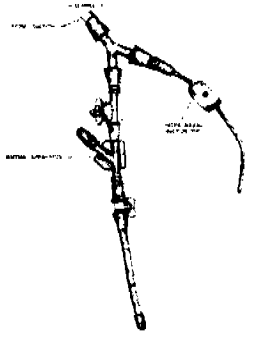

Illustration 1.2

METHODS

Experience has taught us that some operations in the oro-nasopharyngeal areas can be bloody and interfere with the dissection. The suction tip was applied in the areas where blood pooling occurs without obstructing the view of the operative field. Eleven surgeons were asked to evaluate the use of the instrument with regards to the following parameters:

1. prevention of pooling of blood at nasopharyngeal and oropharyngeal areas.
2. providing the surgeon a clear surgical fields and plane of dissection
3. shortening of surgical time
4. complications
5. ease of use

Tonsillectomy procedure

After induction of general anesthesia and routine asepsis and antisepsis procedure with 4% chlorhexidine gluconate solution (phisohex), the suction tube [previously soaked in activated dialdehyde solution (cidex) for 30 minutes] was inserted in the opposite nares hagging the turbinates towards the nasopharynx until it reached the oropharynx. The tube was at the nasopharynx at about 9-10 cm from the collumella and reached the oropharynx at about 11-12 cm. The tube was visualized at the oropharynx by the surgeon and positioned in the location convenient during surgery. Ideally, the tube should be placed in between the two tonsillar fossa. In such location any blood pooling during dissection could be limited. This is done if a nasotracheal intubation is performed because the nasotracheal tube depresses the oropharyngeal wall making it the most dependent area. (See illustration 2.1) If an oral intubation is performed, the flexible tube should be inserted about 13-14 cm from the collumella or few millimeters before the laryngeal inlet, the most dependent region in this case due to tube pressure effect.

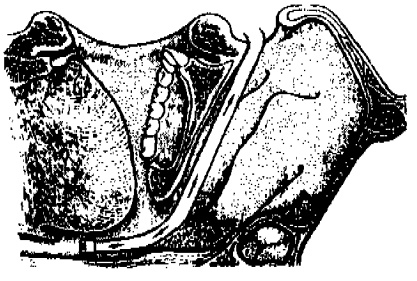

Illustration 2.1.

Polypectomy procedure

The suction tube was inserted transorally hagging the soft palate towards the nasopharynx. This was easily inserted with the aid of a soft palatal retractor. During polypectomy the head of the patient was hyperextended, making the nasopharynx the most dependent portion. During surgery, progressive pooling of blood in the oro-nasopharynx can interfere in the operative field. Application of flexible suction tip prevented pooling because of continuous suctioning, the frequency of changing the working instrument with the traditional suction tip was minimized and more time was devoted to the procedure. This instrument was also able to shorten surgical time and, to some extent, reduce blood loss. Illustration of the actual location of the tube is shown in saggital of head (See illustration 2.2)

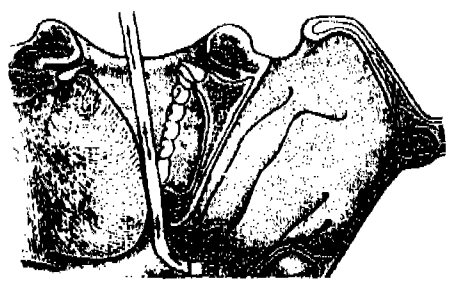

Illustration 2.2

EVALUATION

Effectivity of the device was evaluated on several criteria through a given questionnaires to the surgeons. Please refer to the evaluation sheet.

EVALUATION SHEET

Name of surgeon:
Name of patient:
Type of operation:
Duration:

I A. Pooling of blood and Surgical Field

- ☐ Very Satisfactory - No pooling of blood during surgery
- ☐ Satisfactory - Minimal pooling of blood but does not obstruct surgical field
- ☐ Fair - Pooling of blood obstructing surgical field with minimal difficulty in doing surgery
- ☐ Poor - Pooling of blood obstructing surgical field with great difficulty in doing surgery

B. Adaptability to the instrument

- ☐ Very Satisfactory - Can insert and remove the instrument without difficulty
- ☐ Satisfactory - Can insert and remove the instrument with minimal difficulty
- ☐ Fair - Can insert and remove the instrument with assistance of the authors
- ☐ Poor - Cannot insert suction tip

C. Surgical Time

- ☐ Very Satisfactory - Shortens surgical time by 50%
- ☐ Satisfactory - Shortens surgical time by 25%
- ☐ Fair - No change in the surgical time
- ☐ Poor - Lengthens surgical time

D. Suction Potential

- ☐ Satisfactory - Suction potential of the flexible suction tip is superior than the conventional suction tip
- ☐ Fair - Suction potential of the flexible suction tip is the same as the conventional suction tip
- ☐ Poor - Conventional suction tip is superior than the flexible suction tip

II. Post-op Complications

	None	Mild	Moderate	Severe
1. Swelling	☐	☐	☐	☐
2. Bleeding	☐	☐	☐	☐
3. Others-state if any:	☐	☐	☐	☐
_____	☐	☐	☐	☐
_____	☐	☐	☐	☐

Overall Assessment:
- ☐ Poor
- ☐ Fair
- ☐ Satisfactory
- ☐ Very Satisfactory

Remarks:
_____
_____
_____

RESULTS AND DISCUSSION

Eleven surgeons who performed tonsillectomy, polypectomy and other nasal surgery (cauterization) during the study period of six months were given questionnaires to evaluate the use of the flexible suction tip for nasal and oral surgery.

A total number of 46 patients were operated during this period (Table1). Five surgeons performed 28 tonsillectomies,

another 5 performed 17 polypectomies and 1 performed a cauterization of turbinates for uncontrolled epistaxis. In 44 (95.65%) cases, the surgeons agreed that there was minimal pooling of blood during surgery with the use of modified flexible suction tip in place because of the immediate and continuous evacuation of blood in the operative field. Whereas in 2 (4.34%) cases polling of blood was noted due to incorrect positioning of the instrument (Table 2).

Table 1. Procedures performed

Procedures	Number of cases
Tonsillectomy	28
Polypectomy	17
Cauterization of turbintes	1
Total number of cases	46

Table 2. Pooling of blood during surgery with the Modified Flexible Suction Tube in place

	No. of cases	Percentage
No pooling blood during surgery	0	0
Minimal pooling of blood but does not obstruct surgical field	44	95.65
Pooling of blood obstructing surgical field with minimal difficulty in doing surgery	2	4.35
Pooling of blood obstructing surgical field with great difficulty in doing surgery	0	0
Total number of cases	46	100

In 32 (69.57%) cases, the surgeons were able to insert and remove the flexible suction tip with minimal difficulty, in 6 (13.04%) cases they experienced no difficulty but in 8 (17.39%) cases, the authors were asked to assist in the insertion and removal of the instrument (Table 3).

Table 3. Adaptability to the instrument

	No. of cases	Percentage
Can insert and remove suction tip without difficulty	6	13.04
Can insert and remove suction tip with minimal difficulty	32	69.57
Can insert and remove suction tip with assistance of the authors	8	17.39
Cannot insert suction tip	0	0
Total number of cases	46	100

Of the 46 patients included in the study, surgical time was shortened by 25% in 33 (71.74%) of cases. However in 5 (10.87%) cases it was shortened by 50% and in 8 (17.39%) cases no change in surgical time was noted (Table 4).

Table 4. Surgical Time

	No. of cases	Percentage
Shortens surgical time by 50%	5	10.87
Shortens surgical time by 25%	33	71.74
No change in surgical time	8	17.39
Lengthens surgical time	0	0
Total number of cases	46	100

In 44 (95.65%) of the 46 cases, the surgeons agreed that suction potential of the flexible suction tip is superior than the conventional suction tip, whereas in the remaining 2 (4.35%) cases suction potential is the same as the conventional suction tip (Table5).

Table 5. Suction Potential

	No. of cases	Percentage
Suction potential of the flexible suction tip is superior than the conventional suction tip	41	89.13
Suction potential of the flexible suction tip is the same as the conventional suction tip	5	10.87
Conventional suction tip is superior than the flexible suction tip	0	0
Total number of cases	46	100

Post-operative complications noted were mild swelling in 4 n (8.70%) cases, mild nose bleeding in 10 (21.74%) cases and moderate nose bleeding in 3 (6.52%) cases (Table 6). All were attributed to traumatic and improper insertion and removal of the instrument. Epistaxis observed can be prevented by the application of a topical decongestant to the turbinates prior to insertion of the flexible suction tip and proper removal of the instrument via the nostril or the oral cavity.

Table 6. Post-op Complications

	None	Mild	Moderate	Severe	Total No. of cases
Swelling	42 91.3%	4 8.70%	0	0	46
Bleeding	33 71.74%	10 21.74%	3 6.52%	0	46

Overall assessment of surgeons per case showed that in 44 (95.65%) cases the flexible suction tip was satisfactory while in the remaining 2 (4.35%) cases it was Very Satisfactory.

CONCLUSION

In this preliminary study conducted, the flexible suction tip for nasal and oral surgery has proved to be an excellent device in providing a clear operative field by minimizing the accumulation of blood at the oro-nasopharyngeal areas. It has also shortened the operating time. It is therefore effective, safe and easy to use.

RECOMMENDATION

The authors encourage further studies be done on the use and effectivity of the flexible suction tip.

ANNOUNCEMENT

1. ASEAN CONGRESS
   October 5 to 9, 1998, Davao City
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   Head and Neck Surgery, Inc.

2. ISIAN CONGRESS
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   Head and Neck Surgery, Inc.

FOLDER CLIPS FOR HEMOSTASIS IN CORONAL FLAP*

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ABSTRACT

The use of plastic folder clips as hemostatic clips for coronal incision flaps have proven to be very promising and could be at par with the more high tech and expensive clips. Aside from being an effective hemostatic gadget, they are easy to use, readily available, and reusable.

Keywords: Coronal Flap, Hemostasis, Folder Clips

INTRODUCTION

In spite of the tremendous advancement in technological development in the field of Surgery and Medicine here and abroad, most patients can not afford these state-of-the-art clips that are often not readily available. In order to cope with these advancements in the international scene, one have to adapt and stretch the imagination by simply being innovative, and yet still remain at par with the first world countries.

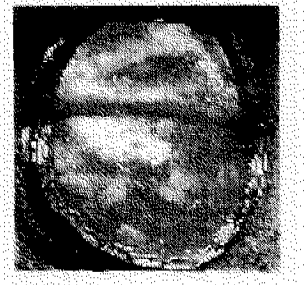

Fig. 1.A. Scalp Flap using the state-of-the-art Caspar scalp clips.

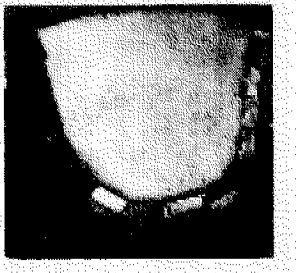

Fig. 1.B. Scalp flap using the state-of-the-art Caspar scalp clips.

The up trend in the number of cases of maxillofacial trauma and neoplasm cannot be denied. The price we have to pay towards modernization and industrialization is high. A better way to approach these cases are by coronal flap incision. The advantage lie in an aesthetically acceptable incision scar and less time consuming, but due to the bleeders being encountered in this type of flap, the time saved in exposing the surgical field is offset by that lost in the control of bleeders. There are several ways to remedy the problem such as to ligate bleeders by cautery or suture tying. The latest concept is the use of the state of the art but expensive clips.

In order to effectively attain the ideal health care delivery to every patient especially those who cannot afford high medical costs, an innovation was introduced in this hospital for the past year with a very encouraging result.

Fig. 2.A. Scalp clips and Caspar clip applicator system

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* Presented, PSO-HNS Poster Session on Surgical Instrumentation December 9,1996, EDSA Shangri-La Hotel, Mandaluyong City
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MATERIALS AND METHODS

The ordinary plastic folder clips are also known as slide stick and are commonly used in fastening files often seen a modern version of the metal or plastic fasteners which come in a variety of colors and sizes.

The plastic clip was cut into small pieces measuring about 1.5 to 2.5 cm in length, using an ordinary steel saw for pvc pipes and conduits. (See Fig. 3-A)

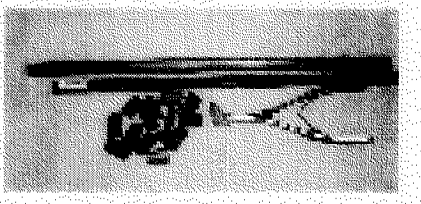

Fig. 3.A. Materials used: ordinary slide stick, folder clips cut into 2 cm. each, nasal speculum

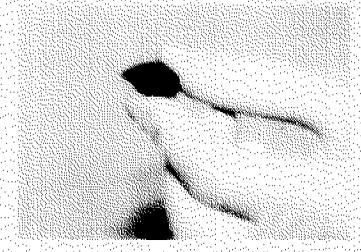

Fig. 4.A. 2 cm cut folder clip held at the base.

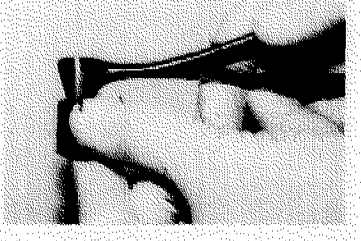

Fig. 4.B. Nasal speculum inserted for opening folder clips.

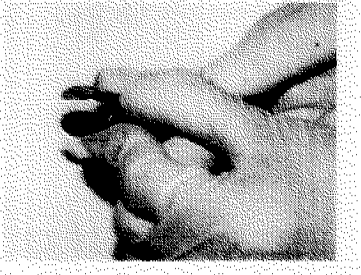

Fig. 4.C. Folder clips ready to be applied.

After doing the incision, and careful dissection at the intermediate layer between the loose connective tissue and the pericranium, the vascularly rich bed with potentially strong bleeders are resected. When scalp is adequately freed from the rest of the fronto-parietal area of the cranial bone, clips were applied immediately to arrest the bleeders. A remarkable decrease in the bleeding was seen, proving the method to be effective (Fig.5-A and 5-B)

Fig. 5.A. Frontal Sinus Mucocoele via coronal incision (viewed from top)

Fig. 5.B. Folder clips used decreases bleeding dramatically.

RESULT

Two patients were subjected to coronal flap incision for different procedures. First patient underwent rigid fixation osteosynthesis for naso-orbital zygomatic complex fracture wherein coronal incision approach was utilized to expose the fronto-nasal area. The said procedure was undertaken with ease and aesthetically sound incision as compared to an open facial approach.

Favorable results were observed in both operations, showing a great potential for future use.

DISCUSSION

The experience with the hemostatic folder clips during the operation was very encouraging. It considerably eases up the operation upon application.

The folder clips are more economical. The price of the scalp clip is approximately P7, 071 per package of 150 clips equivalent to P47.15 per clip. The cost of slide stick is P2.25 per stick. On an average cut of 2 cm per clip, 15 clips will be produced, or about P0.15 per clip.

The instruments used for applying the clips are also very expensive. The Caspar scalp clip applicator alone is P92,977.20. Their are other ordinary types of forceps used for applying and removing scalp clips, the average cost of one is P11, 000 as compared to an ordinary nasal speculum which costs P500 on the average.

COSTS OF SCALP CLIPS VS. FOLDER CLIPS

Scalp Clips	Folder Clips	Difference
P 47.15/clip	P 0.1/clip	P 47.00

COST OF CASPAR APPLICATOR VS. NASAL SPECULUM:

Caspar Applicator	Nasal Speculum	Difference
P 92,977.20	P 500	P 92,477.20

APPLYING FORCEPS VS. NASAL SPECULUM

Forcep	Nasal Speculum	Difference
P 11,000	P 500	P 10,500

In taking into account the variety of clips available in the market it was found that the most suitable type for this procedure is the gray colored clips to its flexibility as compared to the other multi-colored brand which are hard and brittle, that easily cracks or breaks upon application of pressure of the clip opener.

CONCLUSION

The usefulness of the plastic clips is indeed very promising. Even though the instrument for assisting and application is quite crude, its value can be overemphasized in maxillofacial and reconstructive surgery. It is quite significant in terms of its practical application and cost-effectiveness.

REFERRENCE

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ANNOUNCEMENT

1. ASEAN CONGRESS
   October 5 to 9, 1998, Davao City
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A PRELIMINARY STUDY ON THE GEOGRAPHIC DISTRIBUTION OF THE FILIPINO OTOLARYNGOLOGIST-HEAD AND NECK SURGEON: CURRENT AND FUTURE TRENDS*

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ABSTRACT

This paper presents the findings of a retrospective descriptive cross-sectional study of the geographical distribution of Philippine Otolaryngologists-Head and Neck Surgeons based on 160 data sheets of diplomates and board eligibles submitted to the Philippine Society of Otolaryngology-Head and Neck Surgery, Philippine Board of Otolaryngology and the various ENT residency training institutions. Pertinent data needed for the study were placed in a database program-Microsoft Access (version 2.0) and pertinent queries were made with resulting answer. Fifty –eight percent (58.1%) of all otolaryngologists practice in the National Capitol Region (NCR) exclusively while ten percent (10.6%) have a combined NCR and Provincial practice. Only thirty percent (30%) have a purely provincial practice. Forty-seven percent (46.9%) are affiliated with an accredited ENT-HNS residency program while twelve percent (12.5%) are staff members of medical schools without an accredited program. Thirty-nine percent (38.7%) are engaged in purely private practice. All regions have a practicing otolaryngologist except for Region 12. The regions with the highest number of otolaryngologists are the National Capital Region (58.1%), region 4 (10.6%) and Region 3 (9.4%). Nationally, there is one otolaryngologist for roughly every four hundred thousand which is in contrast to the NCR ratio of one otolaryngologist for about every seventy-six thousand. Thirty-nine percent (39.4%) have fellowship training and of these, seventy-one percent (45/63) (71.4%) practice in the NCR and most of them (68.2%) are affiliated with an accredited ENT program. This is in contrast to the general ENT specialists, of which forty-nine percent (48/97) (49.5%) practice in the NCR and most of them (49.5%) are in pure private practice. The most common fellowship taken are: Otology /Neurology /SkullBase Surgery (25.4%), Head and Neck Oncology (20.6%) and Rhinology/Allergy (15.9%). Among the recent graduates (1992-1995), majority (35/75) (46.6%) practice purely in the NCR and most are in pure private practice (72%) (54/75).

Keywords: Geographic distribution, ORL-HNS specialists, trends

INTRODUCTION

Parallel to the continually increasing number of Filipinos is the increasing number of Filipino otolaryngologist-head and neck surgeons. This is both logical and needed so that the population is adequately served by the specialty. In the past few years, there was a noticeable increase both in the number of the accredited residency programs and in the number of graduates per program. One wonders where exactly these specialist go.

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* Presented, PSO-HNS 40th Annual Convention, December 8, 1997
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There are so many questions which must be addressed. Where do the otolaryngologists practice? How many practice in Metro Manila? How many are in the provinces? Are there underserved areas and what are they? How many of the otolaryngologists have additional subspecialty training? Is such extra training availed of in ENT training programs? Are any of these subspecialists in the underserved areas? Do the products of the current residency programs supply and fill up the underserved areas? Is there a need for more programs be located? Are there too many programs in Manila?

It is surprising to note that no formal study has been done to review the actual distribution of otolaryngologists in the Philippines. The Philippine Academy of Ophthalmology has just presented a similar study recently and is trying to plan out its programs with respect to the findings of the study. This paper will attempt to answer all these and other related questions.

SIGNIFICANCE

In order for the Philippine of Otolaryngology and Philippine Society of Otolaryngology-Head and Neck Surgery to jointly plan out the future of residency programs in the Philippines, a review of the current demographic status of practicing otolaryngologists especially the recent graduates must be made. Knowing the distribution of the specialists and the subspecialists throughout the country, strategies can be made to correct any possible undersupply and maldistribution. This knowledge, however, must be correlated with the projected population per region in the country.

OBJECTIVES

General:

To determine the demographics of current practicing otolaryngologists in the Philippines.

Specific:

1. To determine the geographical distribution of the practicing otolaryngologists in the Philippines, in general, and the recent graduates of various ENT programs.
2. To determine the type of practice of these practicing otolaryngologists.
3. To determine the percentage of those otolaryngologists with subspecialty training and correlate this with their geographical distribution and type of practice.
4. To correlate the distribution of otolaryngologists with the general population per region.

MATERIALS AND METHODS

This is a retrospective descriptive cross-sectional study. All diplomates and all board-eligible otolaryngologists who have filled out a query form from the Philippine Society (PSO-HNS) or Philippine Board of Otolaryngology-Head and Neck Surgery were included (160 individuals out of 235). Attempts were made to update and insure the accuracy of the data obtained. The various accredited training programs were also contacted to supply the data for the recent graduates (within 4 years).

All the pertinent data were then logged in the computer using a database program called Microsoft Access (version 2.0). Data logged in included the name, area of practice, type of practice, place of training for residency and fellowships and the year of attendance. Various correlation-queries were then obtained and the percentages were then calculated manually.

RESULTS

Fifty-eight percent (58.1%) of all otolaryngologists practice in the National Capital Region (NCR) exclusively while ten percent (10.6%) have a combined NCR and provincial practice. Only roughly thirty percent (30%) have a purely provincial practice or are currently abroad (Table 1). Forty-seven (46.9%) are affiliated with an accredited ENT-HNS residency program

while twelve percent (12.5%) are staff members of medical schools without an accredited program. Thirty-nine percent (38.7%) are engaged in purely private practice (Table 2).

Table 1. Area of Practice

National Capital Region (NCR)-58.1%(93/100) NCR and provinces combined – 10.6% (17/160)	69% (110/160)
Others (Provinces, US, etc.)	30% (48/160)
Unknown	1.25% (2/160)

Table 2. Type of Practice

Affiliated with accredited ENT residency program	46.9% (75/160)
Affiliated with Medical School but with no accredited ENT program	12.5% (20/160)
Pure Private Practice	38.7% (62/160)
Unknown	1.9% (3/160)

All regions have a practicing otolaryngologist except for Region 12. The regions with the highest number of otolaryngologist are the National Capital Region (58.1%), Region 4 (10.6%) and Region 3 (9.4. %). Approximately 50% of those practicing in Region 3 and 4 also have a combined NCR practice (Table 3). Analysis of the ration of ORL-HNS to the 1991 population shows that there is one otolaryngologist for roughly every four hundred thousand. The national average shows a sharp contrast to the NCR ration of one otolaryngologist for about every seventy-six thousand. Only region 3 and 4 are near the national average, but even they have more patients per otolaryngologist. Other regions appear to be underserved. (Table 4).

Table 3. Geographic Distribution of Otolaryngologists

Regions	Pure	Combined with NCR	Total	Percentage
NCR	93		93/160	58.1%
1	6		6/160	3.75%
2	1		1/160	0.6%
3	7	8	7/160	9.4%
4	9	8	9/160	10.6%
5	1		1/160	0.6%
6	6		6/160	3.75%
7	6		6/160	3.75%
8	1		1/160	0.6%
9	2		2/160	1.25%
10	1		1/160	0.6%
11	4		4/160	2.5%
12	0		0/160	0.0%
Unknown	5		5/160	3.1%
US/UK	2		2/160	1.25%

Table 4. ORL-HNS: Population Ratio

	Number of ORL-HNS	Population (1991)[1]	Ration (ORL-HNS: Population
RP	160	63,620,672	1:379,629
NCR	109	8,295,323	1:76103
1	6	3,742,170	1:623695
2	1	2,436,456	1:2,436,756
3	15	6,526,418	1:435,094
4	17	8,753,209	1:514894
5	1	4,051,837	1:051,837
6	6	5,617,965	1:936,327
7	6	4,798,165	1:799,694
8	1	3,142,464	1:3,142,464
9	2	3,291,009	1:1,645,504
10	1	3,657,039	1:3,657,039
11	4	4,653,816	1:1,163,454
12	0	3,451,644	0:3,451,644

*ORL-HNS serving in two regions are recorded in both
[1] 1991 Philippine Health Statistics

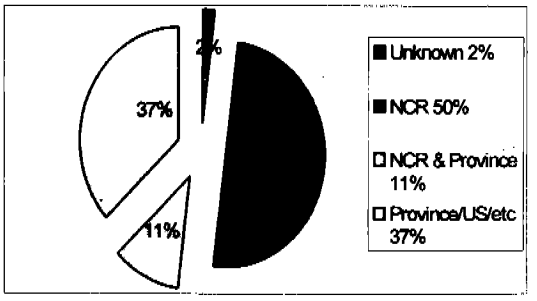
Sixty three have formal fellowship training and of these, seventy-one percent (45/63) (71.4%) practice purely in the NCR which is in sharp contrast to the general otolaryngologists of whom only forty-nine percent (49.55%) 48/97) practice purely in the NCR (Tables 5,6 and 7). Thirty-seven percent of general ENT specialists practice in the province or the US/UK as compared to only nineteen percent of subspecialists.

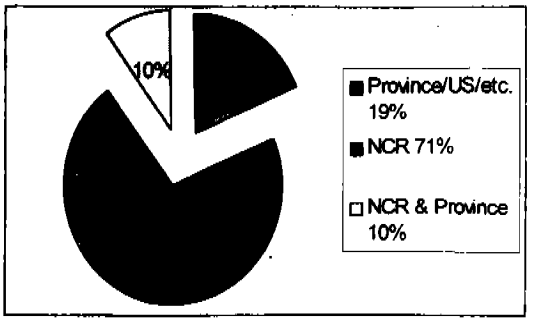
Table 5. Fellowship Training

General ORL-HNS	60.6% (97/160)
With Fellowship Training	39.4% (63/160)

Table 6. Area of Practice by Specialty

General ORL-HNS: Total of 97





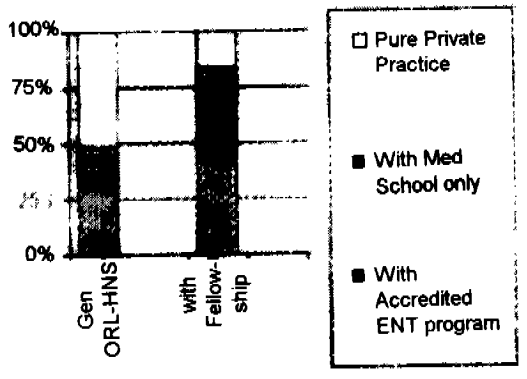
With Fellowship: Total of 63

Table 7. Area of Practice of Subspecialists.

NCR alone: 71.4 % (45/63)	80.9% (51/63)
NCR and Provinces combined : 9.5% (6/63)	
Provinces : 12.7% (8/63)	22.2% (14/63)
US/UK : 6.3% (4/63)	

Most subspecialists (those with fellowships) (43/63-68.2%) are affiliated with an accredited ENT residency program as contrasted to the general otolaryngologists of whom majority (49.5%) (48/97) are in pure private practice (Table8).

Table 8. Type of Practice by Specialty



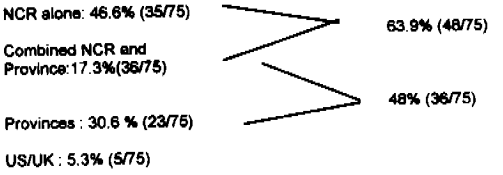
The most common area of fellowship training undetaken was in the subspecialty of Otology / Neurology / Skull Base Surgery (25.4%) followed by Head and Neck Oncology (20.6%). Rhinology / Allergy follows, comprising 15.9% of all fellowships taken (Table 9).

Table 9. Types of Fellowships taken.

	Actual Number	Percentage
Otology/Neurotology/Skull Base	16	25.4
Head and Neck	13	20.6
Rhinology/Allergy	10	15.9
Plastic/Maxillofacial	8	12.7
Multiple	6	9.5
Larynx Brochoesophagology	6	9.5
Pediatric ENT	4	6.3

To determine the current trends, the recent graduate from 1992 to 1995 were analyzed as a group. It can be noted in Table IV that only 46.6% practice in the NCR alone as contrasted to the general average of 58.1% as seen in Table 1. Combining, however, all those with some type of NCR practice, they comprise 63.9% which is not so far from the general average of 69% as seen in Table 1. The percentage of these recent graduates who are practicing in the provinces or US/UK is higher at about 35% compared to the general average of 30%.

Table 10. Area of Practice of Recent Graduates (1992-1995)



Most of the recent graduates are involved in pure private practice (72%) while only sixteen percent are with an accredited ORL-HNS residency program (12/75). Eight percent are affiliated with a medical school which however has no accredited ORL-HNS residency training program (Table 11).

Table 11. Type of Practice of Recent Graduates (1992-1995)

Affiliated with accredited ENT residency program	16% (12/75)
Affiliated with Medical School but with no accredited ENT program	8% (6/75)
Pure Private Practice	72% (54/75)
Unknown	3.9% (3/75)

Table 12 shows that eighty-six percent of the recent graduates do not have any kind of fellowship (65/75). Only ten, comprising thirteen percent, have a fellowship. Of the subspecialties, Otology / Neurology / Skull Base Surgery, again, is the most commonly undertaken.

Table 12. Types of Fellowships taken by Recent Graduates (1992-1995)

None		86.7% (65/75)
With Fellowships – of which:		13.3% (10/75)
Otology/Neurology/ Skull Base:	30% (3/10)	
Pediatric ENT:	20% (2/10)	
Plastic/Maxillofacial:	10% (1/10)	
Rhinology/Allergology:	10% (1/10)	
Multiple:	10% (1/10)	
Larynx/Broncho esophagology:	10% (1/10)	

DISCUSSION

The results show that the distribution of otolaryngologists-head and neck surgeons is skewed of the National Capitol Region. This is true for the general picture and separately for the general ENT specialists and subspecialists. It is also true for the recent graduates. The next commonly served areas

are Region 3 and 4 which are near Metro Manila. Many of the specialists in these areas also practice in NCR. What makes them stay in this area and in the nearby province?

The attraction for practicing in Manila is due to many factors, medical and non-medical. A medical factor to consider is that the otolaryngologists-head and neck surgeon needs a tertiary hospital to be able to maximize the application of his skills while serving his community. One of the medical factors to consider is the general state of the community: is it thriving, can it support specialists in private practice? Other non-medical factors to consider are the availability of good housing, the presence of good schools to send children to, the accessibility of entertainment centers, the convenience of airports and other modes of transportation. Security is a very crucial factor to consider given the conditions in the society today.

Hopefully, with the increasing economic stability and with improved security in the rural areas, there will be a natural attraction to practice in other areas aside from the National Capitol Region. ENT graduates, especially the younger ones, are encouraged to go to the more underserved areas.

An unsolved problem is determining the ideal ration of otolaryngologists to the population. The Philippine has seventy percent of its population below the poverty line. This leaves only thirty percent of the actual population who can sustain the practice of an otolaryngologist. In the recent 7th ASEAN congress, an ideal ration of 1:40,000 was cited for Singapore. Singapore is basically a middle-class society with health insurance for everybody. A different situation exists in the Philippines. Multiplying the Singapore ratio by three (since only slightly less than one-third in our country can afford to go to a private otolaryngologist), gives a theoretical ratio of 1:120,000. Is this the ideal ratio for the Philippines? for the moment, this is uncertain. The Philippine Society and the Philippine Board of Otolaryngology-Head and Neck Surgery must and will have extensive discussion regarding this matter. A lot of future planning depends on knowing what the ideal ratio is for the country.

A more detailed and complete study is being planned. If the future update shows similar results as this preliminary study does, there would probably be a need for more accredited training programs but this must be based in the different provincial university hospitals in consortium with the big government and private tertiary hospitals. Hopefully, this will provide a better geographical distribution of future otolaryngologists and, at the same time, maintain a quality academic background. It is also recommended that the services of those subspecialists in provincial settings be tapped to help serve in these centers.

It is also recommended that there be a moratorium on the opening of new training programs in Manila for the meantime and instead develop consortiums among the smaller accredited Metro Manila programs to give their residents a better and more well-rounded exposure and training. Preference in acceptance to these Metro Manila programs may also be given planning to serve their rural communities.

In general, most otolaryngologists are affiliated with an ENT residency program as compared to the recent graduates of whom majority are in pure private practice. An overwhelming number of subspecialists are affiliated with ENT programs. This is understandable, as the skills and training of these subspecialists are needed to be passed on to the next generation. It is also interesting to note that many general otolaryngologists are affiliated with training programs; this can be explained by the fact that in the past, with the advent of the different training programs, there was need for faculty for these programs and there simply was a lack of subspecialists to fill up these positions. The current and future trend seems to be that, for those seriously considering an academic career, a subspecialty training is a requirement. With the availability of more subspecialtists in the future, the quality and quantity of faculty in these programs can be increased to further enhance the residency training programs.

LIMITATIONS

The principal limitation of the study is the incomplete submission of data forms of all diplomates and non-board certified otolaryngologists which gives us an incomplete picture of the situation. Another confounding problem is that some data sheets were incompletely filled up.

This study does not include the graduates of non-accredited ORL-HNS programs and graduates of EENT programs. They are not recognized by the Philippine Board of Otolaryngology-Head and Neck surgery. Do these graduates have the necessary skills to be deservingly called Otolaryngologist-Head and Neck surgeons and thus be counted as such? These are unanswered questions which will be dealt with in the future by the PSO-HNS and the PBO-HNS.

Nevertheless, with the amount of data gathered, a good picture of the status of the demography of Philippine Otorhinolaryngology-Head and Neck surgery has been obtained.

RECOMMENDATIONS/PLANS

It is recommended that the study be improved in terms of data collection. The authors, with the help of the PSO-HNS, will get the most up to date information on the different graduates-board certified and board eligible otolaryngologists. This is in preparation for an expanded, more detailed study as the data now gathered is only good for preliminary study. With this, even more queries can be made using the database program, thus giving a more complete picture of the present situation.

Once the database is well-tested and proven usable, the PSO-HNS will use it regularly and will regularly update it.

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AMBULATORY CO2 LASER SURGERY IN ORL (Initial Experience at FEU-NRMF)*

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ABSTRACT

The Carbon dioxide laser was used to treat patients with certain ENT conditions. Prior to the development of the Carbon Dioxide laser, excision of this lesions by conventional means often resulted in incomplete removal, significant bleeding, postoperative edema, required confinement and general anesthesia. A total of 133 cases were included in this experience and all were done on an out patient basis. Cases were reviewed as to age, sex, diagnosis, anesthesia used, laser setting, and complications.

Keywords: Ambulatory, laser surgery, ORL applications

INTRODUCTION

Out patient Surgery using the CO2 laser has been a useful alternative to patients with certain ENT conditions. Patients' desire not to be confined and not to undergo general anesthesia have been fulfilled. The prolonged recovery phase of surgery has been minimized. The uses of the CO2 laser in ablation of tissues, vaporization and cutting were all utilized.

OBJECTIVE

The objective of this paper is to review and analyze the ambulatory CO2 laser procedures done as to age, sex, diagnosis, anesthesia, laser setting, and complications.

MATERIALS AND METHODS

The records of all ambulatory CO2 laser procedures were reviewed from March 1995 to October 1996. All cases reviewed as to age, sex, diagnosis, type of procedures, type of anesthesia, laser setting and parameters and late post op complications.

A Sharplan 1055 55 watt CO2 laser enhanced with a " Swiftlase" and " Silktouch" scanning device, "Explume" smoke evacuator, 230mm oropharyngeal handpiece and a 125mm standard handpiece were used.

Oropharyngeal procedures were done with the patient in the sitting position while cutaneous lesions were done with the patient either in the sitting or supine position.

RESULTS

From March 1995 to October 1996 a total of 133 cases were done.
Age ranged from 1 to 70 yrs. old with an average of 35 yrs. old. There were 54 male and 79 female.

The diagnosis and number are as follows:

1. Tonsillitis	44
2. Moles	34
3. Wart	16
4. Hypertrophic turbinates	8
5. Blepharochlasia	6
6. Syringoma	6
7. Hemangioma	5
8. Skin Tags	5

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9. Snoring	5
10. Xanthelasma	5
11. Freckles	4
12. Nevus lateralis	3
13. Ankyloglossia	2
14. Neurofibroma	2
15. Acne Scars	1
16. Ranula	1
17. Rhinophyma	1
18. Tattoo	1
19. Tonsil papilloma	1

Emla was used in 54 cutaneous cases, Lidocaine injection was used in 28 cutaneous, 29 oral and 2 rhinologic cases. Lidocaine spray alone was used in 119 oropharyngeal and 6 rhinologic cases.

The settings of the laser varied depending on the procedure. The following were the laser settings used and the number of cases done:

TABLE 1

A. Laser Ablation of Small Cutaneous Lesions

Laser ablation of Moles	34
Laser ablation of Warts	16
Laser ablation of Syringoma	6
Laser ablation of Skin Tags	5
Laser ablation of Xanthelasma	5
Laser ablation of Freckles	4
Laser ablation of Nevus Lateralis	3
Laser ablation of Neurofribroma	2

Laser setting: 125mm handpiece, focussed, 5-10 watts, continuos wave, continuos mode.

B. Laserbrasion

Laserbrasion of Acne Scars	1
Laserbrasion of Rhinophyma	1
Laserbrasion of Tattoo	1

Laser setting: 200mm handpiece, "Silktouch scanner", focused, 7-10watts, continuous wave, continuous mode.

C. Laser Assisted Intra-oral Procedures

		Laser Setting
Laser Assisted Tonsil Cryptolysis (L.A.T.C.) –	44	230mm handpiece, "Swiftlase scanner", focused, 12-15watts, continuous wave, continuous mode
Laser Assisted Uvulopaletoplasty (L.A.U.P.)	5	1. trenching – 230mm handpiece with backstop, focused, 10-20watts, continuous wave, continuous mode 2. Ablation of uvula – 230mm handpiece without backstop, "Swiftlase scanner", focused, 10-20watts, continuous wave, continuous mode.
Laser release of Tongue-tie	2	125mm handpiece, focussed, 5-10watts, continuous wave, continuous mode
Laser excision of Ranula	1	125mm handpiece, focussed, 5-10watts, continuous wave, continuous mode
Laser excision of Tonsil Tag	1	2230mm handpiece, focused, 55-10watts, continuous wave, continuous mode

D. Laser Assisted Blepharoplasty

Laser Assisted Transconjunctival Blepharoplasty	4
Laser Assisted Upper Blepharoplasty	2

Laser setting: 125mm handpiece, focused, 6-8watts, continuous wave, continuous mode

E. Laser Assisted Turbinectomy (Endoscopic guided)

Laser Assisted Partial Turbinectomy (L.A.P.T.) of hypertrophic inferior turbinates	8

Laser setting: "Flexilase" nasal fibers, 3watts, Superpulse, continuous mode

F. Laser Excision / Ablation of Vascular Lesions

Vaporization of Hemangioma	5

Laser setting: 125mm handpiece, defocused, 5 watts, sharpulse, continuous mode

DISCUSSION

Majority of the cases done were cutaneous lesions like moles, warts and syringomas. During the initial days of the study, EMLA cream was used to produce anesthesia. It was found to be effective but there was a long waiting time for the EMLA cream to fully anesthetize the lesion. Because of this, infiltration with Xylocaine 1% with or without epinephire was utilized. These lesions were small enough to be cut and ablated by the standard 125mm hand piece set at 5-10 watts in continuous wave, continuous mode (1).

Another cutaneous procedure done was laserbrasion for acne scars and wrinkles or "skin resurfacing" as it is otherwise called. Again initially EMLA cream was used, but was later shifted to local infiltration and nerve block. Since these lesions involved wider areas, the "Silktouch" scanning was used with 5-10 watts in continuous mode (2). Postoperatively, biosynthetic occlusive dressing was used initially for these cases but later shifted to Sofratule ointment (generic). Early hyperpigmentation in about 1/3 of the cases was noted but a return to normal after 3 months was seen. Three out of the 6 cases of syringoma recurred on follow-up probably due to the intrinsic depth of the lesion (3).

Intraoral procedures consisted of Tonsil Cryptolysis and Laser Assisted Uvulopalatoplasty. Xylocaine !% spray alone was sufficient anesthesia for 19 out of

49 cryptolysis cases, while the rest required additional infiltration on the pillars. For Tonsil Cryptolysis, vaporization or the tonsil surface and crypts were achieved using 12-15 watts, continuous mode using the "swiftlase" scanner and "explume" (filtered suctioning device) connected to the oropharyngeal handpiece. Tonsil cryptolysis technique achieves the functional results of reduction of tonsil volume, elimination of crypts were bacteria are situated and ablation of thee lymphoid tissues that serves as the foci for chronic tonsillitis. (4) The "swiftlase" scanner is best suited for oropharyngeal procedures due to its depth of penetration. None of thee cryptolysis patients underwent a 2nd session so far, with the longest follow up of 9 months. There were no post op complications.

LAUP experience is still limited to 5 patients. This procedure consists of laser resection of the uvula & soft palate to manage snoring secondary to palatal flutter (5,6). All 5 patients had good results (elimination of snoring). The steps included an initial use of the cutting mode for resection of the uvula & trenching of the soft palate, then the "swiftlase" handpiece was used for ablation of the base of the uvula and part of the soft palate.

Laser was used in 2 cases of upper blepharoplasty and 4 cases of trans conjunctional blepharoplasty (lower eyelids). Transconjunctival blepharoplasty is preferred for young baggy lower eyelids where it has thee advantage of not having an external incision since no skin will be excised. Xylocaine 1% with adrenalin was used as infiltrative anesthesia. For precise cutting the 125mm handpiece was used set at 6-8 watts (8). Bleeding is almost Post-op edema and swelling is very minimal. No complications were noted.

There is limited experience in Laser turbinectomy (anterior turbinate). Special "Flexilase" nasal fibers were used for this procedure set at 3 watts, superpulse, continuous mode (7). Eight cases were successful as far as relief of nasal stuffiness is concerned except for a case wherein a repeat turbinectomy had to be done. The second procedure proved successful.

Two cases of tongue hemangioma was managed using the "swiftlase" scanner, while thee three other hemangioma cases were skin lesions managed using the 125mm handpiece at shapulse mode, defocused, set at 5 watts. All these cases were done under local anesthesia (9,10). Post-operative complications were temporary hyperpigmentation in majority of the cases of moles, warts and syringomas, wound infection in neurofibroma and recurrence in 3 out the 6 cases of syringoma.

SUMMARY

The initial experience using ambulatory CO2 laser surgery at the Department of ORL-HNS, FEU-NRMF was presented. Cases ranged from cutaneous, oropharyngeal to cosmetic surgery procedures. Although cosmetic and oropharyngeal cases are still limited, the outcome and results from laser surgery proved to be promising. Preliminary data from some of the procedures can be used for future research and studies.

Though several studies have compared the laser to conventional procedures, this experience does not intend to replace the tried and tested traditional methods already being done but to add the CO2 laser as an option for the present armamentarium of the ENT-HNS specialist.

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BILATERAL ACOUSTIC NEUROMA: A CASE DIAGNOSIS*

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ABSTRACT

Acoustic Neuroma accounts for approximately seventy-eight percent (1) of all tumors involving the cerebellopontine angle. Hearing loss, tinnitus and vertigo should lead the physician to reserve the unilateral acoustic neuroma as a constant differential diagnosis in any patient presenting with a triad of these symptoms. However, bilaterality occurs in less than five percent of cases. Hence the often missed diagnosis and the grave consequences of such a common error. The tumor usually becomes symptomatic between ages thirty and forty years, and routine autopsies have revealed a very small incidence of symptomatic acoustic neuromas. It is more common in women. A case of a twenty-six year old male with a huge (Six by six centimeter lesion) acoustic neuroma in the left cerebellopontine angle, with a similar, but considerably smaller lesion in the right, presenting only with profound sensorineural hearing loss bilaterally is discussed here. This gross excursion from the classic manifestations of the acoustic neuroma illustrates the variability of presentation of this tumor and re-emphasizes the need for a high index of suspicion for a timely diagnosis.

Keywords: Acoustic neuroma, bilateral sensorineural hearing loss, cerebellopontine angle tumors

INTRODUCTION

The evaluation of sensorineural deafness and vertigo are two of the most frustrating clinical entities that the otolaryngologist deals with on nearly a daily basis. The cerebellopontine angle tumor however, specifically the acoustic neuroma, is not a lesion seen too often by any specialist, and the classical description of a patient presenting with unilateral sensorineural deafness, tinnitus and vertigo is very rarely reproduced in the clinics. A bilateral acoustic neuroma confounds the diagnosis even more, and the late consequences of such an error can be catastrophic for both the patient and the attending physician. However, today with the state-of-the-art imaging modalities, electrophysiologic testing, and the rising competence of the otolaryngologist, there is very little room for error, and the otolaryngologist has very little excuse, if at all, to miss out on the timely diagnosis of such a lesion.

This paper was written with the following objectives in mind:

1. To present a case of a bilateral acoustic neuroma.
2. To illustrate the high index of suspicion necessary in dealing with an otherwise healthy young patient presenting with bilateral sensorineural hearing loss secondary to the acoustic neuroma.
3. To discuss the diagnostic modalities involved in the timely diagnosis of the acoustic neuroma.

CASE REPORT

E.G. is 26-year old male, paint-mixer by profession who sought consult in this clinic with the chief complaint of progressive bilateral hearing loss. The condition started 3 years PTC when a difficulty in speech discrimination was noticed on the part of the patient; specifically, an increasing difficulty in

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conversing over the telephone and listening effectively during class lectures. At this point in time there were no associated signs and symptoms such as headache, blurring of vision, or dizziness.

Two years PTC, the mother noticed the patient's eyes to be *'protruding'* and to appear *'always startled'*. At this point, there were also noticeable slight disturbances in gait and balance.

Eight months PTC the patient was brought to a private hospital. 'Ear cleaning' was done. The patient was advised to undergo several audiologic tests, but the patient was lost to follow up. There were no medications prescribed.

Three months PTC the patient was forced to quit studying due to difficulty in hearing and speech discrimination and subsequently worked as a paint-mixer. Eventually, however, patient stopped working as well due to the progression of symptoms. The persistence of symptoms finally prompted consult in this out-patient clinic.

The patient is an only child, a former commerce student, and a non-smoker, non-alcoholic drinker.

Past medical history revealed only varicella nine years PTC. The patient has had no other previous illnesses or hospitalizations.

E.G.'s mother died at the age of thirty-six, several weeks after surgery for a *'brain tumor'*. The maternal grandmother also died of a 'brain tumor'. No other heredofamilial disease were elicited.

Physical examination revealed a well-nourished, well-built male. There were no cafe-au-lait spots. The rest of the general physical examination was essentially unremarkable. The ear, nose and the throat examination was unremarkable, except for the absence of response to the Weber's and Rhinne's test on either ear.

Pertinent findings in the ophthalmologic examination were as follows: A visual acuity of 6/6 bilaterally; slight proptosis bilaterally; pupils were three to four millimeters, and briskly reactive to light, extraocular muscle movements were full and equal bilaterally. There was bilateral optic disc edema with dull foveal reflexes. The optic disc were slightly hyperemic.

Neurologic examination revealed a patient oriented to three spheres. There was no extraocular muscle paralysis, but there was a weaker corneal reflex in the left. There was no facial paralysis.

Cerebellar function test results were as follows: A positive Romberg's and sharpened Romberg's test; a positive tandem walk with eyes opened and closed; and positive finger-to-nose test. There was no spontaneous, gaze or positional nystagmus elicited.

The impression at this point was a cerebellopontine angle lesion, to rule out a bilateral involvement. The results of the physical examination of the patient required a battery of electrophysiologic tests to confirm the impression.

Audiometry revealed a profound sensorineural hearing loss in the left ear and severe to profound sensorineural loss in the right. Speech reception threshold could not be tested in either ear. Acoustic reflexes were negative bilaterally. Tympanometry, however, was normal in both ears. There were no discernable waves in the ABR even at the maximum levels of stimulus intensity which was one hundred decibels. (Fig. 1) No response was elicited in the minimal Kobrak's and ice-calorics on either ear. Hence, a retrocochlear lesion, specifically, a bilateral acoustic neuroma could not be ruled out. Electronystagmography revealed absent responses to warm and ice calorics in both ears.

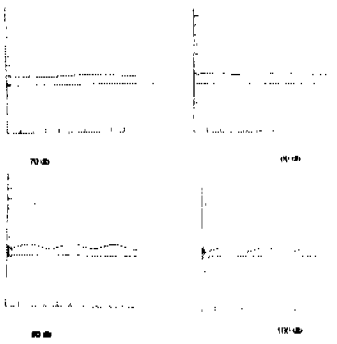

Figure 1. Auditory brain evoked responses (ABR) Showed no discernable waves even at maximum levels of stimulus intensity (100db) in both ears.

Chromosomal analysis using conventional staining of peripheral blood revealed a normal male karyotype with no gross abnormality on either chromosome twenty-two or seventeen. (Fig. 2)

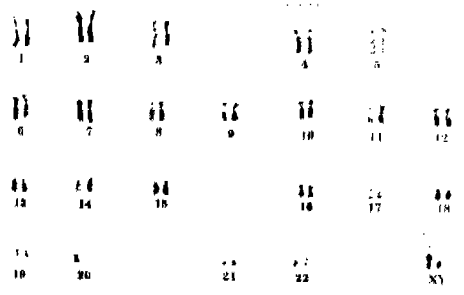

Figure 2. Chromosomal analysis using conventional staining of peripheral blood revealed a Normal male karyotype with no gross abnormalities in chromosome 17 or 22.

Computerized tomography of the head and cerebellopontine angle confirmed a large tumor mass density in the left with greatest diameters of 6.2 by 4.6 by 3.9 centimeters. A similar tumor mass was also noted in the right cerebellopontine angle measuring 1.7 by 1.7 by 1.7 centimeters, exhibiting similar enhancing characteristics (fig. 3). Both CP angle tumors were noticed to extend into their respective internal acoustic canals which were expanded, the left slightly more than the right. The porus acousticus on both sides were blunted. Hydrocephalus and compression of the fourth ventricle with displacement to the right was noted.

Figure 3. Computerized tomography of the head and CP angle confirmed a huge tumor density in the left with greatest diameter of 6.2 by .6. by 3.9 centimeters. a similar tumor was also noted in the right CP angle, measuring 1.7 by 1.7 by 1.7 centimeters, exhibiting similar enhancing characteristics.

At this point, a clinical impression of bilateral acoustic neuroma, to rule out neurofibromatosis type II was strongly considered.

This patient has been strongly advised to undergo surgical removal of the tumor in the left cerebellopontine angle via a combined translabyrinthine/suboccipital approach as soon as it could be arranged. The patient is at the time of this writing currently weighing his options.

DISCUSSION

The acoustic neuroma accounts for approximately six percent of intracranial tumors. All races are affected equally, and it is slightly more common in women. In the Philippines however, as in many Asian countries, no strict tumor registries are in order and the exact incidence of the acoustic neuroma in the Filipino population is not clear. These may represent only a fraction of those actually existing.

The acoustic neuroma occurs in two forms: The 'sporadic' type is the first, which accounts for over ninety-five percent of cases. It is usually unilateral and becomes symptomatic in the fifth decade of life. The second type is the familial type, or that associated with the Neurofibromatoses. The Neurofibromatoses in turn are divided into two: NF type I, in which two percent present with unilateral acoustic neuromas, and virtually none with bilateral involvement; and the NF type II, which is rarer, with five percent of cases presenting with bilateral tumors. Both become symptomatic earlier in life, most in the third decade.

This patient presented two years PTC with a progressively deteriorating speech discrimination, decreased hearing in general, followed one year later by mild disturbances in gait and balance. Despite medical consultation, no diagnostic workups were made and the patient was eventually lost to follow up. Narrowing down the differentials and adding clues to the possibility of a bilateral tumor is the fact that the patient presented with no pertinent history of childhood trauma or infection, viral or otherwise. In addition, an important clue in this patient's history is a strong family history (mother and maternal grandmother) of similar symptomatologies. The patient's mother and grandmother allegedly

presented also with a history of deafness before finally succumbing to a 'brain tumor' while in their middle age, as described by the patient's guardian. Additionally, E.G.s mother, in particular, also presented with elevated 'warty' skin lesions in the middle third of the face, the forehead and the nape. Hence, from the family history alone, a familial type of acoustic neuroma, or neurofibromatosis type II could not be discounted from the start.

In a twenty-six year old male presenting with a progressively deteriorating speech discrimination unilaterally, associated with dizziness and tinnitus, the astute otolaryngologist will undoubtedly have no difficulty in including the acoustic neuroma in the list of differential diagnosis. This triad of symptoms are, to say the least, classic. However, a bilateral presentation (3) ironically confounds the diagnosis even to the experienced otologist, illustrating once more the variability in the presentation of this particular cerebellopontine tumor (4). Hence, a battery of electrophysiologic and imaging tests are always in order to confirm the clinician's suspicion of a bilateral CP angle tumor in any patient presenting with a history and physical examination findings such as this. Poor speech discrimination should always give the otolaryngologist strong clues to the timely diagnosis of an acoustic neuroma. Profound sensorineural hearing loss in these patients is due to mechanical compression and vascular compromise of the eighth nerve fibers.

This patient presented with no true vertigo, thanks to compensation of the vestibular nuclei. Central compensation is more or less the rule of thumb in these cases due to the indolent behavior of the acoustic neuroma, which grows in size an average of .1 to .3 centimeters per year. Nevertheless, the mechanical damage to the vestibular nerves and the presence of brainstem compression undoubtedly are responsible for the gait and balance disturbance in the patient. Large acoustic neuromas indent on the lateral cerebellar lobe and peduncles and may impair the output of a sizable fraction of the ipsilateral cerebellar hemisphere. Hence, the gait ataxia and dysmetria. Patients in the cisternal and compressive stage of acoustic neuroma growth tend to fall toward the side of the lesion, but not invariably so. E.G.s tendency is to fall forward.

The facial nerve appears to be robust in order to sustain substantial mechanical compression and stretch from tumor growth, as very well demonstrated in this patient. The functional integrity of the facial nerve in this particular case has not suffered much despite the monstrosity of the ipsilateral left tumor. A weak corneal reflex in the left denotes involvement of not only the facial nerve but also the trigeminal as well, which is in fact usually the next nerve to be involved as the tumor enroaches outside the internal auditory canal.[5]

Bilateral papilledema is an expected phenomenon in the brainstem compressive and the hydrocephalic stages of acoustic neuroma tumor growth, as again illustrated here. The presence of bilateral papilledema, in close correlation with the rest of the patient's neurologic and neurotologic examination is strongly suggestive that the tumor, slow growing as it is (acute causes of increased ICP will not present with papilledema) has extended beyond the internal auditory canal and the porus acousticus. The presence of beginning hydrocephalus was confirmed by CT scan. E.G. presents, therefore, with beginning brainstem compression and fourth ventricle collapse.

Taking into account the natural history of the untreated acoustic neuroma E.G., if not treated surgically, may soon present with intractable headache, lower cranial nerve involvement, blindness, respiratory disturbances secondary to brainstem hernaition, coma, and eventually death to respiratory arrest. However, an intratumoral hemorrhage may still accelerate the demise, as has been reported in some centers abroad.

The most reliable among the battery of audiologic tests in the diagnosis of the acoustic neuroma is still the auditory brain evoked response (ABR). Although the sensitivity of the ABR approaches ninety-five percent in the diagnosis of the acoustic neuroma, this is markedly reduced when the tumor is in its intracranalicular and cisternal stages (sixty-nine percent sensitivity) (6) The CT scan's prowess as a diagnostic tool becomes very evident once the tumor

erodes the internal auditory canal and widens the porus acousticus. True enough, the results of the CT scan studies made the diagnosis clear; delineating exactly the size and extent of each cerebellopontine angle tumor.

Recently, the magnetic resonance imaging has proved superior to the CT scan in its ability to delineate soft tissue involvement in CP angle tumors and the intracanalicular stage of tumor growth to the millimeter level. At the time of this writing, MRI studies are being arranged for the patient. Although the MRI is no longer necessary as a diagnostic tool in this particular case, wherein the left tumor has progressed to the hydrochepallic stage, the study will prove useful in the operative management of the patient.

The surgical plan is to remove the left CP tumor via a combined translabyrinthine/suboccipital approach the soonest possible time. The functional integrity of the facial nerve is remarkably intact, and should be saved through this approach, sacrificing only hearing, which is in fact almost absent. The tumor specimen will be brought also to a genetics laboratory for chromosomal analysis of chromosome numbers 17 and 22. The results of this study may confirm the strong suspicion of Neurofibromatosis type II in this patient.

CONCLUSION

Any patient presenting with a progressive hearing loss of the sensorineural type should alert the otolaryngologist to the possibility of a cerebellopontine angle tumor. The non-specialist too must be educated on the epidemiology, the symptomatology, and the variability of presentation of acoustic neuroma, which accounts for seventy-eight percent of all CP angle tumors. The importance of a prompt diagnosis can never be overemphasized. Sophisticated and highly sensitive imaging modalities and electrophysiologic tests are available to narrow down on this very challenging clinical entity, and to confirm the suspicion of an acoustic neuroma. The lack of understanding on the presentation of this tumor, however, is a sad reality. The country's lack of a strict and efficient national tumor registry is still another point of contention, hindering advancement in local studies in the acoustic neuroma.

The otolaryngologist must complement clinical instinct with the battery of physiologic and imaging tests available for the confirmation of suspicious physical examination findings consistent with an acoustic neuroma. Poor speech discrimination points to a possible retrocochlear lesion and should serve as an indication in itself to continue with more sophisticated examinations. Abnormalities in the ABR, specifically delayed interpeak latencies between wave three and five are highly suggestive of an acoustic tumor. CT scan studies of the CP angle may be used to delineate the tumor once it has grown beyond the intracanalicular stage, and the MRI is indicated when entertaining the possibility of a small, intracanalicular lesion without bony erosion, or when one wants to delineate the soft tissue involvement of a large tumor mass in order to plan the surgical approach.

This case in point illustrates clearly the high index of suspicion and the ancillary steps necessary for the otolaryngologist and even the general practitioner in dealing with progressive sensorineural deafness in a healthy patient.

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ANNOUNCEMENT

1. ASEAN CONGRESS
   October 5 to 9, 1998, Davao City
   Host: Phil. Society of Otolaryngology-Head and Neck Surgery, Inc.

2. ISIAN CONGRESS
   February 14 to 18, 1999, PICC, Manila
   Host: Phil. Society of Otolaryngology-Head and Neck Surgery, Inc.

3. ASIA-OCEANIA CONGRESS
   February 7 to 12, 2000, PICC, Manila
   Host: Phil. Society of Otolaryngology-Head and Neck Surgery, Inc.