January - March 2000 Vol. 15 No. 1

The Philippine Journal of Oto Rhino Laryngology Head & Neck Surgery

PHILIPPINE SOCIETY OF OTOLARYNGOLOGY HEAD AND NECK SURGERY

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The Philippine Journal of Otorhinolaryngology-Head and Neck Surgery is committed to the publication of scientific work on the specialty. It seeks to disseminate timely and relevant information to improve practice and to inform health policy. It provides a forum for the continuous exchange of views among health professionals concerned with the provision of quality otolaryngologic care.

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Style

Write in simple and clear sentences. Express ideas as logically and succinctly as possible. Refer to Strunk and White's "The Elements of Style" (3rd ed.) for guidance.

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Editorial

Growth by subspecialization

The Society's decision to allow the formation of subspecialty groups within its fold is a long delayed but nevertheless welcome move. Indeed, in a world where knowledge transcends place and paradigm, to stay put is to wither and die. The Society has no choice but to grow and to innovate. It is buffeted at every turn by patients who need increasingly sophisticated care, new technologies that need to be wielded correctly and other providers who have aggressively challenged our expertise in even our traditional "turfs" as the mouth, the face and the nose.

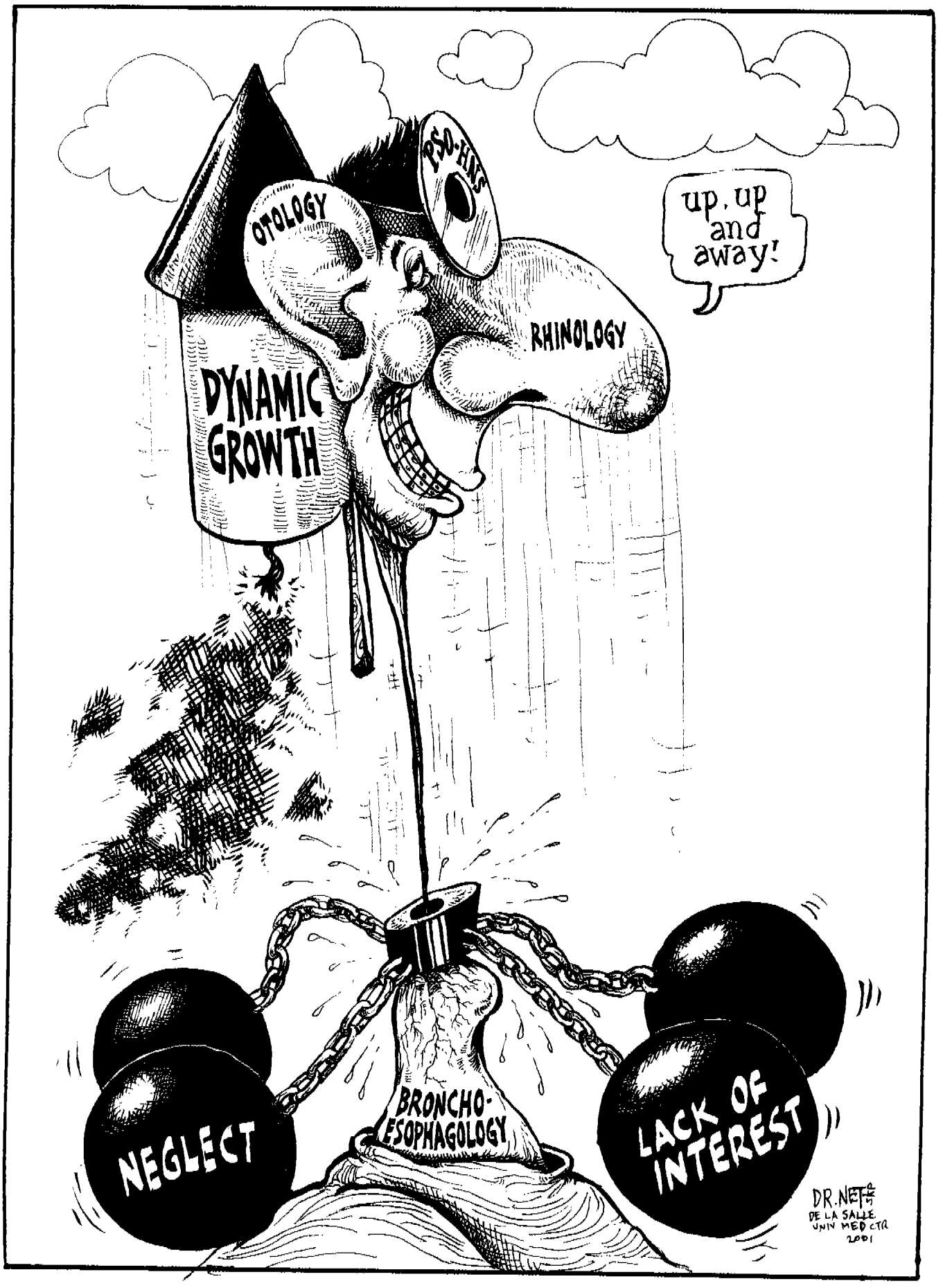
And yet the demands to be more socially relevant and to be responsive to the needs of Filipinos have never been more pressing as now. Precisely because we live in a country that, as one sociologist memorably puts it, can be likened to a sea of poverty on top of which floats a thin layer of the elite, our specialty can not afford to relieve itself of its duty to alleviate the inequities of health everywhere. Subspecialty knowledge remains unused and undeveloped unless it is held accountable for upgrading the quality of the process and outcomes of ENT care that we provide our patients. This flies in the face of those who seek to subspecialize as a means for self-aggrandizement.

And because our Society has had a long tradition of espousing plebeian causes, I am certain that subspecialization need not turn us into Ortega y Gasset's view of specialists "who 'knows' very well his own tiny corner of the universe but is radically ignorant of all the rest."

There is another broader set of reasons that protects us from the dangers of subspecialization. The new millenium has ushered an era of unprecedented growth in human knowledge. Already the conquest of cancer is in the horizon and, although AIDS is still proving too tough a nut to crack, other horrific diseases will soon be so controlled as to be consistent with long comfortable lives. And the key to this growth? The answer is consilience, the notion that all knowledge is connected. Consilience means literally a "jumping together" of knowledge by the linking of facts and fact-based theory across disciplines to create a common groundwork of explanation. This is the same Holy Grail that inspired Einstein, architect of the grand unification of the universe. Bringing to bear the knowledge of seemingly disparate sciences as engineering, medicine and computers prised open the secrets of the human genome. Immunology, chemistry and molecular biology have done the same to tease out the processes underlying the rhinitides.

How then can we grow through subspecialization and remain true to the call for relevance and consilience? First, by going back to the basics. The scientific foundations of our specialty still need to be elucidated, including the molecular tangles of allergy, and the biochemical brew of cancer induction. An emphasis on basic science research, on the study of the nanomechanisms of ENT disorders is critical to expansion of our knowledge base. Second, by a critical and judicious application of new diagnostic, medical and surgical tools. High technology devices are more than new toys for the boys; they are double-edged knives that can heal and kill, sometimes simultaneously, and we need to find the right balance of benefits and harms whenever we decide to use them on every patient. Third, by caring about their ultimate effects on outcomes that matter most to us and our patients---survival, long term morbidity and dependence, body image, quality of life, reassurance, self-worth and economic productivity. We may fit the right hearing aids on all our patients but how many will, upon regaining hearing, will recover their autonomy?

Jose Acuin, MD,MSc


OTOLOGY
P-S-O-H-N-S
up, up and away!
RHINOLOGY
DYNAMIC GROWTH
NEGLECT
BRONCHO-ESOPHAGOLOGY
LACK OF INTEREST
DR. NET
DE LA SALLE UNIV MED CTR
2001

volunteer health workers to do the survey in the different barangays since they were very visible in the barangays and are familiar with the residents. Fourteen volunteer barangay health workers were given an orientation about the questionnaire and a mock interview was performed by each while supervised by the author. Later, an average of 35 questionnaires were given to each. They were instructed not to leave the questionnaires to the respondents but to conduct a one- on- one interview just in case the respondents have some questions or clarifications about the questions. ENT residents, interns and clerks also conducted some of the interviews with neighbors and some family members. The answers were later gathered and collated

RESULTS

A total of 560 respondents were surveyed. Respondents were all adults and residents of the city.

On the probable causes of ear infections, majority of the respondents recognized that "common colds"(79%), dirty water accidentally poured in the ear canal (88%) and leaving the feeding bottle in the baby's mouth while sleeping (61%) can cause otitis media.

Table 1. Perceived causes of ear infections

	Yes (%)	No (%)	Don't know (%)	No answer (%)
Common colds	439 (78.4)	80 (14.8)	35 (6.2)	6 (1.1)
Dirty water poured in the ear canal	491 (87.7)	52 (9.3)	15 (2.7)	2 (0.4)
Feeding bottle left in baby's mouth	342 (61.1)	142 (25.4)	72 (12.8)	4 (0.7)

Three fourths of the respondents were aware that ear infections could give rise to complications. 78% said permanent deafness could ensue while 67% thought that some complications could prove fatal Yet only about 23% thought that these complications could endanger their own children.

Asked how they would recognize ear infection, 69% cited fever and ear pain while 73% cited foul smelling ear discharge. On certain beliefs and myths regarding ear infections and ear care, 67% believed that daily ear cleaning was essential to good ear care. However, only 51% thought that an eardrum, once perforated could neither spontaneously heal (54%) nor be repaired (51%).

Another significant finding is that only 59% know of the presence of an ear specialist in the city who can handle difficult ear infections.

Table 2. Perceived methods of caring for children with ear infections

	Yes (%)	No (%)	Don't know (%)	No answer (%)
Daily cleaning of ear canal	374 (66.7)	155 (27.7)	23 (4.1)	8 (1.4)
Nose blowing can rupture eardrum	396 (70.7)	118 (21.1)	35 (6.2)	11 (1.9)
Hole in the eardrum can not be repaired	283 (50.5)	177 (31.6)	90 (16.1)	10 (1.8)
Swimming can aggravate ear infection	375 (66.9)	130 (23.2)	47 (8.4)	8 (1.4)
Ear discharge is normal in a child	184 (32.8)	301 (53.8)	54 (9.6)	21 (3.8)
Ruptured eardrum will not heal spontaneously	300 (53.6)	126 (22.5)	115 (20.5)	19 (3.4)
No specialist in the city can handle difficult cases of ear infections	130 (23.2)	330 (58.9)	90 (16.1)	10 (1.8)

50.71% of the respondents go to our institution for consult regarding ear infections and 24.1% with a private specialist.

Table 3. Facilities resorted to by respondents

Health facility	n	%
Baguio General Hospital	284	50.7
Health Center	157	28.0
Private specialist	135	24.1
Private Hospital	29	5.2
General practitioner/private doctor	27	4.8
EENT	11	1.9
Others	18	3.3

On the precipitating causes of ear infections, the answers were varied and suggest that the respondents regarded ear infections as provoked by multiple causes.

Table 4. Perceived precipitating causes of ear infections

Precipitating cause	n	%
Water getting inside the ear canal	88	15.7
Colds	78	13.9
Dirty/improper cleaning materials/improper care/cleaning	70	12.5
Not cleaning everyday/poor hygiene	58	10.4
Foreign bodies/dirty materials in the ear	42	7.5
Deafness (?)	42	7.5
Dirty water	32	5.7
Nose blowing	16	2.8
Too much cleaning	16	2.8
Others	53	9.6

Regarding the timing of consult, most respondents would immediately seek care.

Table 5. Timing of consult for ear infection

Timing of consult	n	%
Immediately	526	93.9
After one week	8	1.4
Others (none at all, more than 2 weeks or only if child looked severely ill)	17	4.7

On what home remedies do they put on the child's infected ear, many have answered none but still a good number of respondents answered baby oil (106) and hydrogen peroxide (98).

Table 5: Specific treatments for ear infections

Specific treatments	n	%
None	201	35.9
Baby oil	106	18.9
Hyrogen peroxide	98	17.5
Consult/wait for doctor	32	5.7
Clean with cloth/cotton	23	4.1
Water	19	3.4
Antibiotic/medicine prescribed by doctor	16	2.8
Others	16	3.0

Respondents delay going to the doctor, mostly due to financial problems.

Table 6. Reasons for not going to the doctor for ear infections in a child

Reasons for non-consult	n	%
No money to buy medicine	277	49.5
Can not afford to pay the doctor	122	21.8
Not applicable	81	14.5
No answer	44	7.8
Can not wait in the hospital/clinic	31	5.5
No time	27	4.8
Others	3	0.6

COMMENTS

The misconception that ears should be cleaned daily must be corrected as the cerumen of the canal serves some protective value for the canal skin (8,11). The belief that a hole in the eardrum is permanent and can not be repaired must likewise be addressed as the tympanic membrane has a remarkable capability of self repair. Most acute tympanic membrane perforations will heal spontaneously both in the animals and human beings because of the migration of canal epithelium that occurs at about 0.5mm to 1mm per day. Chronic eardrum perforations may also be closed using the different surgical approaches. (6) If this misconception is not corrected, patients with a chronically perforated eardrum who may be amenable to surgery may not consult at al and thus

Original study

Otitis Media Awareness among City Residents

Emily Grace Teodoro-Estaris, MD*, Edwin M. Cosalan, Md, FPBO-HNS**

Objectives: To gauge the awareness of city residents of the causes, presenting signs and complications of otitis media; to determine which health facilities are usually consulted, the folk myths and the remedies that apply to ear infections, and to develop recommendations on informing residents about otitis media, its proper treatment and the available facilities and services in our institution
Design: Cross-sectional survey
Setting: Urban communities
Participants: Adult residents
Results: Majority of the respondents identified some of the actual situations that may lead to otitis media like "common colds" at 79.39%, dirty water poured in the ear canal 87.67% and leaving the feeding bottle in the baby's mouth while sleeping 61.07%. Many respondents also recognized the danger and complications otitis media can create, but the majority still think that daily ear cleaning is a must. Of note is that 40% are not aware of the existence of competent doctors in the city who can handle difficult cases of ear infections. But majority still seek consult immediately (93.93%) to a doctor for ear infections at our institution (50.71%). Respondents have varied answers as to the causes of ear infections and what to put in the infected ears of a child.
Conclusions: Although many are aware of the determinants and complications of otitis media, there is still a need to correct the many misconceptions, myths and practices about ear care and the causes of ear infections.

INTRODUCTION

Otitis media is still a common and potentially lethal infection among developing countries. The fatal complications of otitis media have been recognized since antiquity. Hippocrates famously said that "acute pain of the ear with continued high fever is to be dreaded for the patient may be delirious and die." [5] Otitis media is the most common cause of OPD consultation in the ENT section of the hospital. (1) It is also the second most common disease of childhood next to upper respiratory tract infection. (2)

Of the 8908 patients seen at our outpatient department from January to December 1997, 1157 (10%) were due to otitis media (1) A small percentage is again seen in the emergency room due to impending intracranial complications. It is the purpose of the study to find out what the residents of the city know about the disease entity.

PARTICIPANTS AND METHODS

A one page questionnaire composed of 21 questions, 16 of which were answerable by "yes", "no" or "I don't know" and the remaining 5 questions of which were open-ended, was administered to residents of the barangays of the city.

The authors made arrangements with the Local Health Department for the

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unduly bear the disability wrought by a perforated eardrum.

A sizable number of the respondents (41%) do not know that capable doctors in the city are capable of treating difficult cases of ear infections. This should be again corrected so as to prevent the possible morbid complications of an otitis media and also to prevent these patients from spending more hard- earned income by hopping from one institution to another.

That most respondents linked the common cold with the onset of ear infection suggests that the importance of upper respiratory infection in the causation of otitis media is a commonly held view. Infants are particularly prone to otitis media because of the low inclination of the Eustachian tube (only 10 degrees to the horizontal) which encourages middle ear insufflation of nasopharyngeal flora and fluid, particularly in the supine position (9).

The stage of complication in an infected ear may be avoided if the disease is detected early and managed properly. Most of the respondents were able to recognize that the presence of a foul smelling ear discharge is a sign of ear infection. Malodorous discharge is a significant early sign of complication. Anaerobic organisms are a major cause of foul smelling discharge.(10)

CONCLUSION

The residents of the city know a good deal about ear infections but much remains to be done to inform them about the true causes of ear infections, the proper ear care and the presence of competent specialist in the city who can manage complicated cases of ear infections.

The results of this study should be considered in planning and implementing health programs aimed at child health in order to better address the caregivers' baseline level of knowledge, build on what they already know, correct their misconceptions and introduce more effective ways of promoting good ear care.

Both the medical staff of the hospital and the barangay health workers should be partners in the implementation and information campaign on certain diseases like otitis media. Barangay health workers are more in direct contact with the patients in the barangay level and can more effectively communicate with them, detect the isease at an early stage and mke the necessary referrals. Hospital staff on the other hand can provide more sophisticated care for advanced or complicated cases.

REFERENCES

Annual Statistical Report, 1997, ENT- HNS.

Kenna, Margaret, "Otitis Media with Effusion", pp. 1592. In Head and Neck Surgery, ed. by Bailey, 1999.

Paparella, M., et al, "Otitis Media with Effusion", in Otolaryngology 3rd ed, 2:1317-1342.

Shambaugh, G. " Acute Otitis Media and Mastoiditis", pp 1343-1376,

Llamas, E. Et al, "Akala ko Luga Lang", Phil J Otolaryngol Head Neck Surg. 1989: 44-46.

Amoils, Philip, MD., et at, " An Animal Model of Chronic Tympanic Membrane Perforation", Otolaryngol Head & Neck Surg J, Jan 1992, 106:. 47- 54.

Widick, Mark, MD., and Coleman, Jack, MD., " Perichondrial Abscess Resulting A High Ear-Piercing- Case Report", Otolaryngol Head Neck Surg J Dec, 1992, 107: 6, part 1, 803-804.

Schuknecht, Harold, MD, "Office Examination of the Ear", Surgery of the Ear & Temporal Bone, 1993, p. 3.

Bluestone, Charles, MD, "Anatomy & Physiology of the Eustachian Tube", Head & Neck Surgery –Otolaryngology by Bailey, copyright 1993, vol. 2, pp.1473, 1478-1479.

Neely,J. G.,MD, "Intratemporal & Intracranial Complications of Otitis Media", Head & Neck Surgery Otolaryngology- Bailey vol. 2, p. 1608.

DeWeese, David, MD, "Infection & Inflammation of the Ear",Otolaryngology Head & Neck Surgery, 7th ed., pp. 395-396.

Original study

Chewing Gum is More Effective than Mefenamic Acid in Relieving Post-Tonsillectomy Pain

Eunice A. Azurin, MD*, Felipe Federico O. Pio Jr., MD, Ferdinand G. Pamintuan, MD**, Benito L. Uy, MD****

Post-tonsillectomy pain is the most common obstacle to the rehabilitation of a patient following tonsillectomy, influencing hospital stay and return to a normal diet. The objective of this paper is to determine the effectiveness of chewing gum in reducing post-tonsillectomy pain.

Thirty adult patients were allocated randomly to receive either chewing gum or oral mefenamic acid immediately after tonsillectomy.

There was a significant difference between the two groups (p=0.002) in terms of the mean reduction in pain scores (1.1 +/- 0.5 and 0.5 +/- 0.5 for the gum and control groups, respectively).

Chewing gum given immediately after tonsillectomy is more effective than oral analgesic in reducing pain. This intervention is cheap, simple and well tolerated.

Key words: Tonsillectomy, pain, chewing gum

INTRODUCTION

Pain is the most significant obstacle to the rehabilitation of a patient following tonsillectomy, influencing hospital stay and ability to return to normal activities. Such pain may last for days, and if poorly controlled, will interfere with early return to normal diet. Anything that is effective in reducing pain experienced post-operatively will reduce length of stay as well as hasten recovery and return to the workforce.

Several methods have been used to control immediate post-operative pain, including infiltration with anesthesia on the tonsillar bed, ice chips and ice cream diet. Schiff in 1982 anecdotally described the chewing of gum post-tonsillectomy as being effective in promoting faster recovery and return to normal diet. The objective of this paper is to determine the effectiveness of chewing gum given immediately after surgery in relieving post-tonsillectomy pain.

PARTICIPANTS AND METHODS

Thirty patients (30) admitted at the service of Otorhinolaryngology of the Santo Tomas University Hospital underwent tonsillectomy under general anesthesia. Excision was done using blunt dissection technique. Bleeding was controlled by suture ligatures using chromic catgut absorbable sutures. Intravenous analgesics were administered immediately post-operatively while in the recovery room.

Fifteen (15) patients were randomly allocated to the study group and fifteen to the control group. Once transported out of the recovery room, all analgesics were withheld. When fully awake, patients in both groups were asked to rate their pain

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using a modified visual analog scale for pain assessment ranging from 1 to 5 was presented with a score of 5 being very painful and a score of 1 being tolerable. Pain was again assessed after forty minutes of treatment using the same scale.

The study group patients were asked to chew one stick of chewing gum for forty minutes. Afterwards, patients were advised to chew gum for ten to fifteen minutes every four hours.

The control group patients were given oral mefenamic acid 500 mg every eight hours round the clock for the first twenty four hours.

Mean pain scores in both groups were compared using t-test.

RESULTS

Fourteen (14) out of the fifteen(15) or 93% of patients in the gum group recorded a significant reduction in post-operative pain with no difficulty returning to a normal diet. There was no post-operative bleeding. In the mefenamic acid group, thirteen (13) out of fifteen (15) or 86% failed to resume to a normal diet. Mefenamic acid was given regularly until the day of discharge.

The mean reduction in pain scores for the gum group was 1.1 +/- 0.5 while that for the mefenamic acid group was 0.5 +/- 0.5. The difference between the two groups was significant (p=0.002).

DISCUSSION

Although tonsillectomy is a common operation, it still carries with it mortality and morbidity. Although hemorrhage and complications related to general anesthesia causes majority of mortality and morbidity, post-operative pain is most significant subjectively and may even be followed by trismus, and subsequently stasis leading to infection of the tonsillar beds, and consequent secondary hemorrhage. Several studies have correlated the manner of surgery, either using blunt dissection, electrocautery or laser to the immediate post-operative pain. A study by Toma, et. al., regarding post-tonsillectomy pain showed that pain persists relatively unchanged for the first four days, during which regular analgesia is required. Some of his samples even exceeded the recommended dosage. A longer acting analgesic was also recommended to cover for night time relief.

The results do show a reduction of pain from Day 1 in those patients who chewed gum compared to the control group. In the control group, pain persisted even on the discharge date.

Pain following tonsillectomy is due to spasm of the muscles associated with mastication. Keeping these muscles active may reduce such pain. A study by Dong, et al in 1995 also showed that chewing gum increases salivary flow. The antibacterial effect of saliva may reduce the rate of infection of the tonsillar fossa and therefore the amount of discomfort felt.

CONCLUSION

This study shows that chewing gum immediately post-operatively was more effective in reducing pain than oral mefenamic acid. This intervention is cheap, simple and well tolerated and we recommend that this study be done on a larger population.

REFERENCES

1. Lavy and Rea. The use of chewing gum in the first post-operative week following tonsillectomy. A prospective randomized controlled study. XVI World Congress of Otorhinolaryngology Head and Neck Surgery. March 1997.
2. Choy, et al. Bipolar diathermy or ligation for hemostasis in tonsillectomy: A prospective study on post-operative pain. J Laryngol Otol. 106:21-22. 1992.
3. Goldsher, et. al. Effects of peritonsillar infiltration on post-tonsillectomy pain. A double blind study. Ann Otorhinolaryngol 105. 1996.

4. Toma, et. al. Post-tonsillectomy pain: the first ten days. J Laryngol Otol. 109: 963-964. 1995.
5. Linden, et. al. Morbidity in Pediatric tonsillectomy. Laryngoscope. 100: 120-123. 1990.

Original study

Videoendostroboscopic Evaluation Of The Larynx: The Medical City Experience

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Data from 353 patients who underwent laryngovideoendostroboscopy (LVES) from August 1997 to October 1998 at the Voice Laboratory were reviewed. Videostroboscopy contributed significant diagnostic information in 37 % of cases. It was critical in altering the previous diagnosis or in giving a diagnosis in an undiagnosed patient in 57 % of cases. Kruskal-Wallis analysis of variance showed that vocal pathologies are significantly correlated to the usefulness of stroboscopy ($p<0.01$) In benign lesions, LVES is useful up to $p < 0.30$. The use of LVES as a diagnostic tool is advocated.

INTRODUCTION

Standard medical practice includes laryngeal examination in patients who present with vocal complaints or dysphonia. Traditionally, most clinicians rely on the use of the laryngeal mirror and headlight in indirect laryngoscopy. More recently, better visualization of the larynx has been made possible with the use of endoscopes (flexible or rigid), brighter light source, and motion photography. In some centers, these techniques are augmented by videorecording the images for playback. But because of the limitation of the human eye to perceive moving objects, much of the behavior of the vibratory vocal fold is not visible through these techniques. To overcome this problem, a technique called *stroboscopy* has been introduced in the diagnostic armamentarium in laryngology and care of the professional voice.

Laryngovideoendostroboscopy(LVES) is the most practical technique of examining the larynx currently available in clinical settings. It allows observation of vocal fold activity and the detailed anatomy of laryngeal structures. Additionally, it provides excellent images that aid in the detection of subtle pathologies not otherwise seen by standard evaluation. This is accomplished with the use of a *stroboscope*. Stroboscopy exploits the limitations of the naked eye. The unaided eye can perceive no more than five distinct images per second and once presented to the eye, the image lingers only for 0.2 seconds after exposure. Stroboscopy makes use of a rigid laryngeal endoscope attached to a light source that generates strobe or flashing light. The pulses of light create an optical illusion with the resultant image of the vocal folds in apparent "slow motion". When used in conjunction with videorecording, a permanent videostrobe record can be obtained for repeated playback.

The basic strobe parameters used to assess vocal fold vibration are symmetry, amplitude, periodicity, mucosal wave, and glottic closure configuration. Symmetry is the degree to which two vocal folds provide mirror images of each other during vibration. Amplitude is the extent of horizontal excursion of the vocal folds during their movement. Periodicity is the regularity of successive cycles as determined by synchronizing the

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stroboscopic flashes and frequency of phonation. Mucosal wave is the observed travellling wave on the surface of the vocal folds. Glotttic closure configuration is determined by the extent of vertical approximation of the vocal folds during the closed phase of the normal pitch and normal loudness vibratory cycles. Interpretation of these vocal fold characteristics by a skilled clinician is necessary to arrive at a correct diagnosis.

In the Philippines, the first voice laboratory utilizing computer integrated laryngeal stroboscopy was begun in this institution in August, 1997. This study is primarily designed to evaluate the added diagnostic value of stroboscopy in patients with voice disorders.

SUBJECTS AND METHODS

Three hundred sixty-five LVES examinations of the larynx were carried out in 353 patients over a 15-month period (August 1997 – October 1998). The study population represents all patients seen at the Voice Laboratory by the second author. All patients were referred to the voice laboratory for diagnostic evaluation of their vocal complaints. Each patient either had an initial diagnosis or no diagnosis at all. Excluded were those patients who had repeat stroboscopic procedures.

Stroboscopic examination was carried out after a brief history taking. Information regarding the patient's daily vocal activity and vocal hygiene were also elicited. All procedures were done using the Kay Elemetrics Computer Intergrated Laryngeal Stroboscope. A 70 degree forward angled rigid laryngeal scope was used in all patients. Subjects were asked to lean forward and flex their head slightly to facilitate unobstructed view of the larynx. The tongue was pulled forward with a piece of gauze to prevent the base of the tongue from impeding the view of the larynx and to stop the subject's attempt to swallow. For subjects with active gag reflex, an anesthetic (Lidocaine 10%) was sprayed on the base of the tongue and the posterior pharyngeal wall. Subjects were asked to phonate at their habitual pitch while the scope was being introduced. During the procedure, phonational tasks were given to the patients. The videostrobe recording was reviewed after each examination based on the stroboscopic parameters (symmetry, amplitude, periodicity, mucosal wave, and glottal closure). Diagnosis and recommendations were made.

The usefulness rating scale from Hirano was used to grade the impact of LVES on clinical management. A usefulness grading of "0" was given if the stroboscopic examination did not contribute new information to the diagnosis or to the subsequent management. A grading of "1" was given if the stroboscopic examination added information by supporting the initial diagnosis or helped rule out other possible pathologies, but did not alter the initial diagnosis. A usefulness grading of "2" was given if the stroboscopic examination provided significant information by altering the initial diagnosis made by non-stroboscopic means or it was critical in providing information leading to the identification of an otherwise undiagnosed pathology. For example a grading of "0" would be given to a patient with severe aperiodicity where phonation could not keep pace with the stroboscope. Here, the stroboscopic examination was no more valuable than a standard fiberoptic examination. A usefulness grading of "1" would be given to a patient with a vocal cord cyst where the mucosal waves were noted to be absent, supporting the diagnosis. A usefulness grading of "2" would be given to a patient without an initial diagnosis where subtle changes in the vocal fold were noted leading to detection of early stage of laryngeal cancer.

Data were evaluated and analyzed using the Kruskal-Wallis analysis of variance by rank.

RESULTS

We did 67 procedures from August to December 1997 and 298 procedures from January to October 1998 for a total of 365 diagnostic procedures.

Table 1 lists the various pathologic categories further subdivided into

subgroups, the number of cases, and the usefulness grading for each disease category.

Table 1. Vocal cord lesions by usefulness of LSEV

Pathology	Total	Usefulness Rating Scale		
		0	1	2
I. Benign Lesions				
Edema	70	4	17	49
Nodules	49	3	26	20
Polyp	33	0	5	28
Cyst	29	0	6	23
Laryngitis	23	0	15	8
Tuberculosis	12	0	4	8
Granuloma	6	0	2	4
Vascular lesions (varices, hemorrhage)	3	0	1	2
Saccular cyst	2	0	2	0
II. Tumors				
Malignancy	10	3	4	3
Pre-malignant (hyperkeratosis, leukoplakia)	6	0	2	4
III. Vocal cord concavity				
Sulcus vocalis	5	0	2	3
Presbylaryngitis or atrophy	4	0	1	3
IV. Scarring				
Web/synechiae	3	0	2	1
V. Neurologic				
Paralysis	26	3	12	11
Spasmodic dysphonia	15	6	6	3
VI. Miscellaneous				
Functional falsetto	3	0	2	1
Psychogenic aphonia	1	1	0	0
VII. Others				
Laryngopharyn geal reflux	21	0	5	16
Dysphonia plicae ventricularis	15	2	4	9
VIII Normal	17	0	13	4

In this series, the major pathologic conditions were (1) benign lesions which include edema, nodules, polyp, cyst, laryngitis, tuberculosis, granuloma, vascular pathologies, and saccular cyst, (2) tumors (malignant and premalignant), (3) vocal cord concavity which includes sulcus vocalis and presbylaryngitis, (4) scarring (web or synnechiae), (5) neurologic conditions which include paralysis, spasmodic dysphonia, functional falsetto, and psychogenic aphonia, (6) others which include laryngopharyngeal reflux and dysphonia plicae ventricularis, and (7) normal examinations.

Stroboscopic examination provided added value and was most useful in cases of benign lesions. It yielded additional information in 28 out of 33 (85%) polyps, 23 of 29 (79%) cysts, and 49 of 70 (70%) cases with edema.

The examination was least useful in the neurologic group. It yielded additional information in 10 of 45 (22%) patients with spasmodic dysphonia 6/15 (40%) and 1 of 1 (100%) patient with psychogenic aphonia.

In 200 recordings (57%), stroboscopic findings provided critical information in establishing the diagnosis. It was useful in 131 recordings (37%) and useless in 22 (6 %).

Table 2. Cases with no previous diagnoses (LVES usefulness index = 2)

Pathology	Number of Patients
Edema	19
Laryngopharyngeal reflux	12
Polyp	10
Nodules	8
Cyst	6
Paralysis	4
Granulomatous lesion (TB, Condyloma)	4
Pre-malignant	4
Granuloma	4
Cancer	3
Sulcus Vocalis	3
Dysphonia Plicae Ventricularis	3
Laryngitis	2
Vascular Pathologies	2
Normal	2
Scarring (Web/Synechiae	1
Total	93

Table 2 shows the cases with a usefulness grading of 2 wherein no initial diagnosis was given and a diagnosis was made after the stroboscopic examination. A total of 93 cases were diagnosed with edema (19/93), followed by laryngopharyngeal reflux (12/93), and polyp (10/93) among others.

Stroboscopy contributed in the diagnosis by identifying loss of mucosal wave secondary to edema and inflammation, subtle lesions of the vocal fold not otherwise seen by mirror examination. Mucus pooling and stranding on areas of the vocal fold ruled out lesions of the larynx. Vascularity of the dorsal surface also led to a diagnosis of cyst in some patients since these vessels always run toward an area with cystic lesions. Sulcus vocalis not much visible by mirror examination was diagnosed in 3 patients. Presence of swollen arytenoids and pacchydermal tissue at the posterior arytenoids suggesting reflux was seen in 12 patients. In 4 cases, pre-malignant lesions were identified stroboscopically by loss of mucosal waves on the involved cord.

The most significant finding from this study was the number of patients who had management decisions changed due to the added information from videolaryngoscopy.

Table 3. Cases with altered diagnoses (LVES usefulness index = 2)

Pathology	Number of Patients
Edema	30
Polyp	18
Cyst	17
Nodules	12
Paralysis	7
Laryngitis	6
Dysphonia Plicae Ventricularis	6
Repeat Strobe	6
Granulomatous Lesion (TB)	4
Laryngopharyngeal Reflux	4
Normal	2
Functional Falsetto	1
Total	113

Table 3 shows a total of 113 cases with a usefulness grading of 2 wherein the strobocopic procedure provided significant information that led to the alteration of the initial diagnosis. Most are benign lesions which include edema (30/113), polyp (18/113), and cyst (17/113) among others.

In the edema group, surgical endoscopy was initially recommended in 10 patients. Therapy focused on improvement of vocal hygiene and avoidance of irritants such as alcohol and tobacco. The rest were misdiagnosed as having either vocal cord lesions or normal larynges. Most cases of cysts were initially thought of as nodules. This is crucial because cysts do not respond to voice therapy and need surgical excision whereas nodules can resolve with a trial of voice therapy.

Vocal pathologies were highly correlated to the usefulness of stroboscopy ($p<0.01$).

Table 4. Vocal cord pathologies by LVES usefulness index and K-W Rank

Pathology	n	Usefulness index			
		0	1	2	Rank
Benign Lesions	227	7	78	142	53.5
Tumors	16	3	6	7	30.5
VC Concavity	9	0	3	6	20
Scarring	3	0	2	1	11.5
Neurologic	45	10	20	15	50
Others	36	2	9	25	38.5
Normal	17	0	13	4	27
Total	353	22	131	200	

It was found to be most useful with regards to benign lesions. Table 5 shows all the benign lesions diagnosed and were subjected to the same statistical analysis arriving at the same conclusion even up to $p < 0.30$. Lesions which benefitted most were edema (64), nodule (61), polyp (47.5), and cysts (46.5) among others.

Patients with large laryngeal lesions were not likely to be helped by stroboscopy in terms of establishing the initial diagnosis (4 cases). Three subjects with vocal cord paralysis secondary to trauma were so aphonic that they could not sustain phonation during the procedure.

Table 6. Types of benign lesions by LVES usefulness index and K-W rank

Pathology	n	Usefulness index			
		0	1	2	Rank
Nodules	49	3	26	20	61
Polyp	33	0	5	28	47.5
Cyst	29	0	6)	23	46.5
Edema	70	4	17	49	64
Granuloma	6	0	2	4	30.5
Laryngitis	23	0	15	8	45
Vascular Pathology	3	0	1	2	24.5
Granuloma tous lesion	12	0	4	8	39
Saccular Cyst	2	0	2	0	20
Total	227	7	78	142	

Six subjects who had neugenic vocal spasticity had complete voice interruptions and could not pace with the stroboscope. Hence, the examinations were useless. The diagnoses of spastic dysphonia were based more on the perceptual characteristics. Without synchrony of the patients' fundamental frequency, stroboscopy failed to provide much information.

DISCUSSION

Historically, *Oertel* is credited with the first laryngeal examination using a stroboscope in 1874, only 24 years after Garcia's introduction of the laryngeal mirror, which became the standard tool for otolaryngologists.

Stroboscopic examination of the larynx has played a central part in the practice of phoniatrics in Europe and Japan since the 19th century. Its role in the evaluation of the voice disorders has been discussed in several foreign studies [1-8].

Since the first major publication on the role of stroboscopy in clinical laryngology by Schondharl appeared in 1960, videostroboscopy has been gaining acceptance as a helpful tool in the diagnosis and treatment planning of vocal pathologies. To use videostroboscopy accurately, it is necessary to understand the process of phonation, principles of videostroboscopy, and the operation of the equipment. Now that it has been introduced here in the country, Filipinos have the opportunity to avail of the services offered by the Voice Laboratory. Documentation of the stroboscopic examination has been fairly made easy and simple.

With regards to the usefulness of stroboscopic analysis of the larynx, our study confirms previous studies done by other authors. It has been proven that stroboscopic analysis is significantly correlated with its usefulness especially in benign lesions of the vocal fold. Colton et al[2] have shown that objective evaluation of stroboscopic examination can be valuable in correctly diagnosing patients and selecting their proper treatment regimen. For example, if the stroboscopic analysis reveals a cyst, unnecessary medications or voice therapy can be avoided and the patient can be immediately recommeded for surgery. Omuri et al[3] found videostroboscopy to be useful in objective evaluation of glottic incompetence and results of thyroplasty. Woo et al[6,7] used LVES to assess findings before and after microlaryngeal phonosurgery and found that dynamic stroboscopic assessment of vocal fold vibratory function is much more valuable as a feedback to the phonosurgeon than is traditional examination with continous light or by flexible fiberoptic laryngoscopy. Careful analysis of various stroboscopic parameters will identify areas that are the result of excess surgical trauma and can be used to develop better phonosurgical tehcnique.

This study has also shown that videostroboscopy has significant usefulness for tumors of the larynx. Previous studies by Von Leden[8] demonstrated a standard light and laryngoscope used in patients with moderately sized tumors could show normal fold movements. In contrast, stroboscopic examination of the same patients showed half had reduced mobility. Therefore, this technique was useful in detecting early stages of cancer.

It is also interesting to note that 93/353 (26%) of the procedures had no initial diagnosis from the attending physician before stroboscopy. Through the

LVES parameters, minute and subtle details of vocal fold vibration was detected, thus leading to a diagnosis. If an initial diagnostic error was presented with conventional methods, a corrected diagnosis was arrived at for selected patients. In this study, mostly those who had a change in diagnosis were those patients with edema, polyp, cyst , or nodules.

Although stroboscopy has many advantages, it has its own limitations. Very hoarse patients prevent adequate recording of the larynx due to their aperiodic vibration. The composite nature of laryngovideostroboscopy dictates that in order for LVES to be useful, the patient must have a relatively periodic acoustic source to pace the stroboscopic light. Another limitation can be the anatomical or neurologic defects which might partially obscure the larynx thus preventing a satisfactory examination.

CONCLUSIONS

In summary, we have found Laryngovideoendostroboscopy (LVES) to be very useful and practical mostly for benign lesions and for some malignant lesions as well. It eliminates diagnostic errors made by traditional laryngeal examination. It is also helpful in selected patients where a diagnosis cannot be determined by conventional means. In addition, it can help classify patients into one of the two treatment groups, either medical or surgical, avoiding unnecessary therapy. Since a permanent recording is available for review, serial evaluation of the larynx is possible and it may increase the patient's motivation to cooperate in treatment strategies through visual feedback.. Also, a better analysis of vocal fold vibratory pattern can be done.

Taking all these into consideration, we recommend that objective parameters based on video analysis be standardized so that a subjective bias of interpretation be limited.

REFERENCES

1. Bless D.M. , Hirano M., Feder R.. Videostroboscopic Evaluation of the Larynx. *Ear Nose Throat Journal* 1987;66:48-58.
2. Colton, R.H., Woo, P., Brewer D.N., Griffin, B., Casper, J., Stroboscopic Signs Associated with Benign Lesions of the Vocal Folds. *Journal of Voice* 1995;3:312-325.
3. Omuri, K., Slavit, D., Kacker, A., Blaugrund, S., Quantitative Videostroboscopic Measurement of Glottal Gap and Vocal Function: An Analysis of Thyroplasty Type 1. *Ann Otol Rhinol Laryngol* 1996;105:280-285.
4. Sercarz, J., Berke, G., Geratt, B., Ming, Y., Natividad, M. Videostroboscopy of Human Vocal Fold Paralysis. *Ann Otol Rhinol Laryngol* 1991;101:567-577.
5. Shohet, V., Courey, M., Scott, M., Ossoff, R. Value of Videostroboscopic Parameters in Differentiating True Vocal Fold Cysts From Polyps. *Laryngoscope* 1996;106:19-26.
6. Woo, P., Casper, J., Colton, R., Brewer, D. Aerodynamic and Stroboscopic Findings Before and After Microlaryngeal Phonosurgery. *Journal of Voice* 1994;8: 186-194.
7. Woo, P., Colton, R., Casper, J., Brewer, D. Diagnostic Value of Stroboscopic Examination in Hoarse Patients. *Journal of Voice* 1991;5:231-238.
8. Von Leden, H. The Electric Synchron-Stroboscope: Its Value for the Practicing Laryngologist. *Ann Otol Rhinol Laryngol* 1961;70:881-893.

Original study

Cefaclor (Ceclor ®) in the Treatment of Acute Tonsillopharyngitis: Effectiveness and tolerability

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Objective: To evaluate the effectiveness of cefaclor (Ceclor ®) 375 mg given BID for ten days in the treatment of acute tonsillopharyngitis. It will also look into early symptomatic response (days 3 – 4) to therapy, and tolerability and safety of the drug.
Methods: This is a Phase IV, open label, non-comparative multi-center study involving 571 patients and 101 physicians.
Results: 571 patients were recruited in the study, 66 (11.6% of all recruits) dropped out or were lost to follow-up during the course of treatment (day 11), and an additional 36 (for a total of 102, representing 18% of the total recruited) dropped out by the end of the study (day 24). At day 3, 89.5% of the patients reported either clinical cure or improvement. Cure rate at the end of the study (Day 24) was 78.5%, or, if patients who are those lost to follow-up are excluded, 97.4%. The adverse event rate was 33.8% (95% CI Exact Binomial : 29.9 to 37.7). However, 83.4% of those with an adverse event were taking concomitant medications. Only 30 of the 121 events reported were probably due to medication intake.
Conclusions: Cefaclor is a safe and effective antibiotic for tonsillopharyngitis. Resolution of symptoms begins at day 3 of intake and almost all patients are well by day 11.

INTRODUCTION

Tonsillopharyngitis is one of the most common conditions encountered in ENT out-patient practice and causes considerable morbidity and loss of productive man-hours. An acute inflammatory condition, the diagnosis is based on the presence of erythematous and/ or exudative tonsils with one or more of the following signs and symptoms: sore throat, dysphagia, odynophagia, fever and tender, enlarged cervical lymph nodes.[1]

Most cases occur during the cooler months of the year as part of common cold and influenzal syndromes. Though often of viral etiology, it is important to recognize bacterial infections, particularly those due to Group A β-hemolytic streptococcus (*Streptococcus pyogenes)* not only in terms of therapeutic management but more important because of the potential complications of a strep throat, namely acute rheumatic fever and acute glomerulonephritis. Suppurative complications such as sinusitis, otitis media, mastoiditis, bacteremia and pneumonia may also occur. Abscess formation, cellulitis and deep neck infections are serious sequels that warrant intensive treatment and hospital care.

Other bacterial types of tonsillopharyngitis could be due to mixed anaerobic infections (that could lead to Vincent's angina and quinsy), *Neisseria gonorrhea, Corynebactrium diphtheriae* and *Mycoplasma pneumoniae. Streptococcus*

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pyogenes, however, is estimated to account for more than half of known bacterial causes of sore throats.[2]

Management [1] includes adequate supportive care: sufficient fluid intake, rest, warm saline gargle, and oral hygiene. Antipyretics and analgesics may be recommended for fever and pain. Early and appropriate antimicrobial treatment provides clinical relief, prevents suppurative complications, and reduces the antigen load and subsequent antibody response, which is important in rheumatic fever prophylaxis[2].

The choice of antimicrobial is ideally based on the results of a culture and sensitivity test. However, given the time and logistic constraints of most outpatient settings, empiric treatment guided by information on resistant patterns prevalent in the area of practice is acceptable. The Phil. Society of Otolaryngology, Head and Neck Surgery [1] recommends a 7 to 10 day treatment with a broad spectrum antibiotic, i.e. amoxicillin or cotrimoxazole, to be shifted to cephalosporins, co-amoxiclav or macrolides if there is poor response within 3 to 4 days.

Cefaclor (Ceclor ®), a second-generation oral cephalosporin, has been in the Philippine market for fifteen years. Its bactericidal action results from the inhibition of cell wall synthesis, a class action of cephalosporins. It has been approved for the following indications: upper and lower respiratory tract infections, skin and soft tissue infection, otitis media, sinusitis, uncomplicated cystitis and symptomatic bacteriuria. While safety and efficacy studies have been conducted for acute bronchitis [3] and community-acquired lower respiratory tract infections in adults [4], this is the first local trial on its use for acute tonsillopharyngitis.

The study aims to evaluate the effectiveness of cefaclor (Ceclor ®) 375 mg given BID for ten days in the treatment of acute tonsillopharyngitis. It will also look into early symptomatic response (days 3 – 4) to therapy, and tolerability and safety of the drug.

Subjects and Methods

This is a Phase IV, open label, non-comparative multi-center study involving 571 patients and 101 physicians. Patients were included in the study if they met all of the following criteria:

1. ≥ 12 years of age
2. clinical diagnosis of acute onset (< 7 days) bacterial tonsillopharyngitis (defined as presence of sore throat and evidence on physical examination of inflammation of the pharynx or tonsils, including swelling and/ or erythema; fever, pharygeal exudate and tender cervical nodes may or may not be present)
3. able to swallow the medication and willing to comply with instructions
4. signed the informed consent form

The following were excluded from the study:

1. those with a history of allergy to penicillin or cephalosporins
2. a previous history of serum sickness-like reaction to cefaclor
3. intake of antibiotics in the 5 days preceding enrollment
4. concomitant use of probenecid or corticosteroid therapy
5. history of renal or liver disease
6. history of rheumatic fever
7. inability to swallow capsules
8. pregnant or lactating women

Patients who fulfilled the study criteria were given 20 tablets of 375 mg cefaclor (Ceclor ®) CD and instructed to take one tablet two times per day (approximately 12 hours apart). They were advised to take the medication at the beginning of a meal or snack and were given a diary card to record intake and their observations. They were asked to return on the 3rd, 11th and 24th day after starting treatment for evaluation. At the end of treatment, they were asked to return the packaging and any excess medication. Patients must have completed at least 80% of the total treatment regimen and been evaluated during the end-of-treatment visit (11th day) to be included in the effectiveness analysis. Those who did not complete the study or meet the criteria for inclusion in the effectiveness analysis but had taken at

least one dose of the drug were included in the safety analysis (intent-to-treat).
The following table summarizes the study design:

Table 1. Summary of study design

	Visit 1 Day 0	Visit 2 Day 3	Visit 3 Day 11	Visit 4 Day 24
Informed consent	✓			
History	✓			
Inclusion /exclusion check list	✓			
Physical examination	✓	✓	✓	✓
Diary cards	✓	✓	✓	✓
Clinical Assessment		✓	✓	✓
	Initial visit	On treatment visit (± 1 day)	End of treatment visit (± 3 days)	End of study visit (± 7 days, 2 wks post-tx)

Clinical response was determined during each visit and was defined as follows:
Cinical cure: elimination of signs and symptoms of infection
Improvement: significant but incomplete resolution of signs and symptoms of infection relative to the patient's baseline
Failure: signs and symptoms have not subsided or improved with therapy, including those requiring treatment with another antibiotic due to non-resolution or worsening of signs and symptoms
Indeterminate: unevaluable due to extenuating circumstances (patient lost to follow-uo or receives a systemic antibiotic for a non-study indication or poor patient cooperation before clinical assessment can be made)
Recurrence: reappearance of the signs and symptoms of infection following symptomatic response at post-therapy assessment of cure or improvement
Adverse event: any undesirable experience or unanticipated benefit that occurs after informed consent is obtained
Serious adverse event: any event which is fatal, life-threatening, disabling or incapacitating or which results in hospitalization, prolongs a hospital stay or is associated with congenital abnormality, cancer or overdose (whether accidental or intentional); in addition, any experience which the evaluator regards as serious or which would suggest any significant hazard, contraindication, side effect or precaution that may be associated with the use of the drug.

Results

571 patients were recruited in the study, 66 (11.6% of all recruits) dropped out or were lost to follow-up during the course of treatment (day 11), and an additional 36 (for a total of 102, representing 18% of the total recruited) dropped out by the end of the study (day 24). The patients' signs and symptoms at the time of diagnosis are presented in the following table:

Table 2. Presenting Signs and Symptoms, all patients

Sign / Symptom	**No. (%) of patients, n=571**
Fever (T > 38.0°C) Mean = 38.04°C	236 (41.3)
Tachycardia (HR ≥ 100/ min) Mean = 85.2 beats/min	62 (10.9)
Elevated diastolic BP (≥ 90 mmHg) Mean BP = 114 / 75	63 (11)
Relevant findings	
Tender neck nodes	348 (60.9)
Throat inflammation	538 (94.2)
Tonsillar exudates	288 (50.4)
Related problems	
Headache	386 (67.6)
Sore throat	560 (98)
Dysphagia	394 (69)
Cough	273 (47.8)
Anorexia	274 (48)
Malaise	403 (70.6)
Other problems:	
Heart	28 (4.9)
Lungs	30 (5.3)
Gastrointestinal	7 (1.2)
Genitourinary	1 (0.2)
Extremities	4 (0.7)

In the assessment of outcomes, only patients with complete information were included. Those who were lost to follow-up or had incomplete data were classified as indeterminate, as defined above. The rate of resolution of the main signs and symptoms is most evident by the end of treatment, on day 11, as seen in Table 3. However, a reduction of about 40% of these signs and symptoms is seen by Day 3 of antimicrobial treatment.

Table 3. Rate of Resolution of Signs & Symptoms, all patients

Sign/ Symptom	% of patients with sign/ symptom, n = 571			
	Visit 1 Day 0	Visit 2 Day 3	Visit 3 Day 11	Visit 4 Day 24
Fever	41.3	16.1	0.2	0.4
Sore throat	98.0	58.3	2.5	0.9
Dysphagia	69.0	30.5	1.2	0.3
Throat inflammation	94.2	57.6	3.2	1.3
Tonsillar exudate	50.4	37.8	2.4	0.3

Based on the assessment of both the physician and the patient, the following outcomes were recorded (Table 4). Based on the physicians' assessment, 89.5% of patients showed a positive (cure and/ or improvement) response to treatment by Day 3 (see Table 4).

Table 4. Patient (Ptt) and Physician (MD) Assessments of outcomes, all patients

	% of patients, n = 571					
	Day 3		Day 11		Day 24	
Assessor	MD	Ptt	MD	Ptt	MD	Ptt
Clinical cure	17.5	13.5	79	71.8	78.5	72.5
Improved	72	67.1	8.1	8.1	1.6	1.8
Failure	2.1	2.1	0.5	0.5	0.2	0.2
Indeterminate	1.6	2.1	0.5	0.5	0.2	0.2
Recurrence	0	0	0	0.2	0.4	0.4
No information	6.8	15.9	12.4	19.3	19.4	25.2

Unfortunately, poor follow-up accounted for incomplete information on succeeding evaluation days; hence cure rates at the end of the study (Day 24) was assessed to be only 78.5%, with a recurrence rate of 0.4% (2 patients) and a cumulative failure rate of 2.8% (13 patients). If indeterminate patients (almost all of whom are those lost to follow-up) are excluded, the cure rate at the end of the study goes up to 97.4% (see Table 6).

The degree of overlap at the end of the study (Visit 4. See Table 4) between the physicians' and the patients' assessments, where both are available, shows 100 % concurrence. It would have been useful to compare the assessments of patients who did not complete the study with those of their physicians to determine whether this rate of concurrence is valid, if the information has been available.

Table 5. Comparison of patients' and physicians' assessments at the end of the study

Patients' Assessment	*Physicians' Assessment*		
	Cure/ Improved	Failure / Recurrence	Total
Cure/ Improved	424	0	424
Failure/ Recurrence	0	3	3
Total	424	3	427

*144 (25.2%) patients did not have information on at least one of the assessments

Table 5 below shows the physician assessments of patient outcomes, considering only those patients for whom information is available:

Table 6. Physician assessment of outcomes, for patients with available information

	No. & % of patients		
	Day 3, n = 571	Day 11, n = 505	Day 24, n = 469
Clinical Cure	100 (17.5%)	451 (89.3%)	448 (95.5%)
Improved	411(72 %)	46 (9.1%)	9 (1.9%)
Failure*	12 (2.1%)	13 (2.6%)	13 (2.8%)
Recurrence	9 (1.6%)	0 (0%)	2 (0.4%)

Indeterminate**	39 (6.8%)	71 (12.4%)	111 (19.4%)

*cumulated, ** denominator used is 571

In addition to cefaclor (Ceclor ®) , 443 (77.6%) patients were reported to have taken concomitant medication. These medications include antipyretics (paracetamol, acetaminophen), vitamins (such as ascorbic acid), painkillers (mefenamic acid, ibuprofen), cough medications (ambroxol, carbocistein), and decongestants (phenypropanolamine, orphenadrine citrate, chlorpheniramine); treatment for specific concomitant problems (hypertension and diabetes) were also taken.

All 571 patients were included in the evaluation for adverse events. One hundred ninety three (193) patients were reported to have at least one adverse event resulting in an adverse event rate of 33.8% (95% CI Exact Binomial : 29.9 to 37.7). However, most of these patients (83.4% of those with an adverse event, see Table 7) were taking concomitant medications. Only 30 of the 121 events reported in Day 3, which is when majority of the events were reported, are probably due to medication intake (abdominal pain, epigastric pain, diarrhea, rashes). Many of the events reported cannot be distinguished from the signs and symptoms of the disease process itself (malaise, cough, fever, nausea, anorexia and vomiting). Over all, the conditions that are likely to be due to medication intake were reported by only 36 patients (6.3% of the total 571), accounting for only 18.6% of all the 193 adverse events.

Table 7 compares the proportions of patients with and without adverse events who were taking concomitant medication with those who were taking only cefaclor (Ceclor ®). The occurrence of adverse events is significantly higher among those taking concomitant medications.

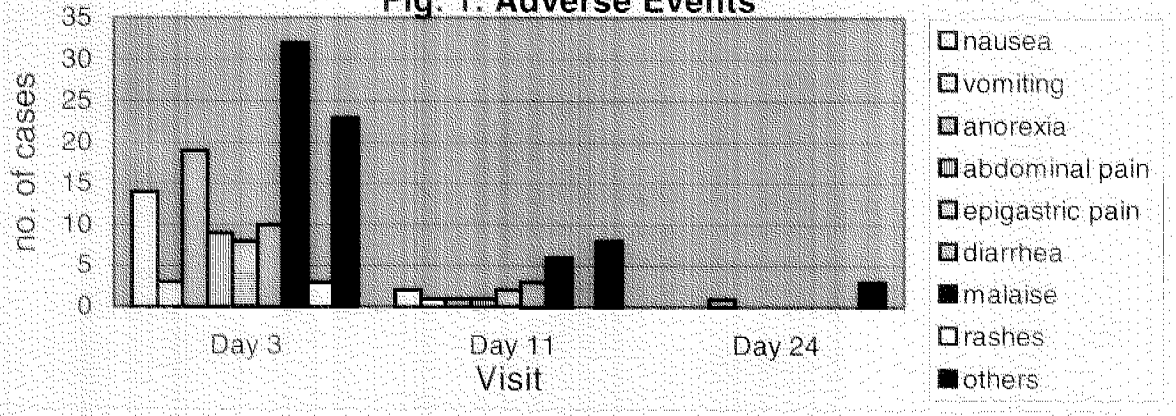
Table 7. Comparison of adverse event rates among those with and without concomitant medication, all patients

Concomitant medication intake	With adverse event, n = 193	Without adverse event, n = 378	Total
With	161	282	443
Without	32	96	128
Total	193	378	571

*Yates corrected $\chi^2 = 5.21$, $p = 0.02$

No serious adverse event was observed throughout the study.

Fig. 1. Adverse Events



Discussion

Our cure rates are more consistent with that of other authors who studies the effectiveness of cephalosporins in tonsillopharyngitis. Schatz et al[5] report meta-analysis results of 84% to 100% response rates when comparing the cephalosporins with the penicillins. They did not find any difference in efficacy when comparing early (< 10 days) and late response to treatment, though they cite the findings of Pichichero and Margolis [6] who

showed more favorable bacteriologic response to the cephalosporins than the penicillins.

Based on the presence of sore throat, throat inflammation and exudates (Table 2), about 40% of patients are relieved of these signs and symptoms by the 3rd day of treatment. However, it is only after 10 days that the desired resolution of symptoms (96 – 99%) takes place. An evaluation at Day 6 or 7 would be necessary to assess whether a shorter treatment regimen is effective.

These results are also consistent with the findings of Del Mar and Glasziou [7] who conducted a meta-analysis that looked into the effects of antibiotic treatment on symptoms and complications of sore throat. In their review, 17 of 18 studies involving 9189 patients were randomised or quasi-randomised controlled trials; 11 of these were double blind. Treatment of sore throat with antibiotics led to a lower incidence of acute rheumatic fever {P < 0.001} and quinsy {P = 0.006}within 2 months; a lower incidence of otitis media within 14 days {P < 0.001}; and reduced symptoms of sore throat {P < 0.001} and headache {P < 0.001} on day 3 compared with the control treatment (no treatment or placebo). 90% of treated and untreated patients were symptom-free by 1 week. No differences existed between the treatment groups for incidence of sinusitis within 14 days or incidence of acute glomerulonephritis within 1 month.

Most of the adverse events reported in the cefaclor (Ceclor ®) study, such as malaise (5.6% of patients) and anorexia (3.3% of patients) were mild and may be attributed to the disease process itself. Those which are likely to be secondary to drug intake, such as diarrhea (1.8% of patients) and abdominal pain (1.6% of patients) were infrequent.

Conclusion

Cefaclor (Ceclor®) given at 375 mg BID for 10 days has proven to be a safe and effective alternative for the treatment of acute tonsillopharyngitis among Filipinos. Resolution of signs and symptoms (in about 40% of patients) begins to be seen on Day 3 of antimicrobial treatment, but the desired response of 96 – 99% resolution is seen only on the Day 11 evaluation after completion of the 10 day recommended regimen. It remains to be seen whether a shorter course will be as effective.

Acknowledgement

This study was made possible through a research grant from Eli-Lilly, Philippines.

References

[1] PSOHNS, 1996. Clinical Practice Guidelines: Otitis Media, Rhinitis, Sinusitis, & Tonsillitis

2 Mandell, Douglas & Bennett's Principles and Practice of Infectious Diseases. 1995, 4th edition, p. 567

[3] Jorge MC., 1998. "Cefaclor AF in the treatment of Bacterial Infections of Acute Bronchitis", unpublished.

[4] Balgos A, et al. 1997. "Etiology of Community-acquired Lower Respiratory Tract infection in adults", unpublished.

5 Schatz, Beth et al. 1996. "Comparison of Cefprozil, Cefpodoxime, Loracarbef, Cefixime and Ceftibuten". *Annals of Pharmacotherapy*, 30:258-268, March 1996.

6 Pichichero ME and Margolis PA. 1991. Pediatric Infectious Disease Journal 10:275-81.

7 Del Mar amd Glasziou. 1998. Evidence-based Medicine 3:52, Mar-April 1998.

Original study

Diameter of Adult Filipino Bony External Auditory Canals

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Objective: To determine the mean diameter of the bony external auditory canal (BEAC) among adult Filipinos using ear canal impressions.
Design: Survey
Setting: Tertiary hospital out patient clinic
Participants and Methods: Impressions were taken from the BEACs of 276 subjects (ages 18-75 yrs.), 141 females and 135 males who were identified from Sept. 1998-Sept. 1999.
Result: The average diameters of the BEACs were 7.54 mm (right supero-inferior(SI)), 6.63 mm (right antero-posterior(AP)), 7.61 mm (left supero-inferior(SI)), and 6.63 mm (left antero-posterior(AP)). Male BEACs had the following average diameters: 7.70 mm (right SI), 6.89 mm (right AP), 7.76 mm (left SI) and 6.85 mm (left AP). Female BEACs had the following average diameters: 7.39 mm (right SI), 6.37 mm (right AP), 7.46 mm (left SI) and 6.41 mm (left AP). There were no significant differences between the average diameters of the right and left ears and between males and females.
Conclusion: BEACs are oval shaped in the vertical axis, measuring about 7.5 mm by 6.5 mm. Male BEACs are slightly larger than female BEACs. Knowledge of these anatomic findings is important in the surgery, care and study of the BEAC.

INTRODUCTION

The basic knowledge of anatomy cannot be overemphasized in the surgery of the ear. Surgical safety and efficacy depends not just on manual dexterity but also on an intimate knowledge of the basic anatomical dimensions of the organs involved.

The dimensions of the bony external auditory canal (BEAC) have been described by authors through different techniques with each setting a different norm from the other. Fredrickson et. al. (1993) reported an average BEAC diameter of 6 mm while Ballenger et. al (1977) noted the diameter to be 7-9 mm. However there is no literature published nor printed to date among Filipinos. Since Filipinos are anthropometrically smaller than Caucasians, Filipino ear canals may also be are proportionately smaller.

The purpose of this paper is to determine the mean diameter of the bony external auditory canal. The results of this study may help in the design of hearing aid ear molds and cotton bud tips that will be minimally traumatic to the ear canals.

PARTICIPANTS AND METHODS

From September 1998 to September 1999, two hundred seventy-six patients who met the inclusion criteria were included in the study, one hundred forty one which are female, and one hundred and thirty five were male. This was done in a tertiary hospital out patient clinic.

A consent form was signed by each participant, stating their willingness to be

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included in the research, after a thorough explanation regarding the study has been given. Subjects were included if they were at least eighteen years old or older, Filipino by race, have no active external or middle ear disease, and were willing to have ear impressions taken. Excluded were those subjects who had cranio-facial malformations, previous ear surgery, history of hearing aid use, impacted cerumen or any history of allergy.

Preparation of Impression Material:

The impression material consisted of microsonic premium vinyl polysiloxane that is easy to measure, mix and insert through the ear. The silicone impression was flexible, yet had total memory. Details of preparation are shown in Figure 1.

Impression Taking by Syringe Technique

Step 1:
A cotton block is an absolute necessity when using the syringe. See to it that a tight block is placed just in front of the tympanic membrane under direct vision. Cotton blocks must be compressed to insure proper results. Be sure to use the correct size of cotton block even though it may appear to be larger in diameter than the ear canal.

Step 2:
Mix the impression material according to instructions and place in the barrel of the syringe. The quicker you can use the material the better the impression.

Step 3:
Insert the plunger and gently push the material into the nozzle to remove air pockets.

Step 4:
Place the nozzle into the canal and fill the canal making sure that the syringe tip is buried in the material at all times.

Step 5:
As the material fills the canal, slowly withdraw the syringe until it reaches the level of the helix and concha completely.

Step 6:
When the external ear has been filled completely, gently press the material with your finger into the concha and helix.

Step 7:
Allow full cure time (10 mins.) before removal. The impression will be distorted if removed too soon. To remove, gently press ear away from the impression. Remove helix curl slightly. Bring impression straight out by pulling the thread attached to the cotton block.

Some technical problems that may be encountered are the following: impressions with insufficient canal depth, canal block not placed deeply enough in the ear, canal area not fully filled by the block, slanted or under-filled canal due to improper placing of the block, distorted impressions due to insufficient curing time.

Special attention is then paid to the canal length and diameter of the impression. The ear canal impression was then transected vertically at 90 degrees right angle with respect to the long axis of the canal. The point of transection was defined at 2 mm from the inner edge of the ear impression.

The following measurements were obtained, by the same person using a single caliper: antero-posterior (AP) and supero-inferior (SI) diameters were measured in millimeters. They were measured from cross sectional slices normal to a curve central axis following the bends of the canal. The anterior wall was corresponded anatomically to the posterior limit of the glenoid fossa, the posterior wall to the mastoid cells and descending portion of the facial canal, the superior wall to the floor of the middle fossa and the inferior wall to the dense bone near the jugular bulb.

The results of the measurements were recorded and analyzed for the level of significance using the t-test.

RESULTS

The average BEAC diameters were 7.5 mm SI and 6.6 mm AP for both right and left ears. The average male BEAC diameters were about 7.7 mm SI and 6.8 mm AP. The female BEAC diameters averaged about 7.4 mm SI and 6.4 mm AP. T-test showed no significant difference with respect to laterality or gender.

Table 1: Mean and median diameters of Filipino bony ear canal (in mm)

	Rt-SI	Rt-AP	Lt-SI	Lt-AP
Mean	7.54	6.63	7.61	6.63
Median	8	7	8	7
SD	0.91	0.98	0.85	0.96

Table 2: Mean and median diameters of male Filipino bony ear Canal (in mm)

	Rt-SI	Rt-AP	Lt-SI	Lt-AP
Mean	7.70	6.89	7.76	6.85
Median	8	7	8	7
SD	0.89	0.95	0.80	0.91

Table 3: Mean and median diameters of female bony ear canal (in mm)

	Rt-SI	Rt-AP	Lt-SI	Lt-AP
Mean	7.39	6.37	7.46	6.41
Median	7	6	7	6
SD	0.90	0.96	0.87	0.96

DISCUSSION

Our results are similar to the 6 mm diameter reported by Pensak and Andleman et. al (1993) but somewhat different from the 7 – 9 mm diameter noted by Ballenger et. al. (1977). The discrepancy in these measurements may be attributed to factors such as height, weight, race and nourishment of the subjects. Further studies may be done to validate our findings.

CONCLUSION

The mean diameter of the adult Filipino BEAC is about 7.5 by 6.5 mm. There are no significant differences between the diameters of the right or left sides or between those of males and females.

REFERENCES

1. Microsonic Custom Earmold Manual, Microsonic Inc. 6th ed. 1998, p 18
2. Ballenger, John Jacob, Disease of the Nose Throat and Ear 12th ed. 1977 Philadelphia, Lea and Febiger Co., 1977 p 609
3. Fredrickson, M. Otolaryngology Head and Neck Surgery V4. ed 3, Mosby Co. 1993

Case report

Giant Cell Tumor of the Temporal Bone presenting as a Deep Lobe Parotid Tumor

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A 23 year-old male with giant cell tumor of the temporal bone, presenting as a deep lobe parotid gland tumor, is discussed as it posed problems with diagnosis and treatment. Cytologic fine needle aspiration biopsy findings revealed carcinoma expleomorphic adenoma vs. acinic cell carcinoma and a CT finding of an infratemporal and para-oro-nasopharyngeal lytic lesion. The patient underwent wide escision and neck dissection. Eighteen moths follwing surgery, the patient is well and exhibits no tumor recurrence. The case is reviewed with pitfalls in diagnosis, appropriateness of treatment and recommendations outlined. It is, after all, the first giant cell tumor of the temporal bone occurring in a Filipino patient.

INTRODUCTION

Giant cell tumor of bone or osteoclastoma is a rare, benign lesion that represents 4 to 5% of all bony tumors. This is usually seen at the epiphysis of long bones and rarely occurs in the skull. Giant cell tumor involving the skull comprise only 1.5% of this total (Dahlin, et al, 1970), and occur in areas of endochondral origin namely, the maxilla, mandible, sphenoid, ethmoid and temporal bones. Less than 25 cases of giant cell tumor of the temporal bone are reported in the world. In general, primary bone tumors of giant cell origin are predominant in females occurring in the second and third decades of life. Due to its rarity, no individual has any extensive experience in dealing with the lesion, and there is no standard method of treatment. Diagnosis remains elusive with most cases in literature misdiagnosed preoperatively.

This documented case of a 23 year-old male with giant cell tumor of the temporal bone is presented to contribute to literature one more case of a true giant cell tumor. The inherent dilemma in the diagnosis of this neoplasm and the challenge of adequate treatment of a benign but locally infiltrative disease is of great interest to the otolarygologist-head and neck surgeon. In the management of this case, the extent of surgery of an anatomically complex region of the skull, with the intent of decreasing the risk of recurrence, is weighed against the quality of life in this young life.

CLINICAL PRESENTATION

R.G., a 23 year-old from Surigao, Northern Mindanao, was admitted at our institution for a right infratemporal mass. Eight months earlier, the patient noted onset of high-pitched, unremitting, ® sided tinnitus and aural fullness associated with nasal stuffiness, sneezing, and rhinorrhea. There was no improvement of the said symptoms following weeks of oral antibiotics as prescribed by a physician. Five months prior to admission, the patient

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was seen at the outpatient clinic with complaints of persistent tinnitus, and otalgia. Examination of the patient revealed a slight pre-auricular swelling, a bulging ® tympanic membrane and moderate conductive hearing loss. The patient underwent myringotomy yielding serous fluid, negative for microorganisms on gram stain. A nasopharyngeal biopsy revealed "chronic inflammation".

On follow up, three months prior to admission, a right soft palate bulge and a smooth mass in the ® external auditory canal were noted. Biopsy of the latter revealed "cell suggestive of benign cystic contents". An assessment of deep lobe parotid new growth with external auditory canal extension was entertained. At this time, the patient developed ® lateral gaze palsy. There was no weight loss, blurring of vision, epistaxis, headache or dizziness.

CT imaging revealed "a right infratemporal and para-oro-nasopharyngeal mass with associated sphenoid and petromastoid bone erosions, and a ® temporal intracranial extension". Repeated fine needle aspiration biopsies revealed "cells suggestive of a low grade salivary gland neoplasm probably pleomorphic adenoma". Review of these slides was done, and signed out as "carcinoma ex pleomorphic adenoma vs. acinic cell CA". The patient was admitted for surgery.

An infratemporal fossa approach using an extended pre-auricular paritodectomy incision to the temporoparietal scalp was developed. A modified radical neck dissection, type I (with preservation of CN XI) was performed with neck nodes (levels I, II and III) sent for frozen section; these were read as "reactive lymphadenitis". External carotid ligation was done below the facial artery.

Intraoperative findings consisted of a huge infratemporal mass involving the parotid gland, the zygomatic process of the temporal bone, the condyle, the petromastoid bones, the pars squamosa and the lateral skull base. The facial nerve was infiltrated by tumor and had to be sacrificed. Wide excision involved total parotidectomy, segmental mandibulectomy and resection of the zygomatic process of the temporal bone at the lateral orbital rim. Residual tumor was scraped off the intact dura of the temporal lobe from the temporal pole anteriorly to the cerebellopontine angle posteriorly. A static temporalis sling and tarsorraphy were made.

The gross specimen was 6x5x1-cm osseous plate of tissue on which are adherent irregularly shaped, brown-tan, and friable areas. Although the attached bone plate was focally rarified, no definite origin from bone can be demonstrated. Microscopically, multinucleated giant cells of the osteoclastic type in a stroma of ovoid to spindle shaped cells are seen. Parotid tissue was normal. The final Histopathologic report was giant cell tumor of bone.

The patient's postoperative course was uneventful. No postoperative radiotherapy was done.

DISCUSSION

This case, indeed, presented related to diagnosis and treatment. The consideration of a nasopharyngeal carcinoma in the beginning was due to unresolved otitis media in the background of nasal symptoms: stuffiness, rhinorrhea, and sneezing. The development of pre-auricular swelling, the persistence of otitis media and a moderate conductive hearing loss to an impression of a parotid new growth. Though initial fine needle aspiration biopsy slides were interpreted as pleomorphic adenoma, the subsequent impression of carcinoma ex pleomorphic adenoma vs. acinic cell carcinoma was consistent with the clinical findings of a pre-auricular swelling, a parapharyngeal mass and extent of tumor involvement on CT image.

Table 1. Case Reports of Giant Cell Tumor of the Temporal Bone

#	Publication	Author	Symptoms	Location of tumor
1	1949	McNerney	Deafness, pain, tinnitus	Petrous pyramid
2	1953	Dinning	Deafness, vertigo, tinnitus	Temporal bone
3	1960	Paterson	Deafness, swelling	(+) Root of zygoma involvement, petrous pyramid
4	1969	Rosenwaser	Hearing loss, facial weakness	Mastoid
5	1969	Jamieson	Deafness, earache, neurologic sign and symptoms	(R) Temporal bone
6	1970	Moyes	Hearing loss, difficulty with swallowing, X, XI, XII involvement	(+) Jugular bulb involvement
7	1974	Glasscock and Hunt	Frontal headache, diplopia	(L) Petrous pyramid
8	1978	Bitoh, et al	----	(R) Petrous, mastoid
9	1978	Ashamallah	Multiple cranial neuropathies	Petrous
10	1981	Daniilidas, et al	Painless swelling, (R) postauricular area	(R) Temporal bone
11	1982	Zelig, et al	---	---
12	1983	Muller, et al	---	Middle ear, petrous bone
13	1985	Motomochi, et al	---	Temporal bone
14	1986	Cook, et al	---	Infratemporal fossa
15	1987	Findlay, et al	Ear pain, hearing loss	(R) Middle cranial fossa, petrous pyramid
16	1988	Tandon, et al	Ear pain, tinnitus, (+) swelling, left side of face	Temporosphenoidal region
17	1992	Bertoni, et al	Pain, swelling, postauricular area	Temporal bone
18	1994	Saleh, et al	---	Infratemporal fossa
19	1995	McClugage, et al	Rotational vertigo, unilateral tinnitus, hearing loss	(R) Temporal bone
20	1997	Buter and Chilla	Conductive hearing loss	Left temporal bone
21	1997	Barnabe, et al	Hearing loss, vertigo	Temporosphenoidal region
22	1998	Magliulo, et al	---	Temporal bone
23	1998	Germano, et al	---	(R) Temporal area

Of the 23 reported cases of giant cell tumor of the temporal bone (Table 1), otalgia, tinnitus and hearing loss are the most common complaints. Patients may also exhibit facial weakness (Rosenwasser, 1969), a post-auricular mass (Daniilidas, et al, 1981 and Bertoni, et al, 1987), vertigo (Dinning, 1953), frontal headache (Glasscock and Hunt, 1974), and multiple cranial nerve neuropathies (Moyes, 1970 and Ashamallah, 1978). There are two reports of a patient presenting with pre-auricular swelling (Daniilidas, et al, 1981).

The etiology of giant cell tumor remains unknown. Microscopically, the tumor is composed of a vascular network of spindle-shaped or oval stromal cells and multi-nucleated giant cells from which it derives its name. Stromal cells are thought to be the genetic foundation of the tumor. Pathologic grading exist for osteoclastoma according to their apparent degree of malignancy (Huvos, 1979) but this has not correlated with subsequent tumor behavior or sarcomatous degeneration (Schajowicz, 1981). Histologically, giant cell tumor may look benign and yet may metastasize (Dahlin, et al, 1970). Stawru, et al, (1988) affirms this claim that although benign, giant cell tumor of bone must be regarded as malignant because of its aggressiveness, high recurrence rate, potential metastasis and the difficulty of total removal.

Radiographically, the tumor lacks distinctive features (Tandon, et al, 1988). It is a purely lytic lesion as at other skeletal sites with soft tissue extension very common (Bertoni, et al, 1991). Routine skull films are mandatory in the diagnosis of these tumors. CT imaging will help outline the extent of the lesion and define bone erosions. That of R.G. was a homogenous mass at the infratemporal area with para-oro-nasopharyngeal extension and sphenopetromastoid erosions.

Definitive preoperative diagnosis of primary bone tumors lies in a tissue biopsy (Peng, et al, 1985). Accuracy rate of fine needle aspiration biopsy in the diagnosis of giant cell tumor is, in general, 88% (Ayala and Zornosa, 1983). Our patient underwent

multiple fine needle aspiration biopsies of the pre-auricular swelling; unfortunately, cytopathologic diagnosis was that of a parotid new growth. All efforts were exhausted to reach a definitive clinical and cytopathologic diagnosis. The impression of a parotid malignancy is compatible with the clinical findings and the results of biopsy.

Intraoperatively, the lesion was consistent with an extensive and malignant parotid gland deep lobe tumor. Frozen section of the specimen excised en bloc was giant cell tumor of bone versus sarcoma. The final Histopathologic diagnosis of a giant cell tumor of the bone came as a surprise. That it was a rare tumor of the skull and of the temporal bone, and the first reported in the country came as an even bigger surprise.

In retrospect, while most cases in literature succeeded in an almost complete extirpation of tumor and the preservation of the facial nerve, the pre-operative and intra-operative diagnosis of a malignant parotid new growth in our patient did not allow the possibility of facial nerve preservation. An adequate removal of the tumor was, however, ensured.

Controversy exists in the surgical approach and the employment off radiotherapy in this type of tumor. First, local curettage alone, the most conservative in the surgical extirpation of the tumor, may not adequate because of high recurrence (Glasscock and Hunt, 1974). Second, complete excision is not possible without compromise to the skull base. Third, there are conflicting reports about radiotheraphy. Many authors claim that not only is there no reduction in the size of the mass (Dinning, 1953 and Lehrer, et al., 1976), the possibility of secondary malignant degeneration exists. Tandon, et al, (1988) suggest that it is prudent to commence treatment with surgical excision in most cases, and to reserve radiotheraphy for failures and recurrences. Bertoni, et al (1992) suggests postoperative radiation theraphy to achieve local control of the tumor. In this patient, postoperative radiation therapy will be administered as salvage therapy in case of recurrence.

At present, only eighteen months following wide excision of the tumor, it is not difficult to conclude that treatment of this huge and benign skull lesion is a success. The patient is well and exhibits no recurrence of tumor.

The prognosis of patients with giant cell tumor of the skull, though benign, is unclear; case reports are limited to a three-year follow-up. Many report success of surgical treatment, with the patient alive and without recurrence of tumor after at least 2 years (Rosenwasser, 1969, Jamieson, 1969, Glasscock and Hunt, 1974, Tandon, et al, 1988 and Bertoni, et al, 1991). Only prolonged monitoring following adequate resection with or without radiotherapy will validate or refute this treatment strategy (Findlay, et al, 1987).

CONCLUSION

This case is consistent with the previously reported cases of giant cell tumor of the temporal bone, most of that were initially misdiagnosed owing to the rarity of the disease. The diagnostic dilemma leads to the following suggestions:

1. unilateral middle and inner ear complaints, specifically, tinnitus, otalgia and hearing loss, warrant a thorough investigation including radiographic and CT imaging of the temporal bone,
2. with lack of clinical criteria for the diagnosis of a zebra in the field, fine needle aspiration biopsy, if not a tissue biopsy, is a must before attempts at definitive treatment.
3. cautinous and adequate extirpation of the tumor is imperative because of the complex location, the infiltrative quality and the high rate of recurrence of the tumor, and
4. attempts at the preservation of the facial nerve must be kept in mind.

It is not difficult to conclude success of treatment in our patient at the present time. The surgical excision is more than

adequate. It is hoped that, with this report, the 24th case of giant cell tumor of the temporal bone may contribute to the establishment of guidelines for its diagnosis and treatment.

REFERENCES

1. Ayala, A.G. and Zornosa, J. (1983): Primary Bone Tumor: Percutaneous Needle Biopsy, Radiologic Pathologic Study of 222 Biopsies, 149 (3): 675-9.
2. Bertoni, F., Unni, K.K., Beabout, J.W., Ebersold, M.J. (1992). Giant Cell Tumor of the Skull. Cancer, 70:5, 1124-32.
3. Burnam, J.A., Benson, J., Cohen, I. (1971). Giant Cell Tumor of the Ethmoid Sinuses. The Laryngoscope, 89:1415-1424.
4. Dahlin, D.C., Cupps, R.E., Johnson, E.W. (1970). Giant Cell Tumor: A Study of 195 cases. Cancer, 25:1061-1070.
5. Daniilidas, I., Tsaligopoulos, M., Themelis, C. and Vartholomeus, A. (1981). True giant cell tumor of the mastoid. Journal of Laryngology and Otology, 95: 853-858.
6. Dinning, T.A. (1953). Osteoclastoma of the Petrous Temporal Bone. Australian and New Zealand Journal of Surgery, 22: 253-257.
7. Emley, W.E. (1971). Giant Cell Tumor of the Sphenoid Bone. Archives of Otolaryngology. 94: 369-374.
8. Findlay, J.M., Chiasson, D., Hudson, A.R., Chui, M. (1987). Giant cell Tumor of the Middle Cranial Fossa. Journal of Neurosurgery, 66: 924-928.
9. Germano, A., Caruso, G., Caffo, M., Galatioto, S., Belvedere, M., Cardia, E. (1998). Childs Nervous System, 14: 4-5, 213-17.
10. Glasscock, M and Hunt, W. (1974). Giant Cell Tumor of the Spenoid and Temporal Bones. Laryngoscope, 84: 1181-1187.
11. Huves, A.G. (1991). Bone Tumors: Diagnosis, Treatment and Prognosis. Philadelphia: WB Saunders 433: 469-477.
12. Jacas, R. and Bermejo, A. (1979). Giant Cell Tumor of the Sellar Region. Acta Neurochirurgica (Supplement).
13. Jamieson, K.G. (1969). Osteoclastoma of the Petrous Temporal Bone. Archives of Neurology, 33:663.
14. Lehrer, S., Rosvit, B. (1976). Giant Cell Tumor of the Temporal Bone. Archives of Neurology
15. Ohaegbulam, S.C. and Gupta, I.M. (1977). Giant Cell Tumor of the Sphenoid Bone with Dural Extension. Journal of Neurology, Neurosurgery and Psychiatry, 40:790-794.
16. Peng, X.J., Yan, X.C. (1985). Cytodiagnosis of Bone Tumors by Fine Needle Aspiration. Acta Cytologica, 29 (4):570-575.
17. Robbins, S.L., Cotran, R.S., and Kumar, V. (1984). Pathologic Basis of Disease. WB Saunders Company, 3rd edition, 1345-1347.
18. Rosenwasser, H (1969). Giant Cell Tumor. Archives of Otolaryngology, 90:726-731.
19. Schajowics, F. (1981). Tumor and Tumorlie Lesions of Bone and Joints. Springer-Verlag, 1981:205-242.
20. Stawru, J.S. (1988). Head and neck, Otolaryngology, 36(3): 127-128.
21. Tandom, D.A., Deka, R.C., Chaudbary, C., Misra, N.K. (1988). Giant Cell Tumor of the Temporosphenoidal Region. Journal of Laryngology and Otology, 102: 449-451.

Fig. 1 Preoperative appearance of patient

Fig. 2 Postoperative appearance of patient

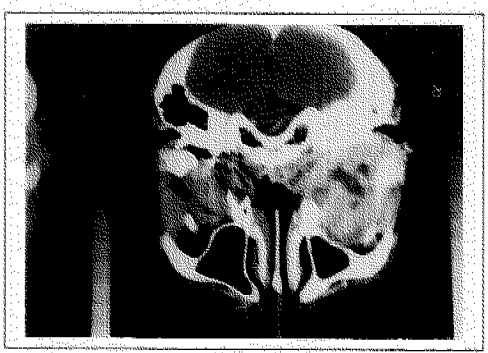

Fig. 3 CT coronal view of the infratemporal mass with paraoronasopharyngeal extension

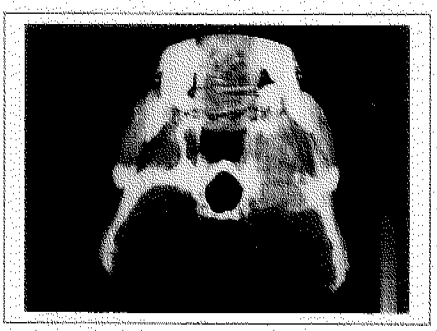

Fig. 4 CT axial view of infratemporal mass and the involvement of the petromastoid areas

Fig. 5 Photomicrograph of giant cell tumor

Case Report

Hoarseness: An Unusual Presentation of Hypothyroidism

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A 50-year old male was admitted because of persistent hoarseness for 3 years with normal ENT findings other than asymmetry in mucosal waves and amplitude on stroboscopy. Initially, he was diagnosed of GERD, however, medication afforded no relief. On follow up because of normal laryngoscopic findings a systemic pathology was entertained. Blood chemistry examinations revealed increased serum TSH and decreased FT4 levels. The patient was given levothyroxine for 4 weeks and his voice markedly improved. Upper airways problems have been the primary consideration in the differential diagnosis of hoarseness. However, in the absence of any pathology within the confines of the larynx, other metabolic entities should be considered. This case was presented to inform clinicians that hypothyroidism as an initial subtle manifestation of the metabolic derangement.
Keywords: hypothyrodism, myxedema, hoarseness

INTRODUCTION

More often than not, clinicians would consider laryngeal and upper airway pathology whenever a hoarse patient presents in the clinic. At times, laryngeal nerve paralysis and some peripheral nerve problems are also taken into consideration. This case reminds us that hoarseness in a patient does not necessarily mean a primary laryngeal problem.

CASE PRESENTATION

RG, a 50 yr. old male from Sorsogon consulted at our institution because of persistent hoarseness. His problem started 3 years prior to admission, when he developed hoarseness with no associated signs and symptoms. He consulted an Otolaryngologist and was diagnosed to have vocal cord nodule. Unrecalled medications afforded temporary relief.

Nine months prior to admission, his hoarseness persisted and was accompanied by difficulty of swallowing, dryness and feeling of a lump in the throat, body weakness, occasional cold intolerance and somnolence. A week prior to admission, he developed epigastric pain, occurring anytime and relieved by eating food. There was no heartburn nor retrosternal pain. A few hours prior to admission, patient had difficulty of breathing thus prompting admission.

The patient denies any history of diabetes, goiter, previous history of neck surgery, nor exposure to high doses of neck radiation. His family history was also unremarkable. Patient has been working as a welder aboard a ship for 10 yrs. but presently he is unemployed. He used to shout at his co-workers inside the ship. He has three children. He started smoking and drinking alcohol when he was 18 yrs. old but stopped five yrs. ago. He is a smoker for thirty-two pack yrs.

Otoscopic, rhinoscopic, and indirect laryngoscopic findings were unremarkable.

The patient was admitted for 3 days. Esophagogastroduodenoscopy showed duodenal bulb erosions which were treated with amoxicillin, clarithromycin and lansoprazole. He was subsequently discharged.

The patient came back after one week unimproved. Flexible laryngoscopy showed no supraglottic mass, no hypopharyngeal mass and no pooling of

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saliva. Laryngoendovideostroboscopy revealed asymmetry in the mucosal waves and amplitude. Glottic closure was complete. At this point, the impression was hoarseness probably due to a systemic pathology. Lipid profile, renal function and blood sugar were normal. However, TSH was increased (3.476 mIU/L) and free T4 was decreased(6.3104). Hypothyroidism was entertained. Thyroid scan revealed nonhyperactive diffuse goiter. The right lobe measured 5.6cm x 1.7 cm and left lobe 5.5 cm. x 1.6 cm.

He was given oral levothyroxine 100 ug/day. Four weeks after oral levothyroxine therapy, marked improvement of the voice was noted. Six weeks after therapy euthyroid state was restored biochemically as the repeat FT4 and TSH were already normal.

DISCUSSION

It is difficult to make a diagnosis of hypothyroidism in the elderly both on clinical grounds and by measuring the parameters of thyroid function. This is partly due to the various metabolic changes associated with aging, as well as to the high incidence of chronic nonthyroidal illness in this population.

Hypothyroidism is not an excessively rare disease[2] but hypothyroidism presenting as hoarseness is not commonly mentioned in most textbooks. It is not a common initial manifestation of hypothyroidism. Weakness is (99%), followed by lethargy (91%), thick tongue causing difficulty of swallowing in 82% and dyspnea is 55%. However, hoarseness is present in 52 % of cases with a full blown myxedema[2]. The clinical presentation of hypothyroidism typically includes fatigue, xerosis, muscle cramps, depression, difficulty concentrating, constipation, fluid retention, cold intolerance, and delayed reflexes.

Hypothyroidism occurs with increasing frequency throughout life, affecting women four to six fold more often than men. Myxedema occurs at all ages but gradually rises with age and peaks at 40 to 60 years. The onset is as insidious as that of any disease and patient is often unaware of it. The development of myxedema is preceded by the destructive process which finally brings about a state of athyreosis (Means). This would explain prevalence of thyroid nodules with age. Thus, structural and functional alterations of the thyroid gland develops in the elderly, yet the diagnosis of thyroid disease is often missed because the sign and symptoms of thyroid dysfunction are often subtle and unnoticeable.

Gradual and progressive hoarseness in hypothyroidism is secondary to mucopolysaccharide infiltration of the vocal cords and possibly by tissue edema in the ambiguous nucleus or the cricothyroid muscles. The result is an increase in the mass of the vocal folds which produces hoarseness and a lowering of voice pitch[1] (Ballenger). Hence, bilaterally edematous, mobile vocal cords should raise the suspicion of hypothyroidism. The videostroboscopy of our patient showed asymmetry in the mucosal waves and amplitude.

Thyroid hypofunction will cause vocalis muscle hypertrophy with deepening of the voice. In the head and neck region, the most common symptoms are voice change, nasal stuffiness, dry throat and foreign body sensation which was present in our patient. The voice may be hoarse (41%); weak (26%); or husky, slow and slurred (33%). Some patients may have difficulty singing high notes. In this case, his voice was hoarse and weakens when he talks a lot and whenever he increase his pitch. The hoarseness may progress to airway compromise if the laryngeal edema becomes superimposed with infection. As what happened to our patient when he was admitted in our institution.

Thyroid - hormone deficiency is treated by means of thyroid-hormone replacement. The ultimate goal is to suppress TSH to normal levels. The average daily dose depends on the patient's age and the cause of hypothyroidism. Elderly adults require 10% to 20% less hormone, and initial doses should be quite small. Improvement in the voice usually occurs

with thyroid hormone replacement if the myxedema is of relatively short duration. In patients with primary hypothyroidism, the daily dose of thyroxine needed to lower the serum thyrotropin level into the normal range was significantly less in older patients than in younger ones. Our patient is on his 8th weeks of oral levothyroxine and his voice is getting better.

It is recommended that patients be seen at monthly intervals to assess their clinical status as well as to measure their TSH levels at the new dose. With the current assay systems for TSH, it is the goal of therapy of hypothyroidism to bring the TSH concentration into the normal range, not to suppressed ranges.

Treatment should be continued throughout the life of the individual and cessation of therapy will be followed by a return of the myxedematous state within a period of one to three months.

CONCLUSION

Hypoparathyroidism may cause thickening and atrophy of the vocal cords. Persistently hoarse patients with otherwise normal physical findings should be worked up for metabolic disorders such as hypothyroidism which is eminently treatable.

REFERENCES

1. Ballenger, John Jacob. Diseases of the nose, throat, ear, head and neck. 14th edition. 1991.
2. Means, J. H. Thyroid and Its Diseases. 2nd ed. 1984.

Case Report

Waiting to Inhale: A Case of Choanal Atresia

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Objective: To describe an uncommon cause of neonatal respiratory distress.
Design: Case report
Case description: The patient was operated on which revealed a membranous structure obstructing the posterior 3rd of the choana bilaterally. The obstruction was corrected by incising the membrane. A stent was placed in each side of the choanae to maintain patency.
Conclusion: Congenital choanal atresia is an uncommon condition that is easily recognizable. It is more of a medical emergency rather than a surgical one. Different approaches for repair are known. The supporters of each technique claims to have an 80% success rate.

INTRODUCTION

Infants are obligate nasal breathers because the posterior soft palate causes the orpharynx and the tongue in close proximity with the hard and soft palate. In contrast to choanal atresia is the cyclic cyanosis of the newborn.[2] When he cries, airflow occurs through the mouth and cyanosis disappears. Unilateral atresia is rarely a cause of neonatal respiratory distress and is often not recognized at birth. Mouth breathing becomes possible only when they reach the age of 4-6 weeks old due to a learned response and facial growth. Any form of obstructions to the nasal cavity may thus mimic the dreadful and rare case of this patient.

CASE DESCRIPTION

KM was a female newborn referred to our department for difficulty of breathing. She was born via normal spontaneous vaginal delivery with an APGAR score of 7 and 10 at 1 and 5 min. However, she soon ceased crying and became gradually cyanotic. Resuscitation was done. A fr. 8 NGT was inserted into each nostril with no success. She was placed on a prone position but still the cyanosis persisted. Crying however relieved the cyanosis.

On the second hospital day, she was observed to repeatedly grasp for air as if she were drowning. A McGovern nipple was immediately inserted into the mouth and which relieved the cyanosis even at rest. The patient was discharged and advised check-up every month. However, the patient was lost to follow-up. At eight months old, she was brought back to our outpatient clinic. A CT-scan study of the nose and nasopharynx revealed a soft tissue mass, obstructing the posterior 3rd of the nasal choana. The soft tissue mass commences at the posterior edge of both inferior turbinates and extends 1.2 cm posteriorly through the entire length of the nasal cavity. The posterior end of the choana commencing at the soft palate is patent. The bony wall of th'e obstructed segment each measures 1.2 cm in height and 5 cm in width. The ethmoid sinuses and both maxillary sinuses are formed. The left side is aerated. No other abnormalities noted. Petromastoid are normal. The impression was choanal obstruction of the membranous type. The patient was then scheduled to undergo surgical correction of the nasal obstruction

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KM's mother had regular pre-natal check-ups and look multivitamins religiously. There were no maternal illnesses and untoward incidents during pregnancy.

The physical findings were unremarkable with no indication of any other congenital anomaly. Insertion of a NGT fr.6 was unsuccessful and no sign of movement of the cotton wisp when placed in front of both nostrils was detected.

Upon surgery, a membranous structure obstructing the posterior 3rd of the choana bilaterally. The obstruction was corrected by incising the membrane covering the whole area of the posterior choana. A stent was placed in each side of the choanae to maintain patency. She was discharged improved the following day and advised to come after a month for removal of the stent.

DISCUSSION

Choanal atresia present in the neonatal period with intermittent cyanosis relieved by crying, normal cry, and cyanosis on feeding. The most common presentation at the age of 1-2 years old is unilateral copious mucoid rhinorrhea or sinusitis. Unrecognized, choanal atresia is ptentially life-threatening.

The differential diagnoses include pharyngeal and subglottic anomalies, laryngomalacia, tracheo-esophageal fistula, generalized swelling of the nasal turbinates, traumatic birth deformity with dislocation of the septum and nasal tumors.

Pharyngeal and subglottic anomalies are common causes of respiratory distress and cyanosis in neonates.[3] However these are associated with stridor and an abnormal tone and/or volume of cry which were not found in this patient.

Another common cause of cyanosis in neonates is laryngomalacia.[3] It is manifested by stridor and distress not relieved by crying. Neonates are usually comfortable in the prone position. Patients with tracheo-esophageal fistula would have demonstrated nasal bubbles and movement of the cotton wisp upon placement in front of the anterior nares were elicited.[1]

Anterior rhinoscopy did not reveal generalized swelling of the nasal mucosa (turbinate hypertrophy or "stuffy nose syndrome"), septal deviation or nasal tumors.

Once the diagnosis is made, the first step is to secure the child's airway and prevent asphyxiation. Under these circumstances, an oral airway, secured with adhesive tape, must be provided. An alternative approach is a McGovern nipple, which is a large nipple with the end cut off and an oral airway placed inside, tied circumferentially around the child's head to maintain its position in the mouth.[2] An oral gastric tube must be placed or the child gavage fed due to the fact that the child cannot breath while feeding.

Choanal atresia is an uncommon anomaly in neonates which was first recorded by Otto in 1830. The reported incidence of choanal atresia is one in 5,000 to 8,000 live births. Unilateral cases outnumber bilateral cases by two to one. The female to male ratio is also two to one.[2] There appears to be a right side predominance. J.S. Fraser originally published a report in 1910 which stated the deformity was made up of 90% bony and 10% membranous atresia.[5] A recent study looking at the CT and Histologic specimens in 63 patients and has showed a 29% pure bone, 71% mixed membranous and bone, no pure membranous atresia present.[4]

Choanal atresia is associated with other congenital abnormalities in 50% of the time. This is seen more often with bilateral atresia rather than unilateral. The majority of children with anomalies tended to have multiple defects, most of which involve the midline maxillo-facial structures in addition to choanal atresia. A common anomaly is the CHARGE syndrome.[2] The infant have a combination of coloboma of the retina, heart defects, atresia of the choana, mental retardation, genital hypoplasia, ear anomalies and hearing loss.

The first to describe posterior choanal atresia was Johann Roederer in 1755. Since that time, there have been four theories developed to explain this phenomenon. The four theories are: 1. Persistence of the buccopharyngeal membrane from the foregut; 2. Persistence of the nasobuccal membrane of Hochstetter (most widely accepted); 3. The abnormal persistence or location of mesoderm forming adhesions in the nasal choanal region: and 4. Misdirection of mesodermal growth, secondary to local factors. The last is the most recent theory developed in 1982 by Hengerer. This theory is based on normal nasal development.[4]

A review of the normal nasal development will assist in the understanding of the theory. The development begins with the migration of the neural crest cells from their origin in the dorsal neural folds laterally around the eye and traversing the frontonasal process. It begins in the 4th week and nasal architecture is completed by the 12th week. During this time the neural crest cells begins to migrate beneath the epithelium through a meshwork of hyaluronic acid and attach to collagen filaments within the facial processes. These pluripotential cells undergo rapid proliferation and differentiation into a matrix of messenchymal tissues which will be transformed into muscle, cartilage and bone. Some of these changes occurs within minutes to hours, and require unbelievable precision. Using the information of neural crest migration, a solid theory and foundation can be proposed. Neural crest cell migrate through a meshwork of hyaluronic acid and collagen filaments to reach preordained position in the facial process. If the flow of these cells is altered with regard to their position or total numbers, the burrowing of the nasal pits may not create the same rotation from the ventral, dorsal, to cephalic caudal plane. This altered thinning would likely prevent the break through at the anterior choana. Therefore the nasal and palatal processes surrounding the nasobuccal membrane are the basic factors leading to the development of choanal atresia. The location of the atretic plate is relatively consistent, the make up varies. The findings of island of cartilage or the membranous bone suggests that the septal or palatal processes must add some cellular mass to the mesenchymal collection that begin in the region of the primary choana.[4]

Genetic factors may influence the migration and determine whether the neural crest cells arrive in the preordained position in correct numbers or whether defects may exist in their matrix or migration.[5]

The first attempted repair was by Carl Emmert in 1851 and the first recorded successful repair was in 1872 by Jacob Da Silva Solis-Cohen. The boundaries of the atresia plate are created by the yndersurface of the sphenoid bones superiorly, the medial pterygoid lamina laterally, the vomer medially, and the horizontal portion of the palatal bone inferiorly. The bone may be 1-12mm in thickness. Additional bony changes that frequently occur are an accentuated arch of the hard palate, a sweeping inward of the lateral and posterior nasal walls and a narrowing of the nasopharynx by the posterior and lateral pharyngeal walls.[2]

The diagnosis of atresia is tentatively made by failing to pass a no. 6 Fr. Catheter at least 32 mm pass the anterior nares into the nasopharynx. A second test for functional patency is by holding a thin cotton wisp in front of one side, then the other, being sure the mouth is closed. Auscultation with a stethoscope is also helpful. A solution of 0.25% neosynephrine with a little gentian violet can be instilled and the dye looked for in the pharynx.[3]

A choanogram which consists of a radiopaque dye inserted into the nose, shows the presence but not the nature of the obstruction. Submental vertex tomographic studies and plain skull films have been used in the past, but with little informative value.

Computerized Tomography is now the method of choice in the evaluation of congenital choanal atresia. Both coronal

and axial cuts are helpful in determining whether the disease is unilateral or bilateral, and the approximate thickness of bone. It also shows the presence and degree of narrowing and stenosis of bony nasal cavity.[6]

Later management of choanal atresia includes several approaches. The transpalatal approach was popularized by Owens in 1965. The approach is through the palate directly to the atretic plate. This approach achieves better visualization and preservation of nasal lining, but the incisions are identical to those for a cleft palate repair and may have a restricting effect (by scar) on lateral maxillary growth. Most surgeon prefer to wait until at least 16 teeth erupted, usually at about 12 to 18 months.

Another approach is by transnasal approach. This is the oldest method of surgical correction. This approach is preferred in older children with unilateral atresia, or in an infant whom there is difficulty in maintaining an adequate airway.

A transseptal-transantral approach was developed by Karanjian in 1942 and was recommended for patients over 8 years of age. This is performed concurrently with septal reconstruction and external nasal surgery. The advantages is a better exposure of the operative field, ready control of bleeding and less danger to sphenopalatine nerve and vessels. This is not recommended in younger children due to the potential for damage to bony growth.[6]

External rhinoplasty approach for unilateral choanal atresia, is usually performed when the child is older than one at which time the nose is sufficiently large to allow access to the atresia plate.[3]

The CO2 laser, using repetitive pulse mode has been used to vaporize the atretic plate. The problem seen with the laser is first the obstruction of the path of the laser beam. Septal deviation and large inferior turbinates obstruct the straight path that the CO2 laser must take. A more difficult problem is the high arch palate, which may preclude the beam's hitting the plate.[7]

Stenting of the nasal airway, although necessary, may be a two-edged sword. The stent is a foreign body which causes granulation tissue and inflammation. It helps prevent re-stenosis. Stenting is achieved using a 3.5-5.0 mm endotracheal tube, cut to a length that reaches into the nasopharynx. Stent material, shape, or diameter are of less importance than the surgical opening created plus careful mucosal flap coverage. Post-operative care involves stent irrigation and routine suctioning. The patients are maintained on oral antibiotics (amoxicillin or a cephalosporin) while the stent is in place. The stents are left for 4-6 weeks. Some say only 2 weeks are necessary to keep good patency and decrease granulation tissue formation.[9] At the time of stent removal, examination under anesthesia or fiberoptic nasopharyngoscope is performed to assess mucosalization and diameter. If granulation tissue is found, it is debrided, cultured and antibiotics continued . Systemic steroids are often used. Re-stenosis is common. Many times repeat dilatation with a urethral probe is used and revision surgery is required.

CONCLUSION

Congenital choanal atresia is an uncommon condition but is easily recognizable. It is important for the obstetrician and primary care giver to be familiar with this condition due to the risk of neonate asphyxiation. Different approaches for repair are known. The supporters of each technique claims to have an 80% success rate. Many physicians prefer the transpalatal approach due to the surgical exposure. With the introduction of endoscopic sinus surgery, the transnasal approach may become more an ideal route for operation.

REFERENCES

1. Bailey, Bj, et al. Otolaryngology-Head and Neck Surgery. Philadelphia, PA: J.B. Lippincott, 1993.

2. Bluestone CD., Stool SE., et al. Pediatric Otolaryngology. Philadelphia, PA.: WB. Saunders Co. 1990. Benjamin B., Evaluation of Choanal Atresia. Ann OtoRhinoLaryngology. 1985; 94:492.
3. Cummings, CW., Otolaryngology-Head and Neck Surgery, Mosby-Year Book; 1993. Vol. I; 711-712.
4. Dunham ME., Miller RP. Bilateral Choanal Atresia Associated with Malformation of the Anterior Skull Base; Embryogenesis and Clinical Implication. Ann Otol Rhinol Laryngol. 1992: 101: 916-919.
5. Harner S, McDonald T, Reeve DF. The Anatomy of Congenital Choanal Atresia. Otolaryngology-Head and Neck Surgery. 1981: 87: 7-9.
6. Stankiewicz JA. The endoscopic Repair of Choanal Atresia, Otolaryngology Head and Neck Surgery. 1990: 103 (6): 931-937.
7. Kamel R. Transnasal Endoscopic Approach in Congenital Choanal Atresia. Laryngoscope 1994: 104: 642-646.
8. Muntz Hr. Pitfalls to Laser correction of choanal atresia. Ann Otorhinolaryngology 1987: 43-46.
9. Liston SI Stenting choanal atresia. Laryngoscop 1980: 1061-1062.

Surgical innovation

Suction In Your Pocket : A Low Cost Suction Pump

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A suction machine was constructed by altering the check valve assembly of an aquarium air pump. The machine is highly portable and cheap. It is capable of generating considerable negative pressure suitable for brief procedures.

INTRODUCTION

Otolaryngology is a special medical field specializing in small cavities in the head and neck region. In order for an otolaryngologist to perform a thorough examination of these areas, debris and secretions must be removed meticulously prior to examination. Removal of these secretions entails the use of a suction machine.

A suction machine is an indispensable tool in every otolaryngologist's clinic. However, with the present economic difficulties we are experiencing, it is quite difficult, particularly for an ENT resident on training, to acquire one. The price of a brand new suction machine ranges from three thousand pesos to more than ten thousand pesos. With this simple project, a suction machine can be made available to every ENT clinic.

The purpose of this paper is to describe the construction of a handy and low cost alternative suction machine suited for minor surgical and outpatient ENT office procedures.

MATERIALS AND METHODS

AIR PUMP (NSB-1), double aquarium pump
Oxygen cannula or plastic/rubber tubings (1/4 in. diameter)
Plastic T or Y connectors
Large vials with rubber stopper or empty mayonnaise bottle

The following steps outline the conversion of the aquarium air pump into the portable suction pump.

1. Remove the bottom cover of the pump. Locate the 2 plastic barrels attached on both sides of the pump. These are the two check valve assemblies (CV).
2. Remove the check valve assembly from the pump.
3. Inspect the barrel and locate the small hole on the side of the barrel. Close the hole using a piece of electrical tape.
4. The rubber gasket has 2 small holes corresponding to the 2 small vertical projections on the periphery of the plastic barrel. Make two new holes on the rubber gasket directly opposite the two holes. Attach the rubber gasket to the barrel. The two vertical projections on the barrel must fit on the new holes in the gasket.
5. Re-attach the check-valve assembly on the pump in such a way that the hole on the side faces the electric coil.
6. Do the same on the other side. Replace the bottom cover.
7. Attach tubings on both air intake nozzles on both sides of the pump. Connect the free ends of the tubing to a plastic Y or T connector.
8. Connect the T/Y connector to a collecting bottle. Attach 1 –1.5 meters of tubing to the other port of the collecting bottle.
9. Plug the pump to a 220 volt wall outlet. Wait for several minutes before using the suction pump to create vacuum in the bottle.

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COMMENT

Commercially available aquarium air pumps consist of the following parts: electric coil, lever, permanent magnet, rubber diaphragm, check valve chamber, nozzle, power switch, and E-core. When an AC current is allowed to pass through the electric coil, the E-core becomes a temporary magnet with rapidly alternating polarity. The permanent magnet attached to the lever is rapidly attracted and repelled by the temporary magnet, thereby producing a vibratory motion on the lever. As a result, the rubber diaphragm attached to the lever generates a positive and negative air pressure which is directed to the check valve chamber. These valves are very effective in directing one way air flow. In commercially available aquarium air pumps, the valves are arranged in such a way that only positive air pressure is produced in the nozzle. In our project, negative pressure is produced by simply altering the arrangement of the check valves.

The negative pressure produced by the pump is quite strong. It can be used in removing thick secretions from ears, nose, and the oral cavity. This portable pump is very useful in minor surgical procedures such as myringotomy and excision of small benign growths in the oral cavity. This pump is also very useful in the localization of bleeding points in cases of epistaxis.

Aside from its affordability, other features of this portable pump include quiet operation, light weight, compact, easy serviceability, low maintenance, and simple construction. The cost of the whole unit is approximately P 800 pesos, almost 1/6 the price of commercially available suction machines.

Fig. 1 Materials Used

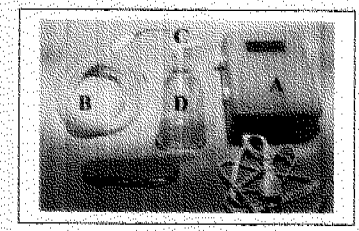

Fig. 2 Removal of Pump bottom cover

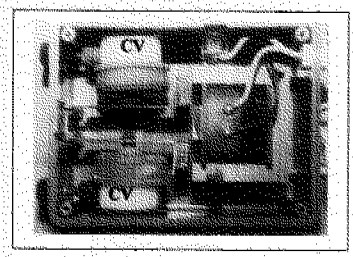

Fig. 3 Removal of Check valve Assembly

Fig. 4 Location and Closure of Small hole on Barrel side

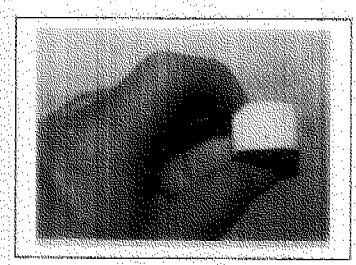

Fig. 5 Addition of 2 holes in rubber gasket

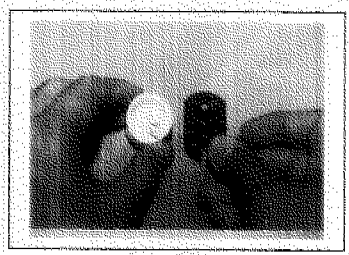

Fig. 6 Re-attachment Of check valve assembly