The Philippine Journal of

OTOLARYNGOLOGY HEAD & NECK SURGERY

1994

OFFICIAL PUBLICATION OF THE PHILIPPINE SOCIETY OF OTOLARYNGOLOGY HEAD & NECK SURGERY, INC.

ACKNOWLEDGEMENT

The editorial staff of the Philippine Journal of Otolaryngology-Head and Neck Surgery appreciates the full support and assitance given by KALI-DUPHAR without which this would not have been possible and Ms. Arlene Sayson for facilitating everything; Ms. Carmen T. Garcia for typing the manuscript and Dr. Jose Angelito U. Hardillo who acted as editorial assistant.

THE PHILIPPINE JOURNAL OF OTOLARYNGOLOGY

HEAD AND NECK SURGERY

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GROWING UP WITH THE SOCIETY

The society has grown by leaps and bounds during the past decade. We have been a part of the Asean Federation of ORL societies that long and its biennial meetings have been something that society members look forward to. The society's annual convention had taken an entirely different character. No longer is it just a time to fraternize and socialize with fellow members. Although activities that fasten camaraderie is still part of the activities in annual conventions, they have become the sideshow rather than the main event. The scientific sessions, usually with foreign experts as lecturers and speakers, have been the centerpiece event and from which the members get their updates on recent trends and innovations. This reality have made attendance at the conventions really worthwhile. To further bolster the continuing medical education program of the society, the midyear connventions has came into existence where role are reversed and it is the time when our cousins in the provinces teach the city slickers a thing or two in otolaryngological realities.

The decade in review has also seen a great increase in the number of physicians who qualify as ENT specialists thereby increasing the membership of the society by at least 500%. At present, plans are underway to find a permanent place for the society where its secretariat will be located and so with a library that will contain teaching materials in its various forms i.e. printed, audio and visual. The said plan can also serve as a home away from home for our provincial colleagues whenever they are in the city for whatever reason.

Like any organism, the society suffers from growth pains at present. Several things or issues are, at the moment, meeting some individual resistance from members. Are we growing too fast? Is it right that the members should shoulder all the burden necessitated by growth? A permanent headquarters is a necessity and a project worth pursuing. But is it that urgent considering the present finances of the society? How do we go about raising the funds required of a project of this magnitude?

The annual conventions invite foreign speakers not only as part of the continuing medical education program of the society thus earning a little extra on the side. Must Filipino specialists play second fiddle in his native land?

These are some of the thoughts that come to mind and the issues that the society must face in this her growing up years.

JOSELITO C. JAMIR, M.D.
Editor-in-Chief

ABSTRACTS

CHARLOTTE M. CHIONG, MD
Abstracts Editor

Blevins NH and Jackler RK. Exposure of the lateral extremity of the internal auditory canal through the retrosigmoid approach: A radioanatomic study. Otolaryngol Head Neck Surg 1994; 111:81-90.

The recent trend toward earlier diagnosis of acoustic neuroma has substantially increased the number of candidates suitable for surgery with an attempt at hearing preservation. Although the retrosigmoid approach affords the possibility of saving hearing in selected cases, it is associated with a somewhat greater morbidity than other approaches, in terms of persistent headache, cerebrospinal fluid leakage and cerebellar dysfunction. For this reason, it is best used selectively, when the probability of success in hearing conservation is high. Only a portion of the internal auditory canal can be exposed through the retrosigmoid approach without violating the inner ear, a maneuver that greatly reduces the chance of preserving residual hearing. Substantial variability exists between individuals as to just how far laterally the internal auditory canal may be opened without compromising labyrinthine integrity. To assess the magnitude of this variability, measurements were obtained from 60 high-resolution temporal bone computed tomography scans with a schema intended to model the surgical angle of view used during the retrosigmoid procedure. Intraoperative measurements in a series of cases established that the actual surgical point of view is situated along a line that passes approximately 1.5 cm behind the sigmoid sinus. In this typical surgical position, these data predict that an average of 3.0 mm (32% of the internal auditory canal length) must be left unexposed to avoid labyrinthine injury, with a range between 1.1 mm and 5.3 mm (9% to 58% of the internal auditory canal). Each additional 1-cm retraction on the cerebellum beyond that customary used affords approximately 1 mm (10% of the internal auditory canal) further exposure of the canal. When considering the retrosigmoid approach to an acoustic neuroma, the clinician is urged to evaluate each patient individually to estimate the amount of internal auditory canal accessible without the removal of a portion of the inner ear. This can be ascertained from an axially oriented, gadolinium-enhanced magnetic resonance imaging sccan in the internal auditory canal plane by drawing a line that originates 1.5 cm behind the posterior margin of the sigmoid sinus and passes tangential to the most medial extent of the labyrinth. If this line intersects the posterior margin of the internal auditory canal at least 2 mm lateral to the deepest point of tumor penetration, then adequate exposure with preservation of the labyrinth is likely an achievable goal.

Editor's Comment:

This article provides a systematic approach to predict the probability of successfully preserving hearing during acoustic neuroma resection. High resolution CT images that show the relationship between the fundus of the internal auditory canal and the position of the labyrinth were utilized. The retrosigmoid approach for total removal of such tumors is obviously limited by the labyrinth when hearing preservation is attempted. This study emphasizes the value of surgical planning that include a careful review of imaging studies such as a high resolution CT images or gadolinium enhanced MRI scans. The focus of this article, that is exposure of the labyrinth during drilling of the pores acousticus however is only one of several factors that have been shown to impact on hearing preservation. The lateral extent of the tumor is not the only important variable. The size of the tumor, amount of cerebellar retraction, vascularity and an intact blood supply to the inner ear and cochlear nerve are perhaps as important if not more important factors to be considered. The authors refers to recent reports of the possibility of preserving hearing despite penetration of the labyrinth when certain surgical manuevers like bone wax packing is promptly instituted. Neurotologists and otologic surgeons will continue to follow with interest such observations on the mechanics of hearing preservation.

Lastly, the primary goal in these cases should always be complete tumor removal with few exceptions

where hearing preservations becomes of utmost importance eg. in cases of planned subtotal resection in the elderly and in an only hearing ear as in Neurofibromatosis-2.

Kelly KE, Anthony JP and Singer M. Pharyngoesophageal reconstructionn using the radial forearm fasciocutaneous free flap: Preliminary results. Otolaryngol Head Neck Surg 1994; 111:16-24.

Pharyngoesophageal reconstruction remains a challenge to the head and neck surgeon. The goals of pharyngoesophageal reconstruction include restoration, with minimal morbidity, of a person's ability to swallow and to speak. Myocutaneous flaps, gastric pull-up, and the jejunal free flap are popular methods of pharyngoesophageal reconstruction; however, none of these modalities is clearly ideal. We have begun utilizing athe radial forearm fasciocutaneous free flap pharyngoesophageal reconstruction. Twelve patients have had reconstruction with this flap with follow-up from 2 to 15 months. Seven defects were circumferential, and five were noncircumferencial. Ten patients (83%) have had successful restoration of both swallowing ability and voice. Donor site morbidity was minimal. The leading complication was salivary leak, which was present in eight (67%) patients. Five of the leaks closed with nonsurgical intervention. No cases of flap necrosis occurred. The radial forearm free flap is a thin and pliable flap that closely approximates the tissue consistency of normal pharynx. Successful restoration of a patient's ability to swallow approximates that enteral flaps and is superior to that of MC flaps. Successful speech restoration is superior to that of enteral and MC flaps. Donor site morbidity is less than that caused by enteral flaps because laparotomy is avoided. Salivary leak is higher than with enteral flaps. Part of this difference is accountable to the high number of secondary and technically challenging reconstructions in this series, and we have raken steps to lower this rate of leakage. These preliminary data show that the radial forearm fasciocutaneous free flap is well suited for pharyngoesophageal reconstruction. Additional experience with this flap for pharyngoesophageal reconstruction is necessary to fully evaluate its utility.

Editor's Comment:

The use of free flaps in reconstructing defects following ablative surgery for treatment of head and neck cancer in general and hypopharyngeal and cervical esophageal cancer in particular is gaining significant ground in major institutions abroad. Radial forearm free flaps offer distinct advantages as pointed out in this article; 1) longer vascular pedicles and larger vessels 2) presence of multiple drawing veins.

The authors give a clear description of the flap anatomy and fabrication as well as important aspects of the postoperative management. This article provides in detail all complications encountered in twelve patients with complete patient data, operative data as well as functional results.

Microvascular expertise as pointed out has improved significantly in the past 15 years. In this country, it is expected that free flap surgery will soon be offered as an alternative reconstructive modality following major head and neck cancer surgery either as surgical salvage or primary treatment.

Clearly the pectoralis major myocutaneous flap will remain to be a favorite of head and neck surgeons because of 1) surgeon's familiarity 2) no additional expertise needed 3) minimal morbidity 4) tolerance to radiotherapy.

The clear advantage of the RFF will be the quality of voice restoration. However the rate of salivary leak was admittedly high in this series (67% or 8/12). Five however did not require surgical intervention. The authors claim that measures have been instituted to address this issue. A follow-up report will be expected to yield more information regarding other problems that may be encountered using this flap with longer follow-up of these patients and as the surgical experience of the operators increase.

NON-ASPIRATING FINE-NEEDLE BIOPSY: THE FUTURE STANDARD IN SOLID HEAD AND NECK TUMOR EVALUATION*

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ABSTRACT

Early detection of malignancy is of paramount importance in the management and prognosis of any cancerous lesion. Currently, fine-needle aspiration biopsy (FNAB) is widely accepted as an initial diagnostic modality in differentiating between benign and malignant lesions but it is quite difficult to master to produce satisfactory specimens for cytologic interpretation. Non-aspirating fine-needle biopsy (NAFNB), a modified technique, was evaluated to determine its diagnostic accuracy in comparison with FNAB in the evaluation of solid tumors in the head and neck. Cytologic diagnosis was confirmed by histopathologic examination in thirty-six patients. The accuracy, specificity, and sensitivity rates using NAFNB were 94%, 96% and 89% respectively. The accuracy, specificity, and sensitivity rates using FNAB were slightly lower at 90%, 95% and 80% respectively. Both procedures are similarly capable of giving the correct specific cytologic diagnosis. From the author's experience, however, the non-aspirating technique is a promising alternative because it is simpler, easier, faster, and safer, eliminating the need for expertise and proficiency required in the aspiration method.

INTRODUCTION

Early detection of a malignant process is of paramount importance in the management and prognosis of any cancerous lesion in the head and neck. To achieve this, various modalities have been used. At present, fine-needle aspiration biopsy (FNAB) is widely used as the standard initial diagnostic tool. It is highly accurate in differentiating between benign and malignant lesions.[1-15] Furthermore, it is economical, can be performed as an outpatient procedure, and is safe with low complication rates.

However, although simple to describe, the procedure is quite difficult to master.[16-17] This probably explains the observation made at the Department of Pathology in our institution wherein lower satisfactory yields are obtained by first year resident aspirators compared with the more senior residents. Recognizing this difficulty, the authors ventured on the search for a better alternative in circumventing this problem.

A satisfatory smear is of utmost importance in aspiration cytology. Hence, whenever an unsatisfactory specimen is taken, the true nature of the lesion can not be assessed, the management may be delayed and in the end, quality patient care may be seriously compromised.

In 1987, **Zajdela** et al reported a modification of the FNAB technique using a 23 or 25 gauge needle without aspiration in the evaluation of breast tumors. They found out that this technique produces a comparable cellular yield, and has similar diagnostic accuracy to the classic fine-needle aspiration biopsy.[18]

In 1990, **Obaldo** et al reported a local pilot study using non-aspiration biopsy in the evaluation of solid thyroid nodules.[19] In 1991, **Abaya** et al conducted their study using this method in the evaluation of solid head and neck masses. Both local studies proved that nonaspirating fine-needle biopsy (NAFNB), a simpler and easier method, produced a higher satisfactory yield compared to the standard fine-needle aspiration biopsy.[20] These however did not include the determination as to whether NAFNB is able to detect when a mass is benign or malignant and to give a correct specific cytologic diagnosis.

The diagnostic value of FNAB has been well documented, but no study has been reported yet in both local and foreign literature regarding the diagnostic accuracy of NAFNB in the evaluation of solid head and neck tumors.

It is the aim of this study to compare NAFNB and FNAB as to their effectivity in the evaluation of solid head and neck masses.

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* Presented at the 4th Annual Interdepartmental Research Paper Presentation, Jose Reyes Memorial Medical Center May 26, 1992, Third Prize Winner
Presented at the 5th Department of Health - Interhospital Clinical Research Contest, East Avenue Medical Center October 9, 1992, First Prize Winner.
Presented at the 12th Philippine Society of Otolaryngology Head and Neck Surgery (PSO-HNS) Boehringer Ingelheim Clinical Research Contest, Silahis Hotel, Manila, October 23, 1992, First Prize Winner.
Presented at the 36th PSO-HNS Annual Convention, Hotel Niko-Manila Garden, December 2, 1992.

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OBJECTIVES:

1. To determine the ability of non-aspirating fine-needle biopsy in differentiating whether solid tumors in the head and neck are benign or malignant.
2. To determine the ability of non-aspirating fine-needle biopsy in giving the correct specific cytologic diagnosis.
3. To compare the yield of satisfactory specimens and diagnostic value of the modified procedure with the standard fine-needle aspiration biopsy.
4. To demonstrate the technique of NAFNB.

DEFINITION OF TERMS:

1. *Non-aspirating fine-needle biopsy* - is the process of obtaining cell samples through a 23 or 25 gauge needle introduced into the tumor mass without applying negative pressure inside the syringe.[18]
2. *Fine-needle aspiration biopsy* - is the process of obtaining cell samples from tumor mass through a small-gauged needle generally with a vacuum system provided by an air-tight syringe.[5-13]
3. *Satisfactory specimen* - sufficient number of cells are seen clearly and their architecture maintained in order to arrive at a diagnosis.
4. *Unsatisfactory specimen* - insufficient number of cells, poorly preserved cells, hemorrhagic diathesis that obscures the underlying cells, and considerable inflammation and debris are present to prevent the ability too arrive at a diagnosis.
5. *Sensitivity rate* - is the proportion of cases detected with malignancy on formal biopsy which are positive on fine-needle biopsy.
6. *Specificity rate* - is the proportion of cases detected without malignancy on formal biopsy which are negative on fine-needle biopsy.
7. *Accuracy rate* - is the proportion of cases correctly diagnosed by the test as being malignant or not.

MATERIALS AND METHODS:

All patients who presented with head and neck masses at the Out-Patient Department of the Jose Reyes Memorial Medical Center from October 1, 1991 to April 30, 1992 were evaluated. Patients with clinically palpable head and neck masses measuring 1 x 1 cm or more which were solid or predominantly solid on ultrasonic examination were included in this study. Imaging was done by one of the authors (JBC) using the TOSHIBA Sonolayer-L SAL 32 B Ultrasound machine. Excluded were patients with previously biopsied masses, patients with bleeding and clotting disorders, and uncooperative patients. Informed written consent was secured from all patients.

Simple random sampling was employed on the study population to create two groups for technique alternation. Group A patients underwent NAFNB after which FNAB was done on the same mass a few millimeters from the initial biopsy site. The reverse sequence in which FNAB is done first followed by NAFNB in the same nodule was employed on Group B patients.

Technique:

Non-aspirating fine-needle biopsy:

The patient was placed in a supine position. The site of biopsy was first cleansed with 70% alcohol. Using the aseptic technique, the nodule was stabilized with the thumb and index finger of the nondominant hand. A one-inch gauge 23 needle attached to a 20 cc syringe with the plunger removed, was inserted gently and firmly by the dominant hand into the mass, and moved back and forth in different directions within the mass until blood or tissue appeared in the hub of the needle. The syringe served as a handle for easier manueverability. The needle was then withdrawn and the plunger was reinserted to the syringe and pushed to expel the sample from the needle on the slide which was promtly smeared. The slide was fixed with 95% alcohol for thirty minutes then sent to the pathologist for **Papanicolau** staining and interpretation. (Figure 1)

Fine needle aspiration biopsy:

A similar one-inch gauge 23 needle attached to a 20 ml syringe with a Luer-lock tip was used. The syringe is manipulated with the dominant hand while the other hand stabilizes the biopsy site. A negative volume pressure of 10 ml. was constantly maintained within the syringe while the needle was moved back and forth within the mass. The negative pressure was released prior to needle withdrawal. The needle containing the sample was detached from the syringe. The syringe was filled with air and the needle was reattached. The sample was then expelled from the needle on to the slide and promptly smeared. The slide was fixed with 95% alcohol for 30 minutes and then sent to the pathologist for **Papanicolau** staining and interpretation. (Figure 2)

No local anesthesia was used in both procedures.

All specimens were obtained and smeared by one of the authors (GCC) who had prior experience with FNAB but not with NAFNB. The slides were then read

by the cytopathologist who was blinded as to which technique was utilized. All satisfactory specimens were evaluated whether benign or malignant. Specific cytologic diagnoses if possible were made. Patients were followed-up 24 hours after the procedure and weekly thereafter for 2 weeks to determine complications.

Final histopathologic diagnoses were then obtained whenever warranted as part of the diagnostic or therapeutic management through section or excision biopsy depending on the case. This served as the gold standard. The histopathologist was blinded as to the results of the cytology.

RESULTS:

A total of 110 patients were included in the study. A satisfactory yield of 71% (78/110) was obtained with NAFNB while 65% (72/110) was obtained with FNAB. The difference was not statistically significant with a p value of 0.1894 by Sign Test. (Table I).

Table I. Comparison Between NAFNB and FNB as to Yield

	FNAB		
	Satisfactory	Unsatisfactory	Total
NAFNB			
Satisfactory	59	19	78
Unsatisfactory	13	19	32
Total	72	38	110

p=0.1894

Final histopathologic diagnoses were obtained in 36 patients. There were 19 subjects in Group A (NAFNB first) and 17 females with an age range of 1 - 64 years.

Table II shows the results as to whether the tumor is really benign or malignant with the use of NAFNB as confirmed by histopathologic diagnosis in 34 cases.

Table II. Comparison of Results Between NAFNB and Histopathology in Detecting Malignancy

	HISTOPATHOLOGY		
	Malignant	Benign	Total
NAFNB			
Malingant	8	1	9
Benign	1	24	25
Total	9	25	34

Sensitivity = 89% (+) Predictive Value = 89%
Specificity = 96% (-) Predictive Value = 95.4%
Accuracy = 94%

Table III shows the results as to whether the tumor is really benign or malignant with the use of FNAB as confirmed by histopathologic diagnosis in 299 patients.

Table III. Comparison of Results Between FNAB and Histopathology in Detecting Malignancy

	HISTOPATHOLOGY		
	Malignant	Benign	Total
FNAB			
Malignant	8	1	9
Benign	2	18	20
Total	10	19	29

Sensitivity = 80% (+) Predictive Value = 89%
Specificity = 95% (-) Predictive Value = 90%
Accuracy = 90%

Complications were noted in both procedures but these were mild and transient. (Table V)

Table V. Complications

	Group A (N = 60)	Group B (N = 50)
Bearable pain	55	43
Pain requiring analgesic	2	3
Hematoma	2	4
Syncope	0	1

DISCUSSION

Fine-needle aspiration biopsy has added a significant dimension to the scien e of evaluating tumors in all areas of the body. It is now accepted as the standard initial diagnostic modality. Its greatest use, however, is in the head and neck because solid tumors in these areas are readily accessible to the procedure. Numerous studies in foreign literature as well as in two local ones have documented that this procedure is capable of producing satisfactory specimens for cytologic evaluation.

Non-aspirating fine-needle biopsy is also capable of producing cellular yields comparable to the aspiration method.[18-20] Our results showed that without aspiration, satisfactory specimens were obtained in 71% of cases while with aspiration the satisfactory yield was only 65%. The difference however, was not statistically significant. **Zajdela** et al who pioneered the modified technique at the Institut Curie in Paris, France had results similar to the percentages that we produced. Comparing NAFNB and FNAB, they noted that the difference in the yields between the two procedures were not statistically significant.

Obaldo et al who introduced its use in our local setting in the evaluation of solid thyroid nodules demonstrated that NAFNB produced greater satisfactory specimens than FNAB. **Abaya** et al also applied the modified technique in solid tumors of the head and neck other than thyroid nodules. Satisfactory specimens were obtained in 74.3% (26/35) using NAFNB which was higher than that obtained iin 51.4% (18/35) using FNAB.

FNAB is highly accurate when used correctly. This high accuracy is also possible with the use of NAFNB as shown by the results of this study. With the employment of NAFNB, the accuracy, sensitivity, and specificity rates obtained were 94%, 89%, and 96% respectively. With the use of FNAB, the results were slightly lower. Its accuracy, sensitivity, and specificity rates were 90%, 80%, and 95% respectively. There is no available reference wherein we can compare the results we got using NAFNB but the figures we obtained using FNAB were similar to those of other authors.[1 15]

In the evaluation of solid tumors in the head and neck, NAFNB is similarly capable of giving correct specific cytologic diagnosis as compared to FNAB.

Fine-needle aspiration biopsy is economical, fast, safe, simple and easy. It is highly accurate with high sensitivity and specificity rates. However, in spite of the advantages it offers, FNAB requires expertise and proficiency. According to **Kline**, one of the chief causes of both false-positive and false-negative diagnosis is still inexperience with the use of FNAB. Geographic miss and lack of representative and sufficient specimen material may be the result of inept technique.[5] In addition, a highly experienced cytopathologist is recommended to achieve optimum diagnostic accuracy. It goes without saying however that before cytologic diagnosis can be made, adequate sampling must be procured. Failed aspirates can be due to several factors. One of these is hemorrhagic diathesis that obscures the underlying cells. This can be minimize by using NAFNB since it reduces the amount of blood in the samples, particularly from vascular tumors.[18]

Although simple to describe and only requiring two basic tools such as fine-needle and syringe, in reality fine-needle aspiration biopsy is difficult to master, taking a longer time for one to acquire the experience and proficiency before optimum results can be achieved. Estimates show that 200 aspirations should be performed in a short period of time under expert guidance before attempting to inedependently utilize the technique for patient care. It has also been recommended that the aspirator perform at least 10 procedures a week in order to be proficient.[16] Kline even advises the prospective aspirator to practice initially on farm produce such as apples, oranges or potatoes.[5] With the non-aspirating technique, the biopsy becomes a simpler method eliminating the required expertise and proficiency in the aspiration method.[18-20]

During the sampling process in aspiration biopsy, even when one has mastered the technique, a great deal of energy is exerted in order to maintain the negative pressure or vacuum within the syringe. **Linsk** recommends that a full 10 ml. of suction to the syringe be applied while moving the needle back and forth into the tumor mass. Some have proposed the use of syringe holder or syringe gun for those with little finger dexterity but the cost renders this nonubiquitous tool impractical in our local set-up. With the non-aspirating method no negative pressure has to be applied thereby lessening the great amount of strain and energy during the sampling process. Lesser energy and work expanded but producing the same quality of results makes the modified technique the better and more efficient alternative to the standard FNAB. It also requires less dexterity on the part of the operator. With the nondominant hand completely free which in the aspiration method would have to be used to create and maintain the necessary negative pressure, NAFNB permits direct manipulation of the needle allowing a more delicate finger tip feeling of the consistency of the tumor tissue while sampling. Even without aspiration, cellular material can still be obtained because cells are detached by the cutting edge of the needle and are conducted into its lumen by capillary force.[18]

In the modified technique described by **Zajdela, Oblado** and **Abaya,** the sampler holds the needle which is moved back and forth into different depths of the tumor. We have added another modification by attaching the syringe devoid of the plunger thereby making the needle easier to manuever during sampling.

Both procedures are highly reliable in obtaining satisfactory specimens for cytology. They have almost similar results with regard to their accuracy, sensitivity, and specificity rates. It is probably safe to assume however that if someone with no experience in both procedures is subjected to a test to compare the two as to which one can produce greater satisfactory specimens and is more accurate, comparably lower results might be obtained from fine-needle aspiration biopsy. The clinical significance of this is that even for the beginners, most especially the first year resident physicians who have no prior experience with FNAB but who perform the majority of needle biopsies in the hospital, they would readily appreciate that NAFNB is a simpler and easier procedure to use compared to the FNAB without fear of obtaining insufficient material for cytologic interpretation.

NAFNB and FNAB are safe with virtually no major complications. **Zajdela** et al claim however that the

modified technique permits a significant reduction in trauma to the tumoral and surrounding tissues and is therefore safer than FNAB.

This study has ably demonstrated that non-aspirating fine-needle biopsy produces a comparable cellular yield and has a similar diagnostic accuracy to fine-needle aspiration biopsy. FNAB is economical, fast, safe and simple. However, this reliable diagnostic modality, despite its cited advantages is difficult to master.

From a theoretical viewpoint, NAFNB is simpler because it eliminates the need for experience and proficiency required to produce a satisfactory specimen. It is easier because one does not have to exert so much energy in maintaining negative pressure while obtaining samples, which in effect makes the procedure faster. Greater maneuverability is achieved by our introduction of attaching the syringe without the plunger to the needle and this allows more sensitive finger tip feeling of the consistency of the tumor tissue during sampling. It is safer since it permits a significant reduction in trauma to the tumoral and surrounding tissues. Failed aspirates can be minimized since NAFNB reduces the amount of blood in the samples particularly from vascular tumors. These factors therefore make NAFNB a promising alternantive to FNAB for the inexperienced and even for the experienced clinician.

CONCLUSION:

1. Non-aspirating fine-needle biopsy is a highly reliable technique in differentiating whether solid tumors in the head and neck are benign.

2. Non-aspirating fine-needle biopsy has the ability to offer correct specific cytologic diagnosis.

3. Non-aspirating fine-needle biopsy and fine-needle aspiration biopsy have similar results in terms of yielding satisfactory specimens and accuracy, sensitivity and specificity rates.

4. The technique of non-aspirating fine-needle biopsy has been demonstrated. From the authors perspective, it is a better and more efficient alternative to fine-needle aspiration biopsy because it is simpler, easier, faster, and safer to perform. However, objective studies comparing both modalities utilizing various performers with diverse experiences in neddle biopsy will have to be done.

We therefore strongly recommend that FNAB be considered as an alternative to FNAB. It is our contention that NAFNB may well become the future standard diagnostic modality in the initial evaluation of solid head and neck tumors.

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THE DIAGNOSTIC VALUE OF BRUSH CYTOLOGY IN ORAL CAVITY MUCOSAL LESIONS*

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ABSTRACT

This prospective study aims to determine the specificity of brush cytology and if it can be a substitute for punch biopsy in the diagnosis of oral cavity mucosal lesions. Subjects were selected from the oral cavity mucosal lesions, seen by the ORL-HNS residents and hospital dentists from March 1992 to September 1993. Specimens were collected using the standard and cheapest toothbrush available, then submitted to the hospital's laboratory for cytopathologic examination. Cytologic Grades of 0-3 underwent a repeated biopsy by brushing prior to punch biopsy. Because of its ability to sample large surface areas with minimal tissue trauma, this study reveals that brush biopsy is a risk-free, non-invasive, and less expensive than punch or incisional biopsy. A distinct advantage can easily be seen when the procedure is done in the clinic which is convenient for both the patient and the physician.

INTRODUCTION

In 1941, Papanicolaou and Traut[1] reported the usefulness of exfoliative cytology in the diagnosis of malignant neoplasms in the uterine cervix. since then, cytodiagnostic technique have been well accepted and used by clinicians of various disciplines. During the early years of exfoliative cytology, its utility as far as ENT-HNS has been questioned.[2] However, because of the development of newer methods, exoliative cytology has been endorsed as an adjunct tool in the diagnosis of head and neck lesions. **Erozan**[3] reported that cytodiagnosis helped detect occult primary laryngeal, oral and pharyngeal carcinoma; recurrent carcinoma after surgery or radiotherapy; clinically suspected cancer before biopsy. Cytodiagnostic techniques were

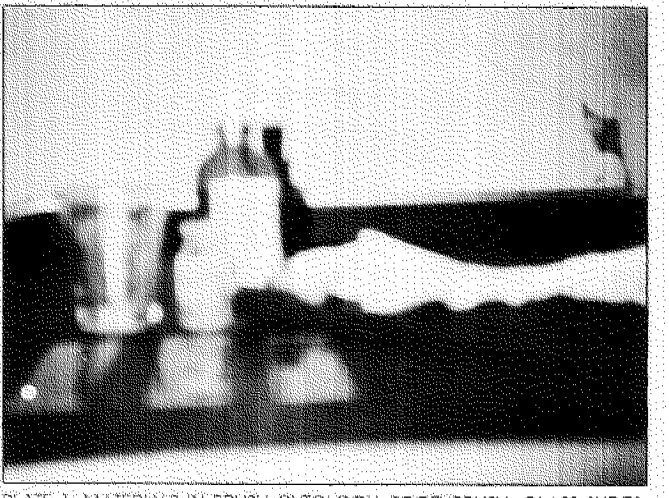

PLATE 1: MATERIALS IN BRUSH CYTOLOGY: TOOTHBRUSH, GLASS SLIDES, FIXATIVE (70% ALCOHOL), MEDICINE GLASS, LOCAL ANESTHETIC (10% XYLOCAINE SPRAY) SURGICAL GLOVES.

used by **Hutter** and **Gerold**[4] to follow up patients with malignant neoplasms that were treated surgically and they found out clinically unsuspected carcinoma among 10 out of 177 patients in the absence of visible lesions. In these studies, brush cytology supplemented biopsy in the diagnosis of clinically suspected primary or metastatic malignant lesions and in the surveilance for local recurrences after initial surgery or radiotherapy.

Among the various ailments seen by an otolaryngologist-head and neck surgeon, it is in the spectrum of oral cavity mucosal lesions that these cytodiagnostic methods like oral lavages, tissue scrappings and brush cytology are of great value. Although the mainstay of tumor diagnosis in the oral cavity includes high degree of suspicion coupled with a sufficient tissue biopsy for histopathologic studies, there are several researches which claim that brush cytology can be a reliable alternative in the definitive diagnosis and monitoring of oral cavity lesions.

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* Presented, Boehringer-Ingelheim Clinical Research Contest, Manila Midtown Hotel, September, 1993.

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PLATE 2: LESION ON THE LOWER LIP, LEFT BUCCAL SIDE.

GENERAL OBJECTIVE

This prospective study aims to determine the diagnostic value of brush cytology in the lesions of oral cavity mucosa.

SPECIFIC OBJECTIVES

1. To determine the specificity of brush cytology studies in the diagnosis of oral cavity mucosal lesions.
2. To determine if brush cytology can be a substitute for punch biopsy in the diagnosis of oral mucosal lesions.

PLATE 3: SPECIMEN COLLECTION: THE LESION OF INTEREST SAMPLED BY GENTLY BRUSHING THE SURFACE, USING A STANDARD TOOTHBRUSH, BY POSTERANTERIOR STROKING TECHNIQUEUFFICIENT TO OBTAIN ENOUGH SPECIMEN FOR GLASS SLIDES SMEARS AND CELL BLOCK CYTOLOGY.

METHODOLOGY

A. RESEARCH DESIGN AND PATIENT SELECTION

Brushings were obtained from patients with oral cavity mucosal complaints and/or lesions and for whom surgical biopsy was recommended.

Subjects were selected from consecutive patients with complaints referable to the oral cavity mucosa and/or lesions in this region of the head and neck; and seen by resident physicians of the Department of ORL-HNS and hospital dentists of our instution from March 1992 to September 1993.

PLATE 4: THE MATERIAL PROCURED HAS IMMEDIATELY PLACED ON GLASS SLIDES BY SMEAR METHOD USING THW TOOTHBRUSH BRISTLES.

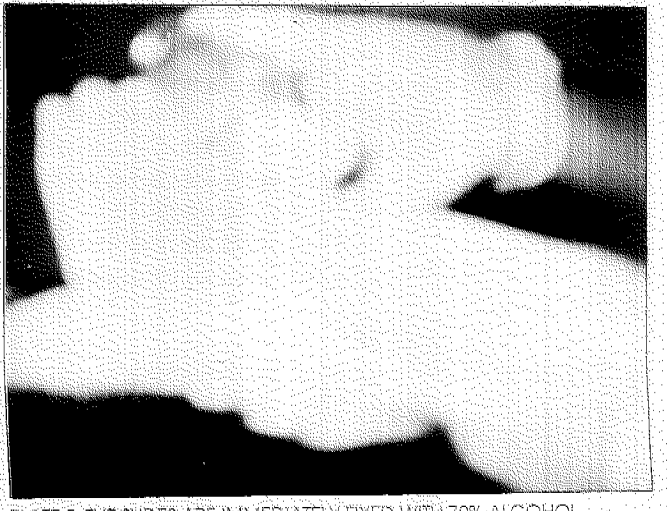

PLATE 5: THE SLIDES ARE IMMEDIATELY FIXED WITH 70% ALCOHOL.

Exclusion criteria were established for:

1. male and female patients below 18 years of age with oral cavity lesions or mucosal complaints
2. patients with a previous medical/dental consultation and/ or medications for their oral cavity mucosal complaints and/or lesions
3. patients who did not follow up at the OPD of the Department of ORL-HNS for histopathologic studies (punch tissue biopsy)

B. SPECIMEN COLLECTION AND PREPARATION

Brush cytology specimens were collected with a standard toothbrush (bristle area measures 30x10 mm). The lesions of interest were sampled by gently brushing the surface by posteroanterior stroking technique sufficient to obtain enough specimen for 2 slide smears and cell block cytology. The material procured was immediately placed on two slides by smear method using the toothbrush bristles. The slides were fixed immediately with 70% alcohol. The brush then was washed into the same fixative agent (60% alcohol) and together with the slides were brought immediately to the hospital laboratory for **Papanicolaou** staining method concomitant with cell block cytology.

Three days after the initial specimen collection, subjects were obliged to follow up at the OPD for punch biopsy of the lesions of interest under local anesthesia. Three pieces of punch biopsy specimens are placed in a small vial with formaldehyde and brought to the hospital laboratory for histopathologic processing.

C. CYTOPHATOLOGIC INTERPRETATIONS AND HISTOPATHOLOGIC DIAGNOSIS

Cytologic interpretations of brush cytology specimens were made by three cytopathologists (resident pathologist, consultant pathologist and hospital's chief pathologist [Department Chairman]). Histopathologic diagnosis of punch specimen and cell block cytology was made by the hospital's chief pathologist and this will be used as the reference standard for calculating the accuracy of cytopathologic interpetation.

Cytologic Grading used in this study were as follows:

Grade 0 : unsatisfactory for interpretation
Grade 1 : negative for malignant neoplasia (benign)
Grade 2 : equivocal or inconclusive for ruling out malignant neoplasia

PLATE 6: THE BRUSH IS WASHED WITH THE SAME FIXATIVE AGENT (70% ALCOHOL). THEN SMEARS ARE AIR DRIED AND BROUGHT TO LABORATORY FOR PAPANICOLAOU STAINING METHOD CONCOMITANT WITH CELL CLOCK CYTOLOGY

Grade 3 : inconclusive but suspicious for malignant neoplasia
Grade 4 : positive for malignant neoplasia (malignant)

For Grades 0-3, a repeat brush specimen collection was done prior to punch tissue biopsy.

Cytologic Grade 1 was considered equivalent to the histopathologist finding of "benign" or "negative for malignant neoplasia"; cytologic Grade 4 was considered equivalent of histopathologist's finding "malignant".

D. STATISTICAL ANALYSIS CATEGORICAL DATA

1. Test for linear correlation (coefficient of correlation) between brush cytology and punch biopsy
2. Test for accuracy of cytopathologic interpretations in terms of sensitivity and specificity:

(a) sensitivity - measures the likelihood that the test is positive given a patient with the disease

(b) specificity - measures the likelihood that the test is negative given a patient without the disease
- measures the likelihood that the test is positive ((has a particular histologic determination of lesion) given a patients with a particular disease

PLATE 7: PHOTOMICROGRAPH OF BRUSH CYTOLOGY OF A LESION IN THE HARD PALATE; CYTOLOGIC GRADE 3: INCONCLUSIVE BUT SUSPICIOUS OF MALIGNANT NEOPLASIA (PAPANICOLAOU, ORIGINAL, X100). Microsection discloses red blood cells, inflammatory cells, and suspicious looking fairly red large cells exhibiting mild pleomorphism and hyperchromaticity.

PLATE 8 PHOTOMICROGRAPH OF PUNCH BIOPSY OF THE SAME LESION OF THE SAME PATIENT IN PLATE 1; FINAL DIAGNOSIS: SQUAMOUS CELL CARCINOMA, WELL DIFFERENTIATED (H & E, ORIGINAL, x40). Microscopic section shows tumour cells derived from squamous epithelium forming nest and cords with areas showing keration pearl formation.

DISCUSSION

Oral mucosal lesions are common clinical entities seen by health professionals including dentists. These lesions represent a wide spectrum of diseases afflicting human population which will result to morbidity and mortality especially if misdiagnosed.

Some occur primarily as a single, well-defined lesion in an area of the oral cavity, whereas others may typically be diffusely spread troughout the oral cavity and at times dilemma arises as to the primary origin of the lesions. The importance of a thorough clinical history-taking should not be overlooked. Emphasis on the onset, duration, growth characteristics and symptomatology of the lesion must be accurately documented.

Some of these lesions have the potential to undergo malignant transformation even in the nonexistence of predisposing factors in carcinogenesis. Hence, the clinicians who attend to these cases should have a high degree of suspicion much more if the lesions failed to resolve after instituting the common armamentarium in oral medicine (such as topical and systemic antibiotics as well as antiseptic mouthwash). Under these circumstances, biopsy studies are mandatory. This current study proposes the utilization of brush cytology for oral cavity mucosal lesions as an alternative to punch or incisional biopsies that are routinely done in most centers.

Fifty six brushings were obtained from 37 patients (22 males and 15 females). Table 1 lists the number of cytologic brushings by anatomic site. Oral cavity

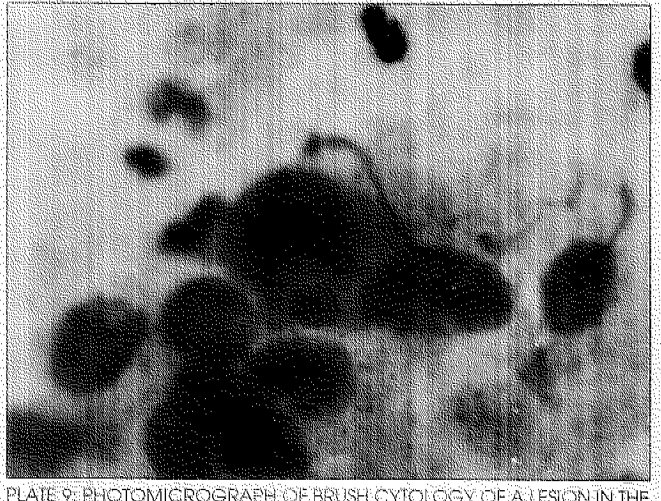

PLATE 9: PHOTOMICROGRAPH OF BRUSH CYTOLOGY OF A LESION IN THE HARD PALATE; CYTOLOGIC GRADE 4: POSITIVE FOR MALIGNANT NEOPLASIA (PAPANICOLAOU, ORIGINAL, X100). FINAL DIAGNOSIS: SQUAMOUS CELL CARCINOMA. Microsection discloses mostly red blood cells and some inflammatory cells with some fairly large pleomorphic cells derived from squamous cells showing large hyperchromatic nuclei and science cytoplasm.

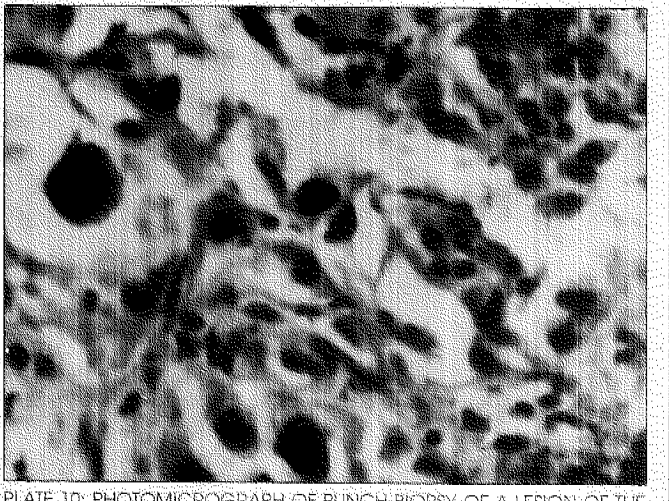

PLATE 10: PHOTOMICROGRAPH OF PUNCH BIOPSY OF A LESION OF THE HARD PALATE; FINAL DIAGNOSIS: SQUAMOUS CELL CARCINOMA, WELL DIFFERENTIATED. (H & E, ORIGINAL, X40). Microscopic section reveals fragments of tissue showing pleomorphic and hyperchromatic cells derived from squamous cells with mild to moderate lymphocytic infiltration.

mucosal lesions appeared to be most common in the tongue, followed equally by the hard palate, gingiva, and lips and then by the buccal mucosa and the floor of the mouth. The least common lesion was seen in the retromolar trigone.

Table 2 lists the number of histopathologic punch biopsy specimen by anatomic site with highest percentage of malignancy in the tongue and highest frequency of benign entity in the lower gingiva.

Table 3 and 4 give the interpretation and grading of the sampled specimen by the 3 selected cytopathologists.

Table 5 is self explanatory, for specimens where histopathologic diagnosis was either benign or malignant.

Table 6 gives the frequency as cytopathologic interpretation by grading and histopathologic diagnosis. The term interpretation is used for cytologic findings, whereas the term diagnosis is reserved for histopathologic findings, used in the study as the reference standard by which the accuracy of brush cytology is determined in terms of sensitivity and specificity measurement.

Table 7 shows correlation of discrepancies between cytopathologic and histopathologic grading of each specimen. Nineteen brushings were repeated by virtue of the above mentioned rule that for Grades 0-3 interpretations, a repeat brush specimen collection has to be done prior to punch tissue biopsy.

Statistical analysis of data shows that brush cytology study give a strongly positive coeficient of correlation with punch biopsy as far as benignity or malignancy of the lesions is concerned. Calculation of the coefficient of correlation (r) from the data in Tabel 7 gives R-value of 0.90. (see Appendix 1)

The cytologic brushings done (n-37) resulted to a relatively high percentage of sensitivity (86.95%). Also, our data showed that brush cytology is as specific as punch biopsy yielding 100% specificity. Nevertheless, even if the number of specimen collected was quite limited, the coefficient of correlation between brush cytology and punch biopsy still show that there is a strong positive relationship between these 2 laboratory procedures. Therefore, brush cytology may be an alternative for punch biopsy as far as cancer detection is concerned.

CONCLUSION

Because of its ability to sample large surface areas with minimal tissue trauma, brush cytologic biopsy is a useful screening technique in combination or not with selective surgical biopsy for the detection of cytologic changes of malignant neoplasia.

This prospective study reveals that brush cytology is a risk free, non-invasive, and less expensive than punch or incisional biopsy. Some of its advantages are: (1) performed readily as an office procedure under local or topical anesthetics; (2) biopsy instrument is readily available; (3) easily done and convenient to the patient; (94) has the ability to sample large mucosal area; and (5) laboratory processing of specimen collected is less time-consuming. Also, the results show that is can be a reliable substitute for surgical biopsies as far as detection of oral cavity cancers and for follow up examination of previously treated oral cavity malignancies.

RECOMMENDATION

The study shows a strong positive relationship between the two variables (brush cytology as compared with punch biopsy) and in order to yield a higher percentage of sensitivity, continuous gathering of data is recommended.

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RESULTS

A. DATA TABULATION (Raw Data)

Table I. Anatomic Site of Cytologic Brushings of Patients with Oral Cavity Mucosal Lesions seen at the ORL-HNS OPDfrom March 1992 to September 1993.

Site	Cytologic Grading	Frequency (No.)	(%)
Gingiva Upper	1	2	5.4
	4	1	2.7
Lower	I	3	8.1
	4	1	2.7
Hard Palate	1	2	5.4
	3	1	2.7
	4	4	10.8
Oral Tongue	2	2	5.4
	3	1	2.7
	4	6	16.2
Lip Upper	1	2	5.4
	4	1	2.7
Lower	2	2	5.4
	4	2	5.4
Buccal Mucosa	I	2	5.4
	4	1	2.7
Floor, Mouth	1	1	2.7
	3	1	2.7
	4	1	2.7
	4	1	2.7
Retromolar Trigone	4	1	2.7
	Total	37	100

Table 3: Cytopathologic Interpretations/Grading by the Cytopahologist (Papanicolau Stained Brush Specimens)

Cytopathologist (Grading 01234)	S							P			E				C			I			M				E				N				S					
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37
Resident 0 1 2 3 4	4	1	1	4	2	4	3	4	1	4	4	4	4	1	1	1	4	2	3	4	2	1	1	4	1	4	1	4	4	1	4	2	4	1	4	4	4
Consultant 0 1 2 3 4	4	1	1	4	1	4	3	4	1	4	4	4	4	1	1	1	4	2	4	4	0	1	1	4	1	4	1	4	4	1	4	3	4	1	4	4	4
Chief 0 1 2 3 4	4	1	1	4	1	4	3	4	1	4	4	4	4	1	1	1	4	2	4	4	2	1	1	4	1	4	1	4	4	1	4	2	4	1	4	4	4

TABLE 4: Cytopathologic Interpretations/Grading by the cythopathologist (Papanicolau Stained Punch Biopsy Specimens)

Cytopathologist (Grading 01234)	S							P			E				C			I			M				E				N				S					
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37
Resident 0 1 2 3 4	4	1	1	4	1	4	4	4	1	3	4	3	4	1	1	1	4	4	3	4	1	1	1	4	1	4	1	4	4	1	4	1	4	1	4	4	1
Consultant 0 1 2 3 4	4	1	1	4	1	4	4	4	1	4	4	4	4	1	1	1	4	4	3	4	1	1	1	4	1	4	1	4	4	1	4	4	4	1	4	4	4
Chief 0 1 2 3 4	4	1	1	4	1	4	4	4	1	4	4	4	4	1	1	1	4	4	4	4	1	1	1	4	1	4	1	4	4	1	4	4	4	1	4	4	4

Table 2: Anatomic Site of Histoopathologic Punch Biopsy of Patients with Oral Cavity Mucosal Lesions seen at the ORL-HNS OPD from March 1992 to September 1993.

Site	Histopathologic Grading	Frequency (No.)	(%)
Gingiva			
Upper	1	2	5.4
	4	1	2.7
Lower	I	3	8.1
	4	1	2.7
Hard Palate	1	2	5.4
	4	5	13.5
Oral Tongue	1	2	5.4
	4	7	18.9
Lip			
Upper	1	2	5.4
	4	1	2.7
Lower	4	4	10.8
Buccal Mucosa	I	2	5.4
	4	1	2.7
Floor, Mouth	1	1	2.7
	4	2	5.4
Retromolar Trigone	4	1	2.7
	Total	37	100

Table 5: Final Diagnosis for Each Histopathologic Specimen (Punch Biopsy)

Specimen No.	FINAL DIAGNOSIS
1	Squamous Cell CA, Poorly Differentiated, Tongue
2	Chronic Inflammation, Hard Palate
3	Chronic Inflammation, Buccal Mucosa
4	Squamous Cell CA, Well Differentiated,Hard Palate
5	Chronic Inflammation, Lower Gingiva
6	Squamous Cell CA, Well Differentiated, Tongue
7	Squamous Cell CA, Well Differentiated, Tongue
8	Squamous Cell CA, Well Differentiated, Lower Lip
9	Chronic Inflammation, Upper Gingiva
10	Squamous Cell Ca, Well Differentiated, Lower Gingiva
11	Squamous Cell CA, Poorly Differentiated, Retromolar Trigone
12	Squamous Cell CA, Well Differentiated, Hard Palate
13	Squamous Cell CA, Poorly Differentiated, Hard Palate
14	Chronic Inflammation, Buccal Mucosa
15	Chronic Inflammation, Tongue
16	Chronic Inflammation, Upper Lip
17	Squamous Cell CA, Well Differentiated, Upper Gingiva
18	Squamous Cell CA, Well Differentiated, Lower Lip
19	Squamous Cell CA, Well Differentiated, Floor of the Mouth
20	Squamous Cell CA, Well Differentiated, Hard Palate
21	Chronic Inflammation, Tongue
22	Chornic Inflammation, Upper Lip
23	Chronic Inflammation, Floor of the Mouth
24	Squamous Cell CA, Well Differentiated, Tongue
25	Chronic Inflammation, Lower Gingiva
26	Squamous Cell CA, Well Differentiated,Tongue
27	Chronic Inflammation, Upper Gingiva
28	Squamous Cell CA, Well differntiated, Tongue
29	Squamous Cell CA, Moderately Differentiated,Tongue
30	Chronic Inflammation, Hard Palate
31	Squamous Cell CA, Well Differentiated, Lower Lip
32	Squamous Cell CA, Poorly Differentiated, Floor of the Mouth
33	Squamous Cell CA, Well Differentiated, Lower Lip
34	Chronic Inflammation, Lower Gingiva
35	Squamous Cell CA, Poorly Differentiated, Lower Lip
36	Squamous Cell CA, Well Differentiated, Upper lip
37	Squamous Cell CA, Poorly Differentiated, Buccal Mucosa

Table 6: Cytopathologic Interpretation by Grading and Histopathologic Diagnosis

Histopatholic Diagnosis	Cytopathologic Interpretations (Grading) [f]				
	0	1	2	3	4
Squamous Cell CA					23
Chronic Inflammation		14			

B. TABULATION OF STATISTICAL CATEGORICAL ANALYSIS OF DATA

Table 7: Cytopathologic and Histopathologic Grading of Specimens

Specimen No.	Site	Cytopathologic Grade (X)	Histopathologic Grade (Y)	XY	X2	Y2
1	Tongue	4	4	16	16	16
2	Hard Palate	0 —> 1	1	1	1	1
3	Buccal Mucosa	0 —> 1	1	1	1	1
4	Hard Palate	4	4	16	16	16
5	Lower Gingiva	1 —> 1	1	1	1	1
6	Tongue	4	4	16	16	16
7	Tongue	2 —> 3	4	12	9	16
8	Lower Lip	4	4	16	16	16
9	Upper Gingiva	0 —> 1	1	1	1	1
10	Lower Gingiva	4	4	16	16	16
11	Retromolar Trigone	3 —> 4	4	16	16	16
12	Hard Palate	2 —> 4	4	16	16	16
13	Hard Palate	4	4	16	16	16
14	Buccal Mucosa	1 —> 1	1	1	1	1
15	Tongue	1 —> 1	1	1	1	1
16	Upper Lip	0 —> 1	1	1	1	1
17	Upper Gingiva	4	4	16	16	16
18	Lower Lip	1 —> 2	4	8	4	16
19	Floor of the mouth	4	4	16	16	16
20	Hard Palate	4	4	16	16	16
21	Tongue	2 —> 2	1	2	4	1
22	Upper Lip	1 —> 1	1	1	1	1
23	Floor of the Mouth	0 —> 1	1	1	1	1
24	Tongue	4	4	16	16	16
25	Lower Gingiva	0 —> 1	1	1	1	1
26	Hard Palate	4	4	16	16	16
27	Upper Gingiva	0 —> 1	1	1	1	1
28	Tongue	3 —> 4	4	16	16	16
29	Tongue	4	4	16	16	16
30	Hard Palate	4	1	4	16	1
31	Tongue	4	4	16	16	16
32	Floor of the Mouth	2 —> 3	4	12	9	16
33	Lower lip	4	4	16	16	16
34	Lower Gingiva	0 —> 1	1	1	1	1
35	Upper Lip	4	4	16	16	16
36	Upper Lip	4	4	16	16	16
37	Buccal Mucosa	4	4	16	16	16
TOTAL		**104**	**106**	**370**	**374**	**382**

NOTE: The arrows under Cytopathologic Grade (X) for each poinnt to the final diagnosis of brush biopsies after a repeated brush cytologic study for Grades 0 to 3, before performing punch biopsy.

APPENDIX 1

TEST FROM LINEAR CORRELATION

COEFFICIENT OF CORRELATION (r)

$$r = \frac{Z\,XY - n\bar{X}\bar{Y}}{\sqrt{[Z\,X^2 - n\bar{X}^2]\,[Z\,Y^2 - n\bar{Y}^2]}}$$

$$r = \frac{n\,Z\,XY - (Z\,X)\,(Z\,Y)}{\sqrt{[Z\,X^2 - n\bar{X}^2]\,[Z\,\bar{Y}^2 - nY^2]}}$$

$$r = \frac{37\,(370) - 104\,(106)}{\sqrt{[37\,(374) - (104)\,2]\,[37\,(382) - (106)^2}}$$

$$r = \frac{13690 - 11024}{\sqrt{(13838 - 10816)\,(14134 - 11236)}}$$

$$r = \frac{2666}{\sqrt{(3022)\,(2898)}}$$

$$r = \frac{2666}{\sqrt{8757756}}$$

$$r = \frac{2666}{2959}$$

r =	0.90

Range of r = +1 to -1

The nearer to +1, the stronger the positive relationship.

The nearer to 0, the weaker the relationship.

The nearer to -1, the stronger the negative relationship.

Therefore, r of 0.90 connotes a stronger positive relationship between the two variables (brush cytology and punch biopsy).

APPENDIX II

TEST FOR ACCURACY OF BRUSH CYTOLOGY

Table A. Brush Cytology, Malignant Observations

	Present	Absent	Total
Observation (+)	20	0	20
(-)	3	14	17
Total	23	14	37

(a) SENSITIVITY

$$= \frac{\text{true (+) observations}}{\text{total no. with malignancy}} \times 100 = \frac{20}{20+3} \times 100 = \boxed{86.95\%}$$

(b) SPECIFICITY

$$= \frac{\text{true (-) observations}}{\text{total no. w/out malignancy}} \times 100 = \frac{14}{14+0} \times 100 = \boxed{100\%}$$

Table B. Brush Cytology, Benign Observations

	Present	Absent	Total
Observation (+)	13	0	13
(-)	1	23	24
Total	14	23	37

(a) SENSITIVITY

$$= \frac{\text{true (+) observations}}{\text{total no. with malignancy}} \times 100 = \frac{13}{13+1} \times 100 = \boxed{92.86\%}$$

(b) SPECIFICITY

$$= \frac{\text{true (-) observations}}{\text{total no. with malignancy}} \times 100 = \frac{23}{23+0} \times 100 = \boxed{100\%}$$

THE COMPARATIVE VALUE OF IMPRINT CYTOLOGY AND FROZEN SECTION OF HEAD AND NECK TUMORS (EAMC EXPERIENCE)*

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CLINICAL ABSTRACT

Fifty-nine (59) fresh specimens of Head and Neck tumors were microscopically diagnosed by imprint cytology and frozen section. A comparison of their accuracy and predictive values were done using paraffin section as the gold standard. Results were comparable for imprint cytology and frozen section with paraffin section. Imprint cytology, being more available, rapid, affordable and with comparable results with frozen section, is then seen to have a good potential for intraoperative diagnosis especially in its application in a rural setting.

INTRODUCTION

Intraoperative histologic consult on the diagnosis of head and neck tumors carry a great impact on the decision making process during surgery. The surgeon is all too aware of the importance of such a consult as the malignancy or non-malignancy of tumors spell a world of difference. Questions on whether the surgeon should dissect conservatively or be radical, the need for post-operative cobalt treatment, post-operative complications to expect and the all too important question of prognosis are answered (**Gnepp**, 1988).

In the ideal setting, biopsies of head and neck tumors make use of the frozen section technique in order to assist the surgeon in making an intraoperative therapeutic decision. The frozen section can identify whether the specimen is malignant or non-malignant, determine the adequacy of surgical margins, determine the extent of disease and map out the need for further surgery (Gnepp, 1988).

However, the set-up for a frozen section technique is not always available. The technique calls for a more elaborate of fresh specimen, cutting and staining of slides, a proficient technician and use of chemicals that are not as easy to procure. There is also a waiting period of about 15 minutes for the surgeon with the patient who is under general anesthesia. The approximate expense for the procedure is P440.00 per specimen in this institution.

An alternative technique to assist the surgeon intraoperatively is the imprint cytology (**Scopa**, 1990). This is a simple technique reported to have a high correlation with frozen section results (**Godwin**, 1976). It involves imprinting or touching the fresh cut surface of the specimen on a glass slide, staining with Hematoxylin, then Eosin, and a shorter waiting period of only 3-5 minutes before a diagnosis is signed out. The approximate expense for the procedure is P55.00.

While imprint cytology has been used in laboratories worldwide, there has been no study of its acuracy and predictive values for head and neck tumors as well as a description of its advantages.

The objective of the study is to come up with a comparison of the accuracy and predictive values of imprint cytology with frozen section using paraffin section as the gold standard in order to assist the surgeon intraoperatively for head and neck tumor cases.

METHODOLOGY

Sampling

For the period of March 1992 to August 1993, all surgical specimens of head and neck tumors or masses needing intraoperative histologic consult were sent to the histopathology laboratory for imprint cytology, frozen section and paraffin section. The specimens came from various head and neck tumors/masses which included: thyroid, submandibular gland, parotid, lymph nodes, larynx, neck mass, pre-auricular mass, nasal mass, buccal mass, supraclavicular lymph nodes, occipital mass and maxillary mass.

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* Third Prize, Boehringer-Ingelheim Clinical Research Contest, Midtown Hotel, September, 1993.

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Slide preparation:

The specimen were sent for imprint cytology, frozen section and paraffin section. The routine procedure is described as follows:

Imprint Cytology:

A gentle touch imprint on selected cut surfaces of the specimen using a minimum of three (3) slides was done. The slides were partially air-dried, then dipped once on 95% ethyl alcohol and immediately subjected to the following staining procedure: Hematoxylin for 1 minute with gentle agitation; dipped once or rinsed in tap water; dipped in eosin for 30 seconds to 1 minute, with gentle agitation; rinsed in tap water, and finnaly dipped in xylol for clearing. The entire process took only 3-4 minutes (**Koss**, 1968).

Frozen Section:

The selected tissue sample from the specimen was placed in a test tube containing (2) ml of 10% formalin. The tube was gently heated for a minute. The tissue was picked out and placed in a freezing or sliding microtome and frozen with the use of carbon dioxide jets until it is firm enough for satisfactory cutting. The ideal thickness is 5 microns, and the sliced tissues were placed in a bowl of water. The microsections were then fished out from the water bowl and placed on a clean slide with albumin layer. The tissue was fixed by heating, then dipped in hamatoxylin for 1 minute, rinsed in tap water, dipped in eosin for 30 seconds to 1 minute, then washed in xylol solution. The tissue was mounted with a cover slip (**Gnepp**, 1988).

Paraffin Section:

The specimen are fixed in 10% formalin for 3 hours followed by one hour fixing each for 70%, 90% and 100% alcohol for a total of 3 hours. The specimen are then soaked in xylene or toluine for 23 hours for clearing. Embedding in paraffin for another 3 hours follows and the paraffin block is then trimmed set for the microtome knife. The cutting rate depends on the type of tissue, the size of the block, and the type of microtome used. The knife is usually tilted at 0-15 degree angulation in a microtome to allow a clearance angle between the cutting facet and the tissue block. The tissue is then cut into ribbon, allowed to float into water heat and stretched. They are placed in the oven at 2-5 degrees centigrade for about 25 minutes, stained and labeled (**Reyes**, 1968).

Slide Interpretation:

All the slides were randomly and independently read by 3 pathologists. Only the available clinical data were made known to them. The slides were then signed out as either positive or negative for malignant cells. The criteria for diagnosis were: (**Koss**, 1984)

1. *cell yield* - the number of cells seen per high power field and in the slide as a whole;
2. *cell morphology* - the size and shape of the cells including the variations therein;
3. *nucleocytoplasmic ratio* - the changes in the proportion in the size of the nucleus to that of the cytoplasm
4. *background* - the substance of elements predominant in the slide such as blood, colloid, etc.

Data Analysis:

The results were tabulated as to age, sex, organ, imprint cytology result, frozen section result (i.e. positive or negative for malignancy) and paraffin section diagnosis (Table I).

The results of imprint cytology and paraffin section were tabulated (Table II) and the result of frozen section and paraffin section were likewise tabulated (Table III). The sensitivity, specificity and predictive values for both frozen section and imprint cytology, using paraffin section diagnosis as gold standard were calculated using the 2 x 2 table.

The sensitivity, specificy and predictive values for imprint cytology diagnosis and frozen section diagnosis were compared.

RESULTS

Only 59 specimens of the 215 head and neck specimens sent to the laboratory were included in the study. One hundred and seventy were excluded because these specimens did not have all 3 methods of imprint, frozen and paraffin section done. The other head and neck tumors/masses which were not included in the study were chronic hypertrophic tonsils, nasal polyps, cholesteatoma. These specimen did not warrant an intraoperative histologic consult. Some head and neck specimens which had a previous biopsy done (i.e. endoscopic biopsies, fine needle aspiration biopsies) were not ordered frozen section by the clinician / surgeon.

There were 23 males (38.9%) and 36 females (61.1%). The age range was from 1 year to 80 years of age with a mean of 41.4 years. The specimens are as follows: 24 thyroids (40.9%), 9 parotids (15.25%), 4 neck mass (6.77%), 3 submandibular mass (5.08%), 3 larynx (5.08%), 3 cervical lymph node (5.08%), 2 mandibular mass (3.38%), 2 palatal mass (3.38%), 2 buccal mass (3.38%), 1 supraclavicular mass (1.69%), 1 maxillary mass (1.69%), 1 occipital mass (1.69%), 1 cricothyroid (1.69%), 1 nasopharynx (1.69%).

TABLE I. Tabulation showing the Diagnosis of Each Specimen using Impriint Cytology, Frozen Section and Paraffin Section

No.	Age	Sex	Organ	IC	FS	Paraffin section
1	39	F	thyroid, r	-	-	follicular adenoma
2	25	F	thyroid, l	-	-	follicular adenoma
3	18	F	thyroid, r	+	+	papillary mixed CA
4	19	M	submandibular, l	-	-	TB
5	67	F	parotid	-	-	whartins tumor
6	67	M	submandibular	+	+	lymphoma
7	10	F	ant neck mass	-	-	thyroglossal duct cyst
8	14	F	thyroid	-	-	follicular adenoma
9	55	F	thyroid,r	+	+	follicular CA
10	5	M	parotid, l	-	-	fibrous cyst
11	26	F	thyroid,bil	+	+	papillary mixed CA
12	22	F	cervical Ln	-	-	chronic lymphadenitis
13	22	F	thyroid	-	-	NCG
14	54	M	parotid	-	-	pleomorphic adenoma
15	15	F	thyroid	+	+	papillary CA
16	37	F	thyroid	+	+	papillary CA
17	20	M	thyroid	-	-	diffuse hyperplasia
18	63	M	nasal mass	+	+	undiff CA
19	22	F	thyroid	-	-	macrofollicular adenoma
20	33	F	thyroid	-	-	NCG with fibrosis
21	29	F	thyroid	-	-	NCG
22	58	F	occipital mass	+	+	liposarcoma
23	64	F	buccal mass	+	+	SCCA
24	22	F	supraclav ln	-	-	TB
25	33	F	thyroiid	-	-	foll adenoma
26	60	F	maxillary, r	+	+	mucoepidermoid CA
27	67	M	nasal mx, r	-	-	gangrenous inflammation
28	63	M	cricothyroid	+	+	sq cell CA
29	58	F	neck mass	-	-	met CA, undiff
30	80	M	mandibular mx	+	+	sq cell CA
31	26	F	thyroid,l	-	-	foll adenoma
32	26	M	thyroid, r	+	+	papillary CA
33	74	F	mandibular	+	+	chondromyxosarcoma
34	54	M	thyroid, bil	-	-	NCG
35	20	M	palatal mass	+	+	neurofibrosarcoma
36	62	M	cervical ln	+	+	metastatic sq CA
37	52	F	thyroid, l	-	-	macrofollicular adenoma NCG
38	26	F	thyroid, l	-	-	follicular adenoma
39	76	F	mandibular	+	+	chondromyxosarcoma
40	47	M	larynx	+	+	SCCA
41	49	M	thyroid, bil	-	-	mfoll adenoma
42	66	M	larynx RND	+	+	SCCA
43	50	F	neck ln	+	+	metastaic Ca
44	20	M	neck mass, r	-	-	branchial cleft cyst
45	61	F	larynx	+	+	SCCA
46	23	F	thyroid, r	+	+	mixed pap. CA
47	17	M	neck mass, l	-	-	TB
48	22	M	parotid, l	+	+	pleomorphic w low-grade mucoepid CA
49	52	M	palatal mx	-	-	pleomor w/ mucoepid CA
50	45	F	parotid, l	+	+	adenoid cystic CA
51	53	F	palatal mx	+	+	pap adenoma
52	43	F	parotid gld	-	-	NCG
53	50	F	thyroid, l	+	+	sq cell CA
54	39	F	buccal mx	-	-	foll adenoma
55	26	F	thyroid, l	-	-	foll adenoma
56	22	M	parotid	+	+	pleomor w/ mucoepid CA
57	68	F	parotid	+	+	pleomor w/ lipomatosis
58	58	M	parotid	-	-	Warthin's tumor
59	65	M	nasopharynx	+	+	anaplastic CA

TABLE II. Accuracy and Predictive Values of Imprint Cytology with Paraffin Section diagnosis as Gold Standard

	Benign Paraffin	Malignant Paraffin	TOTAL
Benign Imprint	28	1	29
Malignant Imprint	1	29	30
TOTAL	29	30	59

Sensitivity = 96.55%
Specificity = 96.66%
Accuracy = 96.60%
Prevalence = 49.10%
(+) Pred value = 95.55%
(-) Pred value = 96.66%

TABLE III. Accuracy and Predictive Values of Frozen Section with Paraffin Section diagnosis as Gold Standard

	Benign Paraffin	Malignant Paraffin	TOTAL
Benign Frozen	28	1	29
Malignant Frozen	1	29	30
TOTAL	29	30	59

Sensitivity = 96.55%
Specificity = 96.66%
Accuracy = 96.60%
Prevalence = 49.10%
(+) Pred value = 95.55%
(-) Pred value = 96.66%

All 59 specimens submitted showed the same results for imprint cytology and for frozen section. Those read as benign for imprint were also read as benign for frozen section. Those read as malignant for imprint were also read as malignant for frozen section.

Twenty-eight of the 29 specimens (96.55%) read as benign for imprint cytology and frozen section were also read as benign in paraffin section

Twenty-nine of the 30 specimens (96.66%) read as malignant for imprint cytology and frozen section were also read as malignant in paraffin section.

One specimen read as a benign for imprint and frozen section was read as malignant for paraffin section. This was the case of a 52 year old male with a parotid mass diagnosed as pleomorphic adenoma with mucoepidermoid CA on paraffin section.

One specimen read as malignant for imprint and frozen section was read as benign for paraffin section. This was a case of a 22 year old male with a mandibular mass diagnosed as ameloblastoma on paraffin section.

Sensitivity results were the same for imprint and frozen section as compared to paraffin section, and was computed at 96.55%. Specificity was at 96.66%, accuracy at 96.66%, prevalence at 49.1% predictiive value at 95.5% and (-) predictive value at 96.66%.

DISCUSSION

An accurate intraoperative histologic diagnosis at the soonest possible time is a great help to the surgeon in making an intraoperative therapeutic decision. This has been the main purpose of the routinely used frozen section technique. Frozen section can answer the following questions about the lesion.

1. What is the disease process? Is it benign, malignant or inflammatory? Often it is sufficient for the surgeon to know that the lesion is malignant or a non-neoplastic condition to make a proper therapeutic decision. Subtyping the disease process may not always be necessary.
2. What is the specific type of disease process? Is it infectious (i.e. granulomatous inflammation vs. an abscess); if malignant, is a polymorphous low-grade adenocarcinoma or a high-grade mucoepidermoid carcinoma? These are important considerations, since the types of cultures obtained at the time of surgery are different in the former example and the type of surgery that would be necessary varies in the latter (i.e. a wide local excision without a radical neck dissection versus a wide local excision with a radical neck dissection).
3. The frozen section is used to determine the adequacy of surgical margins.
4. It is used to determine the extent of disease and map out the need for further surgery (i.e. partial versus total laryngectomy) and confirm or refute the presence of suspected matastases).

The process of fixing diseased tissues and preparing histologic specimens for microscopic examinations was first introduced by **Reimer** in 1818. Since then, there had been several improvement in the recent years and to this day, in a study of over 45,000 specimens, the actual overall acuracy of frozen section has ranged from 97.2 to 99.5% with an average of 98.6% (**Gnepp,1988**). **Pickren** in 1962 had a diagnostic accuracy of frozen section for various specimen at 95.7%. Several studies have shown that imprint cytology is a quick and simple alternative method of intraoperative

consult with wide applicability in the histopathologic diagnosis of lesions of all organs (**Godwin**, 1976; **Shidham**, 1983; **Scopa**, 1990). The value of the method is enhanced when it is used with frozen section (**Scopa**, 1990). However, **Godwin** claims to have widely used imprint cytology in the past 20 years and has found its applicability to all types of lesions from all organs.

Lee (1982), in a study of 522 cases reports the overall accuracy of imprint cytology on various sites reaches 92.9% and the accuracy rate in a study by **Scopa** of 230 cases is at 94.0%.

Other authors have had studies with the following accuracy rates for imprint cytology (from Clinical Abstracts - see after bibliography):

Lukacs, 1983	30 various sites	95.5% accuracy
Helpap, 1977	breast masses	95.5% accuracy
Wober, 1977	332 neurosurg cases	93.7% accuracy
Tsukada, 1992		97.3% accuracy
Bhabra, 1980	475 lymph nodes	99.3% accuracy
Feinberg, 1980	214 lymph nodes	99.0% accuracy
Jaylo, 1978	385 lymph nodes	94.5% accuracy

One Philippine study is worth mentioning. A published study on 65 breast tumors by **Seguil** (1992) showed accuracy rates of 96.6% and 98.5% respectively for imprint cytology and frozen section and concluded that the accuracy and predictive values of both imprint and frozen section methods are comparable and recommends that all cases of breast masses submitted for paraffin section should have an imprint to verify further its reliability and its accuracy.

This study shows an accuracy rate of 96.6% for both imprint cytology and frozen section of head and neck tumor/masses as compared to paraffin section results. While the review of literature mentions imprint cytology as an adjunct method to the frozen section (**Hoefler**, 1979); **Kim**, 1990), this study points to the accuracy of imprint cytology to be at par with that of frozen section technique for head and neck tumors in determining the presence or absence of malignancy. However, the invasiveness of a tumor cannot be adequately assessed by imprint cytology alone.

In a rural setting where the sophisticated and expensive machines and set-up for a forzen section cannot always be made available or possible, the value of having an alternative that will just be as reliable, accurate, available, and affordable is a very important consideration or issue called to mind. Often what will be important is that the surgeon be made aware ifi the lesion is malignant or not in order for him to make a proper therapeutic decision. The imprint cytology is highly accurate in this regard.

CONCLUSION

A study of 59 specimens of head and neck tumors/masses using imprint cytology, frozen section was done. Results showed an accuracy rate of 96.6% for both imprint cytology and frozen section with paraffin section as gold standard. Imprint cytology then is as accurate as frozen section in determining the malignancy or non-malignancy of lesions. The advantages of imprint cytology over the frozen section technique especially in rural areas is discussed.

RECOMMENDATIONS

This study on imprint cytology on head and neck tumors/masses in general can be more extensively studied by classifying head and neck tumors into more specific organs (i.e. thyroids, salivary glands, skin cancer, neck nodes, etc.) and thereby investigate whether a pattern for each organ may exist with regard to accuracy of a pathologist (i.e. a fresh resident graduate, a pathologist form a rural area, etc.) can also be undertaken in order to ascertain the level of skill needed in order to sign out diagnoses with imprint cytology and frozen section.

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AUTHOR	FROZEN SECTION	NO. OF CASES ACCURACY
Dankwa, 1985	95.6%	1000 various sites
Gnepp, 1988	97.2-99.5%(98.6%)	4000 various sites
Pickren, 1976	95.7%	
Kaufmann, 1986	97.1%	586 various sites
Scopa, 1990	94.3%	586 various sites
Luckaks, 1983	95.5%	30
Helpap, 1977	95.5%	breast masses
Weber, 1990	93.7%	332 neurosurg
Tsukada, 1992	97.3%	
Bharbra, 1989	99.3%	475 lymph nodes
Feinberg, 1980	99.0%	214 lymph nodes
Jaylo, 1978	94.5%	385 lymph nodes
LOCAL STUDIES:		
Segui, 1992	98.5%	65 breast masses
This study, 1993	95.5%	45 various H & Neck masses

ARYTENOID FRACTURE WITH DISPLACEMENT: RARE BUT POSSIBLE AFTER INTUBATION*

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INTRODUCTION

Certainly nobody would want to live with a tracheostomy even for a few seconds. A tracheostomy is generally misconceived as irreversible and an indication of the end to a normal life. It is reassuring though, that most conditions requiring a tracheostomy can be treated surgically or eventually resolve. Since the first incision into the "windpipe" was described in 1500 B.C. in the Aber Papyrus and Rig Veda, the tracheostomy has evolved into an accepted procedure to bypass an obstructed airway, to remove secretions from, and to instill oxygen into, the distal tracheobronchial tree. Most common indications for a permanent tracheostomy include a stenosed or incompetent larynx, chronic obstructive airway disease and obstructive sleep apnea. Conditions that cause obstruction but can be managed surgically include some tumors, some congenital anomalies, injuries or fractures of the larynx and trachea, and bilateral vocal cord paralysis.

This case is reported to illustrate an example wherein the reason for the tracheostomy could have been surgically corrected. The patient could have been spared from the agonies of a tracheostomy. A tracheostomy with a cannula presents potential complications that could be permanent. However, if a tracheostomy is the only means to survive, one then has to put up with the inconvenience and apprehension of maintaining a patent tracheal stoma for 5, 10 agonizing years, or a lifetime.

CASE REPORT

The patient is a 28 year old, female, who was admitted because of progressive difficulty of breathing, aggravated by lying down, exertion and deep inspiration.

The condition started 14 years prior to admission, when patient was admitted and diagnosed to have Rheumatic Heart Disease (RHD) at FEU hospital and then referred to the Philippine Heart Center (PHC). She had severe mitral stenosis necessitating an open mitral valve commissurotomy (OMC) and then emergency mitral valve replacement (MVR) the next day because the commissurotomy ruptured. On the 8th post-op day, extubation was done but progressive dyspnea and laryngeal stridor prompted reintubation after 6 days. A tracheostomy was eventually done. A year after discharge, the tracheostomy tube was accidentally removed, was not reinserted but stoma left open. It was closed after 5 years per patient's request. Two to three years after closure, the patient noted slight dyspnea, easy fatigability, and throat discomfort. The patient was also admitted at PHC for Pleural Effusion secondary to pneumonia, and in 1992, was admitted at St. Luke's because of pneumonia and tuberculosis. Anti-TB therapy was given for 6 months.

A few months prior to admission, patient was admitted at Makati Medical Center where Flexible Fiberoptic Laryngoscopy was done under local anesthesia. On introduction of the scope, patient developed stridor and severe dyspnea prompting an emergency tracheostomy. Assessment was a hyperplastic polypoid right arytenoid. Patient was then transferred to Manila Doctor's Hospital for direct laryngoscopy and arytenoidectomy and possible vocal cord lateralization.

The Past Medical History revealed rheumatic fever at the age of 9 years. The rest of the personal, social and family histories were unremarkable.

The patient was admitted with a tracheostomy tube. The vital signs were: Blood Pressure - 80/70 mmHg; Heart rate - 75/min; Respiratory rate - 28/min; and Temperature - 36.7°C. The vocal cords could not be visualized on indirect laryngoscopy because of the overhanging hyperemic epiglottis. The rest of the head and neck findings were unremarkable. Chest and lung examination revealed ronchi on both lung

* Presented, Manila Doctors Hospital Annual Residents Research Forum, August 19, 1993.

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fields. Precordium was adynamic. Apex beat was at the 5th intercostal space, midclavicular line. Cardiac rate was irregularly irregular. Other physical examination findings were unremarkable.

COURSE IN THE WARD

Arytenoid dislocation was the admitting impression. The 12 lead EKG showed atrial fibrillation with rapid ventricular response, right axis deviation, poor R wave progression in V1 - V3 and to rule out inferior wall ischemia.

Direct suspension laryngoscopy was done on the second hospital day under general anesthesia. Clear visualization of the larynx using the Zeiss operating microscope with a 400 mm lens revealed a swollen right arytenoid mound overriding the left, infolding anteriorly covering the glottic chink (Fig. 2, see Appendix). A 5 mm transverse incision was made along the horizontal axis of the arytenoid cartilage. The arytenoid mound was grasped with the suction tip and moved but no corresponding movement of the involved vocal cord was noted. Sharp and blunt dissection was done to expose the cartilage (Fig. 3). Findings revealed a fracture with displacement of the vocalis process of the arytenoid cartilage. The fractured segment was about the size of a chili pepper seed, was grasped and removed using a fine forceps. Upon delivery, with the rest of the arytenoid cartilage intact, the arytenoid mound slipped back to normal position (Fig. 1). Incision was not anymore sutured and Hydrocortisone was injected into the right arytenoid mound. Anesthesia was lightened and the vocal cords were observed to be mobile. Tracheostomy tube was successfully removed on the 8th post-op day. The patient was discharged the next day with a "normal" voice.

DISCUSSION

Airway compromise in a patient with a history of emergency mitral valve replacement (MVR), prolonged intubation, laryngeal stridor on extubation necessitating tracheostomy, pneumonia and tuberculosis, could be secondary to an injury to the glottis or recurrent laryngeal nerve (RLN). Traumatic or mechanical injury to the RLN would be highy considered, but an arytenoid dislocation, fracture, or subluxation could happen.

Clinically it is quite difficult to differentiate a RLNP from an arytenoid dislocation, subluxation or fracture. All could present with dyspnea, laryngeal stridor, hoarseness, throat discomfort and pain, odynophagia and or dysphagia.[5,6,10,15]

RNLP was primarily considered because of the medical history of the patient. Prior to the OMC and MVR, the patient had an enlarged left atrium and ventricle by echocardiogram. Hoarseness in RHD with MS is usually attributed to compression of the RLN (Ortner's Syndrome). Based on the echocardiogram a month and a half post-op, there was significant decrease in the left artrium and ventricle.

During the open heart surgery done under hypothermia, the aorta and both superior and inferior vena cava were cannulated, and the ascending aorta cross-clamped throughout the procedure. Thus, the LRLN could have been injured at some point of its anatomic course, especially as it loops around the aorta. However, in this patient, the injured arytenoids and immobile cord were on the right.

Several studies pointed out trauma, i.e. thyroid surgery, as the most common aetiology of RNLP.[11,17] Other notable cause identified were: Tuberculosis 0.5%; Pneumonia 1.1%; cardiac arrest, surgery and pacemaker implant 1.1%.[6,13] The patient had an extensive open heart surgery, prolonged intubation, laryngeal stridor prior to the pneumonia and tuberculosis. Thus, pneumonia or tuberculosis were probably only complications of an existing injury because any abnormalities in the larynx could predispose to recurrent respiratory tract infections, which also aggravates the dyspnea.[2,12] The anterior rami of the RLN could also get compressed between the thyroid lamina and a posteriorly dislocated arytenoid cartilage.[12] In this patient, it was disclocated anteriorly. A RLNP would usually resolve after 6-12 months, unless the injury was permanent like a complete transection. In this patient the vocal cords moved (Gutmann's maneuver) after the partial arytenoidectomy.

The cricoarytenoid joint allows the arytenoid cartilage a wide degree of mobility. This, plus its anatomic location, makes its dislocation, subluxation, or fracture as an isolated intubation injury extremely rare.[11,12] More so, if it is right because of intubation, the endotracheal tube is usually inserted at the right side of the mouth and directed to the left.[2,11,12] The incidence of arytenoid subluxation, dislocation or fracture with displacement following trauma to the larynx is not known.[5,18,19] A low incidence is suggested by a prospective study of 1,000 patients in whom laryngoscopy after short term intubation uncovered only one case subluxation.[5] Physical findings that suggest acute arytenoid subluxation include reduced vocal cord mobility and arytenoid edema.[5,11] In this patient, the right arytenoid appeared edematous, polypoid and hyperplastic on flexible fiberoptic laryngoscopy. The right vocal cord also has impaired

mobility dislocation but moved after partial arytenoidectomy. An arytenoid dislocation means complete separation of the arytenoid cartilage from the surface of the cricoarytenoid joint space and usually results from severe laryngeal injury while a subluxation means abnormal displacement but still partially in contact with the cricoarytenoid joint.[5]

Arytenoid dislocation or subluxation could be due to one or more of several factors: the pressure exerted by the convex aspect of the tube on the arytenoid; reintubation within a short period; severe traumatic injury to the larynx or neck; or some systemic disease.[5,11] Pressure on the arytenoid would have caused a posteriorly directed dislocation, subluxation or displacement, not anteriorly as in this patient. Perhaps, during intubation the endotracheal tube was directed posteriorly towards the esophagus and as it was redirected to the glottic chink, the arytenoid was pressed, fractured and displaced. Other possibly more common causes of a fracture would be transections of the larynx or other blunt trauma to the neck.

The diagnosis of an arytenoid subluxation, dislocation or fracture, and its differentiation from a RNLP, has become more accurate with the recently available diagnostic procedures like Magnentic Resonance Imaging (MRI), computed tomography (CT), elctromyography (EMG), Flexible Fiberoptic Laryngoscopy, and direct suspension laryngoscopy (DL).[5] In this case, an arytenoid dislocation was already considered based on the findings of the fiberoptic laryngoscopy. However, on microscopic visualization by DL intraoperatively, the arytenoid was not dislocated nor simply subluxated, rather it was fractured with displacement of the fractured segment. Despite the minute size of the fractured segment, it was enough to cause airway obstruction by mechanically restricting normal vocal airway obstruction by vocal cord mobility. The right vocal cord was midline and immobile. Current literature regards fracture of the arytenoid as a concommitant injury in severe laryngeal and neck trauma; rarely as an isolated injury. Most studies reported dislocation or subluxation, not fracture or breaking of the arytenoid cartilage into two segments.

Lateralization of the vocal cords was not anymore necessary in this patient as mobility was good after removal of the fractured segment. Lateralization is usually done for vocal cord paralysis, and more often, voice quality is sacrificed. But patients would opt for a hoarse voice rather than a tracheostomy. Lateralization and arytenoidectomy is necessary before successful decannulation and closure of a tracheal stoma in airway obstruction.[4] compared to extralaryngeal arytenoidectomy more consistently preserves voice quality and avoids the major complication of aphonia.[10,15] The partial arytenoidectomy done in this patient still provided some attachment for the abductor and adductor muscles of the vocal cords, thus preserving voice quality of the natural airway is restored and patient is saved from a tracheostomy.

SUMMARY

A 28 year old, female, status/post RHD with Mitral stenois, OMC, MVR, initially presented with severe dyspnea and laryngeal stridor on extubation after prolonged intubation, necessitating a tracheostomy 10 years ago. Progressive dyspnea after closure of the tracheal stoma after 5 years resulted in another tracheostomy. With the presenting symptoms of dyspnea, dysphonia, swollen right arytenoid mound, and a medially fixed right vocal cord, the patient was diagnosed to have an arytenoid fracture with displacement by DL and microscopic visualization.

This case is reported because, being an extremely rare complication of intubation, arytenoid fracture with displacement, was not initially considered. It is also quite difficult to clinically diagnose and differentiate from a recurrent laryngeal nerve paralysis. More accurate diagnostic procedures include MRI, CT scan, EMG and direct laryngoscopy with an operating microscope.

Treatment and management done in this case was partial arytenoidectomy. The procedure restored the natural airway, preserved the voice quality, offered the patient freedom from a tracheostomy, and thus a better quality of life.

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AN UNUSUAL CASE OF DRY COUGH*

*Cresencio E. Go, Jr., M.D.***

INTRODUCTION

Millions of people visit their doctors each year complaining of cough. In many cases, the cause is either an upper or a lower respiratory tract infection. A thorough history and a simple chest X-ray may reveal it to be otherwise. The Department of Otolaryngology - Head and Neck Surgery of the MCU-FDTMF Hospital would like to report an unusual case of dry cough.

CASE REPORT

This is a case of a 25 year old male vendor from Pag-asa, Quezon City who consulted the ENT/Out-Patient Dept. due to cough.

The condition started 4 days PTA as cough described as dry non-productive, irritating with no associated difficulty of breathing. Three days PTA, the patient developed occasional difficulty of breathing with low grade fever.

Physical examination showed a conscious, ambulatory patient with temperature of 38 degrees centigrade; Respiratory rate of 23 per minute; Heart rate of 115 per minute and Blood pressure of 130/90.

Ear, Nose, and Throat findings were unremarkable. Lung findings revealed harsh breath sounds; tenderness over the left midclavicular line 5th and 6th midsternal line. No rales, no wheezes appreciated.

A chest X-ray (PAL) was requested and it showed a metallic foreign body in the trachea occupying the right and left main pulmonary bronchi. The rest of the lung fields are clear. The heart is not enlarged. Both hemidiaphragms and costophrenic sulci are intact.

Further history was taken and revealed that 4 days PTA, the patient had prompt ingestion of a necklace while running away from alleged holduppers (??) at the vicinity of Monumento market.

Based on this history and chest X-ray finding of a foreign body in the bronchus, it was decided to do rigid bronchoscopy.

One hour after admission, under local anesthesia with standby anesthesiologist, xylocaine 10% was sprayed transorally and transtracheally. PILLING rigid bronchoscope 7 mm x 40 cm was then inserted up to the carina. The necklace was seen at this level with both ends entering through left and right primary bronchi, confirming the chest-X-ray finding. The mucosa of the trachea was not edematous and only slight hyperemia and secretions were noted. With the use of Pilling forward grasping forceps with serrated and slightly cupped jaws, the foreign body was grasped at the level of carina and was extracted out easily. The whole procedure was within 10 minutes.

The foreign body revealed a 22 karat, gold necklace, 48 cm. in length.

Immediately after operation, the patients' coughing disappeared and the fever subsided. No medical nor surgical complications were noted and the patient was sent home after 2 days.

DISCUSSION

Incidence of foreign bodies (FB) in the tracheobronchial tree is not common, but definitely, not rare. A 12 year study was made by **Bednarski** between 1965-1987 in adult patients where he did 4,172 bronchoscopies out of which 0.31% had FB in the tracheobronchial tree. At the Chevalier Jackson Bronchoscopic clinic, 1,859 exogenous FB, were removed in the air pasage. Jewelries account for 3.6% of these foreign bodies.

The causative factors of FB aspiration in the tracheobronchial tree were classified as: (1) Personal factors, such as age, sex, occupation, social condition and place of residence: (2) Failure of the patients' normal protective seizure, unconsciousness; (3) Physical factors, expression of emotions, activities, posture; (4) Dental, medical and surgical factors; (5) Psychopathic

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* Presented, Third Midyear Convention of the PSO-HNS held at Davao Insular Hotel, Davao City lastg June 5, 1994.

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and psychotic factors; (6) Properties of the foreign body itself, and (7) Carelessness, which accounts for most foreign body accidents.

In normal individuals the larynx has efficient protective reflexes against foreign body in the larynx, trachea and bronchi. These reflexes include the laryngeal closing reflex which consist chiefly of the tilting and closure of the upper laryngeal orifice, and the bechic reflex. Failure of this reflexes can cause accidental foreign body in the tracheobronchial tree. A defect in the efficiency of this barrier is produced by the impulse to take a deep inspiration preparatory to the cough excited by the contact of a foreign body which is what may have happened to this patient.

The statistical analysis of tracheobronchial FB made by **Enzan**, et al. in 1981 recorded the main symptoms as coughing (72%), wheezing (53%), and dyspnea (25%). The pathognomonic symptoms of FB in the trachea include: (1) audible slap, (2) palpatory thud, and (3) asthmatoid wheeze. The physical signs vary with the conditions present in different patients and at different times in the same patient. Organic FB of vegetal origin, such as peanut kernels, beans and watermelon seeds cause violent laryngotracheobronchitis with toxemia, cough, and irregular fever. Organic FB such as bone or animal shells after months or year produce symptoms of chronic pulmonary sepsis, abscess and bronchiectasis. Obstructive FB cause alectasis, drowned lung and, eventually, pulmonary abscess. Non-obstructive metallic FB, as in the case of FB necklace in this patient, only manifest as simple cough of long duration.

Pathologic tissue changes in cases of exogenous FB depend on the character of the FB, its size and shape relative to the bronchus invaded, and the length of its sojourn. Vegetal substance irritate the tracheobronchial mucosa, through chemical reaction or allergy, causing diffuse edema resulting in quick swelling. Metals, like iron and steel, are less irritating because bacterial activity is inhibited by ionizing. However, oxidation of these substances produce roughness of surface and sharpness of edge which can cause mucosal perforation. Rough, obstructive metallic FB, through the process of corrosion, causes localized inflammation and mucosal swelling which can totally occlude the bronchus. The 22 K necklace is a smooth, metallic, non-obstructive exogenous FB which produces, at most, only slight local congestion of vessels in the part of the mucosa in contact with the intruder.

In patients in whom the history, physical examination, or radiologic evidence point toward a foreign body, it is helpful to obtain a duplicate object to study its mechanical properties and the problems involved in the removal of that FB. A well thought management and a more complicated problem. In a patient with a FB indwelling more than 24 hours, attention to adequate hydration and control of the febrile reaction resulting from secondary infection with antibiotic therapy and of other coincidental medical problems, makes the removal safer and more likely to be successful.

Bronchoscopy under local anesthesia is all that is required for any bronchoscopic procedure in adults because, compared to the larynx, the bronchi are relatively insensitive. According to **Jackson**, general anesthesia is not necessary for any bronchoscopic procedure. In infants and young children, no anesthetic, general or local, is used.

An adequate size of a ventilating bronchoscope should always be used. Its lumen should be small enough to reach the level of the FB and yet provide as large a working lumen as possible. Forceps, specifically designed for each type of FB should also be used. According to **Ballenger**, the endoscopic time used in an attempt at FB removal should be limited to 30 minutes. Thereafter, the chance of endobronchial and subglottic edema requiring a tracheotomy greatly increases.

Complications are relatively rare after prompt diagnosis and removal of foreign bodies of the tracheobronchial tree and recovery is generaly rapid. However, with the delay in diagnosis and removal of these tracheobronchial foreign bodies, the complications vary from chronic pulmonary disease to even death.

CONCLUSION

Non-obstructive foreign bodies in the tracheobronchial tree may present with non-specific symptoms like dry cough. Therefore, a high index of suspicion on the part of the attending otolaryngologist is needed.

It is therefore recommended that first a good history must be very carefully taken considering the possibility of foreign body aspiration in patients with coughing, wheezing or dyspnea, no matter how mild the symptom may be. Secondly, chest x-ray, which is an affordable procedure, is a very important tool in diagnosing these patients. Lastly, bronchoscopy should always be done in all cases of suspected foreign body of the tracheobronchial tree.

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IN SEARCH OF THE "HOLY GRAIL"

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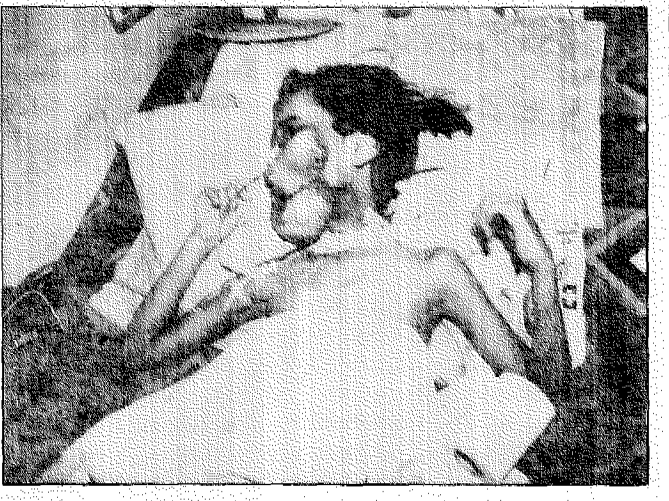
*Alberto F. Calderon, MD****

INTRODUCTION

Otolaryngologists are trained to diagnose and treat head and neck cancers once we see them. During these training days diagnosing and treating cancer patients have been routine. As head and neck surgeons, huge tumors may not be as impressive anymore, much less interesting. Sometimes, though, the fact that a certain lesion is rare, regardless of the size, should arouse one's interest.

This paper presents an "interestingly rare" experience, about an uncommon tumor that has so far afflicted "only" 173 unfortunate individuals in the entire world since it was initially reported in 1918.



1 WEEK POST-OPERATIVE

CASE REPORT

An 8 year-old child was admitted at this institution on September 24, 1992 presenting with a huge oromandibular mass. The condition apparently started 10 months PTA when a toothache prompted dental consult. Analgesics were prescribed, providing temporary relief. With the persistent symptom, the left mandibular first molar was extracted a month later. The pain disappeared, however, for the next few days swelling over the left mandibular area adjacent to the extracted tooth was noticed.

Eight months PTA, two more mandibular molars on the same side were extracted, but the swelling has progressed, with intermittent bouts of fever. A few weeks later, a palpable mass can be appreciated over the site of extraction.

Seven months PTA, patient was brought to a hospital were a biopsy on the lesion was done which revealed malignancy. Patient was confined for several days, awaiting for a schedule of an operation but was brought home against medical advice on the 6th hospital day and, instead, was brought to an "herbolaryo". An enormous progression of the tumor size has been noted since then and, upon the advice of some generous friends, the patient was brought to this institution.

The patient presented with a huge 30x25 cm. oromandibular mass extending laterally from the left mandibular area. The dentition was still intact but displaced. The tongue was likewise displaced laterally on the right side but still freely movable. The airway was partially compromised.

Tracheostomy was done together with an intraoral wedge biopsy of the lesion. Histopathological reports revealed MALIGNANT SMALL CELL TUMOR OF PROBABLE NEUROECTODERMAL ORIGIN. The patient subsequently underwent wide excision of the mass with total mandibulectomy. The entire mass, noted to be an outgrowth from the body of the left mandible with extension towards the midline, weighed exactly 3,000 grams. An intact but displaced dentition was likewise noted. Aside from necrotic tissues along the exposed areas, the entire stony hard, compact mass had an intact mucosa. Primary closure of the defect

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THE 3-KILOGRAM LESION

was employed without mandibular reconstruction.

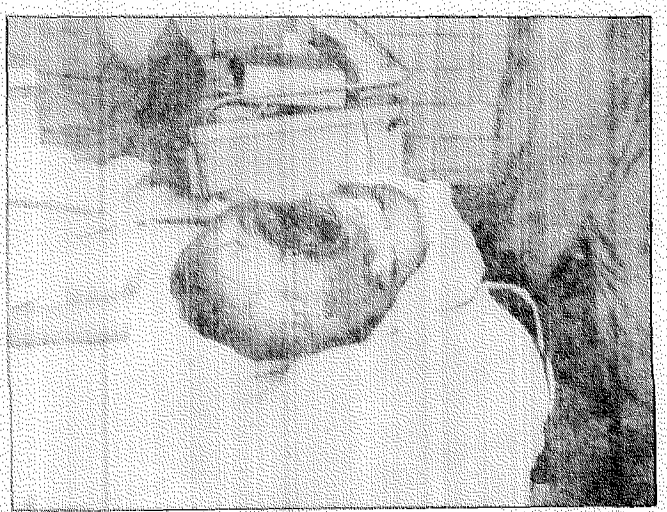
Histopathological reports on the excised mass confirmed our pre-operative diagnosis.

Postoperative course was uneventful. Recovery was relatively uncomplicated. Slowly, the skin flaps stabilized for the next few days. Strict antibiotic therapy compliance and careful attention to daily wound cleansing provided a remarkable recuperation.

Thirty-four days post-operatively, the patient was sent home three kilograms lighter, but gratefully smiling.

DISCUSSION

Most tumors can be distinctly classified, described, managed accordingly and prognosticated based on their tissue of origin. But how is a lesion which, in the first place doesn't seem to have an origin managed? Such is the dilemma that pushed the clinician to pursue



PRE-OPERATIVE

a deeper understanding on the case of Ana Marie who literally "shouts" in search of an explanation by presenting with a "boulder" of a tumor.

Characteristic abnormalities in the form of deletions, translocations, or oncogene amplifications have been identified in most of the primitive, embryonic neoplasms of childhood; these observations have contributed to the basic understanding of normal differentiation and growth in addition to gaining insights on to the complex events of oncogenesis.

An essential hurdle for the surgical pathologist is the ability to diagnose accurately and separate out small round cell tumor of childhood from another for purposes of treatment and prognosis.

Unlike neuroblastoma, juvenile rhabdomyosarcoma, medulloblastoma and some of the other primitive embryonic neoplasms almost exclusively found in childhood, primitive neuroectodermal tumor (PNET) eventually emerged as an entity but not after considerable controversy. Whereas other tumors were rejected as distinctive tumor types shortly after they were described, PNET was almost neglected in the literature, which is arguably a fate worse than rejection.

Historically, PNET made its debut in the journal, Proceedings of the New York Pathological Society, introduced by Dr. Arthur Stout in 1918.

Following a case report of an osteolytic lesion of the radius in a 14 year-old female presenting with a pathologic fracture, the stage was then set for the next 70 years of studies, discussions and controversies.

The present-day experience with PNET is a neoplasm of non-neural soft tissues with a predilection to late childhood and adolescence.

Throughout the period from 1918 into the early 1970s, skepticism was expressed about the existence of PNET. No one was more outspoken and categorical than Dr Rupert Willis who contended that these putative soft tissue tumors presented nothing more than a metastasis from an unrecognized neuroblastoma or a carcinoma.

The advent of electron microscopy and immunochemistry had provided refinements in the histologic recognition of specific subtypes or variably presented histologic features within the major tumor categories. However, PNET has been the metaphorical "Holy Grail" of pathology in the quest to established the histogenesis and phenotype, an endeavor that has hunched more than one investigator.

Moreover, with the advent of higher technology, tumor registries reflected a decline in the percentage of reported rhabdomyosarcoma (which has become an easy way out for the pathologist particularly in this histologic dilemma), and an increase in the diagnosis of PNET.

Based on a summary of five series from the literature, a total of only 173 reported cases since 1918, PNET was diagnosed between birth and 81 years of age, with a corrected mean of 18 years. Males slightly predominated over females.

These tumors have a predilection for the truncal and axial soft tissues, including the chest wall and paravertebral region (50-60% of cases) and extremities (20-25% of cases); the thoracopulmonary region in PNET is the single most common primary site (40% of cases). Interestingly, literatures have yet to report on these lesions arising in the head and neck region.

It is generally agreed that the overall prognosis for PNET is poor: disease-free survival is between 30 and 45%. Local relapse and metastasis to the lungs generally develop within 1-2 years after diagnosis.

In order for a neoplasm to qualify as a neuroectodermal tumor of bone, rosette formation must be extensive rather than occurring as isolated structures. And in order for a particular round cell tumor to qualify as PNET, it should be composed of cells with uniform round to slightly ovoid nuclei with minimal identifiable cytoplasm and a background devoid or virtually devoid of extracellular matrix. Furthermore, there is a consensus that rosette formation is necessary for the diagnosis (of PNET) without a particular specification for quality and quantity.

A lobular arrangement of cohesive, uniform, small hyperchromatic cells in a fibrous background is the most common pattern of growth in PNET. If electron microscopy is available, elongated interdigitating cellular processes with filaments or microtubules are the ultrastructural features and should be present for diagnosis. Thus, electron microscopy retains an important role in its differential diagnosis.

One may state from the aforementioned comments that all so-called small cell tumors of childhood are classifiable IF unlimited technology is applied to the neoplastic cells.

Despite the reservations of some, in vitro studies have yielded intriguing suggestions about the sources of PNET. There are three potential progenitors:

a. the cells of the neural crest
b. primordial germ cells; and
c. mesenchymal cells in the marrow space or soft tissues.

After years of painstaking research and controversies, the mesenchymal stem cell remains the most plausible progenitor.

CONCLUSION

To conclude this discussion, some final reflections and questions are posed. First, it is unlikely that the issue about the histogenesis of PNET will be settled anytime soon to everyone's satisfaction since most pathologists agree that the limits of diagnostic resolution has been reached and another generation of technology is awaited to resolve the matter.

Second, being able to excise the lesion on its entirety may already be a considered success. It may be a consolation that the patient, on the 7th month post-operatively, is still disease-free.

Seven months maybe, is too short a time to celebrate since a disease-free survival is only 45%. What has transpired 7 months ago may well be a small step forward. Or a giant leap.

As for Ana Marie's point of view, a trivial point to ponder: How could a simple toothache go wrong?

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EXUDATIVE TONSILLITIS: COMMONLY SEEN; SOMETIMES OF UNUSUAL ORIGIN*

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ABSTRACT

A case of a 31 year old female presented with tonsillitis, high grade fever, gingivitis, oral ulcers, weight loss, pain over the elbows and anemia. Several consultations with a pulmonologist, an infectious and tropical disease specialist, immunologist, endocrinologist, and hematologist were done due to the intactable nature of the infection, despite adequate antibiotic treatment. Several laboratory examinations were done including bone marrow biopsy, immunoglobulin assay and serum electrophoresis which clarified a diagnostic picture of a plasma cell disorder, multiple myeloma. A rare case of myeloma presenting as tonsillitis and oral ulcers have been reported. The clinician confronted with this case faces an additional challenge which is more fortuitous and not purely a chance phenomenon.

INTRODUCTION

Tonsillitis is one of the most frequently diagnosed conditions in ENT daily practice.

Patients with low resistance, those with recurrent attacks as part of a generalized pharyngitis, or viral infection are predisposed to develop tonsillitis.

The onset of infection is frequently abrupt, with fever, odynophagia, and/or dysphagia, pain radiating to the ears as well as limb and back pains, and swelling of regional lymph nodes.

On examination, the tonsils may be swollen and hyperemic with purulent exudates. There may be jugolodigastric lymph node enlargement. The exudates are particularly characteristic of bacterial infection and must be differentiated from adherent membranes of diptheria and infectious mononucleosis.

Clinical experience frequently can discern a predominantly bacterial infection and throat culture will make this certain. Differentiation must be made from viral disease, infectious mononucleosis, diptheria, fungal infection, granulomatosis, and pharyngeal manifestations of systemic disease.

The disease usually lasts for a week without treatment, but with proper antibiotic treatment, it lasts only for two to three days. In cases wherein sore throat never resolves completely, ideal treatment is clindamycin, lyncomycin or oxacillin.[1] Its severity vary depending on the virulence of the infecting organism and the resistance of the patient.

This report is a case of a 31 year old female who was given a stronger class of antibiotic treatment for exudative tonsillitis, but the disease persisted.

CASE REPORT

This is a case of a 31 year old female physician who presented with three weeks history of sore throat, odynophagia and high grade fever. The patient consulted with an otorhinolaryngologist and was diagnosed to have exudative tonsillitis and was prescribed Ofloxacin affording temporary relief of symptoms. Ten days PTA, there was recurrence of odynophagia and high grade fever. Due to progressive odynophagia and weight loss, the patient was admitted in a local hospital was given Co-amoxyclav for two days affording no relief. This was then shifted to Ceftriaxone and Metronidazole affording relief of symptoms. But the patient, developed oral ulcers and gingivitis so antibiotics were discontinued. Culture and sensitivity of tonsillar swab done showed *Klebsiella sp.* resistant to Ceftriaxone. Due to the recurrence of the tonsillitis after the antibiotics were discontinued and with its resistant organisms, she was then referred to our institution. On physical examination, the patient was febrile and tachypneic. Examination of the oral cavity and pharynx showed hyperemic upper and lower gingiva, oral ulcerations, hyperemic faucial tonsils with

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* Presented, Interesting Case Contest, PSO-HNS Third Midyear Convention held at Davao Insular Hotel, Davao City last May 5, 1993.

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exudates. There was a tender pustular lesion over the left anterior cervical area.

On admission, an impression of exudative tonsillitis and gingivostomatitis rule out septicemia was given. The patient was started on Ceftazidime per IVT and Tetracycline: Prednisone mouthwash. Complete blood count showed severe neutropenia at 1.0×10^9/L. Chest X-ray revealed cardiomegaly with pulmonary congestive changes. ABG showed uncompensated metabolic alkalosis with adequate oxygenation at room air. Fasting blood sugar was elevated. Serum electrolytes showed normal sodium and low potassium. Urinalysis showed trace albumin and granular casts at 28/coverslip. Culture and sensitivity test of tonsil swab showed heavy growth of alpha hemolytic *Streptococcus sp.* and moderate growth of *Enterobacter sp.* both sensitive to Netilmicin, Chloramphenicol, Vancomycin and Ceftazidime, and *Candida sp.* sensitive to Nystatin.

Fulminant sepsis was being considered so a referral to Infectious and Tropical Medicine was done. Ketoconazole was started. She was still febrile at 38.5 to 39.0 C. Blood culture and sensitivity showed *Staphylococcus* aureus sensitive to Netilmicin, Chloramphenicol and Vancomycin after 2 days. Culture and sensitivity of urine was negative.

A referral to Pulmonary Medicine was done wherein pneunomia in an immunocompromised individual was considered. Sputum gram stain showed gram positive cocci in chain. Sputum culture and sensitivity showed heavy growth of *Enterobacter sp.* and alpha hemolytic *Streptococcus sp.* sensitive to netilmicin, Sulbenicillin, Chloramphenicol and Ceftazidime.

The patient became dyspneic, and tonsillitis progressed to peritonsillar cellulitis. ABG was requested and showed combined respiratory and metabolic alkalosis with moderate hypoxemia at room air. Repeat chest X-ray showed pneumonia at the superior segment of left lower lobe. Lobe flow oxygen per nasal cannula was given.

The patient had a history of hyperthyroidism with irregular intake of carbimazole (Neo-mercazole). An Endocrinology consult was done. Serum T_4 was normal while TSH was depressed. The thyrotoxicosis in storm maybe due to sepsis. The intake of the said drug must have been the cause of neutropenia, it being a part of an idiosyncratic reaction. Cortisol was normal ruling out hypercortisolism due to (?) CA. Glycosylated hemoglobin requested was likewise normal which showed that the hyperglycemia is only stress-induced.

The patient had watery stools for several days. Stool examination done was positive for yeast cells. Stool culture and sensitivity showed heavy growth of *Staphylococcus epidermidis* sensitive to Co-amoxiclav and Sulbactam-Ampicillin, and no Salmonella organism was isolated. Infectious and Tropical Medicine suggested a shift of antibiotic to Netilmicin. anti-HIV was negative.

On the fifth hospital day, she was still tachypneic and had deceased fremiti and breath sounds over left lower lobe. Repeat chest x-ray showed pleural effusion and consolidation over left lower lobe. Ultrasound of the pleural cavity showed minimal amount of free fluid.

A referral to Immunology was done because of the immunocompromised state of the patient. The patient was noted to have occasional pain over the elbows, hepatosplenomegaly and neutropenia. SGOT and SGPT were normal. Ultrasound of the abdomen showed hepatomegaly with diffuse pattern, limy gallbladder, slight splenomegaly and bilaterally enlarged kidneys.

At this time, a referral to Hematology was done to rule out the presence of a blood dyscrasia. Likewise, a possibility of a primary bone marrow deficiency as well as peripheral immunologic destruction of neutrophils has been considered. Peripheral smear showed lymphocytosis, slight increase in platelets and normocytic normochromic red blood cells. Bone marrow biopsy smears showed hypercellular preparation with striking increase in the number of plasma cells (more than 10%), some of which appear abnormal (having bilobed nuclei). There was maturation arrest in myeloid series with predominance myelocytes, promyelocytes and myeloblasts, and paucity of segmental forms. Red cell precursos and megakaryocytes were abundant. The histopathologic picture of which was suggestive of multiple myeloma. Then, protein electrophoresis requested revealed elevated levels of alpha I (11.1%), alpha II (16.0%) and gamma (35/6%); while depressed level of albumin (24.5%) which disclosed findings consistent with multiple myeloma. Serum calcium and uric acid results were low. BUN and creatinine were normal. Alkaline phosphatase level was elevated. Netilmicin was shifted to Vancomycin as suggested by the hematologist. Likewise, a repeat CBC showed anemia with depressed hemoglobin level (74 g/L), RBC (3.47×10^{12}/L), hematocrit (0.243), improvement in WBC count (4.3×10^9/L), and normal platelet (300×10^9/L). Erythrocyte transfusion was given and the patient apparently improved. She became afebrile and can take in foods orally. Skeletal survey was negative. IgG and IgA levels were elevated at 32.3 g/L and 6.0 g/L, respectively. IgM and IgE level were normal. Prednisone 60 mg/day was started. Repeat CBC showed an increase in hemoglobin level (111 g/L), and WBC count (8.6×10^9/L). Repeat chest c-ray showed resolving pneumonia in the superior segment of the

left lower lobe, and resolved left pleural effusion and left lower lobe consolidation. Recovery was excellent and patient was discharge.

DISCUSSION

A diagnostic puzzle that defies solutions after prolonged and extensive testing requires reexamination of all the patient's findings for any details that may have been overlooked. A fresh history and physical examination are the starting points; a review of the many radiographs, pathological materials and laboratory data may yield a new and more focused differential diagnosis, and sometimes, repeating tests that were previously negative may generate new insights.

Septecemia in an immunocompromised patient is the primary consideration in this case. The immunocompromised state of the patient with its hematologic picture could lead to a blood dyscrasia as its cause.

The presence of multiple infections which is definitely present in this case is a common initial findings in myeloma patients. This is attributed to the release of a soluble substance from myeloma cells which in turn stimulates macrophages to produce a factor that suppresses normal B cell function. Susceptibility to bacterial sepsis is further increased by frequent occurrence of granilocytopenia that may be due to marrow replacement by tumor cells.

Neutropenis as seen in this case is part of the disease progression. It is a result of the distribution of tumor cells within the bone marrow spaces.

Hemoglobin levels between 7 and 10 g/dl are most commonly found. The presence of normochromic and normocytic red cells, and rouleaux formation may be prominent as seen in the patient's hematologic picture.

The bone marrow aspiration showed a striking increase in the number of plasma cells as well as the maturation arrest in the myeloid series with predominance of myelocytes, promyelocytes and myeloblasts and the increase in the IgG and IgA levels became important clues among otherwise non-specific findings.

Typical M-components are demonstrable in virtually all patients who have multiple myeloma. The most common combinations are: IgG and IgA (33%), IgM and IgG (24%), IgG and IgG (17%), IgM and IgA (8.5%), and IgM and IgM (8%). Plasma cells producinng 2 or more monoclonal proteins are found in 0.5 to 1.0% of patients.[2] In this case, IgG and IgA were elevated.

This patient satisfies the criteria for multiple myeloma (Appendix A) which is (1) the bone marrow

APPENDIX A

Table 1: Criteria for the Diagnosis of Multiple Myeloma

1. **Cytologic Criteria**
   a. Marrow morphology: Plasma cells and/or myeloma cells in excess of 10%, when 1000 or more cells have been counted
   b. Biopsy proven plasmacytoma, either in bone or soft tissues
2. **Clinical and labortory criteria**
   a. Myeloma protein (M-component) demonstrable by immuno-electrophoresis of plasma
   b. Myeloma protein (M-component) demonstrable by immuno-electrophoresis of urine
   c. Roentgenologic evidence of osteolytic lesions. Generalized osteoporosis qualifies as a criterion if the marrow contains in excess ofo 30% plasma or myeloma cells
   d. Myeloma cells in at least two peripheral blood smears

   To qualify for the diagnosis of multiple myeloma, one must satisfy on of the following combinations: 1a and 1b; 1a or 1b and either 2a, 2b,2c or 2d.

APPENDIX B

Table 2: Myeloma Staging System

Stage	Criteria	Measured myeloma cell mass (cells x 10/m)
I	All of the following: 1. Hemoglobin > 100 g/L 2. Serum calcium value normal (<12 mg/100 ml) 3. On x-ray, normal bone structure (scale 0) or solitary bone plasmacytoma only 4. Low M-component production rates a. IgG value < 50 g/L b. IgA value < 30 g/L c. Urine light chain M-component on electrophoresis < 4 g/24 hours	<0.6 (Low)
II	Fitting neither Stage I nor Stage III	0.6-1.20 (Intermediate)
III	One or more of the following: 1. Hemoglobin < 85 g/L 2. Serum calcium value <12 mg/100 ml 3. Advanced lytic bone lesions (scale 3) 4. High M-component production rates a. IgG value > 70 g/L b. IgA value > 50 g/L c. Urine light chain M-component on electrophoresis >12 g/24 hours	>1.20 (High)

Subclassification Based on Serum Creatinine Levels

Level	Stage	Median Survival, months
A <2 mg/dL	IA	61
B >2 mg/dL	IIA, B	55
IIIA	30	
IIIB	15	

Subclassification Based on Serum Beta 2 Microglobulin Levels

Level	Stage	Median Survival, months
<4 ug/mL	IA	43
>4 ug/mL	II	12

morphology containing plasma cells and/or myeloma cells in excess of 10% when 1000 or more cells have been counted, and (2) myeloma protein (M-component) demonstrable by immunoelectrophoresis of plasma.

Multiple myeloma is included in the monoclonal gammopathies, paraproteinemias, plasma cells dyscrasias or dysproteinemias. It is a malignant proliferation of plasma cells due to the uncontrolled proliferation of plasma cells derived from a single clone. It is primarily a disease of the elderly with the media age at diagnosis of 64 years. The yearly incidence is about 3/100,000. Males are slightly more affected than females.[3]

The clinical manifestations of multiple myeloma result from the uncontrolled and progressive proliferation of mature and immature plasma cells, the effect of marrow replacement, and the pathologic manifestations occasioned by the overproduction of certain proteins and the constituent polypeptide chain (M-components).

The clinically apparent stage of multiple myeloma is usually preceded by an asymptomatic period of variable duration. A few instances of asymptomatic myeloma lasting for two decades have been reported[2]

Bone pain is the most common symptom in myeloma and present in nearly 70% of patients.[3] Susceptibility to bacterial infections like pneumonias and pyelonephritis is the next common clinical problem which constitutes the major cause of death. Myeloma patients characteristically suffer from repeated bouts of sepsis, usually due to high grade encapsulated organisms. Anemia also occurs in about 80% of patients.[3] Renal as well as neurological symptoms could be present in minority of cases.

A clinical staging system (Appendix B) has been developed based on level of hemoglobin, serum calcium, M-component production, and extent of lytic bone disease as seen on the skeletal survey. This is useful for predicting prognosis in patients with multiple myeloma. The case presented fits in the description of a patient with Stage I disease.

Asymptomatic stable disease do not benefit from early treatment. Therapy of multiple myeloma should not be started unless signs of progression (sustained increase in serum urinary protein or significant disease manifestations such as weight loss, anemia, bone pain, renal insufficiency) occur.

All infections should be investigated and treated promptly. The risk of septicemia is great. Serious infections can be treated with a cephalosporin and an aminoglycoside or another wide spectrum bactericidal regimen.

Alkylating agents are the mainstay of treatment but these causes some degree of pancytopenia. Prednisone therapy is useful in patients who develop pancytopenia during the acute terminal part of the disease because it is not myelosuppressive. It is well tolerated for months and often results in a fall of M protein concentration, decreases proteinuria, produces a rise in the hemoglobin level, leukocyte and platelet counts, and stabilization of the disease.

Thus, the clinician confronted with this type of patient faces an additional challenge. Multiple myeloma is not recognize as a common cause of tonsillitis. One is, therefore, hesistant to come too readily to the conclusion that multiple myeloma was the cause of the tonsillitis.

A definitive analysis of prognostic and therapeutic factors will require patients with tonsillitis and an attempt should be made to accomplish a multidisciplinary approach to patients with multiple myeloma.

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ANOTHER ORAL MASS*

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ABSTRACT

It is estimated that 1% of all oral malignancies represent metastatic foci. The case of a rare metastatic choriocarcinoma to the mandible is presented. The initial impression of a primary squamous cell carcinoma of the oral cavity was disproved by the histopathologic findings and confirmed by the elevated hCG titers Uncommonly, no primary focus had been identified in the uterus from which the neoplasm commonly arises. Aggressive triple drug chemotherapy was instituted and an initial response was observed. However, the patients developed resistance to the drugs later in the course of treatment and subsequently expired. Treatment for metastatic choriocarcinoma to sites other than the oral cavity consisting of chemotherapy, surgery, and irradiation were likewise reviewed.

INTRODUCTION

All too often, the Head and Neck is quick to conclude malignant looking lesions in the oral cavity as squamous cell carcinoma since it comprises more than 90% of all oral malignancies.

However, other possibilities do exist. Non-epidermoid malignancies make up less than 10% of all oral cavity cancer and consist of a variety of different histologic types. The most common non-epidermoid malignancies are of minor salivary gland origin. Lymphomas, melanomas, and sarcomas may also occur.

Not to be overlooked is the possibility of a carcinoma metastatic to the oral cavity. **Batsakis** estimated that 1% of all the oral malignancies represent metastatic foci and that 1% of malignant neoplasms metastasize to the jaws, the mandible being the favorite metastatic site.[1] This unusual form of metastatic pattern always pose not only therapeutic but often diagnostic problems of no mean order.

A case report of a rare metastatic tumor to the mandible with extension to the soft tissues of the oral cavity is being presented.

CASE REPORT

R.V., a 32 y/o female, married from Quezon City, was admitted at this institution because of gum bleeding.

History started about three months PTA when the patient noted a gingival swelling in the lingual side over the right lower molar areas associated with toothache over the same area. No consultation was done.

One month PTA, with the persistence of the toothache, the patient consulted a dentist who did tooth extraction was done and was prescribed antibiotics and analgesics. There was no change in the character and size of the gingival swelling.

Three weeks PTA, patient noted a rapid increase in size of the gingival mass. Likewise, there was a rapidly enlarging, painful, erythematous swelling over the right body of the mandible. The patient was prescribed another course of antibiotics which afforded no relief.

Two weeks PTA, patient suddenly noted spontaneous bleeding from the gingival mass amounting to about 100 cc. and applied cold compress over the right mandibular area and gargled with cold water which relieved the bleeding.

A few hours PTA, patient noted a recurrence of profuse bleeding from the gingiva with dizziness and temporary loss of consciousness. The patient was rushed to this institution and was subsequently admitted.

Review of systems was unremarkable. There were no heredo- familial diseases. Patient is a non-smoker and non-alcoholic beverage drinker.

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* Presented, POS-HNS Third Midyear Convention, Davao Insular Hotel, Davao City, May 5, 1993.

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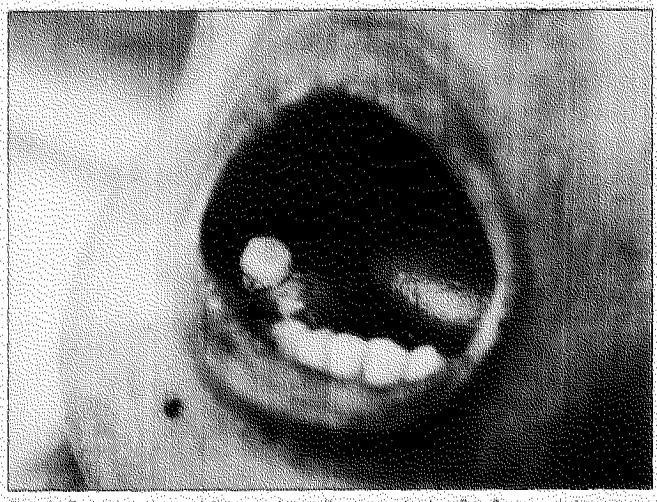


Fig. 1: Examination of the oral cavity revealed a 5 x 3 cm. violaceous, nodular, doughy, tender mass over the right lower gingiva from the canine area to theretromolar area extending to the right anterior tonsillar pillar, right lower gingivo-buccal gutter, and floor of the mouth.

Pertinent Physical Examination

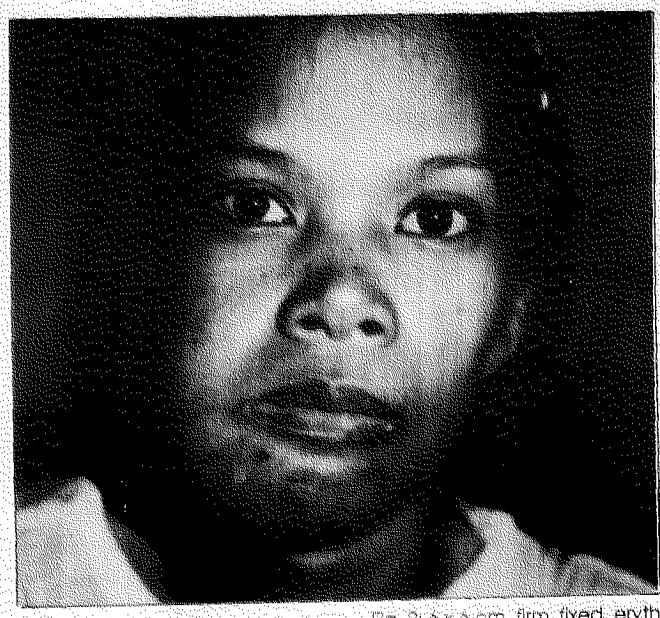
On admission, patient was conscious, coherent, and was not in any form of distress. BP was 90/70 and PR was 100/min. and had pale palpebral conjunctivae. Pertinent examination of the head and neck revealed a 5 x 3 cm. violaceous, nodular, doughy, tender mass over the right lower gingiva from the canine area to the retromolar area extending to the right anterior tonsillar pillar, right lower gingivo-buccal gutter, and floor of the mouth. There was no trismus. Likewise, there was a 6 x 6 cm. firm, fixed, erythematous, tender swelling over the right body of the mandible. There were no palpable neck nodes.

Admitting impression was a Malignant New Growth of the oral cavity, probably Squamous Cell Carcinoma.

Course in the Ward

Initial laboratory work-ups done revealed a hemoglobin of 77.9 h/L and a hematocrit of 0.25. Two units of properly-typed and cross-matched fresh whole blood were transfused which raised the hemoglobin level to 95 g/L. Chest Radiograph was negative. Mandibular X-ray series done showed a focus of expansile-lytic destruction in the right mandible which appeared to have displaced one of the molars. Possibility of adamantinoma or giant cell tumor was considered. Incision biopsy of the gingival mass was then performed. Profuse bleeding was encountered in the procedure which was, however, controlled by continuous presure. Histopath revealed syncytiotrophoblastic and cytotrophoblastic cells in an avillous stroma which was consistent with Choriocarcinoma. Slides were passed on to different pathologists from different institutions for review and all were one in saying that this was indeed choriocarcinoma.

A referral to the Department of Obstetrics and Gynecology was made for co-management of the case. Menstrual history revealed menarche at the age of 15 with regular menses occurring every month lasting for about 2-3 days. Obstetrical History showed that the patient is a G3P2 (2-0-1-2). The first and third pregnancies were full-term, delivered by VSD, uncomplicated at Fabella Hospital. The second pregnancy, however, was an abortion at 2 mos. AOG and completed with a D & C. Internal examination done was essentially normal. Serum B-hCG and 24-



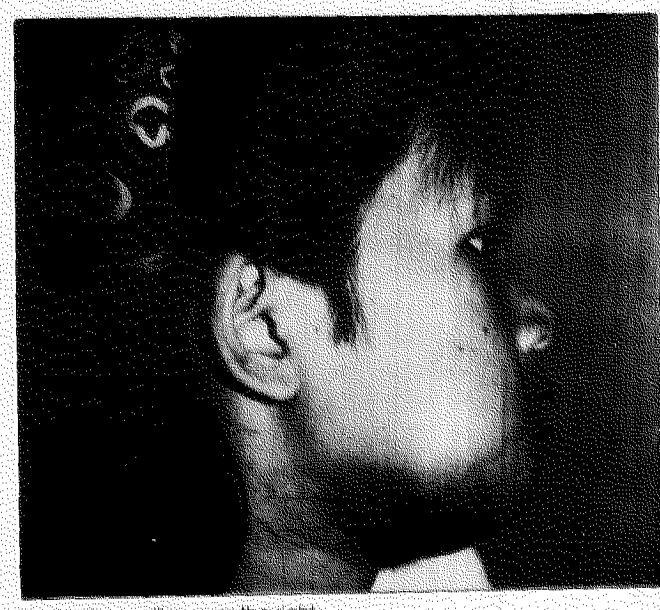


Fig. 2: 6 x 6 cm. firm, fixed, erythematous, tender swelling over the right body of the mandible.

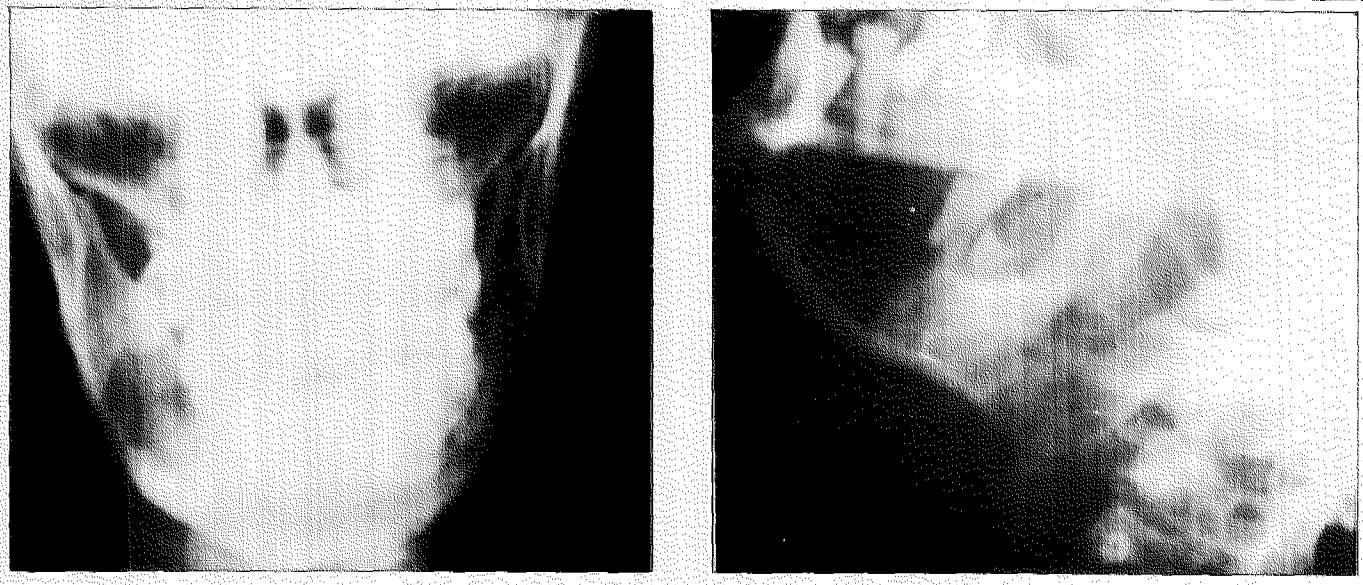


Fig. 3: Mandibular x-ray series showed a focus of expansile-lytic destruction in the right mandible which appeared to have displaced one of the molars.

hour urine hCG were markedly elevated at 22,088 mIU/ml (NV=0-10) and 18,432 above IU/ml (NV=250 IU/ml), respectively. Fractional curettage done was negative. Transvaginal ultrasound showed a normal pelvis sonographically.

With a diagnosis of metastatic choriocarcinoma to the mandible with extension to the so tissues of the oral cavity, the patient was referred to the Section of Oncology for chemotherapy.

Treatment Course

Baseline liver function tests, BUN, Creatinine, CBC with platelet count determinations were done. Chemotherapy was planned if the hemoglobin was above 100 g/L, total white count was above 3,000 with a neutrophil count of 1,500 and platelet count of 100,000.

A chemotherapy regimen consisting of Methotrexate (40mg/,2), Actinomycin-D (8mg/k/day) for 5 day, amd Cyclophosphamide (500 mg/m2) was started. Signs of toxicity were monitored during and after chemotherapy.

A repeat serum B-hCG prior to the second course of chemotherapy revealed a value of 2,446 mIU/ml (NV=0-10) as against the pre-treatment value of 22,088 mIU/ml. The next two courses of chemotherapy were then given with an interval of 21 days. There was marked diminution in the size of the mandibular swelling and oral mass after the third course and the patient was sent home improved and was advised to continue chemotherapy. However, patient was lost to follow-up.

Three months later, patient was readmitted because of profuse gingival bleeding. BP on admission was 90/60 and pulse rate was 100/min. The patient was markedly anemic with a hemoglobin level of 77 g/L and was transfused with two units of fresh whole blood and with improvement of the hemoglobin to 96 g/L. The mandibular swelling and oral mass were observed to be as that of the pre-treatment size. Likewise, there was a draining fistula with seropurulent discharge over the right mandibular area. Serum B-hCG was elevated at 8,731 mIU/ml (NV=0-10).

Chemotherapy was reinstituted. Two courses of combination chemotherapy were given. However, no significant reduction in the size of the mass was observed. The patient would develop intermittent profuse bleeding from the oral mass which necessitated transfusion of a total of 5 liters of blood. The patient was recommended as the patient exhibited resistance to the drug regimen given. As surgery was being prepared, patient developed difficulty of breathing. Chest X-ray done revealed multiple nodular densities of varying sizes in both lung fields consistent with pulmonary metastasis. Patient went into cardio-pulmonary arrest and eventually expired despite resuscitative measure.

DISCUSSION

Metastatic cancer of the oral cavity is rare and occurs most often to the mandible and is almost always from primary tumors located below the clavicle. The most common primary foci of metastases are the breasts, followed by the lungs, kidneys, and prostate.

Primary neoplasms of the breasts, thyroid, prostate, and ovaries commonly metastasize to bone. However, there is a limited number of cited examples of metastasis

to the mandible from distant primary sites. According to **Batsakis**, an anatomical factor bears on the relatively low incidence of secondary deposits in the mandible. For a metastatic lesion to become established in bone, there is at least a partial dependence upon the presence of red marrow. Here, thin-walled vascular channels provide a suitable site for the enlodgment and proliferation of neoplastic emboli. The infrequency of mandibular involvement is abetted by the physiological paucity of red marrow.

While it is estimated that 1% of malignant neoplasms metastasize to the jaws with the most common primary sites coming from the breasts and kidneys, there has been no report before of a choriocarcinoma metastasizing to the mandible.

In choriocarcinoma, the propensity of normal trophoblast to invasive growth and erosion of blood vessels goes completely out of control, resulting in a rapidly growing tumor which invades the blood vessels, endometrium, myometrium, peritoneum, and eventually metastasizes to distant organs. Although classified histologically as a carcinoma, the behavior of its growth and metastasis is more in keeping with that of a sarcoma. Metastasis occur early in the course of the disease and usually are blood borne because of the affinity of trophoblasts for blood vessels. The mechanism of tumor spread is believed to be one of arterial embolization.[2] The most common site of metastasis is the lungs (over 75%), followed by the vagina (50%). Surprisingly, in this patient, the tumor lodged into the mandible which does not have a rich blood supply.

In many cases of choriocarcinoma, metastatic lesions have often presented more striking clinical signs than the primary growth in the uterus. In a review of the literature, metastatic choriocarcinoma can present in bizarre fashions. Santhosh-Kumar, et al. first reported a case of spontaneous bilateral pneumotho- races due to metastatic choriocarcinoma[3] as an unusual cause of ischemic heart disease was first reported by **Vasiljevic**, et al.[4]

Neurologic manifestations caused by cerebral metastases [5,6,7] and intracranial aneurysms[8,9,10,11] were reported by several authors. A patient with a clinically unsuspected metastatic choriocarcinoma to the liver who died of severe hemorrhage following liver biopsy was presented by **Alveyn**, et al.[12] **Kristofferson**, et al. described a patient with metastatic choriocarcinoma presenting as acute intestinal obstruction and splenic hemorrhage.[13] In this patient, the tumor presented like a primary malignant tumor of the oral cavity with a mandibular and gingival involvement which bled profusely.

Metastatic choriocarcinoma usually has a primary neoplasm in the uterus from which it commonly arises. However, the case just presented is uncommon because no primary focus in the uterus had been identified. As was reported by other authors, case reports of metastatic foci were observed in the gastrointestinal, respiratory, genitourinary, or central nervous system with apparent spontaneous resolution of the primary site.[14,15]

Recognition of the possibility of choriocarcinoma is the most important factor in the diagnosis. Unusual bleeding after any type of pregnancy, be it term pregnancy, abortion, or ectopic pregnancy should be investigated by curettage and especially by measurements of hCG. Curettage may or may not be helpful in the diagnosis. Growths buried deep within the myometrium may be inaccessible to the curette,

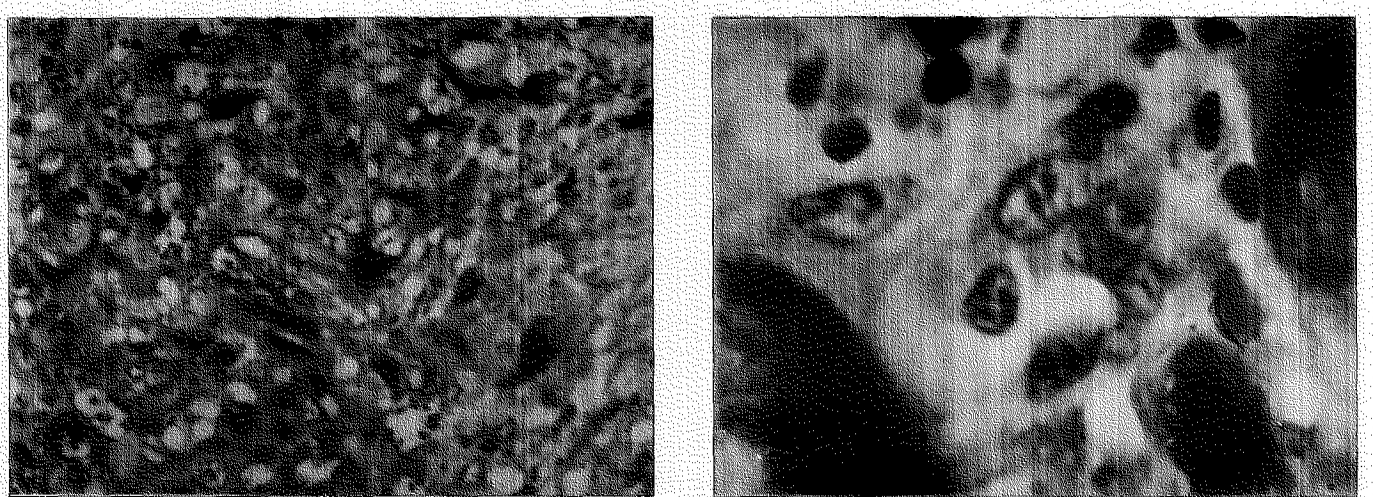


Fig. 4: Histopath revealed syntiotrophoblastic and cytotrophoblastic cells in an avillous stroma.
A. Low power magnification (left)
B. High power magnification (right)

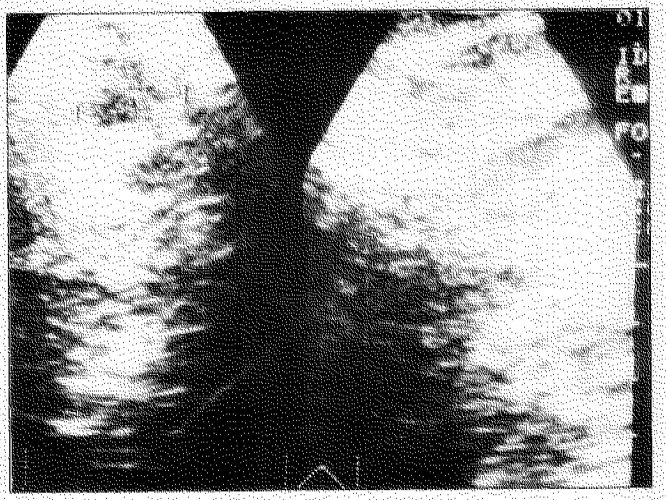


Fig. 5: Transvaginal ultrasound showed a normal pelvis sonographically.

and hence, cannot be documented.

Chemotherapy is the mainstay in the treatment of choriocarcinoma. Single agent chemotherapy is used in the treatment of non-metastatic trophoblastic disease. Methotrexate (0.3 mg/kg) is the drug of choice for initial chemotherapy. Actinomycin D is less toxic, and is used as an alternate drug if liver function tests are abnormal, if the patient cannot tolerate methotrexate, or develops resistance to it. For patients with metastatic, high risk disease, combination chemotherapy using three drugs is used. This "triple therapy" involves the use of methotrexate, actinomycin-D, and an alkylating agent such as cyclophosphamide or chlorambucil.

The response to chemotherapy is assessed primarily on the basis of weekly hCG regression. Complete remission is defined as three negative consecutive weekly hCG titers.

The patient initially responded to the triple chemotherapy regimen as manifested by the diminution in size of the oral mass and the decrease in the level of hCG titers. However, patient developed resistance to the drugs in the course of the treatment with failure to control the disease process.

Since choriocarcinoma may be classified as a systemic disease, there are differences in opinion with regards to the role of surgery in choriocarcinoma. In some centers, metastatic foci in the brain have been managed by surgical excision early in the course of treatment. In Ilancheran's series, cerebral metastasis in choriocarcinoma was successfully treated with craniotomy and excision followed by chemotherapy.[5] Surgery has also been employed in the treatment of drug resistant disease. **Xu** reported a 50% 5-year survival in 43 drug resistant cases of pulmonary metastatic choriocarcinoma who underwent resection of the metastatic foci.[16] Surgical removal is indicated when residual foci of disease with high levels of hCG fail to respond to further chemotherapy.

In this patient, surgery was contemplated after the chemotherapeutic failure. Although surgery may be considered for the resistant mandibular lesion, it should be borne in mind that the prognosis of any metastatic cancer to the oral cavity is uniformly poor.[17] **Batsakis** pointed out that resection of the mandible is too mutilating a procedure in these instances and does not significantly prolong life. Therefore, surgery for the metastatic lesion remains controversial.

Recent progress in the treatment of metastatic

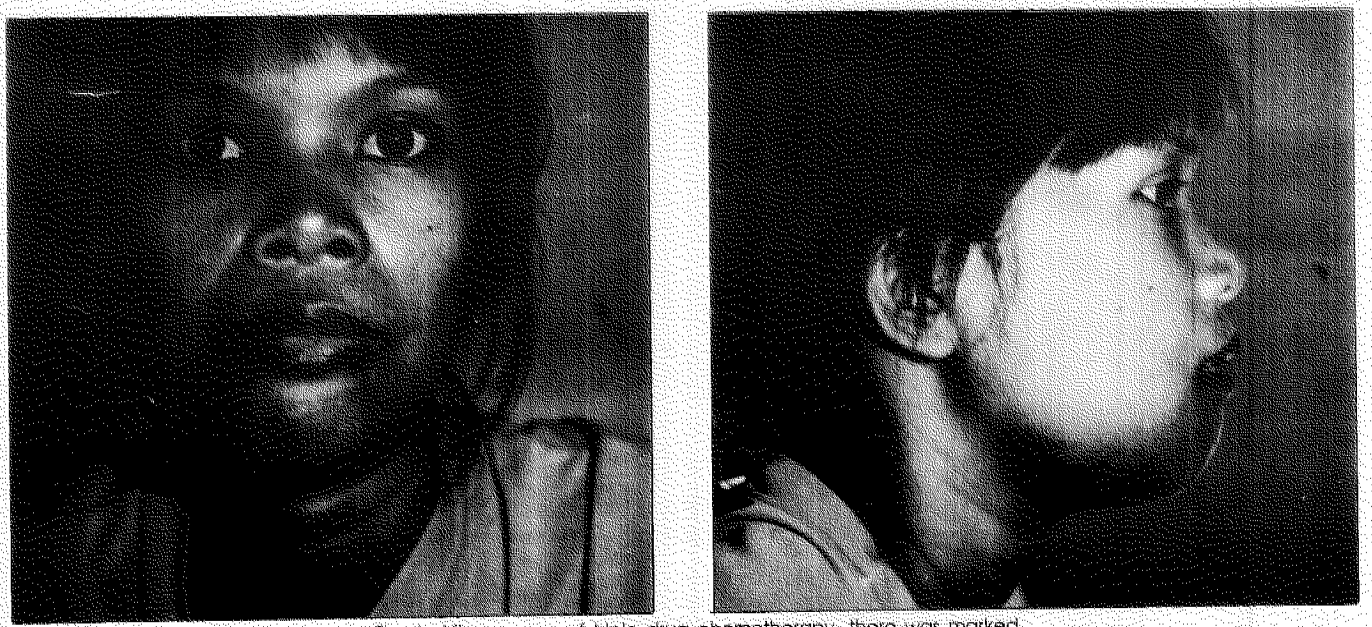


Fig. 6: After courses of triple drug chemotherapy, there was marked diminution in the size of the mandibular swelling.

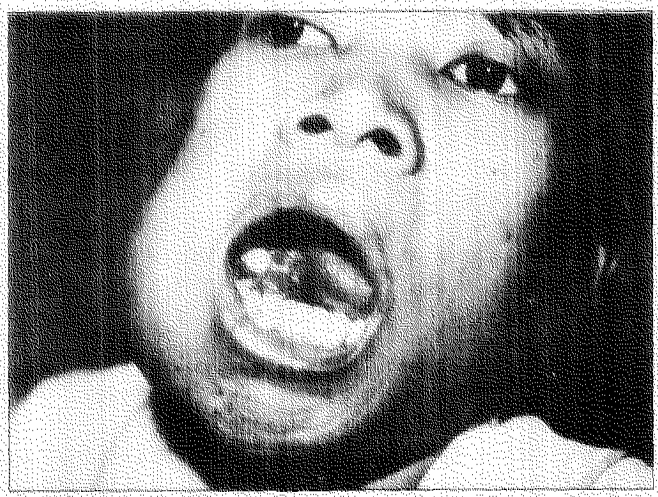


Fig. 7. The patient exhibited resistance to the chemotherapeutic drugs. The mandibular swelling and oral mass were observed to be as that if the pre-treatment size. A draining fistula with seropurulent discharge over the right mandibular area was noted.

choriocarcinoma involves irradiation aside from chemotherapy. **Soper, et al.** employed brain and liver irradiation as adjuvant therapy to reduce homorrhagic complications of brain and liver metastases.[18] **Yordan** reported that radiation has a distinct therapeutic role in the treatment of central nervous system choriocarcinoma, and provides evidence that the irradiated brain tends to resist recurrent disease even in those patients for whom the outcome is fatal.[19]

From these reviews, it is suggested that a multidisciplinary approach to metastatic choriocarcinoma to the oral cavity be employed to improve the survival of patients. It includes surgical treatment for the metastatic foci and irradiation aside from chemotherapy. Although the prognosis for any metastatic tumor to the oral cavity remains poor with over two-thirds of patients dead within 1 year and a 4-year survival rate of approximately 10%[1], there has been no report on the prognosis of patients with a metastatic choriocarcinoma to the mandible. An assumption can only be made that probably, the prognosis for patients with mandibular metastasis from choriocarcinoma is poor as this patient did succumb to the disease. Thus, further studies are needed to elucidate the roles of chemotherapy, surgery, and irradiation in the treatment of metastatic choriocarcinoma to the mandible.

SUMMARY

When a patient presents with a mass in the oral cavity it usually does not pose much of a problem to the unsuspecting clinician with regard to the diagnosis of the lesion. However, this may not be the case for other possibilities do exist. A primary or a metastatic tumor to the oral cavity should always be considered.

This paper has presented a rare metastatic choriocarcinoma to the oral cavity. While it has been estimated that approximately 1% of all oral malignancies represent metastatic foci, there has been no report of a metastatic choriocarcinoma to the oral cavity, the mandible in particular, in a review of literature. The initial impression of a primary squamous cell carcinoma of the oral cavity was disproved by the histopathologic findings and confirmed by the elevated hCG titers. Uncommonly, no primary focus in the uterus where choriocarcinoma most commonly arises could be identified by sonography and curettage. The patient was treated with chemotherapy, this being the mainstay in the treatment for choriocarcinoma. However, the

patient expired; probably indicating a poor prognosis as with the other types of metastatic tumors to the oral cavity. To improve survival, a multidisciplinary approach consisting of chemotherapy, irradiation, and surgery for the metastatic foci has been recommended.

A metastatic choriocarcinoma to the oral cavity should be considered in any woman of childbearing age who presents with profuse bleeding from an oral mass. An increased clinical awareness of the disease will lead to an early diagnosis and thus, prompt and aggressive management of the case may improve the survival rates of patients with this kind of metastatic tumor to the oral cavity.

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THE SECRET OF THE TUBERCLE IN THE ANTRUM OF HIGHMORE*

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ABSTRACT

OBJECTIVES:

1. Present a rare documented case of Primary Tuberculosis of the Maxillary Antrum.
2. Discuss its possible pathogeneses.
3. Review its differential diagnoses.

DESIGN:

Case Report

PATIENT:

48 year old Filipino

RESULTS:

Patient presented with signs of a seemingly malignant lesion at the left infraorbital rim. Computed tomography revealed a mass predominantly at the left maxillary antrum with extensions to the left ethmoids, orbit, and infratemporal fossa. Caldwell-Luc biopsy showed pale yellowish granulomatous material inside and outside the antrum. Histopathologic diagnosis was chronic caseating granuloma, consistent with tuberculosis. Triple anti-Koch's regimen (2RHZ/7RH) resulted in progressive resolution as early as one week's time.

CONCLUSION:

The protean manifestations of tuberculosis continue to defy one's imagination. For this case, possibilities on how the tubercle bacilli managed to reach the maxillary antrum, and whether the lesion was primary or secondary were discussed. It is emphasized that since tuberculosis can mimic any disease and occur anywhere in the body, it should always be considered in the differential diagnosis of all disease entities.

INTRODUCTION

In the mysterious world of bacterial species, there exist some bacilli whose characteristics and manifestations continue to defy one's imagination. From where they come, how they grow and proliferate is sometimes a secret only they would know.

One such organism is the tubercle bacillus.[1,2] It can mimic any disease; it can affect any organ. Although recent advances in chemotherapy have reduced the incidence of unusual tuberculous entities, once in a while, an intriguing occurrence crosses the path of the clinician to stir his thoughts and to provoke his intellect. A perfect example is tuberculosis of the sinonasal region.[13-21]

Nasal lesions are unusual. Since the Italian professor, **Morgagni,** first described TB ulcerations of the nose, nasopharynx and soft palate in 1761,[15] sporadic reports have appeared in the literature. The next case appeared one century later, when **Willing** presented autopsy findings of 476 TB cases which included one with nasal septal lesions.[15] Primary involvement of the nasal tract, however, was not to be reported until 1872 in London, where **Clarke** addressed the Pathologic Society.[14,15] Since then, not more than 50 cases have been reported in English medical literature.[13-18]

Rarer still is primary involvement of the paranasal sinuses. Local and foreign literature review showed no account of such a lesion. Reports were mainly on secondary involvement from a neighboring focus and those with concurrent or previous pulmonary disease.[19,20] Pathogenesis of primary disease of the paranasal sinuses remains a mystery to this day.

With this report, the authors aim to:

1. present a rare documented case of Primary Tuberculosis of the Maxillary Antrum
2. discuss its possible pathogeneses
3. review its differential diagnoses

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* Presented at the PSO-HNS Third Midyear Convention held at Davao Insular Hotel, Davao City, May 5, 1993.

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CASE REPORT

A 48 year old Filipino pedicab driver from Bulacan consulted because of mass at the inferolateral aspect of the left orbit (corresponding to body of zygoma) of 3 years duration. The mass was initially described as erythematous, slightly crusted,doughy, non-tender, about 0.5 x 0.5 cm and slowly enlarging. It apparently started 3 months after patient's left malar area mildly hit the dashboard of a vehicle which came to a sudden stop. Said trauma allegedly cause minimal swelling and since no skin break was evident, no consultation was done at that time. Thereafter, progressive enlargement of the mass was noted. Unre- called medications were intermittently taken which only resulted in slight decrease of the mass. A year later, patient started experiencing occasional diplopia, left nasal congestion with mucopurulent discharge, and slow progressive maxillary swelling. No further consultations were done until patient was seen at the Out-Patient Department and subsequently admitted for work-up. Past medical and family histories were unremarkable except for occasional bilateral aural discharge since childhood.

Initial examination showed a hyposthenic, fairly nourished patient with a 2 x 3 x 1 cm, crusted, purplish, doughy, non-tender, cauliflower-like fixed mass, at the inferolateral rim of the left orbit (Figures 1 and 2). The eye was slightly proptosed, however, extraocular muscle mobility was full. The left cheek and gingivobuccal area were slightly bulging but non-tender. The left lateral nasal wall was slightly pushed medially, with the mucosa appearing pale and grainy. Yellowish nasal discharge was also noted. Both tympanic membranes were perforated: 80% on the left, 60% on the right, with no signs of active infection.

Paranasal sinus x-ray revealed haziness of the left maxilla, with no evidence of bone destruction. Computed tomographic (CT) scan demonstrated an extensive, mainly solid moderately enhancing mass lesion predominantly within the left maxillary sinus extending slightly into the nasal cavity, ethmoid sinuses, inferior and lateral aspect of orbital cavity and inferior temporal fossa (Figure 3). The left lateral rectus muscle was partially encroached by the extension causing slight medial deviation and proptosis of the globe. Associated osteolytic changes involving the lateral orbital wall, superior medial lateral walls of the maxilla were noted (Figure 4). The report was signed out as a probably malignant neoplastic process.

Chest X-ray was unremarkable. Sputum Acid-Fast smear and culture, PPD and Anti-HIV test were negative.

An initial impression of Newgrowth, inferolateral rim, orbit, left, was entertained.

Wedge biopsy of the malar mass and sinuscopy of the antrum were done. However, sinuscopy was uncontributory because of bleeding, so exploratory Caldwell-Luc was performed. Findings were: the soft tissue (supra- and subperiosteal) was filled with pale yellowish, granulomatous, slightly gritty material. The antrum was also filled with the same material. About 5 cc of antral tissue was retrieved for histopathologic examination (Figure 5).

Final histopathologic reading was granulomatous infection with Langhan's cells and caseation necrosis (Figures 6 and 7). Although no bacilli were seen on acid-fast smears and culture of antral and skin lesions, tuberculosis was the final diagnosis.

The patient was promptly treated with triple anti-Koch's regimen (2RHZ/7RH) 400 mg Isoniazid, 600 mg Rifampicin, 1500 mg Pyrazinamide. Within one

FIG. 1: PRETREATMENT

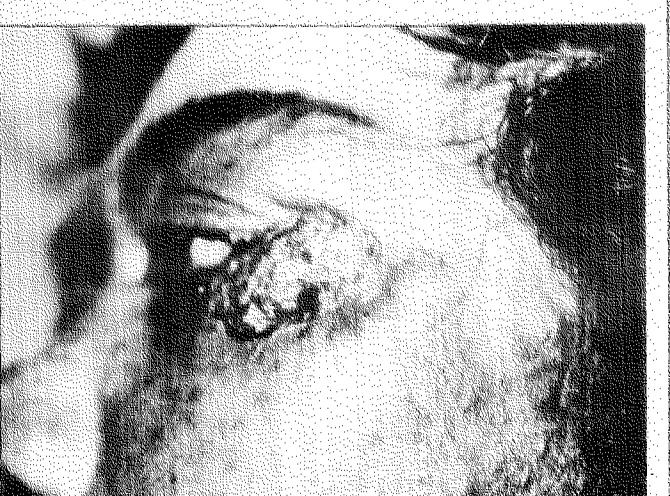

FIG. 2: PRETREATMENT

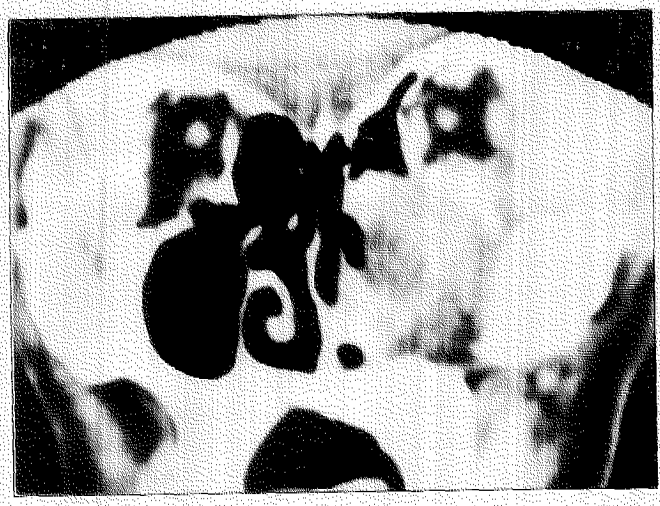

FIG. 3: SINUS CT (PRETREATMENT)

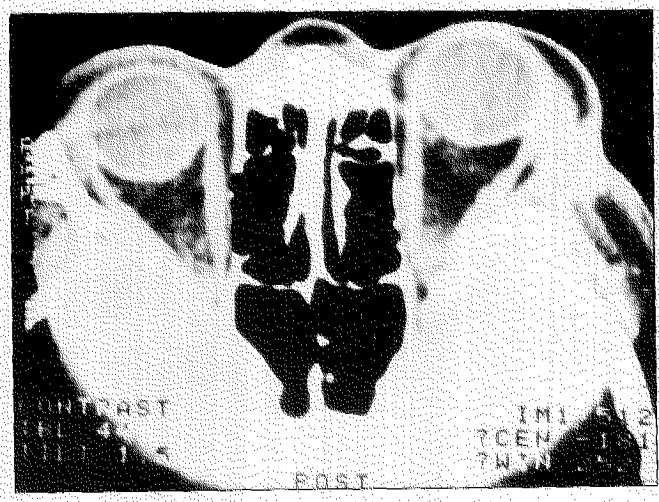

FIG. 4: SINUS CT (PRETREATMENT)

week, marked decrease in size to 1.5 x 2.5 x 1 cm was noted. Further decrease in size until lesion was level with adjacent skin was noted after one month.

After two months, Pyrazinamide was discontinued but Isoniazid and Rifampicin were resumed at the same dosages. At that time, the overlying skin was smooth, but was contracted (Figure 8).

On the ninth month of anti-Koch's was performed. The nasal and antral cavity was smooth there was no evidence of reaccumulation of granulomatous tissue ((Figure 9).

Repeat CT showed that the previous mass lesion within the left maxillary sinus did not recur. The left middle turbinate was absent and the medial maxillary wall was dehiscent, both attributable to the Caldwell-Luc procedure. The nasal cavity and ethmoid sinuses were free of disease (Figure 10). Only a soft tissue density at the left infratemporal fossa with inferolateral orbital extension and orbital proptosis persisted. This was attributed to fibrosis and scar tissue formation (Figure 1).

At present, the patient is asymptomatic. The skin lesion has leveled off. Scar contracture is evident, however, the skin is smooth and no evidence of recurrence is noted (Figure 12).

DISCUSSION

The capability of TB to mimic cancer of any other disease has been documented. Most reports dealt with extrapulmonary involvement, particularly the head and neck region. [1-3] Although most extrapulmonary spread occurred after uncontrolled lung infection, primary TB can occur almost anywhere in the body: oral cavity, mandible, parotid, nose, skin, etc. [1,9,13-22, 24-27]

In the nasal region, several authors have postulated that the rarity of primary TB disease is due to the effective bactericidal action of the nasal secretions and mechanical protection by the cilia. [10-18] Furthermore, the marked chronicity of these lesions seems to suggest that the nasal mucosa does not provide a favorable climate for growth. [14,15] The lesion may arise through local inoculation or inhalation. Usually, the septum is affected, and a perforation is occasionally present. Lesions may take the form of ulcerations or granulomata. Ulcerations are generally shallow and granulations may appear at the margins of the lesions. Granulomas appear pale red or pink with slightly roughened or granular surface. Nasal obstruction, which is the most frequent complaint, is not necessarily due to granuloma alone, but usually form crust formation. Scaling, epistaxis and fetor may occur.

Tubercle bacili are rarely recovered from the surface of granulomata or from nasal washings. [14,15] They are occasionally found in bits of tissues from biopsies. Microscopically, the pathology displays the characteristic pattern of tuberculomas as elsewhere in the body. Tubercles consisting of aggregations of round cells, epitheloid cells, Langhan's giant cells and foci of caseation necrosis are present. Although caseation necrosis is pathognomonic of TB, a positive culture or successful guinea pig inoculation will provide the absolute proof.

Primary TB of the paranasal sinuses has not been reported yet. Previous documentation noted that the disease was secondary to pulmonary or extrapulmonary TB which reached the sinuses by way of the blood stream or by direct extension into the sinus. [18,20] The maxillary and ethmoids were most susceptible.

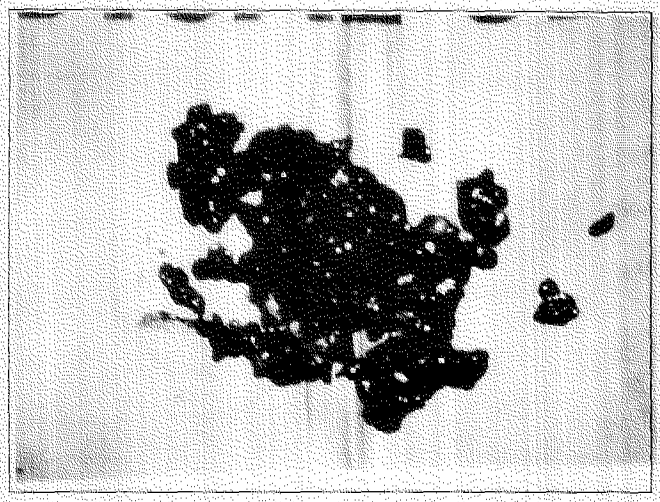

FIG. 5: ANTRAL BIOPSY SPECIMEN

For this particular case, the authors would like to address two main questions:

1. Is the lesion primary or secondary?
2. What are the possible pathways for its occurence in the maxilla?

In answer to the first question, the authors contend that this present case is a primary manifestation of TB of the antrum. There was no history of past exposure or infection. The patient showed no signs and symptoms referrable to a possible pulmonary TB, such as anorexia, cough, afternoon rises in temperature, night sweats, etc. Moreover, the diagnostic work-ups such as chest x-ray, sputum smear and culture were unremarkable. It is highly unlikely that the patient's condition was a secondary process.

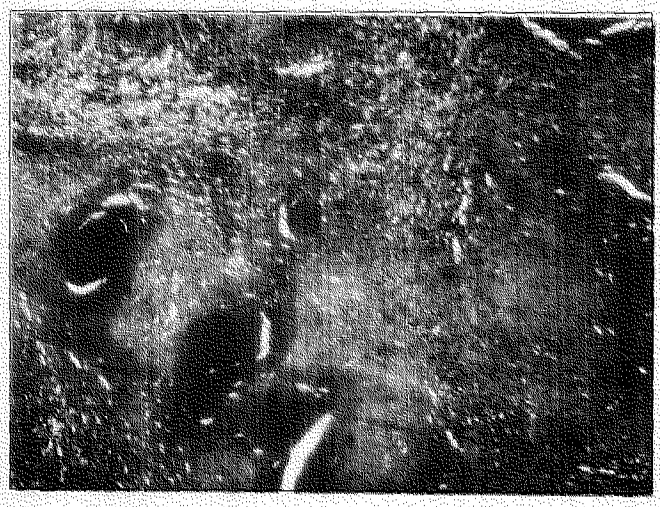

FIG. 6: CASEATION NECROSIS

As to the question on pathogenesis, one can assume that a similar process (inoculation or inhalation) as in the nasal cavity occurred. For this particular case, four hypotheses are forwarded.

The first is that when the patient suffered head trauma during the vehicular accident, tubercle bacilli must have been inoculated on the malar area. With time, the bacilli managed to survive, causing osteomyelitis of the zygomatic bone. When the periosteal integrity was breached, bacilli seeded into the adjacent areas: the orbit and the maxilla. This hypothesis is plausible when taking into account the aid of gravity. However, tubercle bacilli are not known to cross the intact skin.[28] Since the patient denied any skin break and application of possibly contaminated balms or medications, there is no portal of entry for the bacilli to invade the bones. Furthermore, primary inoculation TB

FIG. 7: LANGHAN'S CELLS

usually appears as chancriform - a firm, non-tender, sharply delimited ulcer, not as a doughy cauliflower-like mass which the patient had. Likewise, lupus vulgaris (mucous or cutaneous TB which stems from relatively high degree of immunity and tuberculin sensitivity) is not considered because it usually appears as reddish-brown plaques with peripheral "apple jelly" nodules. Another negative point is that the time lag of three months between head trauma and initial manifestations of skin lesions was too long.

The second hypothesis is that the patient had a primary orbital process which extended to the adjacent regions. This is highly unlikely since the disparity between the pathology in the orbit and adjacent areas such as the maxilla, skin and infratemporal fossa was too much. If the orbit were affected first, then more destruction or disease manifestation should be evident from that area. Moreover, ophthalmologic complaints such as diplopia and proptosis came much later than the skin lesions.

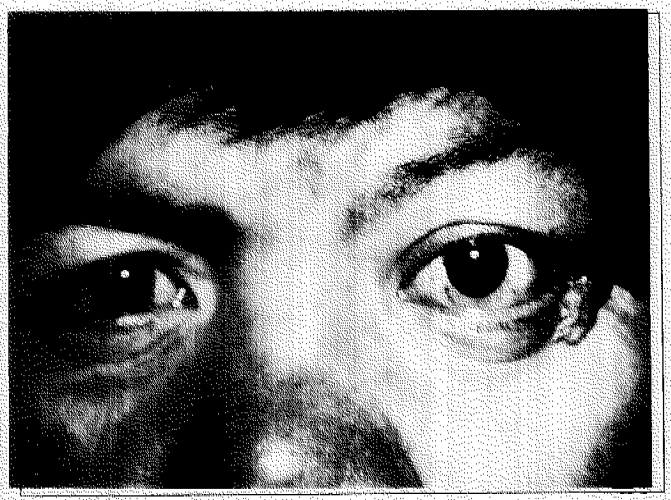

FIG. 8: 2 MONTHS PRETREATMENT

FIG. 9: SINUSCOPY (9 MONTHS POSTREATMENT)

A more plausible hypothesis is that the patient already had primary tuberculosis of the antrum at the time of the accident. The head trauma must have caused violation of periosteal integrity, probably at the sutures or at actual subclinical fracture lines at the malar area. Bacilli were then able to seed to the orbit and skin through these portals. Because the antrum is known to able a silent area due to its space, there was time lag before skin manifestations were noted. It could be argued that the lesion could have extended from the nasal cavity, however, except for the slightly grainy mucosal surface, the nasal cavity was relatively "silent" in contrast to the pathology in the maxilla.

Lastly, there is always the possibility that the patient had a previous subclinical pulmonary lesion which healed, with viable organisms still present in metastatic areas held at bay by immune mechanisms. In this case, the tubercle bacilli opted to hide in the antrum of Highmore (maxilla). A breakdown in local or systemic host defenses then led to reactivation of the bacilli.

Whatever course the tubercle bacilli took would remain their secret, however, one of the above possibilities should explain its unusual occurrence in the maxilla.

Clinically, differential diagnoses should include the shole gamut of granulomatous disease, infectious and malignant, such as syphilis, scleroma, leprosy, sarcoid, mycoses, leishmaniasis, herpes, midlinne granuloma, Wegener's granuloma, etc. [29]. Of course, malignancy should always be high on the list. Although final diagnosis rests with histopathologic confirmation, a good clinical clue for correlation should be maintained

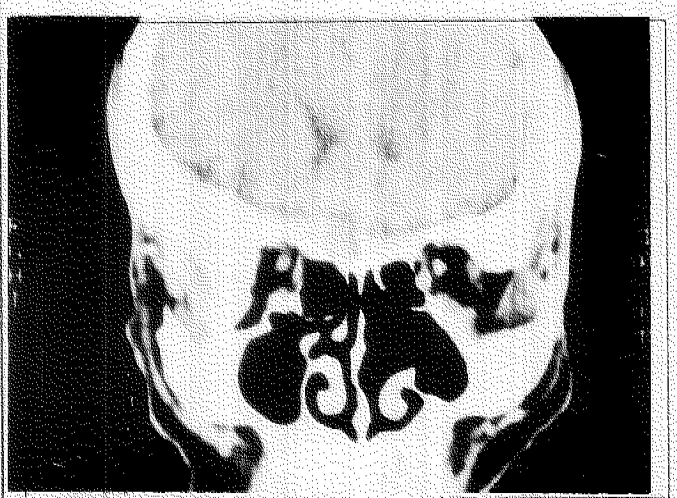

FIG. 10: SINUS CT (9 MONTHS POSTREATMENT)

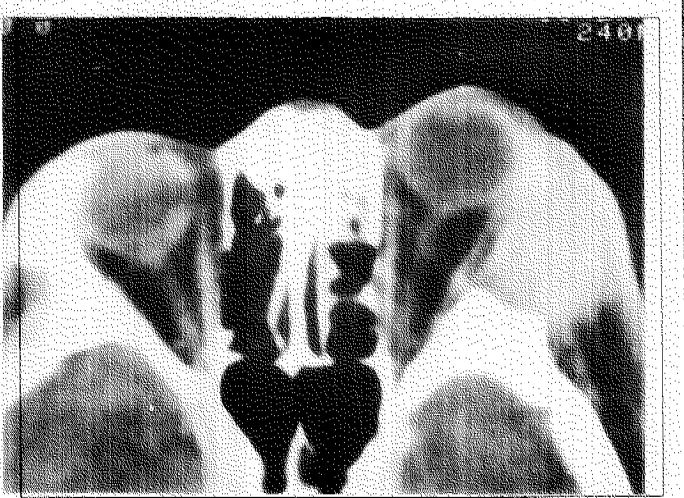

FIG. 11: ORBIT CT (9 MONTHS POSTREATMENT)

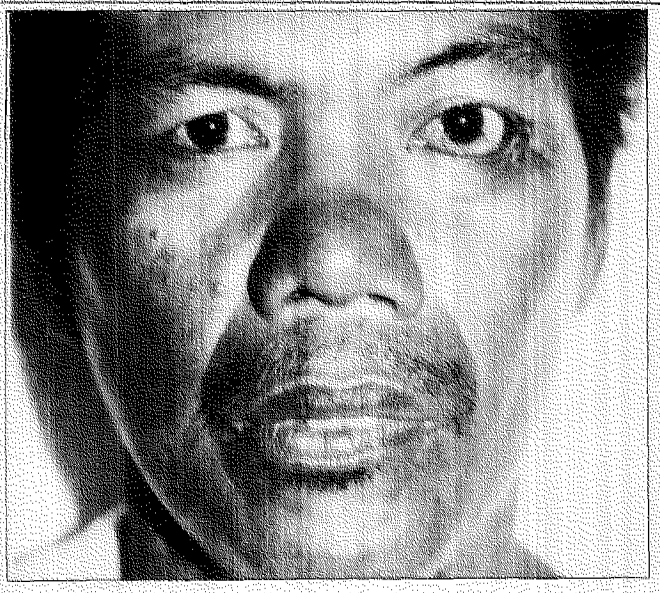

FIG. 12a. 9 MONTHS POSTREATMENT

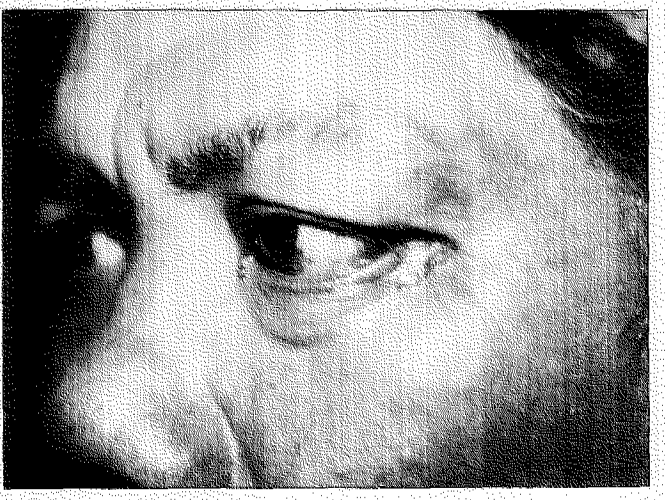

FIG. 12B. 9 MONTHS POSTREATMENT

since inappropriate management could lead to disastrous complications.

The recent pandemic outbreak of Acquired Immune Deficiency Syndrome (AIDS) should also be taken into consideration. Its association with TB, particularly in atypical forms, have cause it to be considered as one of the qualifying conditions in AIDS diagnosis.[30-31] A routine HIV test should be done when atypical forms of TB are encountered. Fortunately for the patient, this test was negative.

Once a diagnosis has been made, antituberculous chemotherapy should be started. Recommended is a short course of 9 months of isoniazid and rifampicin, supplemented with a third drug (ethambutol, streptomycin, or pyrazinamide) during the first 2-3 months.[3,32]

Since TB remains a major world health concern,[33] particularly in Southeast Asia,[34] it is prudent to keep in mind this entity in the differential diagnoses of unusual disease entities. Although it is not true that 99.5% of Filipinos have been affected by tuberculosis in one way or another, the prevalence is still relatively high [34] to warrant special attention. Cure is easily achieved with present chemotherapy agents and sanitary healthy living.

SUMMARY AND CONCLUSION

A case of primary tuberculosis of the maxillary antrum has been describebd. The lesion was diagnosed by tissue biopsy and treated with triple anti-Koch's regimen (2RHZ/7RH) with successful results. Possible pathogeneses and differential diagnoses were also discussed. It is emphasized that tuberculosis can mimic any disease and occur anywhere in the body.

With this report, it is hoped that the Secret of the Tubercle in the Antrum of Highmore has been unlocked. There may still be mysteries that remain in the dark world of bacterial species. However, with man's persistence and supreme intellect, the answers will someday be known.

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EFFICACY AND SAFETY OF FLUTICASONE PROPIONATE IN PERENNIAL ALLERGIC RHINITIS*

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Evelyn Tolentino, MD; Felicidad Cua-Lim, MD

ABSTRACT

The clinical efficacy and safety of Fluticasone Propionate (FP) in the treatment of perennial allergic rhinitis in the Philippines was assessed in an open study on 65 selected cases with moderate to severe degree of nasal allergy at 200mcg/day for a period of 4 weeks. The FP aqueous nasal spray was given in the mornings when the nose was relatively clear without the secretion. Routine hematology examination, blood chemistry, renal function and hepatic function tests, serum cortisol and routine urinalysis were performed before and after treatment. Each patient was advised to record daily their allergic symptoms on a diary card which was collected every 2 weeks.

The resuls of the treatment revealed remarkable improvement of their allergic symptoms by about 85%. Their vital signs and all laboratory findings were normal before and after the treatment. This study shows that FP is very effective and safe for the treatment of perennial allergic rhinitis.

INTRODUCTION

Allergic rhinitis is an inflammatory reaction of the nasal mucosa due to an Ig-E mediated reaction to specific allergens. The cardinal symptoms of allergic rhinitis in the Philippines are: frequent sneezing especially upon waking up in the mornings, watery rhinorrhea and nasal blockage. Nasal sneezing may occur also during the daytime, in the evenings or upon sudden exposures to different strong allergens. Sneezing may be preceded or associated with varying degrees of itchy nose, itchy and slightly reddened eyes and some itchy throat or palate. Although the disease is not serious, its symptoms substantially interfere with one's quality of life.

In the Philippines, where the temperature is usally over 70°F and the humidity is above 50%, perennial rhinitis is the common form of allergic rhinitis. The most important allergens are: *Dermatophagoides farinae, Dermatophagoides pteronyssinus,* house dust, mold spores and pollens. A good history, through otolaryngological examination, and allergy skin tests are important in establishing the diagnosis of an IgE-mediated reaction to perennial allergens.

The management of allergic rhinitis involves the triad of avoidance, pharmacotherapy and specific aeroallergen immunotherapy. It is well known that H_1 antagonists are widely used as first line treatment for allergic rhinitis. However, H_1 antagonists are primarily of use in controlling sneezing, rhinorrhea and pruritus, but are ineffective in relieving nasal blockage. Intranasal steroids can inhibit mediator release from mast cells. Basophil and especially the products of eosinophils are involved in the late phase reaction. The tropical nasal corticosteroids presently available in the Philippines are beclomethasone dipropionate and budesonide. These products are used twice a day. Recently, fluticasone propionate (FP), a halomethyl ester of androstane 17_ - thiocarboxylic acid, has been the subject of several multicenter studies.

The advantage of FP is that it is long-acting, needs only once a day intranasal administration. FP exerts local anti-inflammatory activity, decreases cellular influx and controls symptoms without systemic side-effects such as the suppression of the hypothalamus pituitary-adrenal (HPA) axis. Previous publications have attested to the efficacy and safety profile of FP in other countries.

OBJECTIVES

The objective of this study is to determine the efficacy and safety of FP (Fluticasone propionate) given 200mcg once a day intranasally to Filipino patients with perennial allergic rhinitis.

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* Presented at the 37th Annual Convention of the PSO-HNS held last Dec.1-3, 1993 at Hotel Nikko-Manila Garden.

** Satellite Symposium Speaker, Chairman, Dept. of ENT-PGH.

STUDY DESIGN

This clinical trial of FP was actually intended for a double blind placebo controlled multicenter-parallel group study. It started in January 1992. Unfortunately, most of the placebo treated patients dropped out of the study because of treatment failure. Due to this unpleasant and regrettable happening, it is decided to make this into an open study with selected patients either with moderate or severe degree of nasal allergy. Since it is very difficult to classify nasal allergy qualitatively and/or quantitatively, the only criterion used clinically is the sneezing. Mild nasal allergy has 1-5 sneezes per day; moderate nasal allergy has 6-10 neezes per day; and severe nasal allergy has more than 10 sneezes per day.

This open study has 65 patients recruited in three medical centers: UP-PGH, Medical Center Manila and Davao Doctors Hospital. There is no run-in period. The patients are treated with FP aqueous nasal spray, 50mcg/actuation, 2 actuations in each nostril, a total of 200mcg taken once daily between 0500 and 0900. These patients will attend the medical clinics of these medical centers for: clinical assessment and start of treatment (visit 1); re-assessment after 2 weeks of treatment (visit 2); 3rd clinical assessment after another 2 weeks of treatment (visit 3); and final Antazoline HCl eye drops will be given to patients as rescue medication if their eye symptoms are intolerable.

All these patients included in this open study have given their informed consents.

STUDY POPULATION

1. **Entry Criteria:**

   Patients over 12 years of age with a history of perennial allergic rhintis (nasal itchiness, sneezing, rhinorrhea and nasal blockage).

   Patients with positive skin prick test to the most common aero-allergens found in the Philippines. Usually, patients with moderate to severe nasal allergy are accepted.

2. **Exclusion Criteria:**

   Patients who have taken intranasal, inhaled or systemic corticosteroids within the previous month.

   Patients who have taken intranasal, inhaled sodium cromoglycate or nedocromil sodium within the previous month.

   Patients taking long acting antihistamines e.g. astemizole, within the previous 6 weeks.

   Patients taking any other medication for nasal complaints.

   Patient who have had nasal surgery within 6 weeks of the start of the study.

   Patients with structural abnormalities of the nasal mucosa, which could interfere with the satisfactory administration of the drug eg. nasal polyps or a significant deviation of the nasal septum.

   Patients with infection of the paranasal sinuses, or an upper or lower respiratory tract infection.
   Patients who have had a course of immunotherapy within the last year.

   Patients in whom corticosteroids are contraindicated or who have a history of adverse reaction to them.

   Female patients who are pregnant.
   Patients with serious and unstable concurrent disease.

   Any patients who, in the investigator's opinion is not suitable for this trial or who will not remain in the same environmental condition during the trial period.

   Patients who have previously been in the study involving FP.

3. **There is a total of 65 patient (Filipinos) selected for this open study.**

Age

The age limit of this study group varies from 16 to 40 with a mean age of 20.

Sex

In this open study, there are 26 males and 39 females.

METHODS

The following procedures are followed by each patient:

1. **Visit 1 (Start of treatment)**
   - 1.1 Careful clinical assessment includiing a thorough history and ENT examination before acceptance to the study.
   - 1.2 Informed consent should be signed before the start of treatment.
   - 1.3 Allergy skin test using the skin prick technique for the more common allergens in the Philippine.
   - 1.4 Diary card is given for a period of 14-17 days. Assessment of the symptoms is written on the diary card, and the patient is advised how to record all his symptoms everyday after the application of FP aqueous nasal spray.

1.5 The patient is taught the technique on how to use FP aqueous nasal spray. Patient is advised not to use any other medication without the consent of the investigator.

1.6 Blood is taken for hematologic examination, biochemistry and serum cortisol determination. Urine is collected for the routine urinalysis.

1.7 The patient is advised to return every 2 weeks with the diary card for a period of 6 weeks for assessment.

2. Visit 2

2.1. Collect the diary card of the previous 2 weeks. Assess the recording if it is properly done.

2.2 Take a short follow-up history if this tallies with the diary recording. If there is no improvement, try to find out if there is any superimposed nasal infection or any adverse event.

2.3 ENT re-assessement to correlate with the diary recording.

2.4 Be sure that the patients is using the FP aqueous nasal spray without any other medications.

2.5 Another diary card is given together with the proper advice and the appointment.

2.6 Advise the patient to return the nasal spray on the next visit.

3. Visit 3

3.1 Collect the diary card.

3.2 Take a short follow-up history too correlate the diary scoring and the symptoms. Find out if there is any adverse event.

3.3 Nasal re-assessment to verify the symptoms and findings.

3.4 Collect the FP aqueous nasal spray with the remaining solution. Check if the spray has been used or not

3.5 Do another clinical assessment of the patient.

3.6 Collect blood for hematological examination, biochemistry, serum cortisol, collect urine for routine urinalysis

3.7 Give another diary form for the next final visit in 2 weeks. Give another appointment to see the investigator after two weeks.

4. Visit 4 (Final Visit)

4.1 Collect the diary card.

4.2 Take another short follow-up history and do nasal examination for correlation.

4.3 Check if there is any adverse event.

5. Assessment of Efficacy

5.1. Clinical Assessments

5.1.1 Nasal Assessment (Rhinoscopy) including ENT Examination

These procedures should be performed in all cases in evry visit to the clinic. This may help correlate the efficacy of the FP and other superimposed medical conditions.

5.1.2 Patient's Assessment of His/Her Symptoms

A diary card (as mentioned previously) covering a 2 week period is given to each patient at clinic visit 1 and 2, and they are asked to a daily record of all symptoms of allergic rhinitis, nasal blockage on waking, nasal blockage during the rest of the day, sneezing, nasal blockage during the rest of the day, sneezing, nasal itchiness, watery rhinorrhea, eye watering/irritation. These are assessed using a four point rating scale for each symptom as outlined below.

0 = absent; 1 = mild; 2 = moderate; and
3 = severe symptoms

At the end of each 2 week treatment period, the patient's diary card will be collected by the Investigator (Physician). This will be checked for correct entry of dates, symptoms and medications. An '*' will be entered by the physician and initialled by them if the data is truly missing.

The use of the trial medication, rescue medications, if any, will also be recorded in the patient's diary card.

Any change in the medication noted on the patient's diary card must be recorded in the clinical record form. The reason for the change should be recorded, and an Adverse Event Form should be completed.

5.1.3 Visual Analogue Scales

At each clinic visit, the investigator will ask the patient to give an overall assessment of their rhinitic symptoms by making a single vertical line on a 100mm visual analogue scale. The scale will be labelled "NO SYMPTOMS" at the right hand edge and "WORST SYMPTOMS EVER" at left hand edge.

5.1.4 Physical Assessment of Symptoms

The symptoms of Nasal Blockage, sneezing, itchiness, watery rhinorrhea and eye symptoms will be assessed by the physician during the clinic visit 1, 2 and 3 using the four point rating scale of 0=none; 1=mild; 2=moderate; 3= severe symptoms.

5.1.5 Hamatology, Biochemistry, Cortisol, Urinalysis Blood saple and urine are taken during visit 1 and 3 for the following:

Clinical Chemistry	*Renal Assessment*
Sodium	Creatinine
Potassium	Urea
Calcium	Urinalysis
Total Protein	
Albumin	
Bilirubin	

Haematology Assessment	*Hepatic Assessment*
Haemoglobin	AST (SGOT)
RBC	ALT (SGPT)
PCV	Alk. Phosphatase
MCV	
Platelet	
Total WBC	
Neutrophils	
Basophil	
Lymphocytes	
Monocytes	
Blood Cortisol	

5.2 Adverse Events

Any adverse event, major or minor, occur during the period of treatment should be recorded and reported. This will help assess the safety and tolerability of FP under investigation.

DISCUSSION:

Intranasal topical steroids are established as an effective and widely used treatment for perennial or seasonal allergic rhinitis and have rendered significant impact in the management of these conditions. Topically, in the nose, the steroids are powerful anti-inflammatory agents - reducing the inflammation and the intercellular edema, acting as mild vasoconstrictors, and suppressing the neutrophil chemotaxis and mast-cell-mediated late phase reaction.

Fluticasone propionate aqueous nasal spray is the latest topical intranasal glucocorticoid available for treatment in allergic rhinitis. The clinical trials in this series of 65 patients reveal fantastically excellent response in all allergic symptoms of the nose - sneezing, itchiness, rhinorrhea, nasal blockage, post nasal drip, and eye watering/irritation. This study also reveals that FP does not affect the hepatic and the renal functions. In this series, 17 out of 65 patients have pale nasal mucosa, and FP reverse these to normal color again after its application. Boggy nasal mucosa was not encountered in this study.

This study shows that FP has no effect on the hypothalamic-pituitary-adrenal (HPA) axis when administered topically at 200mcg once daily. Intranasal FP is well tolerated. In this particular series, there were no undersirable effects. The obvious advantage is the eacy compliance by the patient since it is given only onnce a day in the mornings.

Figure 4 reveals that the average duration before the onset of improvement from the usual allergic symptoms is between 3-8 days. Sixty percent of the 65 patient is within this period. Thirty-two percent of this series shows marked improvement on the 3rd day. It should be borne in mind that Fluticasone aqueous spray should be applied when the nasal passage is relatively clear without any secretion. This is imperative for the success of the topical steroid nasal therapy.

CONCLUSION:

From this study, the results showed FP (Fluticasone propionate) to be very effective topical intranasal glucocorticoid. FP has no demonstrable suppression of the hypothalamic-pituitary-adrenal (HPA) axis after intranasal administration. The dose is 200mcg administered once a day. It is therefore, convenient and compliance is at its best. FP intranasal application has been documented to be very efficacious and safe. It is highly recommendable addition for the treatment of perennial allergic rhinitis.

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-SMELL IDENTIFICATION TEST (-SIT)*

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ABSTRACT

The development of a standardized olfactory test for local use is described. Over 500 subjects participated in four experiments. Experiment 1 was subdivided into 2 phases to determine if the odors were within the desired intrinsic characteristic. The influence of extrinsic variables such as age, sex, and smoking history in the relative identifiability of each odor was likewise analyzed. Experiment 2 eliminated the odors which were variably identified after a multiple choice presentation test. Experiment 3 established test-retest reliability at 1 month. A scoring system was then devised based on the arbitrary scores assigned to each odorant with regards on the odors' familiarity and characteristics. Experiment 4 was a clinical application of the test wherein normal persons were discriminated from those with well-known olfactory problems. The normal subjects provided a score of more than 90 and the anosmics less than 70. The development of this simple, inexpensive and objective test may now provide a means to detect olfactory dysfunction.

INTRODUCTION

Disturbance in the sense of smell is not a trivial matter. Although the degree of disruption to daily life is experienced by the patient with reduced or absent smell is much less apparent than with major losses in the other senses, the sense of smell remains important to the patient.

The sense of smell largely determines the flavor of the foods one ingest and the beverages one savor and serves as an important early warning system for detection of fire, dangerous fumes, leaking gas, spoiled food and polluted environment.[9] Impairment of the sense of smell may be responsible for mood changes, and there is an increased incidence of depression in people who become anosmic. There is also some evidence linking olfactory impairment with sexual dysfunction.[8]

Many olfactory disoders occur as a result of accidents, disease state, medical interventions, aging and exposure to a number of environmental pollutants.[3] Smell disorders can serve as important diagnostic signs of a number of serious diseases and anomalies, including ones related to the ontogeny of the hypothalamus and pituitary, intracranial neoplasms, and temporal lobe epilepsy.[5]

All too often however, many clinicians fail to recognize the importance of the sense of smell. In addition to a lack of awareness of the problem, one reason why smell has been ignored to such an extent is that there have been no accurate and relatively simple ways of assessing olfaction. In recent years, tests based on upon sophisticated quantitative instruments such as air-dilution olfactometers have been developed but these are beyond the scope of day to day clinical practice.[2] Other tests such as the UPSIT, an acronym for University of Pennsylvania Smell Identification Test produced by Doty and colleagues are attractive alternatives but their clinical applicability in the Filipino patient is doubtful as they present with test items that are totally foreign and inappropriate for the Filipino patient.

This study was designed to develop a standardized test of olfactory function for local use called the Smell Identification Test of - SIT. The study was divided into four experiments (figure 1), each with specific objectives.

EXPERIMENT I: ODOR SCREENING

Phase 1: Odor Screening for Intrinsic characteristics

To grade the various odor/scents according to perceived intensity, pleasantness, familiarity, coolness - warmth, and variability.

Phase 2: Odor Screening for Extrinsic variability

To evaluate the relative influence of subject variables i.e. age, sex and smoking history.

Subjects:

30 males and 30 females with a mean of 26.4 years, and no known organic cranial nerve I pathology were randomly chosen from a pool of 70 clinically screened subjects. Assignments were accomplished using a table of random numbers. Fifty (50) were smokers. Of these, only 12 smoked more than one pack per day.

Instruments:

A qualitative 5 point Likert type scale was used to grade the respondents perception of the odor introduced. Parameters measured were the following:

1. Intensity (from very weak to very strong)
2. Familiarity (from very unfamiliar to very familiar)
3. Coolness & Warmth (from cool to warm)
4. Pleasantness (from very pleasant to very unpleasant)
5. Irritation (from very irritating to not irritating)

Odor Panel:

The sixty odor stimuli (see appendix A) included in the study fulfilled the following criteria: A) Readily available locally, B) stimuli must be both composed by single as well as multiple components, C) has the best ability to stimulate non-CN I intranasal or pathological chemosensory system, D) that odors should be familiar and readily identifiable[2]. (see appendix B for odorants description and preparation).

Procedure:

The sixty (60) subjects rated, in individual hour-long test sessions all of the 60 smell samples, usiing the 60-page questionnaire with the 5-point scale previously mentioned. (see appendix C). To sample an odorant, the subject was taught repeatedly to squeeze and sniff simultaneously as needed so as to answer completely each questionnaire before moving to the next odorant. Returning to previous odors was not allowed.

To control for position response biases of the subjects, the odors were presented randomly. The subjects were allowed to work at their own rate, but each were required to take at least a 10 minutes break halfway through the task.

Statistical Evaluation:

Phase I: Iintrinsic characteristics

All scores were tabulated and summated to some up with a standard odor score (OS). The scores were then divided by the number of subjects to come up with the mean odor score (OSx). Odors with a mean score of 15 and above were considered intrinsically desirable.

Phase II: Extrinsic Variability

Mean odor scores were correlated with extrinsic characteristics (age, and smoking background) to screen out odors easily variable and, therefore, affected by population characteristics causing confounding errors. Correlation test was carried out using Pearson's coefficient test and Point-Biserial test. Significant correlations established at p value of 0.05 was considered confounding and, therefore, extrinsically variable.

RESULTS:

A. Subject profile

Mean Age	Standard Deviation	
Male n=30	24.5	+/-1.25
Female n=30	26.7	+/-1.09

Phase I and Phase II exerciss in experiement I failed to eliminate odors screened previously by the author. Figure 2 shows that all odors were within desired intrinsic characteristic, as subjectively perceived by the population sample, thus its inclusion. Figure 3 shows that none of the odors had significant correlation with age and smoking history, which do not influence recognition of the odor stimulus.

EXPERIMENT II: IDENTIFIABILITY

1. To established which among the previously tested odors would consistently be identified by normal subjects in a multiple choice response situation where response alternatives were provided.
2. To eliminate stimuli which were not correctly responded by normal subjects from inclusion in the final version of the - SIT.

Odors eliminated by both instrinsic and extrinsic variability were not included in the second experiment.

Subjects:

Two hundred sixty four (264) subjects with a male to female ratio of 1:1, were clinically screened. These comprised the population who would identify the test substances which were screened out from Experiment I. The same orderly fashion was used to present the various stimuli.

Instruments:

A printed questionnaire with multiple choice options was given to each subject. Outright

identification was made by checking the lettered item perceived to correspond to the stimulus presented. (see appendix D).

Odorant Presentation Format

The order of presentation of the odors was determined randomly with the subject choosing 3 other alternatives determined by lottery,

Procedure:

Each subject was instructed to complete the printed questionnaire. Instructions that were not understood were clarified. Following completion of the test, the answer sheet was checked to ensure that all items had been answered.

Although the test could be self-administered, in most case, an enumerator administered the test in all cases to eliminate bias. The response alternatives were read clearly and audibly to the subject both before and during the sniffing of each stimulus, which was held directly underneath the subject's nose.

Statistical evaluation:

Difference in frequencies of those correctly and incorrectly identified each odor as distinguished between sexes was tested using Chi-square with significant differences established at p value of 0.05, and therefore rendered variably identifiable. All odors with significant differences were then eliminated from the odor panel.

Results:

Correct and incorrect proportions were measured and their difference were tested using Test of Proportion. Odors with significant differences as represented by p value greater than 0.05 were considered, as variably identifiable.

The following odors being variably identified: Menthol, Coffee, Ginger, Root beer, lemon, Ammonia, Gunpowder, Mosquito coil, Guava, Mango, Thinner, Cinnamon, Grape, Pine, they were thus eliminated from the odor pool. The remaining 45 odors comprised the final stimuli for the - SIT (See appendix G for final list)

Experiment III: DECAY Potential:

The purpose of Experiment III was to quantitatively determine the test-retest reliability (after 4 weeks between test administration fo the -SIT in a group of subjects composed of persons with no known olfactory dysfunction.

Subjects & Procedures:

Twenty (20) subjects (10 males and 10 females with a mean age of 29 years) were selected from our subjects population for retesting of the - SIT odorants at an interval of one week for at least four weeks from the time of their initial test.

Odors included from Experiment II were tested on 20 individuals. Coded bottles containing the odor (one week old) stimuli were randomly presented to the population pool by blinded individual. (see appendix E) After which, decoding was done to identify odors that were correctly identified. This procedure was done at 1 week, 2 weeks and 3 weeks after the initial testing.

Statistical Evaluation:

Serial McNemar test was done to detect significant changes in the proportion of indiividuals correctly identifying the odor stimuli at 1 week, 2 weeks and 3 weeks after initial testing.

Results:

After tabulating the results, no significant change in the identifiability of the test substances was noted at 1,2,3 weeks after the initial testing. (see apppendix F)

Experiment IV: Clinical Application:

1. to evaluate the utility of the - SIT in discriminating between persons with and without olfactory dysfunction

   Group A - Normal
   Group B - Pathological

Subjects and Procedures:

The - SIT was administered to two groups of subjects. These groups, along with the rationale for the testing are described in detail below.

A. *Persons with normal olfactory sensation and no known disease states.*
   This group of subject were comprised of the study population described in Phase II except those greater than 65 years old. This consisted of 35 individuals. Persons older than 65 years of age were omitted because of a disproportionate number of evidenced anosmia or other forms of olfactory pathology.
B. *Persons with olfactory dysfunction*
   This group of subjects comprised of 35 subjects with known olfactory dysfunctiion as gauged by the physical examination and history. This group

consisted of persons over 65 years old, persons complaining of anosmia secondary to head trauma, viral infection, anterior craniotomy, sinusitis, nasal polyposis, and frontal lobe tumors.

Scoring: Odors included in Experiments II and III were included in Experiment IV. Arbitrary individual scores for each odor were derived by dividing the probablity value of each odor with the total probability of all odors then multiplied by 100. These scores would give a summation of one hundred. (See appendix H)

Statistical Evaluation:

Scores of pathological and non-pathological samples were analyzed using Independent T-test at p value of 0.05. Distribution curves of the sampling block were measured to identify overlap levels or "gray zone" for the 2 population based on the mean standard deviation and skewdness of the samples. Predictive values were established with the delineated scores.

DISCUSSION:

The prevalence of disorders of olfaction is not known. Published foreign data by the national Geographic Society, in association with the Monnell chemical Senses Center, has shown that 1.2% of 1.5 million respondents to a smell survey reported a permanent smell loss.[8] Surveys, however, have considerable selection bias and precludes generalization tot he entire population. Several investigations in the past noted anosmia rate of 7.2% in head injury patients and as high as 20.3% in patients with nasal sinus disease.[9] Local data on anosmia rate is lacking but based on unpublished data from a Department of Otolaryngology, 12% of 15,000 patients presented with smell disturbances.

Although many clinicians might continue to dismiss the relative importance of a chemosensory problem, one has only to see a few of these patient to realize the devastating effect it has on the quality of life. Olfaction serves as a warning system for such things as spoiled foods and escaping gas. Patients become unsure about their own body odor and the appropriate use of cologne, and, actually, can become socially insecure. The most difficult problem, however, is the daily appreciation of food, and, in fact, patients may suffer nutritional impairment actually avoiding food or may turn to excessive use of salt or sugar to offset flavor loss, which can aggravate other medical problems as well.[11]

Unfortunately, clinical Otolaryngologists have limited means to confirm and diagnose these problems. Tests using sophisticated quantitative instruments such as air-dilation olfactometers and quantitative threshold test have been developed in the past. But these tests are too expensive, complex and time-consuming for routine use.[1,2,6,7,8] Doty and colleagues developed a relatively simple "scratch and sniff" test marketed under the title of UPSIT, and acronym for University of Pennsylvania Smell Identification Test.[3,5] The clinical applicability of the UPSIT on the Filipino patient, however, is impractical as it presents test items that are totally foreign, and, thus, probably inappropriate for the Filipino patient. Moreover, while UPSIT can be self administered, it's rather expensive as it costs about US$30 per test. The development of this Smell Identification Test grew out of the realization that there is a need for standardized test for olfactory dysfunction suitable for the local setting. Smell testing involves the preparation of odors and delivery of an odour stimulus and the assessment of the response of the olfactory system. This assessment may either be by some form of objective measurements of the physiological events produced by the process of olfaction, or it may be by recording the patient's subjective response. Recording of olfacto-pupillary and olfacto-respiratory reflexes and measurement of cardiovascular changes in response, that is by actually naming the odor stimulus, is much more practical and clinically applicable olfactory tests. Several points deserve emphasis. First, there are several variables that affect the identification of an odor stimulus ranging from the extrinsic to the intrinsic characteristics of the stimulus. It has been emphasized from previous studies that age, sex, and history of smoking affect the olfactory function.[5,6] Moreover, the intrinsic characteristics of the stimulus such as familiarity, pleasantness, intensity, coolness-warmth, and irritablity greatly affect the relative identifiability of the stimulus. Thus, in the choice of odor stimuli to be used in olfactory testing, it is necessary that these mentioned variables be considered and corrected. A method has been devised wherein all these factors are corrected for and a method was also formulated wherein age, sex, and smoking history were taken into consideration. The result of course is a list of 45 out of 60 odor stimuli. It must not be surprising that common stimuli such as coffee, menthol and tobacco were not included in this final list because these odorants perform poorly in discriminating patients with normal olfactory function from those with abnormal olfactory function. Furthermore, because all other variables are already corrected for to start with, the - SIT is a straightforward test as it no longer needs a normative data for age/sex unlike the UPSIT.

Second, that the odorants must be presented in a convenient manner and at a concentration well above the threshold concentration at which it can be detected and recognized by normal individuals. The odorants were presented in a standardized manner using the "squeze-bottle" technique making it simple, and, at the same time, delivering suprathreshold concentration of the test stimuli.[1,2,11] Such presentation can be used repeatedly to different patiients, making the test cheaper than UPSIT which can be used only once. However, such presentation makes the administration of the test less convenient than UPSIT.

Third, the task of actually naming odors, even very familiar ones, presents a challenge quite independent of any impairment of smell itself. Sumner used four well-known smell to investigate 200 subjects without olfactory complaints and found out that only two-thirds of his subjects could name three or more of the four bottles correctly.[9] By employing a multiple choice procedure; the patient is given a number of alternative identifications for each smell bottle.[5,6] Fourth, the patient's ability to identify the odor depends on the odor's familiarity and characteristics. Thus a scoring was devised in such a way that each odorant unique in itself may have an individual score based on its familiarity and characteristics. Such point system made this study different from the UPSIT. The summation of these individual scores were used to discriminate those who are normosmic from those who are anosmic. Normal individuals score more than 90; anosmics score less than 70. It has to be emphasized that the -SIT was used to quantitative overall bilateral olfactory function, in contrast with the test administered by the Connecticut Chemosensory Clinical Research Center. Bilateral olfactory testing was done because (a) many patients do not notice subtle unilateral problems of olfactory dysfunction involve both nostrils; (b) many patients do not notice subtle unilateral problems of olfactory function, and (c) the periodic changes in nasal airflow from one nostril to the other make such unilateral determinations problematical in some individuals.[1]

The development of this -SIT gives us now a simple, inexpensivve and objective test to detect olfactory dysfunction. The test has been shown to clearly differentiate between persons with normal olfactory ability and well-documented group of persons with olfactory dysfunction.

SUMMARY AND CONCLUSION

The development of a standardized olfactory test which we call the -Smell Identification Test (-SIT) have been described. Chosen objectively were 45 odorants out of the original 60 odorants for inclusion in the final test odorants. Individual scores have been assigned to each odorant and the summation of these scores serve to discriminate those with normal olfactory function from those with well-known olfactory problems. This study shows that normal subjects provide a score of more than 90 and anosmics less than 70.

RECOMMENDATIONS

The study on -SIT is an ongoing study. While this paper merely describes the development of -SIT, future investigations must focus on its clinical validation in a larger scale of population.

APPENDIX A - LIST OF ODORANTS

- SIT IDENTIFICATION TEST

ODORANTS:

1.	Orange	31.	Mothballs
2.	Vanilla	32.	Onion
3.	Lemon	33.	Alcohol
4.	Banana	34.	Durian
5.	Melon	35.	Merthiolate
6.	Buko	36.	Pepper
7.	Pineapple	37.	Paint
8.	Grape	38.	Bagoong
9.	Caramel	39.	Strawberry
10.	Cinamon	40.	Floor wax
11.	Chocolate	41.	Laurel
12.	Coffee	42.	Mango
13.	Tobacco	43.	Hot sauce
14.	Liquor	44.	P. Butter
15.	Gunpowder	45.	Motor oil
16.	Almond	46.	Catsup
17.	Vinengar	47.	Kerosene
18.	Soy Sauce	48.	Betadine
19.	Lime	49.	Tea
20.	Guyabano	50.	Garlic
21.	Menthol	51.	Cola
22.	Thinner	52.	Pine
23.	Insecticide	53.	Rugby
24.	Ginger	54.	Rootbeer
25.	Mustard	55.	Lysol
26.	Patis	56.	Detergent
27.	Vitamins	57.	Chico
28.	Apple	58.	Mosquito coil
29.	Ammonia	59.	Rose
30.	Guava	60.	Sampaguita

APPENDIX B: Preparation of test Odorants

Preparation:

Test subtances were contained in 120 ml. capacity squeezable polythelene coded bottles with flip top cap covered with green cloth and numbered accordingly.

Smeel Bottle Number	Odor	Contents
1	orange	30 ml. of orange concentrate
2	vanilla	30 ml. of vanilla concentrate
3	lemon	30 ml. of lemon concentrate
4	banana	30 ml. of banana concentrate
5	melon	30 ml. of melon concentrate
6	buko	30 ml. of buko concentrate
7	pineapple	30 ml. of pineapple concentrate
8	grape	30 ml. of grape concentrate
9	caramel	30 ml. of caramel concentrate
10	cinamon	30 gm. of Country Side sinamon potpouri shavings
11	chocolate	30 ml. of Mccormick choco conc.
12	coffee	30 ml. of Nescafe coffee powder
13	tobacco	tobacco shreds of 2 winston cig.
14	liquor	30 ml. of remy Martin brany
15	gunpowder	gunpowder content of 2 triangulo
16	almond	30 ml. of Alsa almond gelatin flavored
17	vinegar	30 ml. of Datu Puti Vinegar
18	soy sauce	30 ml. of Silver Swan soy sauce
19	lime	30 ml. of lime juice
20	guyabano	30 ml. of Katas guyabano conc.
21	menthol	30 ml. of Vicks Vaporub
22	thinner	30 ml. Boysen paint thinner
23	insecticide	30 ml. of Nuvan insecticide
24	ginger	30 gm. of crushed ginger
25	mustard	30 ml. of McCormick mustard
26	patis	30 ml. of Lorins patis
27	cough syrup	30 ml. of Loviscol cough syrup
28	apple	30 ml. of apple scented sham.
29	ammonia	10 ml. of pure ammonia dil. with 20 ml. of water
30	guava	30 ml. of guava concentrate
31	mothballs	5 pcs of naphthalein balls
32	onion	30 gm. of diced onion
33	alcohol	30 ml. of Green Cross 70% rubbing alcohol
34	durian	30 gm. of durian candy bar
35	merthiolate	30 ml. of Hizon Lab. Merthiolate
36	pepper	30 gm. of ground black pepper
37	paint	30 ml. of white Boysen Paint
38	bagoong	30 ml. of bagoong
39	strawberry	30 ml. of strawberry scented hand lotion
40	floor wax	30 ml. of Johnson wax
41	laurel	3 dried leaves of laurel
42	mango	30 ml. of Katas mango concentrate
43	hot sauce	30 ml. of Mother's Best hot sauce
44	peanut butter	30 ml. lady's Choice peanut butter
45	motor oil	30 ml. Caltex motor oil
46	catsup	30 ml. of Del Monte catsup
47	kerosene	30 ml. of Petron kerosene
48	betadine	30 ml. of Pacual lab. povidone iodine
49	tea	30 ml. of Lipton tea in 10 ml. of water
50	garlic	3 cloves of garlic
51	cola	30 ml. of coke
52	pine	30 gm. of Country Side pine potpouri shavings
53	rugby	30 ml. of rugby
54	rootbeer	30 ml. of Fanta rootbeer
55	lysol	30 ml. of lysol
56	detergent	30 ml. of Tide ultra powder
57	chico	30 gm. of diced chico
58	katol	1 coil of elephant brand mosquito coil
59	rose	30 gm. of Country Side Rose potpouri shavings
60	sampaguita	30 ml. of Country Side sampaguita concentrate

APPENDIX C: Experiment 1 - Questionaire

- SIT IDENTIFFICATION TEST

PATIENT NO. _____

NAME: _____

AGE: _____ SEX: _____ S _____ NS _____

PLASTIC BOTTLE NO. _____

PLEASE RATE THE ODOR ACCORDING TO THE FOLLOWING PARAMETERS:

I. PLEASANTNESS:

1——2——3——4——5
VERY UNPLEASANT VERY PLEASANT

II. INTENSITY:

1——2——3——4——5
VERY WEAK VERY STRONG

III. COOLNESS-WARMTH

1——2——3——4——5
VERY COOL VERY WARM

IV. IRRITATING:

1——2——3——4——5
VERY IRRITATING NON-IRRITATING

V. FAMILIARITY

1——2——3——4——5
VERY UNFAMILIAR VERY FAMILIAR

APPENDIX G - FINAL LIST OF ODORANTS

- SMELL IDENTIFICATION TEST

ODORANTS:

1.	Orange	16.	Thinner	31.	Laurel
2.	Vanilla	17.	Insecticide	32.	Hot sauce
3.	Banana	18.	Mustard	33.	Peanut butter
4.	Melon	19.	Patis	34.	Motor oil
5.	Pineapple	20.	Vitamins	35.	Catsup
6.	Caramel	21.	Apple	36.	Kerosene
7.	Chocolalte	22.	Mothballs	37.	Betadine
8.	Tobacco	23.	Onion	38.	Tea
9.	Liquor	24.	Alcohol	39.	Garlic
10.	Almond	25.	Durian	40.	Cola
11.	Vinegar	26.	Merthiolate	41.	Rugby
12.	Soy Sauce	27.	Pepper	42.	Lysol
13.	Lime	28.	Paint	43.	Chico
14.	Guyabano	29.	Bagoong	44.	Rose
15.	Floor wax	30.	Strawberry	45.	Sampaguita

APPENDIX H - ARBITRARY SCORES

- SMELL IDENTIFICATION TEST

ODOR	p VALUE	SCORE	ODOR	p VALUE	SCORE
1	.1120	.5	24	.1052	.5
2	.3342	2.0	25	.1794	1.0
3	.9094	4.0	26	.3685	2.0
4	.2501	1.0	27	.7059	3.0
5	.3685	2.0	28	.8913	4.0
6	.3020	1.5	29	.1388	.5
7	.4645	2.0	30	.8870	4.0
8	.8870	4.0	31	.2468	1.0
9	.3139	2.0	32	.3452	2.0
10	.4870	2.5	33	.4897	3.0
11	.7267	3.0	34	.2414	1.0
12	.4897	3.0	35	.2972	1.5
13	.1835	1.0	36	.8715	4.0
14	.1661	1.0	37	.7500	4.0
15	.7475	3.0	38	.6405	3.0
16	.1388	.5	39	.2006	1.0
17	.8938	4.0	40	.3348	2.0
18	.9654	4.0	41	.2528	1.5
19	.9802	4.0	42	.8349	4.0
20	.0951	.5	43	.8154	4.0
21	.5990	2.5	44	.0723	.5
22	.0993	.5	45	.7023	3.0
23	.1664	1.0			

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COST-EFFECTIVE SINUS SCAN (CESS), AN ALTERNATIVE TO COMPUTED TOMOGRAPHY SCAN FOR SINUSITIS*

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OBJECTIVES

1. to compare the yields in detecting anatomic landmarks and diseased areas in sinusitis patients using direct coronal computed tomography sections focusing on the Ostiomeatal Unit (Alternative Scan) against the Standard 3 mm interval cuts, with emphasis on cost-effectiveness analysis.
2. to determine if the alternative technique of computed tomography scan will be less expensive than a standard scan, yet retaining a high yield of optimal information.

DESIGN

Clinical health economics cross sectional study (Cost-effectiveness analysis)

SETTING

Tertiary care hospital

MATERIALS

Plain direct coronal computed tomography sections focusing on the Ostiomeatal Unit versus Standard scan (3 mm interval cuts) of 15 patients with sinusitis.

RESULTS

1. Yield of the Alternative Scan against the Standard 3 mm interval coronal CT of the paranasal sinuses was 96.9%.

2. Cost-effectiveness ratio of the Alternative Scan was P 6.19/item detected, which was P 9.81 less than that of the Standard 3 mm interval scan.

3. Standard 3 mm interval scan, with an additional 3.1% yield compared to the Alternative Scan, will mean an incremental cost of P 322.58 per extra item detected.

CONCLUSION

The Alternative Scan, with its high yield and low cost-effectiveness ratio, is recommended for evaluation of the paranasal sinuses. It remains the prerogative of the clinician to request a complete scan if needed.

INTRODUCTION

When the first results from a prototype Computed Tomography (CT) scanner came out more than 2 decades ago in England, the major response was that of cyanical indifference.[1] This same reaction can still be perceived here in the Philippines, particularly if CT is used for evaluating benign conditions, such as sinusitis.

It should be emphasized though, that, presently, the capabilities of current generation scanners[2,3,4,5,6] have been so greatly refined, such that in developed countries, CT is gradually replacing standard plain radiography as the initial imaging modality of choice. Documentation of subtle nuances in mucosal disease and anatomical variations of the nasal and paranasal pathway can speel a big difference in the management of recalcitrant sinusitis. Plain films only allow visualization of gross disease, particularly of the bigger sinuses such as the frontal and maxillary sinuses. Still, many clinicians content themselves with standard plain films which studies have shown to be inferior.[5,6,7,8,9]

Rhinologists now are interested primarily in details of the Ostiomeatal unit (OMU).[8,10,11,12] CT provides a clearer and more revealing picture of these structures.[3,5,8,13,14,15,16] With proper identification of the pathology, radical sinus surgery can be obviated since only concerned diseased areas are addressed. Furthermore, as in any kind of surgery, complete information regarding the anatomy keeps surgical complications to a minimum. With CT scan, areas of high risk can be easily identified. These are not seen with plain radiography.

* First prize, Boehringer-Ingelheim Clinical Research Contest, Midtown Hotel, September, 1993.

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Inspite of the vast information provided by CT, its use is limited in developing countries mainly due to the expense involved. In Metro Manila, a complete CT of the paranasal sinuses costs from P3000 to P5000. Such astronomical expense may mean too much for the average Filipino patient. If costs can be lowered without sacrificing detail and information, this will be welcomed by all, considering the benefits obtained.

One way of cutting down the expense is by reducing the number of CT sections. In a preliminary study, the authors noted that most of the important information provided by CT were mainly from the OMU, where the sections comprise about 50% of a complete scan. In essence, some interval cuts may then be omitted without altering results significantly. Other authors have even recommended reducing scans to as low as 4 to 12 sections.[17,18,19,20] With this in mind, this paper aims to propose a scanning technique analyzed via cost-effectiveness principles. And with judicious use of limited resources, the opportunity to use them in another potentially productive way will not be lost.

MATERIALS AND METHODS

I. DATA GATHERING

Patients above 15 years old seen at the Out-patient Department manifesting clinical signs and symptoms of sinusitis were evaluated. The sinusitis triad[21] was used as screening criteria:

1. nasal obstruction or stuffiness
2. pathologic secretions (purulent, mucoid or serous)
3. headache or tenderness localized to sinuses

The following were excluded:

- patients with bleeding disorders
- patients with congenital defects
- patients with endocrine disorder
- patients with malignancy
- patients with skeletal disorder
- patients with previous surgery to paranasal sinuses
- patients with previous trauma to paranasal sinuses

Complete rhinologic and endoscopic examination was done. Those with anatomical variations and local disease where surgery was contemplated were subjected to a complete direct coronal CT scan of the paranasal sinuses. CT was done only when the patient was not suffereing from an acute attack so active inflammation would not interfere with visualization of basic pathologic changes in key areas.

CT technique was modified from the method of SJ Zinreich:[5,8,22]

POSITIONING	: prone, head hyperextended
PLANE	: direct coronal
DEPTH	: frontal to sphenoid sinus
GANTRY ANGULATION	: perpendicular to Infraorbitomeatal line
MATRIX	: 512 X 512
SLICE THICKNESS	: 3 mm
TABLE MOVEMENT	: 3 mm increments
SCAN TIME	: 2-5 seconds
WINDOW	: + 1,500 to 2,000 HU
CENTER	: - 150 HU
ZOOM FACTOR	: 4-6
RADIATION LEVEL	: 125 kV, 450 mAs

Since each patient has 2 sides (right and left) which are independent of each other available for study, each side was treated as a set. Therefore, total number of sets of series of CT sections analyzed was computed as follows:

$$N = \text{No. of patients} \times \text{2 sides (left \& right)}$$

Readings were based on the following (adapted from Jorgensen):[23]

I. IDENTIFIABLE LANDMARKS:

A. Frontal Sinus
B. Frontal Recess
C. Nasolacrimal Duct
D. Agger Nasi
E. Uncinate Process
F. Ethmoidal Infundibulum
G. Hiatus Semilunaris
H. Cribriform Plate
I. Lamina Papyracea
J. Anterior Ethmoid Labyrinth
   Bulla
   Lateral Sinus
K. Posterior Ethmoid Labyrinth
   Onodi's Cell
L. Maxillary Antrum
   Ostium
   Haller's Cell
M. Sphenoethmoidal recess
N. Sphenoid Sinus
   Vidian Nerve
   Optic Nerve
   Poramen Rotondum
   Internal Carotid Artery
O. Skull Base

II. DISEASED AREAS:

A. Frontal Sinus:
   Opacification
   Hypoplastic
B. Frontal Recess:
   Occlusion
C. Agger Nasi:
   Opacification
D. Uncinate Process:
   Medially Bent
E. Ethmoidal Infundibulum:
   Occlusion
F. Hiatus Semilunaris:
   Occlusion
G. Anterior Ethmoid Labyrinth:
   Opacification
   Bulla:
      Mid. Turb. Contact
   Lateral Sinus:
      Occlusion
   Polyp
H. Posterior Ethmoid Labyrinth
   Opacification
   Onodi's Cell:
      Ofacification
I. Maxillary Antrum:
   Polyp
   Opacification
   Ostial Occlusion
   Fluid
   Haller's Cell:
   Opacification
J. Middle Turbinate:
   Hypertrophy
   Concha Bullosa
   Paradoxical Curve
K. Inferior Turbinate:
   Hypertrophy
L. Nasal Septum:
   Deviation:
      Superior
         Mid. Turb. Contact
      Middle
         Mid. Turb. Contact
      Inferior
         Inf. Turb. contact
M. Sphenoethmoidal Recess
   Occlusion
N. Sphenoid Sinus:
   Opacification

Using the above as a checklist, the reader determined whether the landmarks were identifiable, and if it were diseased or normal. Two readers were assigned: a radiologist and an otorhinolaryngologist. Interobserver reliability was determined.

The complete scan was interpreted first.

Then, on a separate day, from the complete scan, the alternative technique was presented as follows. Using the lateral scout planogram as a guide, consecutive 3 mm sections were chosen starting from the posterior table of the frontal sinus up to the posterior edge of the last anterior ethmoid cell. Three additional sections were included: one each across the middle of the frontal, posterior ethmoid and sphenoid sinuses. The rest of the complete scan were not included for analysis.

The alternative scans were then compared to the corresponding standard scans (Control) as follows:

$$\text{Yield} = \frac{\text{Number of (+) items detected (Alternative Scan)}}{\text{Number of (+) items detected (Standard/Control)}}$$

Average yield was computed as follows:

$$\text{Average Yield} = \frac{\text{Yield}_1 + \text{Yield}_2 \ldots + \text{Yield}_N}{N}$$

DISCUSSION:

Current thought on the pathogenesis of sinusitis center on the role of the Ostiomeatal unit (OMU).[8,10,11,12,21,24,25] This refers to the area of the middle meatus (Figure 1), bounded medially and anteriorly by the middle turbinate, anteriorly by the uncinate process, laterally by the inferomedial surface of the orbit, and posteriorly by the ethmoidal bulla.[24] Obstruction in the OMU, whether inflammatory or structural in origin, results in alteration of mucociliary clearance of the other sinuses, which later becomes a focus of infection.

CT, due to the absence of overlapping structures, provides a superior and versatile picture of the OMU. Additional information of relationships to vital structures (cribiform plate, vidian nerve, optic nerve, foramen rotondum, internal carotid artery, etc.) which may cause complications in surgery are also obtained.[3,5,8,14,15,16,26]

II. ECONOMIC ANALYSIS:

A. Costing:

Let total direct cost per processed plate (PP),

$= z = a + b + c + d + e + f + g$

where

a = cost of blank plate = P30.00/PP (8 x 10)

b = wear and tear of CT machine

$$= \frac{\text{present acquisition cost of machine}}{\text{no. of plates processed/day} \times \text{no. of working days/year} \times \text{Annualization Factor*}}$$

$$= \frac{\text{P } 15{,}000{,}000}{100 \times 302 \times 3.3522}$$

= P 148.20/PP

c = wear and tear of rapid film processor

$$= \frac{\text{present acquisition cost of machine}}{\text{no. of plates processed/day} \times \text{no. of working days/year} \times \text{Annualization Factor*}}$$

$$= \frac{\text{P } 400{,}000/\text{PP}}{100 \times 302 \times 3.3533}$$

= P 4.95/PP

$$d = \text{cost of developer} = \frac{\text{cost/38 liter container}}{\text{no. of plates processed/day} \times \text{no. of days/container consumed}}$$

$$= \frac{\text{P } 1{,}5000.00}{100 \times 10}$$

= P 1.50/PP

* From Drummond: Factor at 15% discount rate over 5 years

$$e = \text{cost of fixer} = \frac{\text{cost/38 liter container}}{\text{no. of plates processed/day} \times \text{no. of days/container consumed}}$$

$$= \frac{\text{P } 850.00}{100 \times 10}$$

= P 0.85/PP

f = cost of labor for plate processing

$$= \frac{\text{Daily salary of radiology technician} \times \text{No. of technicians in 3 shifts}}{\text{No. of plates processed/day}}$$

$$= \frac{\text{P } 150.00 \times}{100}$$

= P 4.50/PP

g = cost of labor for consultant reading plate

$$= \frac{\text{Daily salary of Radiologist} \times \text{No. of Radiologist in one day}}{\text{No. of plates processed/day}}$$

$$= \frac{\text{P } 185.00 \times 2}{100}$$

= P 3.70/PP

Therefore,

z = 30.00 + 148.20 + 4.95 + 1.50 + 0.85 + 4.50 + 3.70

= 193.70 or roughly P 200.00/processed plate

N.B. Excluded from the costing were use of building, land, light, water, administration and other overhead costs.

A complete 3 mm scan averages 30 sections in paranasal imaging. Since 4 sections are reproduced in an 8 x 10 plate, then 8 plates are used in a complete scan. Therefore, total direct cost per scan, or Z = P200.00 x 8 + P1,600.00.

Since about 12 sections comprised the alternative scan, three 8 x 10 plates would be used. Therefore, cost of alternative scan, or x = P200.00 x 3 = P600.00.

B. COST EFFECTIVENESS RATIO:

$$\text{Cost-effectiveness ratio} = \frac{\text{Cost}}{\text{Yield}}$$

e.g.

(X) Alternative Scan	(Z) Standard Scan
If yield of X = 90%	If yiled of Z = 100%

then,

$$\frac{\text{P 600}}{90} = \text{P 6.67/ item detected} \qquad \frac{\text{P 1,600}}{100} = \text{P 16.00/ item detected}$$

C. INCREMENTAL COST ANALYSIS:

$$\text{Incremental cost} = \frac{(\text{Cost Z}) - (\text{Cost X})}{(\text{Yield Z}) - (\text{Yield X})}$$

e.g.

	Z (Standard)	X (Alternative)	Incremental
Cost			
Cost	P 1600	P 600	P 1000
Yield	100%	90%	10%
			P 100.00/ extra information obtained

RESULTS:

15 patients, 8 males and 7 females, with ages ranging from 20 to 53 years and a mean of 36.4 years, were studied. Therefore, a total of 30 sides were available for analysis. Table A shows the frequency of symptoms of the 15 patients.

TABLE A

DISTRIBUTION OF SYMPTOMS
N = 15 patients

Headache	13
Nasal obstruction	12
Nasal discharge	10
Nasal pain	8
Posterior nasal drip	6
Facial pain	2

The difference in the yields of both scans was noted to be minimal at 3.1%, with both readers, an otorhinolaryngologist and a radiologist, having good agreement beyond chance (TABLE B).

Since the alternative scan costs less, a corresponding decrease in the Cost-effectiveness Ratio was also note, with a difference of almost P10.00 between both scans. Incremental Cost Analysis showed that P322.58 would be needed to detect 1 more item if the complete scan were preferred over the alternative scan (TABLE C).

TABLE B

COMPARISON OF YIELDS OBTAINED BETWEEN RADIOLOGIST AND OTORHINOLARYNGOLOGIST

	YIELD 1 [%]	YIELD 2 [%]	KAPPA VALUE [%]
GROUP			
Z (standard 3 mm cuts)	100	100	72.6
X (alternative)	96.9	96.0	79.8
DIFFERENCE	3.1%	4.0%	

YIELD 1 : OTORHINOLARYNGOLOGIST'S READING
YIELD 2 : RADIOLOGIST'S READING
KAPPA VALUE : INTEROBSERVER RELIABILITY TEST

Excellent agreement	$\geq$ 80%
Good agreement	60% < 80%
Fair agreement	= 60%
Poor agreement	< 60%

TABLE C

COST-EFFECTIVENESS RATIOS AND INCREMENTAL COST ANALYSIS OF THE STANDARD AND ALTERNATIVE SCANS

	COST	YIELD (ENT-HNS'S)	COST-EFFECTIVENESS RATIO (Peso/Item detected)	INCREMENTAL COST ANALYSIS (Peso/extra item detected)
GROUP				
Z (standard 3 m cuts)	P1600	100%	P16.00	P322.58
X (alternative)	600	96.9%	6.19	
DIFFERENCE	P1000	3.1%	P 9.18	

LEGEND:

ENT-HNS: OTORHINOLARYNGOLOGIST

Inspite of these overwhelming advantages, CT scan of the paranasal sinuses is not a usual work-up ordered by the Filipino physician. The obvious reason is the expense involved, with a complete scan ranging from P3000 to P5000. This study was undertaken to look for a better alternative in order to maximize the benefits from CT. Cost-effectiveness analysis was applied to properly evaluate this proposed alternatives.

In a preliminary study of consecutive complete coronal CT of the paranasal sinuses, the distance from the posterior table of the frontal sinus to the posterior edge of the last anterior ethmoid cell was noted to average 25 mm. This finding was comparable to the study by **Chiong**, et al. where the average length of the Hiatus Semilunaries in Filipino cadavers averaged 17 mm.[27] Therefore, at 3 mm intervals, the entire OMU would use up not more than 9 cuts only. In actuality, it is these O.M.U. cuts which will matter the most, since most disease areas identifiable by CT are concentrated here.[19,20,26]

In this study, the alternative scan approached closely the yields of the standard 3 mm intervals at 96.9%. By concentrating on the OMU, no significant amount of information was lost, and by limiting the frontal, posterior ethmoid and sphenoid sinus to one cut each, redundant data from superfluous cuts may be omitted. Thus, the cost have been drastically reduced without compromising important details.

The reduced number of sections consequently lowered the cost-effectiveness ratio of the alternative scan. However, there is inherent danger in simplistic interpretation of ratios. Efficiency may have been sacrificed in favor of cost containment.

Would it be acceptable to use an apparently cost-effective alternative which has a lower yield?

For rhinologists familiar with the pathogenesis and the delicate complexity of the area, the value of absolute information is inarguable. Many time, inadequate pre-operative assessment or unfamiliarity with the area result in disastrous complications.[8,25,27,28] Each point evaluated (CT checklist) is as important as the next one, such that too much loss of information would be detrimental.

Therefore, the relatively small difference in yields between the alternative scan with the standard 3 mm cuts, should lead us to raise the question whether the additional yield of 3.1% is worth the extra cost. To determine this, incremental cost analysis was done.

Computations showed that an additional P322.58 will be needed for every extra item that would be detected. Is it worth paying the extra incremental cost to detect additional details? The practical answer would be no. However, it remains the prerogative of the clinician to request a complete scan if needed, particularly in instances such as recalcitrant cases and suspected tumors.

In the end, by using the alternative scan, the considerable savings acquired (P1,500 to P2,500) will then be available for other necessities.

For the above practical but prudent reasons mentioned, the authors contend that the alternative scan contains enough information to warrant consideration as the imaging modality of first choice.

CONCLUSION:

1. Yield of the Alternative Scan against the Standard 3 mm interval coronal CT of the paranasal sinuses was 96.9%.

2. Cost-effectiveness ratio of the Alternative Scan was P6.19/item detected, which was P9.81 less than that of the Standard 3 mm interval scan.

3. Standard 3 mm interval scan, with an additional 3.1% yield compared to the Alternative Scan, will mean an incremental cost of P322.58 per extra item detected.

4. The Alternative Scan is less expensive, yet retains a high yield of optimum information. Thus, it is recommended for evaluation of the paranasal sinuses, hereby to be name Cost-effective sinus Scan (CESS).

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THE ACCURACY OF FINE NEEDLE ASPIRATION BIOPSY IN THE DIAGNOSIS OF THYROID CANCER*

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ABSTRACT

A total of 595 patients with FNAB studies from 1986 to 1991 underwent thyroidectomy in our center. Histopathological diagnoses were obtained. The sensitivity rate of FNAB in the diagnosis of thyroid malignancy is only 53.2% compared to the high values reported worldwide. The overall accuracy rate of FNAB, however, for both benign and malignant lesions of the thyroid is 93.1%. Limitations of the procedure include sampling errors, indeterminant cytology and experience of the cytopathologist. As a screening test for detection of malignancy, FNAB is less reliable than is widely accepted. It is an adjunct to management rather than a definitive test.

INTRODUCTION

A thyroid nodule is a common presentation of thyroid disease. Benign thyroid disease is extremely common compared to a small proportion of malignant neoplasms which can also present clinically as thyroid nodule. It is, therefore, important to identify this malignant tumor which requires immediate surgical intervention.

In our institution, fine needle aspiration biopsy (FNAB) is a procedure routinely used to differentiate benign and malignant conditions of the thyroid. Many authorities have reported as high as 95% accuracy rate with this technique.[1-6] In our experience, however, a certain number of patients with benign preoperative FNAB diagnosis turned out to be malignant postoperatively. This prompted us to undertake this study with the goal of determining the role of FNAB in the diagnosis of thyroid cancer in the local setting.

OBJECTIVES

A. General
To determine the accuracy of FNAB as a diagnostic procedure in thyroid cancer

B. Specific
a) to identify the clinical parameters for suspicion of malignancy
b) to enumerate the primary indications for surgery in patients included in the study group
c) to determine the sensitivity, specificity and accuracy rate of FNAB as a diagnostic tool in the diagnosis of thyroid cancer

MATERIALS AND METHODS

A total of 1,711 patients from 1986 to 1991 were admitted in our department for surgical management of nodular goiter. The medical records of these patients were reviewed for the purpose of this study. Five hundred and ninety-five patients had FNAB diagnosis and these formed the basis of the study group. Histological confirmation was obtained. A correlation was established between the cytologic findings and post operative pathologic result with the histologic diagnosis from the final paraffin section being the definitive diagnosis.

Fine needle aspiration biopsy was performed with the patient seated in the examining chair with the neck hyperextended. Local anesthesia was not necessary. The skin was cleaned with an antiseptic. A no. 22 or 23 gauge needle attached to a 20 cc disposable syringe was then introduced through the skin into the nodule varying the direction of insertion. Suction was applied by withdrawing the plunger of the syringe, and maintained using the extended thumb. The needle was advanced and withdrawn within the nodule three or four times at various angles, and the suction gently released by detaching the syringe from the needle. The

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* Presented, Boehringer-Ingelheim Clinical Research Contest, Midtown Hotel, September, 1993.

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needle was withdrawn, the material expelled onto glass slides, smears made and fixed using 95% alcohol. The procedure was repeated several times depending on the material obtained. The slides were then submitted to the cytopathologist for staining and analysis. Cytologic diagnoses were grouped into five categories: 1) carcinoma, 2)suspicious for carcinoma, 3) indeterminate, 4) benign, and 5)inadequate.

For the purpose of analysis, cases reported by cytologic examination as suspicious for carcinoma was compiled as diagnostic of that lesion because the effect on therapy was identical. In cases of indeterminate lesions, follicular and hurthle cell tumors were designated in this category since cytologic separation of benign and malignant condition of these entities is often impossible. Cytologic analysis showing pronounced cellular atypia in follicular tumors, however, were considered suspicious for carcinoma.

The following parameters were analyzed:1) sensitivity-the proportion of patient with malignant thyroid disease and positive cytologic findings, 2) specificity-the proportion of patient without malignant thyroid disease and negative cytologic findings, 3) false-positive fraction- the probability of positive cytologic findings in a patient without a malignant thyroid disease, 4) false-negative fraction- the probability of negative cytologic findings in a patient with a malignant thyroid disease, 5) positive predictive value-the probability of having malignant thyroid disease and positive cytologic findings, 6) negative predictive value-the probability that a patient did not have malinant thyroid disease in the presence of negative cytologic findings, and 7) accuracy index- the proportion of correct results (true-positives and true-negatives) in relation to all cases studied.

RESULTS

The results of FNAB (cytologic diagnosis) in the study group of 595 patients is shown in table 1. Fourty nine had repeated aspirations because of unsatisfactory or inconclusive results from the first attempt. Colloid goiter and colloid cyst together comprised 77.8% of the cases. Six cytologic diagnosis were of thyroiditis which included Hashimoto's disease, Riedel's thyroiditis and suppurative thyroiditis. Five patients had toxic goiter described cytologically as nodular hyperplasia. These patients had elevated hormonal levels and treated as such before undergoing operation. Follicular tumor comprise 5.7% of the cases and hurthle cell tumor 1.2%. Follicular carcinomas were those found cytologically to have follicular proliferation with pronounced cellular atypia compared to follicular adenomas. This was seen in ten patients. Twenty eight patients were diagnosed as having papillary carcinoma and was operated on at once for that reason alone.

The primary indication for surgery in all patients is shown in Table 2. The most common indication for surgery was an obvious lump on the throat causing the patient to desire surgery because of cosmetic disfigurement. Thirty one patients who were operated on for this indication had cancer at surgery. Four patients with benign histopathological results were operated on for mechanical indications. Three had mediastinal or substernal goiter and one had vocal cord paresis. Eighteen of 595 patients underwent surgery for clinical suspicion of carcinoma alone. Of these, four turned out to be benign. One patient had hemangiopericytoma which is explained by the fact that this type of tumor is clinically invasive. FNAB diagnosis as an indication for thyroidectomy included carcinoma, suspicion of carcinoma and indeterminate lesions. A total of 106 patients (12.4%) were under this category.

The clinical factors for a suspected malignancy is enumerated in Table 3. The incidence of cancer according to each clinical finding is also presented. The most reliable indicators of malignancy were vocal cord paralysis, tumor fixation, rapid growth and physical characteristics of the nodule. Some overlap exists, as some patients had multiple indicators of malignancy. None of patients had family history of cancer nor history of neck irradiation. This could be attributed to incomplete history taking. Similarly, no distant metastases were reported. Of eighteen patients with lymphadenopathy, only sixteen had malignancies after surgery. The other two patients had reactive lymphadenitis after thyroidectomy with node picking. For the patients with recurrence after previous thyroidectomy, seven cases (29.2%) were found to be malignant.

Final histologic diagnosis of all patients who underwent surgery were obtained from the paraffin-embedded specimens. Frozen section was done in five cases only. Three were benign and two were malignant which were confirmed correctly by routine histopathological specimens.

The postoperative histological conditions of 595 patients who underwent surgery in our institution were then correlated with previous FNAB findings. As shown in the group of 472 patients with negative cytologic findings, twenty-nine had malignant postoperative histologic conditions. Positive cytologic findings were found in thirty-nine patients , six of those had nonmalignant histologic conditions. Within the group of cytologically indeterminate cases of follicular and Hurthle cell tumors, 31 patients had benign and 10 malignant postoperative histologic results.

The evaluation of the procedure, which included only those with positive or negative cytologic findings gave the following results: 1) sensitivity 53.2%, 2) specificity 98.6%, 3) false-positive fraction 1.4%, 4) false-negative fraction 87.9%, 5) positive predictive value 84.6%, 6) negative predictive value 93.8%, and 7) accuracy index 93.1%.

DISCUSSION

An ideal diagnostic strategy for treatment of thyroid nodules is to identify all thyroid carcinomas and allow them to be treated by a single operation without unnecessary extensive surgery for benign disease. The technique of FNAB has been widely used as a triage method to separate thyroid nodules into those that can be followed clinically due to a low suggestion of carcinoma and those nodules requiring immediate operative investigation. It is a simple, safe and inexpensive procedure available for study of thyroid nodules.[3,4,7,8]

Most authorities locally and abroad have reported that FNAB is the most accurate procedure in differentiating benign and malignant thyroid conditions.[1-6] In this study, the FNAB data obtained in a large series of patients was reviewed. Contrary to the reports worldwide, the experience with FNAB showed that it is a highly accurate procedure in evaluation of thyroid nodules but has a low sensitivity for detection of malignancy. The results of the present analysis are therefore disappointing. As a basis of selection for surgical operations of thyroid nodules according to prediction of malignancy, fine needle aspiration cytology is less reliable than is widely accepted. It is not a definitive diagnostic test but it should be used in combination with other diagnostic modalities.

Other diagnostic methods that may be employed include ultrasound, radionuclide scanning, biochemical studies and hormonal suppressive therapy. In a study reported by **Watters** et al, ultrasound can identify the different types of thyroid pathology based on the different ultrasonic features in most cases, although no single feature is pathognomonic.[10] On the other hand, radionuclide scans are useful to demonstrate a "hot" nodule found in autoimmune hyperfunctioning thyroid adenoma.[11,14] This condition is rarely malignant thus preventing needless surgery. An elevated level of thyroid hormones also suggests that the nodule is autoimmune. Thyroid function is usually normal in patients with thyroid carcinoma. The use of suppressive hormonal therapy in the diagnosis and long-term management of thyroid nodules remains controversial. However, **Mazzaferri** et al reported that both FNAB and hormonal therapy are equally sensitive although the latter has a much lower specificity.[9] All of these modalities are complementary and no single technique is diagnostic of malignancy.

Despite the popularity of FNAB,it is subject to both sampling and interpretative errors. Adequate materials must be obtained for a diagnosis and this requires practice and attention to technical details. The usefulness of FNAB is diminished in very small (<1 cm), very large and multiple nodules due to the possibility of a geographic miss.[8] The sample material is therefore not representative of the disease. This may be seen in cases of occult papillary CA or those occuring in a background of colloid adenomatous goiter. Another potential source of error is the expertise of the cytopathologist. FNAB as a diagnostic procedure was introduced only in this center about a decade ago. At present, more experienced cytopathologist to give a more definitive and reliable diagnosis are needed.

The main limitation of this study is the recognized difficulty with follicular and Hurthle cell lesions. There is a widely held opinion that FNAB cannot differentiate benign from malignant follicular and Hurthle cell neoplasms. The cytologic technique fails to document the architectural feature of vascular and capsular invasion. This study showed a 24.4% risk of malignancy in these entities. In this center, patients undergo surgery if the FNAB revealed such findings. An intraoperative frozen section analysis is recommended by several authors to determine the extent of thyroidectomy.[12-13] Although only a few cases are reported in this study, frozen section examination yielded good results. It is useful when labeled positive and can be used with confidence to predict malignancy since false-positive diagnoses are rare.[9,16]

A correlation between the clinical indicators of malignancy and FNAB was also established. Five patients clinically suspected to have malignancy were confirmed histologically. Four had benign FNAB diagnosis and one had inadequate yield. A negative FNAB is, therefore, less reliable when clinical suspicion is high.[8]

Two other indicators for surgery may render FNAB superfluous in some patients. First, cosmetic disfigurement may cause the patient to desire surgery. In this series, 12.4% had cosmetic reasons to mandate surgery. Second, mechanical problems make FNAB unnecessary. Thyroidectomy is justified for all nodules causing symptoms of aerodigestive tract compression. Also, large mediastinal nodules should be removed even when asymptomatic, as approximately 10% are malignant and the remainder carry a small but serious risk of rapid, sudden enlargement that can be life-threatening.[8] It is clear that patients can be selected for thyroidectomy without FNAB.[8,12]

CONCLUSION AND RECOMMENDATIONS

The accuracy of FNAB in the diagnosis of thyroid cancer is lower than widely accepted. It is an adjunct to the management of thyroid nodules but is not a definitive diagnostic test and, in particular, negative results do not exclude neoplastic disease. Other diagnostic methods should be employed for proper evaluation of thyroid nodules. Furthermore, clinical diagnosis and risk factors should be considered to support the validity of the diagnosis. Meticulous preoperative screening to accurately assess the risk of malignancy allows a rational selection of patients for surgery.

Further prospective studies are indicated to define an optimum management policy in the evaluation of thyroid nodules. The technique of FNAB should also be improved to maximize its diagnostic usefulness taking into account the known limitations of the procedure.

Table 1. Results of FNAB in 595 patients

Finding	No. of patients	Percentage
Colloid goiter	396	77.8
Colloid cyst	67	
Thyroiditis	6	1.0
Hurthle cell tumor	7	1.2
Follicular tumor	34	5.7
Follicular Ca	10	1.7
Papillary Ca	28	4.7
Toxic goiter	4	0.7
Inadequate smear	43	7.2
Total	595	

Table 2. Indications for Surgery

Indication	No. of patients	Percentage
Clinical suspicion of CA	18	3.1
Mechanical symptoms	4	0.7
FNAB diagnosis of CA	74	12.4
Miscellaneous		
Cosmetic reasons	375	63.0
Refractory to treatment	106	17.8
Recurrent	18	3.1

Table 3. Clinical Suspicion of Malignancy

	No. of patients	Percent with malignancy
Very firm nodule	30	100
Rapid growth	6	100
Tumor fixation	8	100
Vocal cord paralysis	6	100
Enlarged regional LN	16	88.9
Male sex with solitary nodule	5	9.4
Recurrent	7	29.2

Table 4. Correlation between FNAB and Final Histopathologic Result

FNAB result	No. of cases	Final Histopath Result	
		Benign	Malignant
Positives	39	6(15.4%)	33(84.6%)
Negatives	472	443(93.8%)	29(6.2%)
Indeterminates	41	31(75.6%)	10(29.4%)

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RHABDOMYOSARCOMA OF THE EAR AND MASTOID*

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ABSTRACT

This is a case of a four year old female child with an ear infection with an aural polyp complicated by facial nerve paralysis and petrositis (Gradenigo's Syndrome). A malignant neoplastic process with an intracranial extension was also considered. An exploratory mastoidectomy was done. The histophatologic report revealed embryonal rhabdomyosarcoma.

INTRODUCTION

Rhabdomyosarcoma, while the most common of the sarcomas in children, is rarely encountered in the ear and mastoid regions. If present, the symptoms are often referable to an otitis media. Even if rare, whenever one considers the possibility of a malignancy in the ear and mastoid in children, one should list rhabdomyosarcoma in the differential diagnosis, a seemingly benign clinical condition but a rapidly fatal disease.

This report, attempts to:

1. present a rare and interesting case of embryonal rhabdomyosarcoma of the ear and mastoid regions
2. illustrate and discuss the disease's clinical course, symptomatology, and histopathology
3. discuss classification, treatment modalities and prognosis of the disease.

CASE REPORT

L.L. is a four year old female from General Santos City who presented with facial asymmetry and chronically discharging ear on the left.

The condition started two months PTA when the parents noticed a smooth, pale pink, soft, nontender mass almost filling up the left ear canal. There was no bleeding nor discharge noted. No consult was done nor were any medications taken.

One month PTA, the patient developed facial asymmetry and the inability to close the left eye. No fever, headache, vomiting nor seizure noted. The patient remained playful and ambulatory. Consultations were done to private specialists who suggested biopsy and/or mastoidectomy.

Three weeks PTA, the patient developed squinting. Another consult to yet another physician led to a referral to this institution for further evaluation and management.

Past medical history, family history, and personal history were all unremarkable.

Physical examination on admission revealed a conscious, fairly nourished, but irritable child. A polyposis, pinkish, soft nontender mass almost filled up the left external auditory canal. There was minimal, foul-smelling mucopurulent discharge. Neurologic examination showed there was limitation of the left lateral gaze, a negative left corneal reflex, as well as a shallow left nasolabial fold and the ability to close the left eye completely. The rest of the physical findings were unremarkable.

The WBC on admission was 11,000 g/l with 68% neutrophils. The mastoid x-ray showed sclerosis of both groups of mastoid air cells, denser on the left, with around, lucent areas on the left.

She was initially admitted by the Pediatrics Department with an impression of brain abscess and was started on antibiotics: Penicillin G, chloramphenicol, and metronidazole. The patient was also referred to the ENT-HNS Department for evaluation and management of the left EAC mass and discharge. The service's impression was chronic tympanomastoiditis with cholesteatoma, AS, with involvement of the 7th nerve, 5th and 6th nerve (Gradenigo's syndrome), R/O neoplasm (probably sarcomatous), R/O other CNS complications. The

* Third Prize, Interesting Case Contest, Third Midyear Convention, Davao Insular Hotel, Davao City, May 5, 1993.

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neurosurgery service concurred. The pediatric neurologist, upon re-evaluation, cleared the patient for transfer to the Department of Otolaryngology-Head and Neck Surgery.

Based on the impression, a CT scan and a biopsy was requested but these could not be done. Instead an exploratory mastoidectomy was performed.

Intraoperatively, the mass in the left EAC was noted to be coming from the mastoid air cells which themselves were filled with granulation tissue-like material. There was a foul-smelling whitish gel-like tissue noted in the antrum. No cholesteatoma was found. There was a bony dehiscence in the tegmen tympani with the same whitish gel-like tissue jutting out from the said defect. There were no ossicles noted in the tympanum. After the procedure, specimen was sent out for histopath studies.

The patient had an uneventful recovery period until three weeks post-op when an aural polyp with the same characteristics as before was noted once again in the EAC of the operated ear. At this time, the histopath report came out with findings with embryonal rhabdomyosarcoma.

Grossly, the specimen consisted of brownish, doughy tissue aggregately measuring 1 cm. Microscopically, there were large clusters of poorly differentiated round to oval cells having scanty cytoplasm, with hyperchromic nuclei with bizarre mitotic figures mixed with spindle-shape cells with tapering bipolar extensions. Racquet-shape cells with single nucleus in the expanded end were also seen. No cross striations were noted.

CT scan was also finally done which showed a soft tissue tumor in the region of the left masseter area, anteriorly expanding into the buccal space, bulging into the nasopharyngeal area with infiltration of the superficial mucosa medially, and superiorly, it invaded the basisphenoid with erosion of medial and lateral pterygoid plates. There was invasion of the sphenoid sinus, sphenopalatine fossa, pons, portions of left hemisphere, and lower midbrain. The findings were consistent with an aggressive neoplasm with intracranial invasion, possibly malignant.

The aggressive behavior and the extensive intracranial involvement of rhabdomyosarcoma precluded any further definitive surgical procedure. The patient was then referred for combined radiotherapy and chemotherapy.

DISCUSSION

Within the past decade, a great amount of clinical interest was focused on rhabdomyosarcoma for two reasons: one, it affects mostly the unfortunate population of children and young productive adults: and two, its response to multidisciplinary treatment has greatly improved prognosis for patients with this neoplasm as compared to its response to traditional treatment such as radical surgery alone.

Rhabdomyosarcoma is a highly aggressive soft tissue tumor with a tendency to metastasize early and a propensity to affect children and young adults. It accounts for approximately one half of the malignant soft-tissue tumors in this group and 8 to 20% of sarcomas in patients of all ages (**Kyriakos**, 1987). Primary tumors are found to be located in the head and neck region in 38% of patients , 21% in the genitourinary tract, 18% in the extremities, 7% in the trunk, 7% in the retroperitoneum, and 9% at other sites. Head and neck primary tumors are mostly found in the orbit followed by the pharynx and the soft tissue of the face and neck (**Cotton**, et al, 1987). The temporal bone area is involved in only about 4 to 7% (**Pensak**, 1987). Some studies noted a slight predominance in male and a slight predilection for Caucasians (**Cotton**, et al., 1987) while other studies show no predilection of sex nor race (**Hyams**, 1987).

The heterogenous group of rhabdomyosarcomas are composed of three histologic varieties, as classified by **Horn** and **Eterline** in 1958—embryonal, alveolar, and pleomorphic. Botryoid rhabdomyosarcomas are considered variants of embryonal lesions. These variants, together with the alveolar and embryonal types, occur predominantly in children, hence are called juvenile rhabdomyosarcomas. The latter pleomorphic type is most common in adults. The juvenile group bahave identically and therapy for each is the same.

In the ear and mastoid, the neoplasm is believed to arise from the totipotential mesenchymal cells tending toward muscle differentiation, with the cytologic findings reflecting a primitive or embryonic pattern. A striated morphologic appearance of muscle-like tumor cell is seen but is not required as necessary for diagnosis (**Hyams**, 1987). Still, many rhabdomyosarcomas are misdiagnosed as poorly differentiated adenocarcinoma, reticulum cell sarcoma, neuroblastoma, synoial cell sarcoma or unclassified sarcomas. With the help of electron microscopy, identifying cytoplasmic myofilaments and frequent infoldings of the nuclear membranes of multinucleated giant cells in these tumors, when present, help substantiate a diagnosis of rhabdomyosarcoma, as does the recognition of Z-band formation (**Bizer**, 1980).

The clinical manifestations demonstrated by patients with head and neck rhabdomyosarcoma varies with the anatomic site of the tumor. Almost always there is a presentation of a painless, enlarging mass, as seen in soft tissue areas. In the ear and mastoid, signs and symptoms are referable to an otitis media, oftentimes presenting as a polyp in the external auditory canal associated with other symptoms, in order of

frequency, as otorrhea, bleeding, earache, deafness and facial paralysis (**Hyams**, 1987). Other nerve involvements may also be present especially when the petrosal area is affected, as demonstrated by persistent headaches and abducens and trigeminal nerve paralyses. All these mimic that of an inflammatory disease process which bewilders both clinicians and pathologists because of the accompanying discharge and polypoid configuration of the tumor at an orifice, or because secondary necrosis and inflammation may obscure the malignancy, especially if biopsy specimens are superficial (**Batsakis**, 1979). However, in the presence of a destructive temporal bone neoplasm in a child, rhabdomyosarcoma should be considered as a differential diagnosis since it is the most common tumor of the ear during the first and second decades.

Biopsy of the lesion is essential to its diagnosis. Likewise, CT scan is very important in order to establish the presence, location, and extent of the tumor.

Before 1970, prognosis of patients with rhabdomyosarcoma was very grim. Optimal treatment consisted of radical surgical excision together with en bloc excision of regional lymph nodes, when feasible (**Bizer**, 1980). This may or may not be followed by radiotherapy. This resulted to a 2 year survival rate of about 10 to 15% mostly composed of patients with localized disease. Due to this dismal outcome, other types of treatment were later attempted such as "reasonable surgical procedure" wherein removal of as much tumor as possible was done with maximum conservation of normal anatomy accompanied by radiation therapy and chemotherapy (**Kilman**, et al., 1973). This treatment produced some improvement in prognosis.

In 1987, the group of **Cotton** cited a protocol earlier formulated by the Intergroup Rhabdomyosarcoma Study (IRS) which considerably prolonged the survival of rhabdomyosarcomatous patients. Based on the extent of the disease at the outset of treatment, patients are divided into 4 clinical groups. It is as follows:

Group I : Localized disease confined to organ of origin or with contiguous involvement (not including regional nodes) completely resected

Group II : a) grossly resected tumor with microscopic residual disease
b) regional disease (regional nodal involvement or extension to adjacent organ) completely resected
c) regional disease with nodal involvement grossly resected with microscopic residual disease

Group III : Incomplete resection or biopsy only with gross residual tumor

Group IV : Metastatic disease present at onset

Patients belonging to group I have the best chances of survival, while patients in group IV have the most dismal outlook. An apparent flaw noted in this system is that since the IRS staging is done postoperatively, the group in which a patient is placed may vary depending on the aggressiveness of the surgeon giving initial treatment.

Clinicopathologic staging of rhabdomyosarcomas, such as that in IRS, has a better correlation with prognosis than either the microscopic appearance of the tumor or its primary location (**Bizer**, 1980), with the exception of orbital tumors which are located in an area with few lymphatics and prominent bony confines which favor excellent prognosis. Non-morphological variables such as DNA profiles may prove to be another prognostic factor, with preliminary studies showing a positive correlation between DNA aneuploidy in rhabdomyosarcomas and patients' response to therapy, plus a possible correlation between gene amplification and tumor progression or metastasis (Editorial, 1989).

In the treatment modalities base on IRS protocol, group I is given vincristine, dactinomycin, and cyclophosphamide chemotherpy with the addition of radiotherapy. All the above modalities are given plus adriamycin to patients with distant metastases (**Parisier**, et al., 1991). This multidisciplinary treatment of rhabdomyosarcoma resulted to a 2 year survival rate of 92% for group I, 78% for group II, 64% for group III, and 35% for group IV (**Cotton**, et al., 1987).

SUMMARY

Early diagnosis of a rare disease entity such as rhabdomyosarcoma of th ear and mastoid is difficult. At the outset, one must already have a high index of suspicion. The rarity of the condition coupled with the common presence of numerous patients having benign, chronically discharging ears with aural polyp and cranial nerve involvement, leads one to gravitate to a more common diagnosis such as otitis media. However, confronted with a child with the symptomatology of a complicated middle ear disease couple with a probable malignancy of the ear and mastoid areas, one must be aggressive in considering and ruling out rhabdomyosarcoma as a differential diagnosis. Despite its seemingly benign clinical presentation, it is indeed a rapidly fatal disease.

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ZENKER'S DIVERTICULUM?*

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ABSTRACT

Described is a rare case of a 60 y/o male who presented clinically and radiographically (esophagogram) as Zenker's diverticulum. Manometry was unsatisfactory. Both rigid and flexible esophagoscopy showed a tapered undilatable upper esophageal portion just after the cricopharyngeal constriction. Neck exploration revealed no diverticulum but a hard bulging mass on the right side of the upper esophagus where a wedge incision biopsy revealed adenocarcinoma.

How an esophageal adenocarcinoma simulated Zenker's diverticulum is discussed.

INTRODUCTION

"Most Otolaryngologists are only superficially aware of the wide range of disorders that may affect the esophagus and the various methods of diagnosis and therapy that are currently available. Although the treatment of many of these diseases falls more appropriately within the realm of gastroenterology and thoracic surgery, these patients will often cross specialty lines when seeking medical attention"[1]. Polishing one's knowledge in the diagnosis of esophageal disorders would be desirable to become more adept in the subspecialty of Bronchoesophagology. The objective of this paper is to report a case of an esophageal malignancy which manifested as Zenker's diverticulum.

CASE REPORT

H. M. S., 60 y/o male, married, Muslim, stevedor, from Zamboanga, was admitted for the first time on December 12, 1991 because of difficulty of swallowing of one year and five months duration.

This condition started about one year and five months PTA as the patient noted slight difficulty of swallowing solid foods. No other signs and symptoms like vomiting or regurgitation were noted.

Nine months PTA, patient began a semi-solid diet since eating solids clogged his throat. It was also noted that while eating, some food was left behind in the throat requiring him to swallow several times to clear the throat. Occasionally noted were regurgitation of some amount of foul smelling and fermented material to the mouth. Patient consulted an ENT specialist in Metro Manila and he was eventually referred to our service for further evaluation and management. Esophagogram was requested with the result stating "The cervical portion of the esophagus is deviated to the left. A pouch-like protrusion is seen at the left side at the level of T1 while a small defect extends to the level of T2. Passage of barium at this segment is

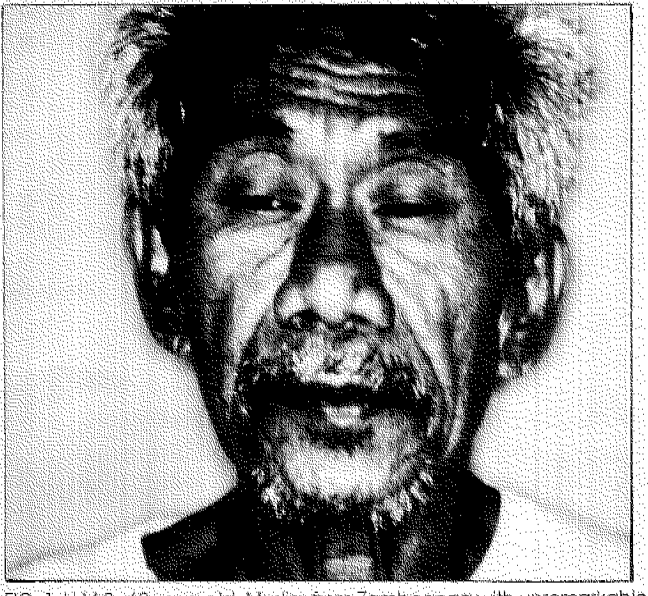

FIG. 1: H.M.S., 60 years old, Muslim from Zamboanga with unremarkable neck examination, no abnormal mass palpated nor bruit noted.

* Third Prize, Interesting Case Contest, PSO-HNS Third Midyear Convention, Davao Insular Hotel, Davao City, May 5, 1993.

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FIG. 2: A prominent rounded collection of barium is shown in the upper esophagus is shown in an oblique view.

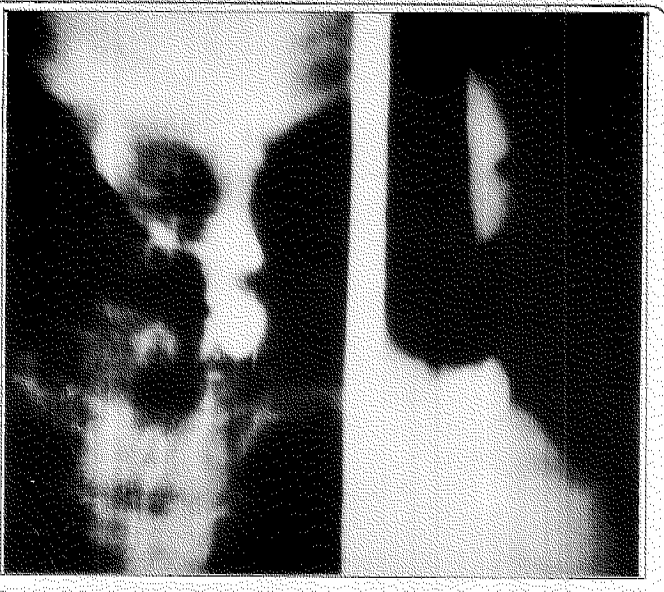

FIG. 3: P-A and lateral views showing a pouch like protrusion at the left side at the level of T1 while a small defect extends to the level of T2.

slightly impedded. The rest of the esophagus is normal. No abnormality is seen in the cervical spine except for a minimal to moderate degenerative osteo-arthritis. The laryngotracheal air shadow are normal. Conclusion: Zenkers diverticulum considered". The patient was admitted for further work-up on this benign disorder prior to a possible diverticulectomy. However, the patient refused admission.

One month PTA the patient started to have difficulty in swallowing liquids. Weight loss of about 50% was observed.

Two weeks PTA the patient agreed to be admitted.

The past medical history showed that the patient developed paralysis of the right side of the body 13 years PTA.

The patient was a 44 pack year smoker and alcohol beverage drinker consuming an average of 6 bottles of beer daily. He also loves eating hot-spicy foods.

Systems review showed weight loss of 50% in one year but with good appetite. The rest of the organ systems were unremarkable.

Physical examination during admission showed a conscious, coherent, ambulatory patient with stable vital signs. Otolaryngologic examination showed pooling of saliva at the pyriform sinuses o.n indirect laryngoscopy. There was no vocal cord paralysis. No abnormal mass was noted. The neck was supple. No abnormal mass was palpated nor bruit noted. The rest of the physical examination were within normal and non-contributory.

On admission, flexible esophagoscopy was done by the Section of Gastroenterology and it was only inserted up to 20 cms because of stricture beyond this area. C-T scan was requested. However, it was not carried out because of financial problems.

Esophageal manometry done by the Department of Surgery showed "incoordinated contractions after the initial primary contraction. Although the patterns are like those of diffuse esophageal spasm, it cannot be labeled as such because the pressures on the average of these contractions are just about 50 mm Hg even lower than that of our standard".

Rigid esophagoscopy was done. However, the findings are similar to those seen by the flexible scope.

Because of the above equivocal findings, a neck exploration was done with the lighted end of the rigid esophagoscope as a guide to the esophageal obstruction and true enough, a mass was found in the right lateral aspect of the esophagus. However, no diverticulum was seen. The surgical histopathology report showed "tumor cells composed of an irregular pattern of well-formed anaplastic glands lined by atypical columnar epithelium". The final diagnosis is moderately well differentiated adenocarcinoma, esophagus, upper portion, right.

DISCUSSION:

The history presents a seemingly textbook description of a Zenker's also known as pharyngo-esophageal and hypopharyngeal diverticulum where an old man exhibited chronic progressive and persistent dysphagia with a sensation of food sticking in the throat and an occasional regurgitation of some foul undigested food to the mouth. The radiographic evidence of diverticulum in the neck added ground towards the establishment of Zenker's diverticulum as the primary diagnosis.

The differential diagnosis included the following structural disorders that may affect the upper portion of the esophagus namely a) benign and malignant

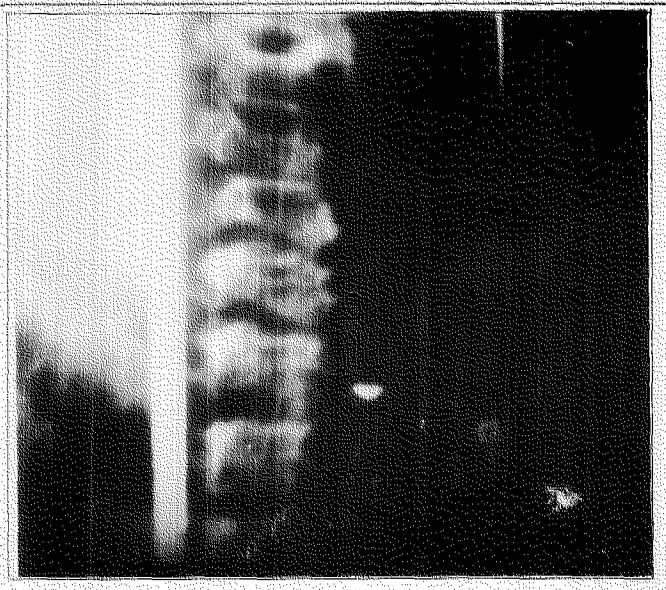

FIG. 4: A small amount of residual barium can still be seen in the upper esophagus in a plain radiograph of the neck taken 24 hours after the barium swallow examination.

neoplasm, b) extrinsic mass compression, c) upper esophageal web, and d) stricture. These disorders may produce the same signs and symptoms that were seen in the patient. With respect to the chronic and progressive obstruction that may be produced and the crucial location (in the upper esophagus) that may be involved, it is speculated that these disorders may cause a secondary pharyngoesophageal diverticulum to develop. This is so because of the presence of Killian's dehiscence (an anatomical defect located just above the transverse portion of the cricopharyngeus muscle) which could gradually and eventually give way and herniate as a result of the high pressure created during swallowing when the pharyngeal muscles contract against the resistance formed by the lesion.

The esophagogram picture distinctly shows a diverticulum and its absence during surgery remains a mystery. A possible explanation to this could be due to an inadequate neck exploration whereby a diverticulum was missed or that the esophagogram finding is a false positive one. The former is conceivable since the work was done on an operating table and not on an autopsy table and the latter remains to be argued. The supposed diverticulum might have been located more posteriorly and superiorly in relation to the mass that was found if a radical exposure had been made.

Malignant neoplasms are far more common than their benign counterpart but make up only 1.1% of all cancers. The squamous cell variety accounts for the most part at 90 to 95% and adenocarcinoma for most of the remainder. Both may develop anywhere in the esophagus although the former has a higher incidence of occurrence at the middle third while the latter develop more at the distal portion in association with Barrett's esophagus. Both are indistinguishable radiographically although the esophagogram is capable of providing information about the vertical extent of the tumor within the esophagus while a CT scan is neccessary for the detection of extraesophageal spread.

No literature was found regarding the development of a diverticulum secondary to an upper esophageal structural disorder, like neoplasm, although the development of carcinoma in a Zenker's diverticulum has been documented but is exceedingly rare. A neoplasm was ruled neoplasm completely due to the presence of an undilatable portion just after the upper esophageal sphincter during endoscopy and due to the failure to do an important work-up, that is, CT scan or MRI, which was beyond the patient's budget.

Extrinsic mass compression was ruled out due to the absence of any palpable abnormal neck mass and an unremarkable chest x-ray result.

Upper esophageal web particularly associated with Plummer-Vinson syndrome was also considered. This was ruled out because of the absence of iron deficiency anemia, signs of atrophic gastritis, and its higher incidence among middle aged women.

Stricture secondary to reflux esophagitis was considered because of history of increase alcohol, smoking, and spicy food intake. This was, however, ruled out because of the absence of symptoms relating to esophagitis, like heartburn and its unlikely position in the upper esophagus. Caustic agent ingestion as a cause was also ruled out because of a negative history.

The patient was not immediately diagnosed to have a malignancy in the esophagus because of the initial work-up which diverted the focus to a benign disorder. Such dilemma may be encountered by anyone and might be faced with shame and perhaps ... medico-legal actions.

CONCLUSION

Any one can be fooled by a rare disease that mimics a more common one and/or that which shows a false positive result like what happened in this case. However, when one or more findings crop up that doesn't correlate with the clinical impression, one has to think again and go back to the drawing board.

Obtaining a biopsy by endoscopy would be fruitful if the tumor is found intraluminally. However, a biopsy through an open-close technique will have to be resorted to, like in this case, for definitive diagnosis and treatment. An ultrasound guided fine needle aspiration biopsy of the cervical esophagus may still have to be studied.

It is therefore suggested that in future cases where an apparent Zenker's diverticulum is manifested but an intramural pathology remains in question even after a

barium swallow examination had been made, a CT and/or MRI study has to be done. This will provide a better management perspective and a better documentation for future studies and presentations.

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AN INTRANASAL MASS: STILL A MYSTERY*

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ABSTRACT

This is a case of a mismanaged intranasal mass which gave rise to neurologic complications. Since histopathologic examination of the specimens from the previous polypectomies were not done, the real nature of the condition is difficult to determine. There are three possibilities: that the intranasal mass could have been a congenital intranasal encephalocoele; that a nasal polyp coexisted with an occult congenital encephalocoele; that an overzealous polypectomy and ethmoidectomy resulted in a traumatic intranasal encephalocoele. The complications regarding these possibilities are preventable by reviewing the clinical features of nasal polyps and intranasal encephalocoeles and knowing the anatomy, operative procedures and techniques necessary to prevent complications arising from intranasal procedures.

INTRODUCTION

Hippocrates (460-379 B.C.) first described the nasal polyp in medical literature and practised nasal polypectomy. The wire snare was introduced by **Fallopius** (A.D. 1523-62) who used iron wire from harpsicords and which method is basically what is done today. From their time on, surgery for removal of these tumors have had numerous complications. Lore noted that complications of polypectomy are hemorrhage, aspiration, septic shock syndrome, and "disaster if the lesion is other than nasal polyps that arises intracranially".

For a more complete removal of nasal polyps, an intranasal ethmoidectomy is usually done together with polypectomy since the most common site of origin of nasal polyposis is the ethmoid sinus. **Mosher** in 1912 considered intranasal ethmoidectomy as one of the most dangerous and blindest of all surgical operations. Complications which may arise from this are perforation of the cribiform plate and lamina papyracea, blindness, injury to the lacrimal gland or sac, and bleeding from the anterior or posterior ethmoidal arteries. **Freedman** and **Kern** in 1979 considered meningitis and cerebrospinal fluid leak as the most serious complications in 1,000 consecutive ehtmoidectomies performed. Moreover, **Maniglia** in 1989 in a study of 40 major or fatal complications were intracranial. Five of these cases had CSF leak and four had meningitis. Also noted were other complications like ocular motility defects, and brain injury resulting in death.

In this paper, a case of chronic recurrent polyps lately associated with CNS complications is presented.

CASE HISTORY

J.B. is an 18 y/o male admitted for the second time in UERMMMC at the Neurology ward because of headache and fever of one day duration. Laboratory procedures were done and gram staining of the CSF revealed Neisseria Meningitides. The patient was then given a complete course of Penicillin. Having had 4 previous episodes of bacterial meningitis for which the patient was admitted in government hospital for the first episodes, the patient was worked up to find the cause of the recurrent condition. Patient was then referred to the Otolaryngology service because of a history of 4 nasal polypectomies.

Past revealed that the patient has been having right nasal blockage and bilateral mucoid to yellowish nasal discharge with accompanying pain over the nasal bridge when exposed to dust and certain odors since 9 years PTA. Consult with a private physician revealed a polyp at the right nasal cavity which was later cauterized. However, with the persistence of the symptoms, nasal polypectomy on the right was done 8 years PTA. No histopathologic examination of the specimen was done but the patient was told that it was

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* Second Prize, Interesting Case Contest, Third PSO-HNS Midyear Convention, Davao Insular Hotel, Davao City, May 5, 1993.

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leak and recurrent meningitis. Failure of the surgeons to order for a histophatologic study of the specimen resulted in the misdiagnosis and mismanagement of the lesion.

A review of 40 cases of intranasal encephalocoele by **Blumenfeld** and **Skolnik** in 1965 showed the peak of onset of symptoms of these patients occurred in the first year of life with relative peaks occurring between 5 to 10 years of age. A small encephalocoele may not manifest itself during infancy and childhood but may become apparent during adolescence or adult life such as in the case reported by **Love** and **Rehl** in 1983 where a 36 year old woman died after developing subdural hematoma when an intranasal encephalocoele mistaken for a nasal polyp was removed during a routine polypectomy and a 35 year old woman seen by **Choudhury et al.** because of recurrent episodes of CSF rhinorrhea and bacterial meningitis after undergoing right nasal polypectomy at the age of 12 and 13 years. In older children and adults, the osseous defect is usually smaller and the base of the intranasal mass is generally peduculated as seen in 2 of 4 cases of **Choudhury et al.** and 2 of 5 cases of **Smith** and **Schwartz** in 1963 resembling a nasal polyp. Frequent modes of presentation in the adolescent and adult population include recurrent meningitis, watery rhinorrhea, seizures, nasal obstruction, and anosmia. Blumenfeld et al. had observed that the occurence of a spontaneous cerebrospinal rhinorrhea is not infrequent. However, such manifestations generally follow polypectomies or biopsies of the intranasal mass. Moreover, in only 30-40% of the time are these lesions associated with other midline congenital anomalies.

Nasal polyps, on the other hand, are rarely seen before the age of 5. However, frequency of occurence of these lesions increases with advancing age and are the most common "tumors" of the nose and sinuses and are not truly neoplastic. Polyps represent hypertrophy of the mucosa, usually as a result of chronic inflammation or allergies. The most common site of origin is the ethmoid sinus, although the mucosa of the turbinates as well as of the other sinuses may also undergo polypoid degeneration. It appear as single or multiple, mucosa covered, pale or translucent, unilateral or bilateral smooth masses associated with nasal obstruction, rhinorrhea, and anosmia. Polyps are usually pale or translucent, although some may have a yellow or pink hue. Twenty five percent of an allergic group had polyps and fifty four percent of patients with polyps had allergies as stated by **K.J. Lee.**

Diagnosis and treatment, therefore, are doubly difficult when an intranasal encephalocoele in an adult is associated with a nasal polyp as documented by **Bullard, Crockard** a primary or congenital intranasal encephalocoele coexisted with nasal polyposis and upon polypectomy and ethmoidectomy, this primary occult encephalocoele was "disturbed" causing a battery of complications.

Therefore, a high degree of suspicion is the mainstay in the diagnosis of intranasal masses specially when it is associated with CSF rhinorrhea and meningitis. Otolaryngologists should always keep in mind the clinical presentation of these intranasal lesions and be aware of the two possibilities previously mentioned. However, the presence of pedunculation, encephalocoele's base and presence of multiple arachnoidal adhesions as stated by **Choudhury et al.** in 1983, make these criteria in differentiating polyps and encephalocoeles not so reliable. **Luyendijk** and **Schmidt** in 1983 agree that a good guide is the position of the intranasal mass wherein all ordinary nasal polyps are located lateral to the middle turbinate and almost every encephalocoele is situated medial to the middle turbinate. Diagnostic work-up which can help in the identification and localization of encephalocoeles and CSF leaks are plain skull films, pneumocencephalography, pantopaque cisternography, surgical trephination and metrixamide digital subtraction video fluoroscopic cystenography. **Zenreich et al.** in 1992 have shown Magnetic Resonance Imaging to be a good diagnostic tool in identifying intranasal encephalocoeles.

Lastly, the possibility of a secondary or traumatic encephalocoele exists. During the third polypectomy and ethmoidectomy about 4 years before the craniotomy, a substantial defect in the cribiform plate may have been created producing a CSF leak, and because of the delayed recognition of this condition, recurrent meningitis, and herniation of intracranial contents resulting in a traumatic intranasal encephalocoele occured. Since there has been no documented case of this nature in medical literature and because of the difficulty in differentiating a primary from a secondary encephalocoele by radiographic and intraoperative findings alone such a theory is difficult to prove. However, the proximity of the CSF leak to the third polypectomy may support this possibility.

Cribiform plate fractures, CSF leaks and subsequent meningitis may occur during polypectomies and ethmoidectomies. **Stankiewicz** in 1989 reported a cribiform plate fracture which occurred during an endoscopic intranasal ehtmoidectomy and was recognized furing the procedure. Maniglia in 1989 reported 6 cases of cribiform fractures during intranasal ethmoidectomy and one during outpatient nasal polypectomy resulting in significant morbidities and 2 mortalities.

Cerebrospinal fluid leaks can occur anywhere along a break in the pia-arachnoid layer which is adherent to the cribiform plate where small arachnoid pouches enter the skull perforations at the exit of the olfactory

nerve rootlets. a fracture in this area may lacerate the pia arachnoid and may, in fact, lead to herniation of dura, the arachnoid, and the brain into the fracture site. Initially, postoperative CSF leak may go unrecognized until the patient develops one or more episodes of meningitis.

The formation of a secondary or traumatic encephalocoele may be explained by the concept of **Taveras** and **Ransoff** in 1953 regarding skull fractures. According to these authors, trauma produces a skull fracture and an underlying dural tear. At the same time, there is probably sufficient subarachnoid hemorrhage to hinder the local circulation of cerebrospinal fluid. The arachnoid membrane projects out through the dural tear into the fracture site. This trapped arachnoid herniate, aided by the normal pulsations of the brain, gradually erodes the edges of the bone, and, at the same time, compresses the underlying cortex. There must be some degree of ball valve mechanism at work also, with the cerebrospinal fluid having easier ingress than egress from the cyst. Arachnoid adhesions about the margin of the brain also play a part in trapping the fluid and possibly brain tissue locally.

To prevent this complication knowledge of the anatomy by identifying the middle turbinate and operating only lateral to it enable the surgeon to avoid the cribiform plate (**Stankiewicz,** 1989). Precise surgical technique, proper instrumentation skillfully used and good training are essential. The nose and paranasal sinuses are surrounded by important anatomical structures namely: the orbit and its contents, the cavernous sinus and internal carotid artery, and the anterior canial fossa. **Maniglia** in 1989 stressed that anatomical landmarks vary from patient to patient and are dependent upon different degrees of pneumatization of the paranasal sinuses. Anthropological differences are important: white patients have larger nasal pyramids and smaller interpupillary distances in comparison to black and Oriental patients. A crowded nasal cavity denotes less margin for error. Moreover intranasal ethmoidectomy, especially if performed in a patient with prior ethmoid sinus surgery, can be hazardous, since the extensive disease and previous surgery might have eroded osseous anatomical landmarks. A preoperative CT Scan may detect such defects.

CONCLUSION

Adequate history, physical examination and proper work-up should be done when dealing with intranasal masses more so when unilateral and in patients in the first decade of life or with hypertelorism or other congenital midline defects. However, intranasal encephalocoeles have been documented to occur in older patients even up to the 6th decade of life and to coexist with nasal polyposis in the same nasal cavity. Moreover, these lesions are not always associated with congenital midline abnormalities.

In addition to these, when doing polypectomy and ethmoidectomy histophatologic examination of the specimen is mandatory and follow-up consultations should always be emphasized to the patient. Also, the surgeon should be equipped with knowledge of the anatomy, the right surgical technique, proper instrumentation and good training to prevent the occurence of major or sometimes fatal complications and, possibly, a traumatic intranasal encephalocoele.

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a nasal polyp. The blocked feeling in the right nasal cavity was relieved but the patient still had recurrent mucoid to yellowish nasal discharge relieved by the intake of decongestants and antibiotics.

The symptoms persisted until 4 years PTA, again with accompanying right nasal blockage. Patient sought consult in a government hospital and was advised admission for polypectomy and ethmoidectomy on the right under general anesthesia. The procedure was done twice during the year because of recurrence of the condition. However, no histopathologic examination was done on both occassions. After the second procedure, the patient noticed clear watery nasal discharge which was salty to taste which increased in amount whenever the head was in a dependent position. This condition resolved spontaneously. Patient also felt occasional vague pain on the nape area and persistence of the nasal symptoms even with the intake of decongestants and antibiotics.

This prompted him to consult another ENT specialist who did a polypectomy and Caldwell Luc (?) under local anesthesis 3 years PTA. After the procedure, the patient again had clear, watery nasal discharge, this time increased in amount. This resolved spontaneously and a few weeks later, patient had his first episode of bacterial meningitis and had 5 episodes of recurrent bacterial meningitis in a span of 2 years. There was no known history of cranial trauma.

Pertinent physical examination revealed an awake, oriented, febrile patient, normocephalic with no neurologic deficits except for nuchal rigidity. Anterior rhinoscopy showed septal deviation to the left and small polypoid masses superiorly located in the right nasal cavity.

Skull x-rays were normal and paranasal sinus x-ray showed ethmoid and maxillary sinusitis on the right. Fiberoptic nasopharyngoscopy revealed ethmoid polyps and partially removed ethmoid bone on the right nasal cavity but no CSF leak was evident during the procedure. However, glucose testing of the nasal discharge was done using an HGT strip and it showed 80-120 mg% supporting an impression of a CSF rhinorrhea.

Definitive tests were done using digital Subtraction Video-Fluoroscopic Cisternography with Iopamidol as contrast media and CT Scan. The plates showed good opacification of the basal cisterns and pooling of the dye in the anterior cranial fossa. Spillage of contrast media into the anterior ethmoid sinus region and eventually into the nasal cavity was seen and this most likely represents the site of communication of the cranial and nasal cavities.

Definitive treatment for the CSF leak was done through a bifrontal craniotomy with patching of the dural defect with tensor fascia lata graft. Intraoperative findings showed a 1 cm funnel shaped bone defect on the right cribiform plate immediately lateral to the crista galli. This defect contained brain tissue covered by many arachnoidal adhesions.

Patient was discharged asymptomatic on the 10th post-op day with a diagnosis of "recurrent meningitis secondary to a CSF leak; etiology: nasal encephalocoele".

DISCUSSION

An encephalocoele is a protrusion of cranial contents beyond the normal confines of the skull, and the term embodies cranial meningocoele (meninges and CSF), encephalomeningocoele (brain tissue and meninges), and hydroencephalomeningocoele (a portion of the ventricle, brain tissue, and meninges). **Blemenfeld** and **Skolnik** in 1965 reported the incidence of encephalocoeles to be 1 in 4,000 births, 75% of which is the occipital variant, 15% for the frontal variant, and 10% for the basal variant frequently the transethmoidal or nasal encephacocoele resembling a nasal polyp. In 1943, **Ingraham** and **Swan** encountered only one intranasal type among 84 cases of encephalocoele. **Matson** reported 14 cases of the intranasal type in a series of 265 encephalocoeles. It appears as an intranasal mass covered with nasal mucous membrane, pulsatile, gray/blue, compressible, faintly translucent and lying medial to the middle turbinate bone next to the septum. The mass may fluctuate synchronously with the patient's pulse or respiration, or enlarge with staining or deliberate obstruction of the jugular veins (Furstenberg sign). It can also be classified as to causation. According to **Choudhury** and **Taylor** in 1983 the term "primary encephalocoele" is a congenital lesion occuring early in embryonic development due to failure of mesodermal ingrowth between the neural tube and the overlying ectoderm, which fail to separate. The osseous defect is a secondary occurence and it lies in the cribiform plate on one or the other side of the midline, where the encephalocoele is covered by layers of meninges. In contrast, secondary encephalocoeles may occur at any age at a bone defect in the cribiform plate resulting from cranial trauma or rhinologic operations, and from erosion due to increased intracranial pressure. The osseous lesion is the primary occurence and the encephalocoele extends into the nose through the bone defect, at which level the torn dura mater stops. Leakage of CSF and the chance of infection are common in the secondary type.

Three possibilities exist regarding this case. One possibility is that a primary or congenital intanasal encephalocoele was mistaken for a nasal polyp which underwent multiple polypectomies causing the CSF

AN UNUSUAL CAUSE OF FACIAL PARALYSIS*

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ABSTRACT

A case of a 37 year old female with a right sided paralysis associated with an ipsilateral infraauricular mass, a mucopurulent ear discharge and an external auditory canal mass is presented. Computed tomography of the head revealed soft tissue bony destruction of the mastoid area consistent with cholesteatoma formation. Fine needle aspiration biopsy of the infraauricular mass showed cell findings consistent with a benign mixed tumor. Initial considerations were that of a parotid malignancy vs. middle ear infection with a concomittant benign parotid tumor. The patient underwent a parotidectomy and mastoidectomy using a unified approach. The mass was found to involve the deep lobe of the parotid with extension to the posterior portion of the external auditory canal, part of the middle ear and the stylomastoid foramen. The mass was excised without any evidence of recurrence four months postoperatively. The facial paralysis was managed with a facial sling. Final histopathological report was Schwannoma.

INTRODUCTION

In a young middle aged female, any disfiguring illness affecting the face is catastrophic. Facial nerve paralysis is one such disfigurement that in the words of one author, has far reaching social and psychological consequences (1). Thus, all cases of facial paralysis whether due to trauma, ear infections or malignancies should be aggressively diagnosed and managed according to its specific etiology. In most cases, diagnosis is more or less straightforward. At times, however, despite a well taken history, complete physical examination, comprehensive laboratory test and logical thinking, one is still prevented from arriving at a correct diagnosis as exemplified by the following case which is reported to increase the awareness of the otolaryngologist to an unusual cause of facial paralysis.

CASE REPORT

A 37 year old female was admitted to the ENT department of the Philippine General Hospital last July, 1992 for a right sided facial paralysis.

The patient presented with a five year history of a gradually enlarging mass at the right infraaururicular area described as firm, movable and non tender. Medical advice was not sought until three years later when patient began to experience right facial paralysis. The patient was seen at a private EENT clinic where a CT Scan of the head showed a normal study and was referred for rehabilitation at a local hospital but was eventually lost to follow-up.

On October 1991, there was a sudden increase in the size of the mass. At about this time, there was right ear discharge described as mucopurulent and foul smelling and hearing loss. Patient denied any previous history of ear infection. Physical examination on consult in July 1992 revealed a well nourished, well developed patient with a right complete facial paralysis, (fig. 1 and 2). There was a 4 by 4 cm firm, movable, non tender mass over the right infraauricular area. In the right external auditory canal was a fleshy mass with a foul smelling discharge, (fig. 3). It was not possible to see past the mass. The left ear was unremarkable.

Topographical mapping of the facial nerve showed a normal lacrimation test, normal taste test, a complete right sided paralysis. Stapedial reflex could not be tested. CT Scan showed a soft tissue bony destruction of the right mastoid area consistent with cholesteatoma, (fig. 4). There was moderate to severe hearing loss over the right. Fine needle aspiration of the mass revealed cell findings consistent with a benign mixed

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* First Prize, Interesting Case Contest, Third Midyear Convention, Davao Insular Hotel, Davao City, May 5, 1993.

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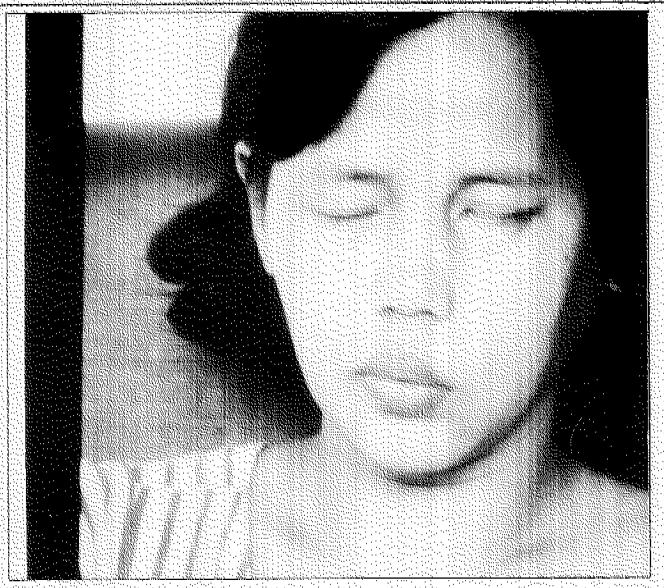

FIG. 1: Complete (R) Facial Paralysis

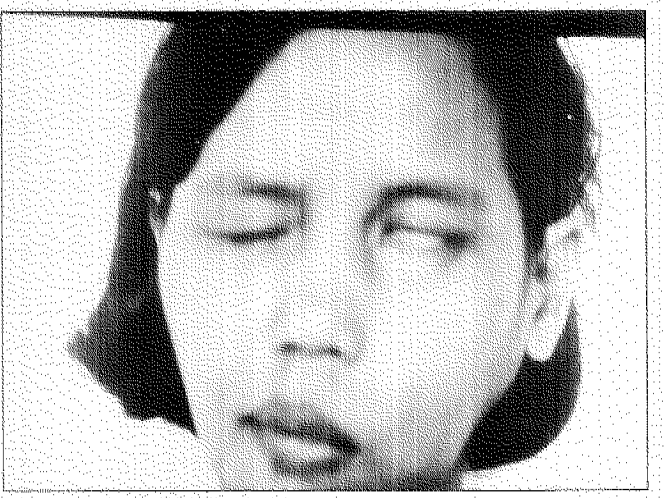

FIG. 2: (R) infraauricular mass

tumor. Aural polypectomy with biopsy showed chronic inflammation. Initial impression was a parotid new growth probably malignant with facial nerve paralysis, aural polyp, right external auditory canal cannot rule out chronic tympanomastoiditis with facial nerve paralysis. She underwent right parotidectomy and mastoidectomy using a unified incision. A mass was found at the deep lobe of the parotid gland with extension into the right stylomastoid foramen and erosion of the cartilaginous and bony external auditory canal. The mastoid antrum was well aerated. Search for the normal facial nerve was unsuccessful.

DISCUSSION

In our case, a 37 year old female presented with a right parotid mass of five year duration, followed by a gradual onset of an ipsilateral facial paralysis, then by a mucopurulent ear discharge. Given this history and the above physical findings, a diagnostic dilemma arose at the time of presentation. Specifically what disease entity was causing the facial nerve paralysis? Several diagnoses were considered. One differential was a malignant parotid mass, the basis of which was the facial paralysis associated with a mass at the parotid area. Fine needle aspiration of the infraauricular mass, however, showed cell findings consistent with a benign mixed tumor. Although cases of benign mixed tumor of the parotid causing facial nerve paralysis have been reported, its occurence is very rare (2). Due to its non invasive character, facial nerve paralysis is seen in these cases only when sudden enlargement of the mass occurs following trauma with resultant hemorrhage (2). Another differential was that of a middle ear infection that was causing the paralysis with a benign parotid tumor. This was further strengthened by CT Scan finding of destruction of the mastoid area consistent with cholesteatoma formation. The patient, however, denied any previous ear infection and the facial nerve paralysis preceeded the ear discharge. Paralysis of the facial nerve usually occurs in a long standing middle ear infection and, unless the facial canal is naturally dehisced, the time lag between the start of the middle ear infection and facial paralysis takes months to years. This was not present in the patient's history. Facial nerve paralysis secondary to an acute middle ear infection although a possibility was hardly entertained. Lastly, a benign parotid tumor with an associated Bell's palsy was also mentioned but was thought to be the least considered differential.

With these diagnoses in mind, it was decided that the parotid tumor and the questionable middle ear pathology be managed at the same time. So the patient underwent parotidectomy and mastoidectomy using a unified incision - a line which extends from the temporal line, behind the ear, going down to two fingerbreadths below the mandible. Subplatysmal dissection was done and the parotid gland was explored first. A 3x5x6 cm encapsulated mass was found in the deep lobe of the parotid gland, containing yellowish and cheesy material. Specimen was sent for frozen section. The external auditory canal was explored and the aural polyp was found to be continuous with the parotid mass via the eroded portions of the cartilaginous and bony parts of the external auditory canal. The mastoid antrum was explored and was found to be clean and well aerated. There was no cholesteatoma. Frozen section was read as benign. Attempts were made to identify the facial nerve as it came out of the

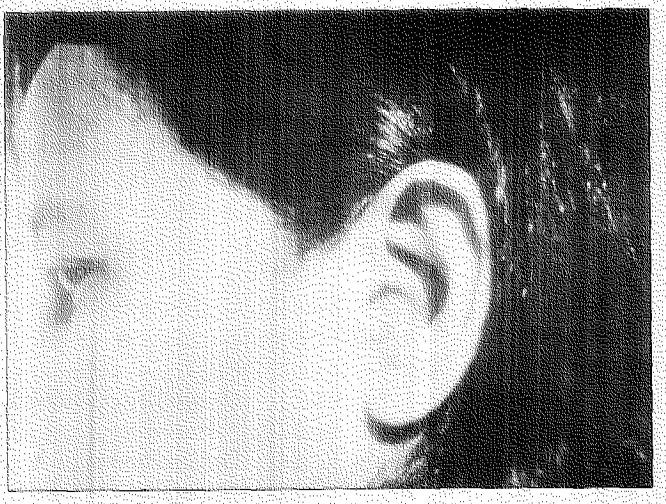

FIG. 3: (R) external auditory canal mass with foul smelling discharge

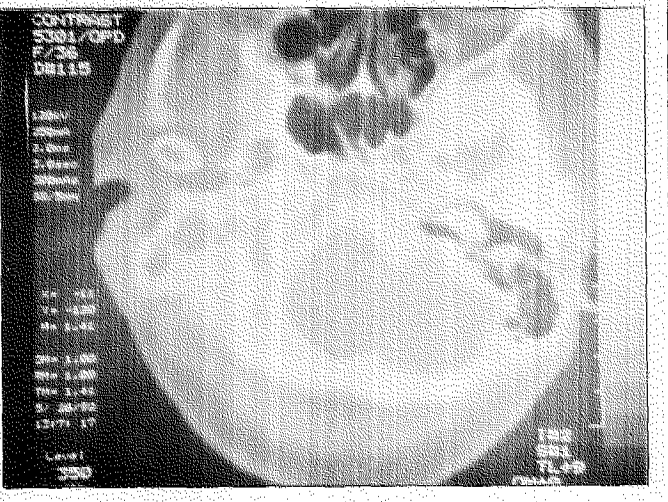

FIG. 4: CT scan film showing soft tissue bony destruction of (R) mastoid area consistent with cholesteatoma

stylomastoid foramen. However, this proved to be futile. The mass had eroded the root of the facial nerve as it emerged from the stylomastoid foramen. The proximal portions of the facial nerve, however, was intact. Exploration of the middle ear showed an intact ossicular chain. The inferior portion of the tympanic membrane was partly eaten up by the tumor leaving the attic and the anterior portion of the tympanic membrane untouched. Parotidectomy was done. After removal of the whole tumor, the defect was closed using part of the sternocleidomastoid muscle, that was mobilized upwards. Tympanoplasty with meatoplasty was done.

The tumor assumed a "dumbbell shape" involving the deep lobe of the parotid with extension into the

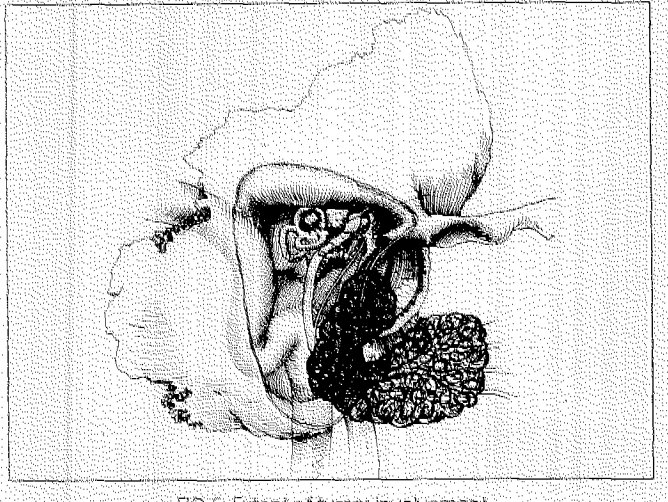

FIG. 5: Extent of tumor involvement

right stylomastoid foramen and erosion of the cartilaginous, bony external auditory canal and posterior portion of the tymapanic membrane, (fig. 5). This is similar to a case reported by **Alford** and **Neely** in 1974. The extension of the tumor into the stylomastoid foramen explains the involvement of the peripheral portions of the facial nerve and the soft tissue destruction of the mastoid area as seen on CT. The hearing loss which was purely conductive was explained by the mass in the auditory canal and the defect at the posterior portion of the tympanic membrane.

On gross examination, the tumor was irregularly shaped, firm well circumsribed, pale, with yellowish discoloration measuring 3x5x6 cm, (fig. 6). Histopathological examination revealed two characteristic patterns of cells; the Antoni A pattern characterized by compact cellular regions composed of spindle cells having oval to elongated nuclei and fibrillar eosinophilic cytoplasm. The cells lay in parallel rows with intervening cellular fibers, creating the classical pallisading, (fig. 7 & 8). The Antoni B or the fasciculated type characterized by a more loose texture with stellate and pleomorphic cells containing intercellular vacuoles all distributed in myxoid substance was also present, (fig. 7 & 8). Final histopath revealed a Schwannoma.

Schwannoma of the facial nerve is a rare clinical and pathological entity comprising less than 5% of all facial nerve paralysis caused by neoplasms (4). First described by **Schmid** in 1930, schwannoma or neurilemmoma of the facial nerve may arise from the intratemporal or extratemporal facial nerve (1,4,5). The following generalizations were made by **Pulec** based on a review of existing literature in 1974; if the tumor

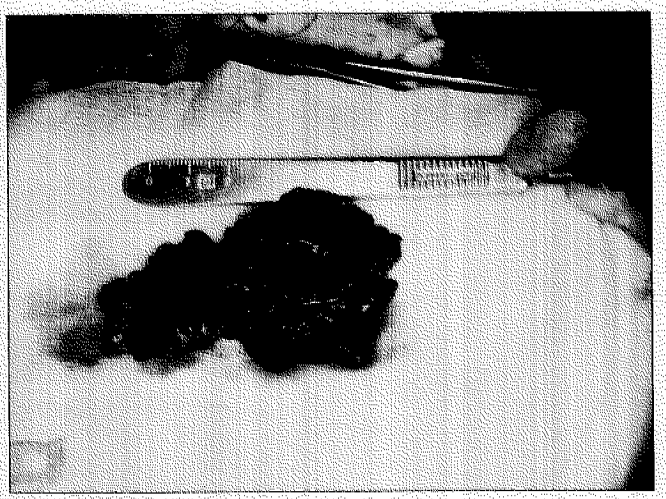

FIG 6: Gross Specimen

arises from the facial nerve inside the internal auditory meatus, facial paralysis would be followed by perceptive deafness due to the pressure of the tumor on the auditory nerve. If, on the other hand, the tumor arises from the horizontal part, deafness would preceed paralysis. Tumors arising from the vertical portion of the facial nerve would cause paralysis and appearance of a mass in the external auditory meatus through the posterior bony wall (7). Those involving the intraparotid facial nerve are rare and generally unsuspected. **O Keefe** in 1949 was the first one to describe such a case. Since then, very few similar cases have been reported amounting to only about fourteen worldwide (8,9). Such a small number can be secondary to some form of under reporting or erroneous diagnosis.

Neurilemmoma of the facial nerve has a protean nature such that clinical presentation vary greatly. In most cases regardless of origin, the primary symptom would still be facial paralysis and the presenting sign a mass at the external auditory canal often diagnosed as a polyp (8,10). Sometimes, the mass erodes through the drum, then infection sets in producing ear discharge thus causing the clinician to consider a middle ear pathology (10).

In this particular case, the clinical presentation, the physical examination and diagnostic exams all pointed to a malignant process affecting the parotid. The only facts suggesting otherwise were a fine needle aspiration biopsy and a frozen section biopsy that were read as compatible with a benign tumor. The presence of ear discharge, aural mass and CT finding consistent with cholesteatoma formation further complicated the picture.

In retrospect, all considerations made preoperatively turned out to be erroneous. According to literature, however, this is the norm in the majority of cases reported; a preoperative diagnosis of schwannoma has rarely ever been made. Rather, Bell's palsy, a cholesteatoma secondary to a middle ear infection, trauma and malignancy were the primary differentials. Only those who had previous experience with schwannomas were able to include it in their differentials and consequently were able to preserve the function of the facial nerve (8).

Facial nerve schwannomas are clinically and histologically benign tumors which should always be treated conservatively, and should have as its aim, the preservation of the facial nerve function whenever feasible (7 & 8). In some instances, the tumor can be readily enucleated from the nerve partially or

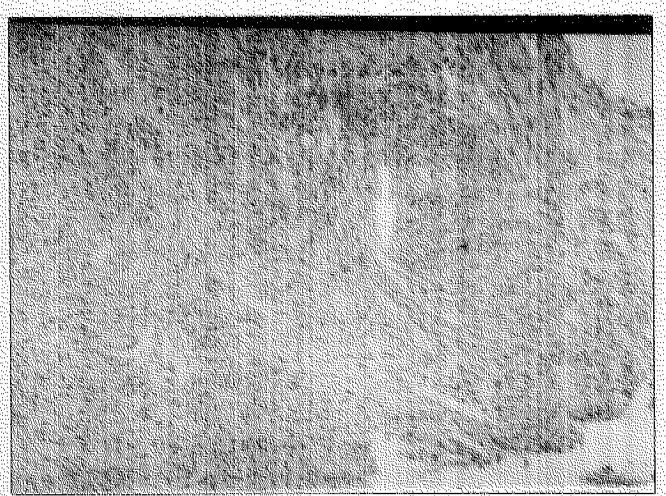

FIG. 7: Photomicrograph of the specimen showing both Antoni A & B patterns. (H & E. x 100)

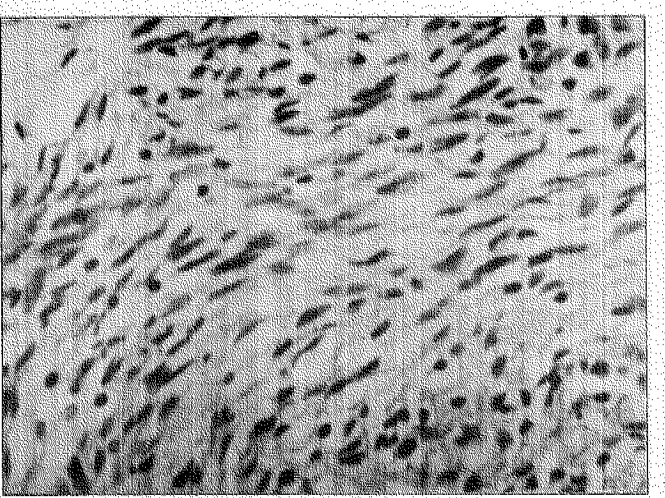

FIG 8: High power view showing classical palisading and pleomorphic cells with intercellular vacuoles. (H & E x 400)

completely without a decrease in the nerve function. This will hold true especially for cases diagnosed early. In advanced cases, it is more difficult to distinguish and separate the tumor from the nerve particularly when cystic degeneration or necrosis has occurred due to infection. In this case, it took 5 years from the onset of the mass before treatment was done by which time, the tumor had transected the peripheral trunk of the facial nerve leaving no room for identification of the distal branches. Otherwise, facial nerve grafting could have been done. On the fourth post operative month, the patient underwent a facial sling procedure with good cosmetic results. There was no sign of any recurrence since then.

SUMMARY

A case of a benign intraparotid schwannoma was reported. Its clinical presentation, pathology, differential diagnosis and management were discussed. This benign tumor has a protean nature such that it can midlead clinicians from arriving at a correct diagnosis unless one has a high index of suspicion. **Hingorani** stated that "Neurilemmoma is an infrequent cause of facial paralysis but if diagnosed at an early stage and dealt with surgically, much of the hideous deformity of the facial paralysis as well as intra cranial complications could be avoided" (**Hingorani**, 1970). It is hoped that, with this report, such a benign tumor will not be allowed to run its potentially devastating course in any future cases.

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