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USE OF AN INNOVATIVE APPLICATOR FOR BRACHYTHERAPY IN NASOPHARYNGEAL CARCINOMA*

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ABSTRACT

OBJECTIVE: This paper aims to present a new applicator for high dose rate remote afterloading brachytherapy in Nasopharyngeal Carcinoma that can be easily assembled using inexpensive and readily available materials. Specifically, this paper aims to:

1. Present the prototype of the innovative applicator.
2. Describe the materials and procedure for making the new applicator.
3. Discuss the advantages and the disadvantages of the applicator

DESIGN: Report of an Instrument Design
SETTING: Tertiary Government Hospital
MATERIALS: Pediatric Endotracheal tube, 2 toy balloons, valve of a Foley catheter, sewing thread
PROCEDURE:

1. A balloon is inserted to the endotracheal tube to serve as its lining.
2. A second balloon is attached to the inferior portion of the endotracheal tube by winding a thread spirally, stopping at about 4 cm. from the distal end, and secured with a knot.
3. The balloon is fixed at the end of the tracheal tube with a knot, leaving a space of about 3 cm. from the end of the 1st knot.
4. The foley catheter valve is attached at the end of the balloon tightly to prevent the escape of air when inflated.
5. The contraption is inserted into the nasopharynx through the nasal cavity using a 4mm. 30° Hopkins sinuscope after nasal decongestion.
6. Simulation films are taken in the antero-posterior and lateral projections to ascertain position of the applicator.

CONCLUSION: The designed afterloading applicator was developed using readily available and inexpensive materials. This innovative applicator achieves the 3 aims of an ideal device for brachytherapy, namely: (1) fixating the radiation source to the nasopharynx, (2) in bringing the source closer to the lesion and (3) away from normal tissue. It is a simple and inexpensive tool, yet it gets the job done and complications are minimized.

INTRODUCTION

For a long time now, radiation therapy has been the treatment of choice for carcinoma of the nasopharynx. However, high doses with large fields are needed to control the tumor. Because of this, significant sequelae and side effects occur at times. These include: radiation myelitis, xerostomia, osteoradionecrosis of the mandible/maxilla, dental caries, hypopituitarism, lens opacities and oropharyngeal fistula among others.

Brachytherapy has been used to deliver a high dose radiation therapy to a limited volume of the nasopharynx. Leung, et al.[2], concluded that locally persistent nasopharyngeal carcinoma can be effectively salvaged by brachytherapy. They also noted that it is possible that routine brachytherapy boost, after completion of external beam therapy could improve local control. On the other hand, Wang[4] and colleagues used brachytherapy as a boost in primary treatment.

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In brachytherapy, one needs an applicator for the insertion to the cavity where the tumor is located. In Nasopharyngeal carcinoma this may be done via the intraoral, interstitial, or intranasal route. One has to use an applicator whose aims are:

1. Fixation- since the nasopharynx is roughly cuboidal and has space within its borders.
2. to bring the source closer to the lesion.
3. to move the normal tissue away from the source of radiation.

In 1975, Wang introduced a simple afterloading applicator for intracavitary brachytherapy of the nasopharynx. This consists of a pediatric endotracheal tube with inflatable cuffs at the distal end of the tube that can accommodate 5 cc. of water. In our institution, Dr. Guerrero Legaspi, Chairman of the Department of Radiotherapy, in collaboration with the Department of Otorhinolaryngology, developed an innovative intranasal applicator that achieves all the three aims of an ideal applicator, with ease and comfort to the patient and to the doctor as well. It also uses a pediatric endotracheal tube, but with improvements. This applicator inflates the inferior portion only and not concentrically, hence it moves closer near the roof and lateral nasal wall of the nasopharynx, the two areas with the most predilection for carcinoma. At the same time, it moves the source away from normal critical structures such as the soft and hard palate, posterior tongue and spinal cord, decreasing the dose and lessening the morbidity.

OBJECTIVES

This paper aims to present a new applicator for high dose rate remote afterloading brachytherapy in Nasopharyngeal carcinoma that can be easily assembled using inexpensive and readily available materials. Specifically, this paper aims to:

1. Present the prototype of the innovative applicator
2. Describe the materials and procedure for making the new applicator
3. Discuss the advantages and the disadvantages of the applicator mentioned

SIGNIFICANCE

The introduction of the innovative applicator hopes to achieve the 3 aims of: fixation, bringing the source closer to the lesion, and moving the critical normal tissues away from the source of radiation. It aims to provide a more easier and comfortable insertion, treatment and removal, benefiting the patient and the physician as well. The applicator introduced decreases the chance of displacement during transport, simulation, and treatment.

THE INSTRUMENT

Materials (figure 1)

The prototype was assembled using the following readily available and inexpensive materials;

1. Pediatric Endotracheal tube with a 3.5 mm internal diameter
2. Toy balloon with 4 mm. and 7mm. internal diameter, 12 cm. in length
3. Discarded valve of a foley catheter
4. Ordinary sewing thread

Procedure for making the applicator/ insertion

1. The 4 mm. balloon is inserted to the endotracheal tube to serve as its lining to avoid direct contact of the endotracheal tube with the patient. *(figure 2)*
2. A second balloon is attached to the inferior portion of the endotracheal tube by winding a thread spirally, stopping at about 4 cm. from the distal end and securing it with a knot. The thread should be placed loosely enough to let the air pass. *(figure 3)*
3. The balloon is fixed at the end of the endotracheal tube with a knot, leaving a space of about 3 cm. from the end of the 1st knot. *(figure 4)*
4. The foley catheter valve is attached at the end of the balloon tightly to prevent escape of air when inflated. *(figure 5)*
5. This contraption *(figure 6)* is inserted into the nasopharynx through the nasal cavity using a 4 mm. 30° Hopkins sinuscope after nasal decongestion. *(figure 7)*
6. Simulation films are taken with anteroposterior and lateral projections, first without introducing air and another set with the balloon inflated with 5-7 cc. of air. This procedure pushes the applicator away from the inferior structures such as the soft and hard palate and makes it closer to the roof and lateral

wall of the nasopharynx. The balloon also holds the applicator in place without the need for gauze packing and preventing its removal during transport and treatment. *(figure 8)*

DISCUSSION

Materials

The materials used are readily available in the hospital setting and inexpensive. The endotracheal tube size is standard for all brands. You only need two toy balloons for each applicator, and these balloons can be bought from any toy store. Any size of Foley catheter valve can be used. The valve is attached to the open end of the balloon by winding a thread around the part of the balloon, which holds the Foley catheter valve.

Procedure

The procedure is self-explanatory and easy to follow. It takes about 10 to 15 minutes to assemble the contraption. The assembly requires no additional paraphernalia. All you need is a good pair of hands. The advantages of the applicator introduced more than compensates for the little time spent in its assembly. The insertion of the applicator needs the aid of a sinuscope (30°). Simulation films are taken to ensure proper position.

Patient and Physician acceptability

Acceptability is almost always expected with the introduced applicator. In a study done by Legaspi et al.[1] (2001), they concluded that this technique provides a better dose distribution and treatment plan in treating patients with nasopharyngeal carcinoma. Furthermore, they noted that it decreases the dose to normal critical structures thereby decreasing the chances of morbidity, and local control is also enhanced since the source is closer to the lesion.

Complications

Complications that may occur are attributed to radiation and not to the applicator. These include radiation myelitis, xerostomia, and osteoradionecrosis, among others. The thread winded around the tube may get untangled or dislodged; however with a good square knot this may be prevented.

ILLUSTRATIONS

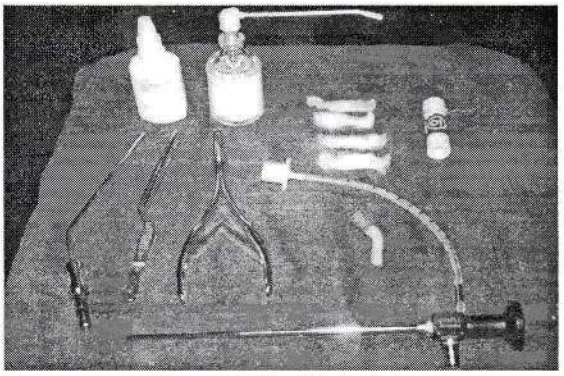

Figure 1: The Materials

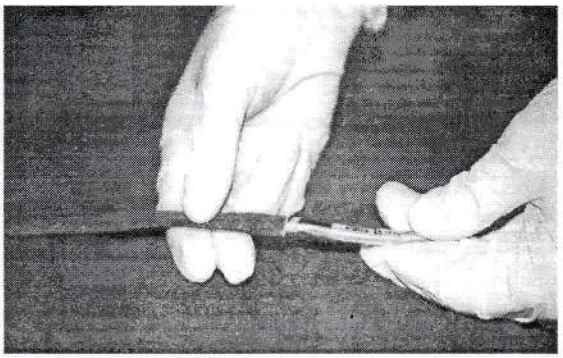

Figure 2: Step 1. The balloon is inserted into the endotracheal tube. Size 3.5 mm.

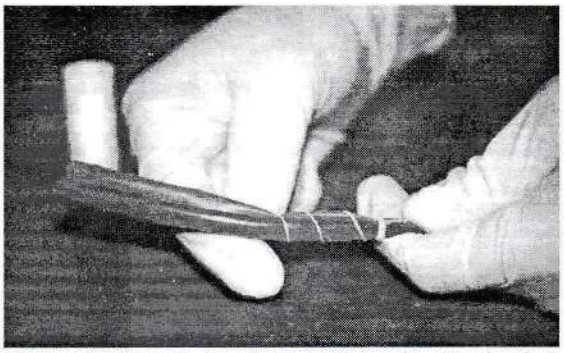

Figure 3: Step 2. Another balloon is attached at the inferior portion and is secured with a thread.

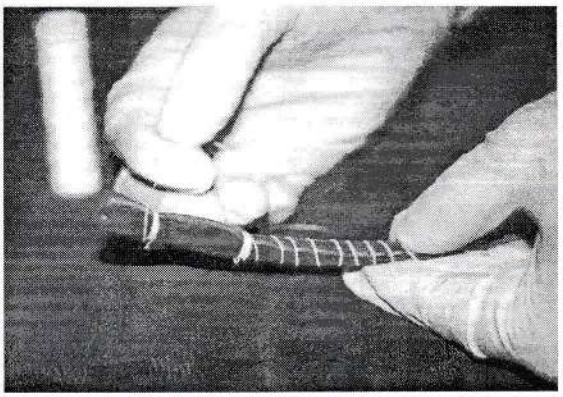

Figure 4: Step 3. The first knot is placed about 4 cm from the distal end and a second knot at 2 cm from the first knot.

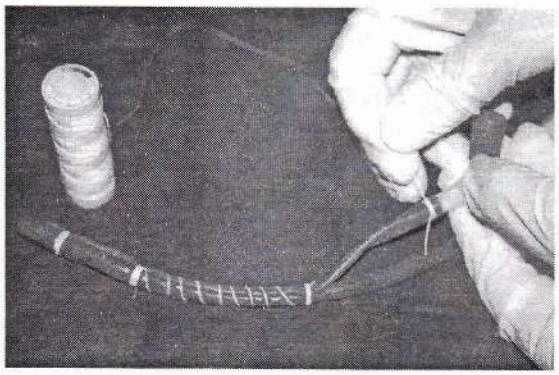

Figure 5: Step 4. Attach the rubber valve of the foley catheter to the second balloon and secure tightly.

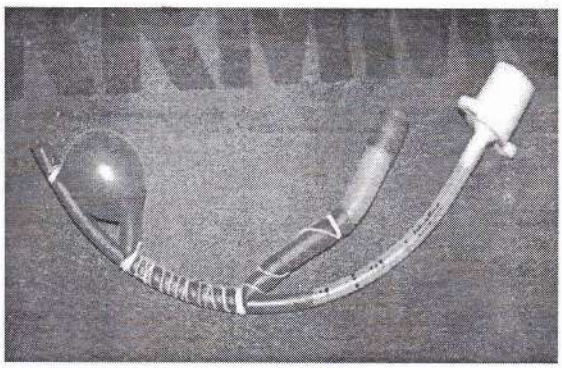

Figure 6: The final product

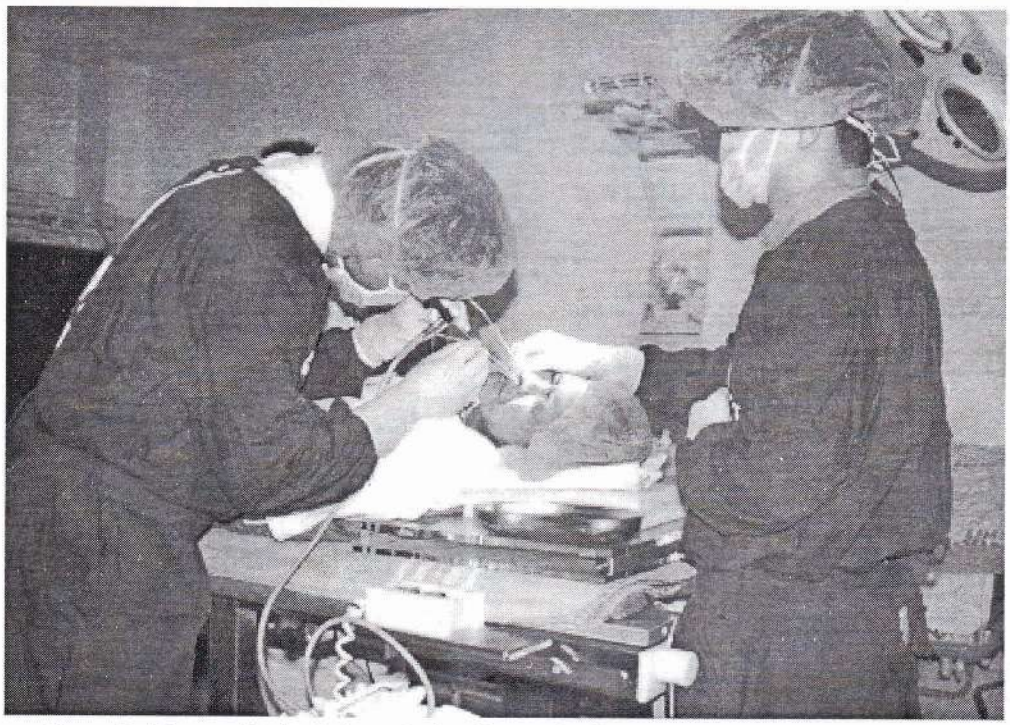

Figure 7: The applicator is inserted endoscopically guided into the nasopharynx.

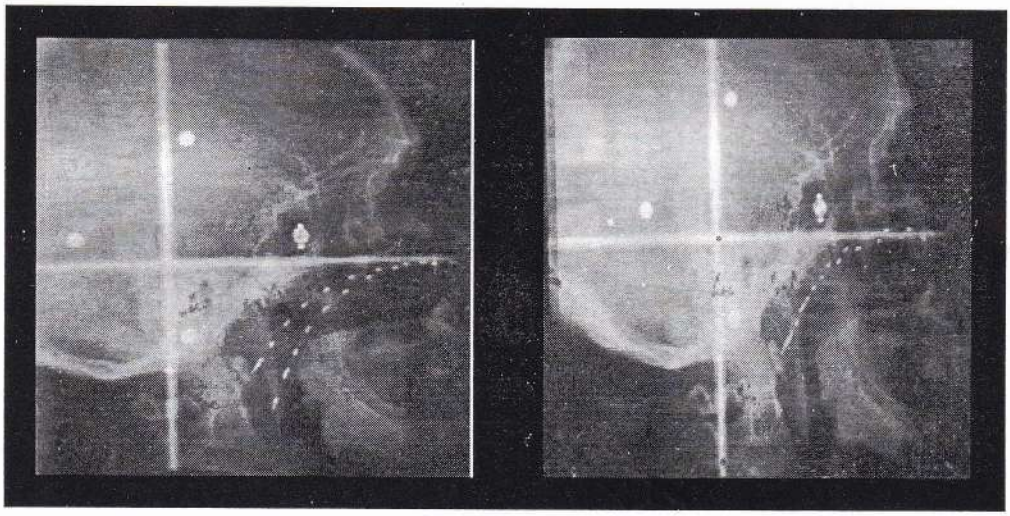

Figure 8: Simulation films are taken with anteroposterior and lateral projection to visualize the position of the probe

CONCLUSION

The designed afterloading applicator was developed using readily available and inexpensive materials. This innovative applicator achieves the 3 aims of an ideal device for brachytherapy namely: (1) fixating the radiation source to the nasopharynx, (2) in bringing the source closer to the lesion and (3) away from normal tissue. It is a simple and inexpensive tool, yet, it gets the job done and complications are minimized.

RECOMMENDATION

This afterloading applicator is a novel concept. It is recommended that prospective studies be done to validate its advantages. A multi-center study with, long-term follow-up of patients may be done to monitor the possible complications that may occur.

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ASPIRATING PIPE: AN INEXPENSIVE ASPIRATING INSTRUMENT*

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ANTHONY CHARLES DALMACIO, MD**

ABSTRACT

The unavailability and the high cost of modern medical equipment and instruments are problems developing countries such as the Philippines is facing. Aspiration, a common office procedure for diagnostic and/or therapeutic purposes is often done without the use of an aspirating gun simply because it is not available or is too expensive.

OBJECTIVE: The objective of the paper is to construct an aspirating instrument made from inexpensive, locally produced materials.

MATERIALS AND METHODS: The instrument was constructed from a plastic T-piece with a groove cut in the middle to accommodate a 10-cc syringe. Two elbow joints were attached to the T-piece and two plastic pipes were attached to other end of the elbow joints. A metal plate with holes cut to accommodate three fingers and the end part of the syringe plunger was inserted into slits in the sides of the plastic pipes. Another two elbow joints with a connector in between were attached to the plastic pipes.

DISCUSSION: The aspirating pipe is an instrument made from locally manufactured plastic pipes. The design is simple which allows it to be reproduced even in remote places because the materials are manufactured locally and are readily available in local hardware stores. Moreover, operation of the device is simple making aspiration smooth and easy.

CONCLUSION: The Aspirating pipe is a simple instrument that greatly facilitates aspiration. It is constructed from materials, which are cheap and locally produced.

INTRODUCTION

The resourcefulness and ingenuity of Filipinos has been remarkable given the limited financial and economic resources. Being a developing nation, modern medical equipment and instruments are often hard to come by because of accessibility and cost. Thus we contend ourselves by using surplus medical equipment and instruments or use nothing at all. Otolaryngology Head and Neck Surgery is one specialty which is instrument-dependent. ENT practitioners have not been exempted from this dilemma. Aspiration whether for diagnostic purposes such as for fine needle aspiration biopsy or for therapeutic purposes is a simple, safe, and inexpensive office procedure yet for want of an aspirating gun, we simply do not use one at all.

OBJECTIVE

The objective of this paper is to create an aspirating instrument fabricated from local and inexpensive materials.

*Second Place, PSO-HNS Poster Session on Surgical Instrumentation Contest, December 02, 2002, Westin Philippine Plaza Hotel, Manila

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MATERIALS

A. 20-mm elbow joint 4 pcs.
B. 20-mm T-piece 1 pc.

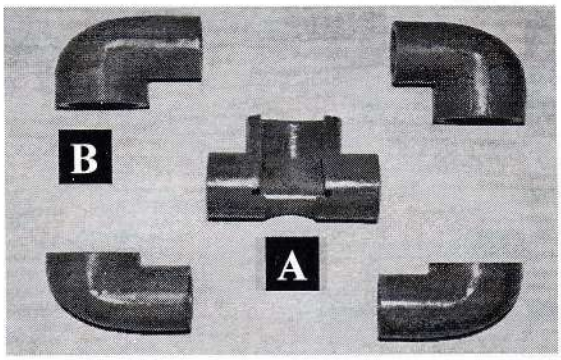

FIGURE 1.1

C. 25-mm pipe 80 mm long 2 pcs.

D. 21-mm pipe 40 mm long 1 pc.

E. 20-mm coupling joint 1 pc.

F. Metal plate 10 cm x 4 cm and 1mm thick 1 pc.

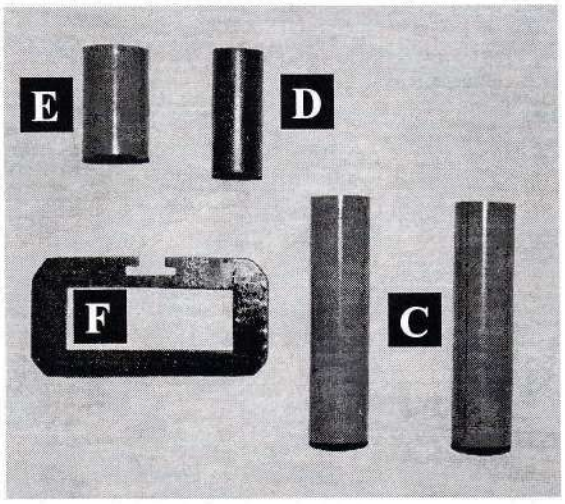

FIGURE 1.2

METHODOLOGY

1. A groove (G) was cut into the T- piece to accommodate the posterior portion a 10 cc syringe as shown in figure 2.1.

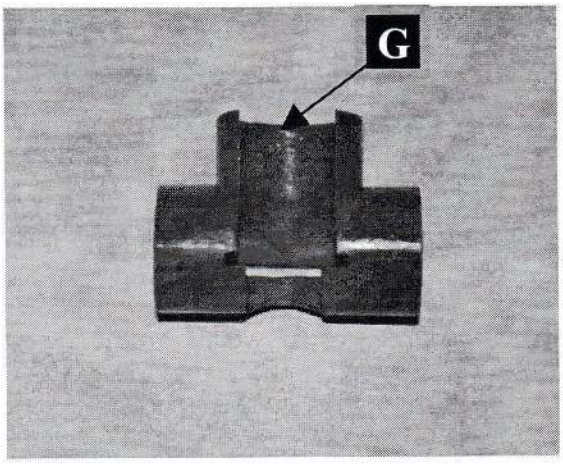

FIGURE 2.1

2. Vertical 1-mm slits (H) were cut into the two 25-mm pipes and into one end of each of the four elbow joints (figure 2.2).

3. A 7cm x 2 cm hole (I) was made in the metal plate and an inverted T cut (J) was made on the opposite edge to serve as the receptacle for the syringe plunger (figure 2.3).

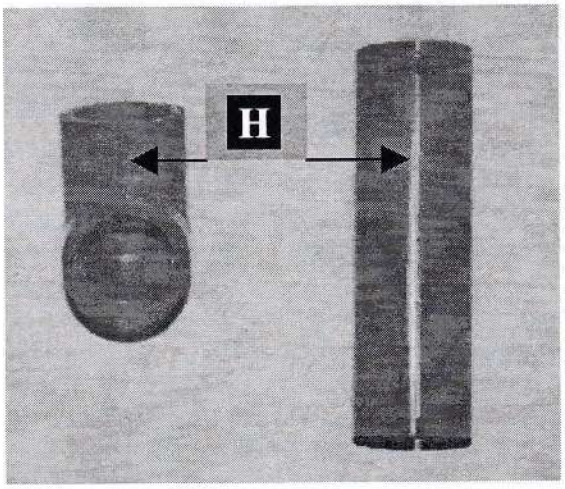

FIGURE 2.2

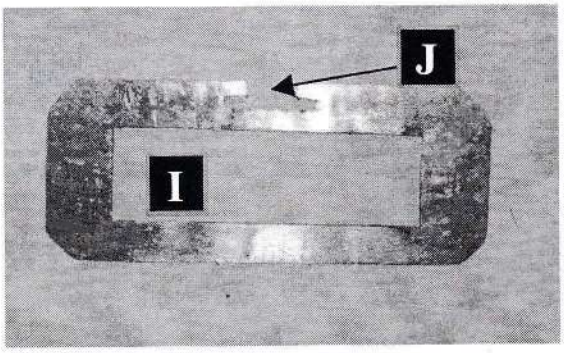

FIGURE 2.3

Instrument Assembly

1. The uncut ends of two elbow joints were attached to the T-piece by inserting 2 cm long 20-mm pipes (figure 3.1).

2. Two 25-mm pipes were attached to the cut ends of the elbows by inserting 2 cm long 20-mm pipes making sure the 1-mm slits were aligned (figure 3.2).

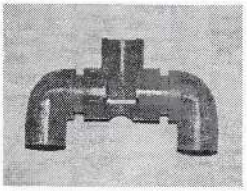

FIGURE 3.1

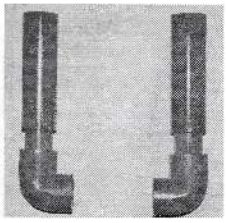

FIGURE 3.2

3. The uncut ends of two elbows were attached to the coupling joint using 20-mm pipes (Figure 3.3).

4. The metal plate was inserted into the slits on the 25-mm pipes and the cut ends of the elbow joints were attached to the ends of the 25-mm pipes again making sure the slits were aligned (figure 3.4).

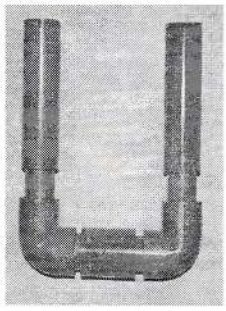

FIGURE 3.3

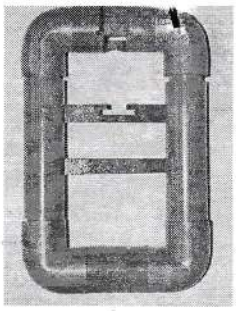

FIGURE 3.4

Instrument Operation

1. With the metal plate in contact with the T-piece, place a 10-cc syringe into the groove on the T-piece making sure the end of the syringe plunger is in the receptacle on the metal plate (figure 4.1).

2. Simply slide the 4 cm long 21-mm pipe into the other end of the syringe and into the open end of the T-piece to the hold the syringe in place (figure 4.2). The instrument is now ready for use.

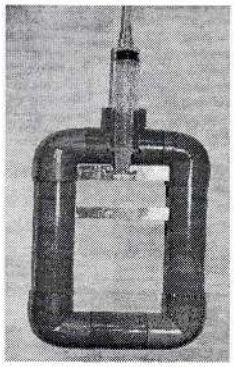

FIGURE 4.1

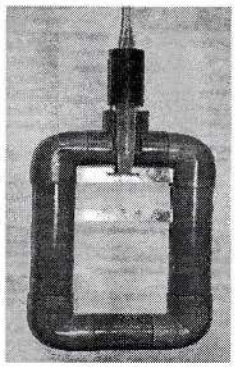

FIGURE 4.2

3. Prepare the area for aspiration using 70 % alcohol and allow to dry. The thumb is placed on the other end while the index finger, middle finger and/or ring finger of the dominant hand are inserted into the opening on the metal plate (figure 4.3).

The non-dominant hand stabilizes the mass while the needle is pushed into it (figure 4.4). Negative pressure is applied by pulling on the metal plate while multiple back and forth motions are made. The negative pressure is then released and the needle withdrawn and the needle cap replaced.

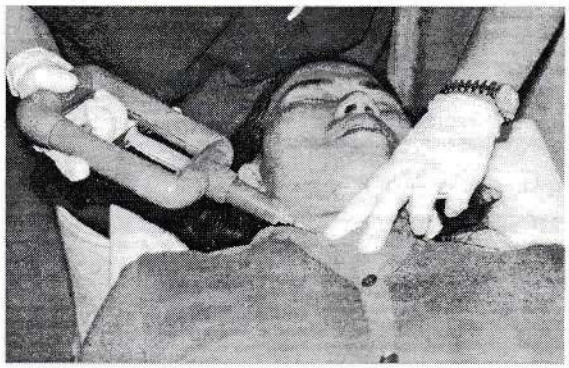

FIGURE 4.3

4. Pull the 3-cm pipe from the T-piece and from the syringe before removing the syringe from the instrument. The instrument is again ready for use.

DISCUSSION

The Aspirating Pipe is a simple device made from locally manufactured polyvinyl chloride plastic pipes. These pipes are readily available in local hardware stores and come in

various sizes and colors. They have largely replaced metal pipes because of their strength, ease of use and not subject to corrosion. The instrument uses plastic pipes to hold the syringe and a metal plate to facilitate aspiration. The design is simple and can be easily manufactured even in far-flung areas of the country as the materials are locally produced and available nationwide. It is lightweight and simple to use and even a novice can do aspiration with relative ease.

Fine needle aspiration biopsy (FNAB) is a cost-effective diagnostic test in the armamentarium of the Otolaryngologist. It is a simple and reliable method for obtaining a histologic diagnosis of head and neck masses. It is a relatively safe, inexpensive and easily performed technique that has become standard in making both diagnostic and management decisions in neck masses. The sensitivity and specificity of FNAB in thyroid disease exceed 90% depending on the skill and experience of the physician performing the procedure and the cytologist interpreting the cytology. Sensitivity for salivary gland neoplasms ranges from 85% to 95%.

The aspirating pipe was designed to facilitate aspiration at the outpatient clinic. Without the use of the more expensive aspirating gun, roughly costing about $70.00 US dollars, we contend ourselves by aspirating with the dominant hand while the other hand stabilizes the mass, a task easier said than done. With the aspirating pipe, aspiration is easier and better control of the syringe is achieved thus yielding more accurate results.

Instrument Cost

A. 20-mm elbow joint	4 pcs.	P 30.00
B. 20-mm T-piece	1 pc.	14.75
C. 25-mm pipe 80 mm long	2 pcs.	30.00
D. 21-mm pipe 40 mm long	1 pc.	2.00
E. 20-mm coupling joint	1 pc.	14.75
F. Metal plate 100 mm x 40 mm x 1mm	1 pc.	Scrap metal
Total		**91.50 Php**

CONCLUSION

The Aspirating Pipe is a simple instrument constructed from locally available and inexpensive materials. Aspiration is made easier and more accurate with the use of the device.

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BASE OF SKULL RETRACTORS*

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ABSTRACT

The advent of base of skull surgery in our institution necessitated the design of retractors with adequate length and width to explore and have a spatial conception of this region. These retractors are designed to fit a self retaining type and a hand held retractor type.

OBJECTIVE: To design tissue retractors for use in the mandibular swing and lateral plate pterygoidectomy approach to the base of the skull.

INTRODUCTION

Skull base anatomy is complex, requiring the head and neck surgeon who endeavors to perform surgical procedures on it to have meticulous three-dimensional conception of the topography and contents of this region. The central anatomy must be studied "from the outside in". Surgery in the skull base area is very demanding but is not outside the scope of any well trained head and neck surgeon specially so with the use of appropriate and well fit instrumentations.

Exposure of the deep areas of the base of the skull when approached laterally is difficult with presently available tissue retractor. When the surgical approach was conceptualized in our institution, we have to use tongue depressors as tissue retractors. The idea of designing specific retractors for the purpose of this specific surgical procedure was then realized.

DESCRIPTION

The base of skull retractors are indispensable in retracting soft tissues to provide for better exposure and conception of the topography in the nasopharyngeal area via a mandibular swing and lateral pterygoidectomy approach. The width is designed to fit the average Filipino's window when the lateral pterygoid plate is chiseled out. The deeper part of the window could be retracted with the use of easily positioned blade like a hand held retractor type.

The self-retaining retractor was designed using a Weitlaner mastoid retractor whereby two blades with dimensions of 5x2.5 cm were attached with screws at the tip using the prongs as "adaptors" for better grip of the blades. The retractor has a 9-cm inside spread with overall length of 17 cm.

Hand held skull base retractor was designed as a double ended stainless steel with blade retractor dimensions of 5x2.5 cm and a no slip grip 1.5 cm bent end. The retractor is 22 cm long to facilitate easy application and not to obstruct the surgical field.

*Third Place, PSO-HNS Poster Session on Surgical Instrumentation Contest, December 02, 2002, Westin Philippine Plaza Hotel, Manila
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***Consultant, Department of Otorhinolaryngology-Head and Neck Surgery, Baguio General Hospital and Medical Center

ILLUSTRATION

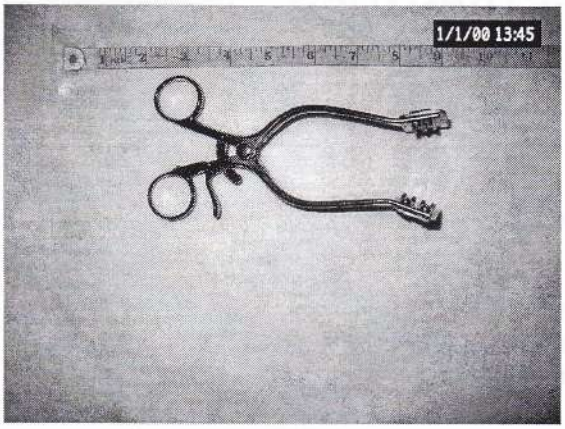

FIGURE 1
Self Retaining Base of Skull Retractor

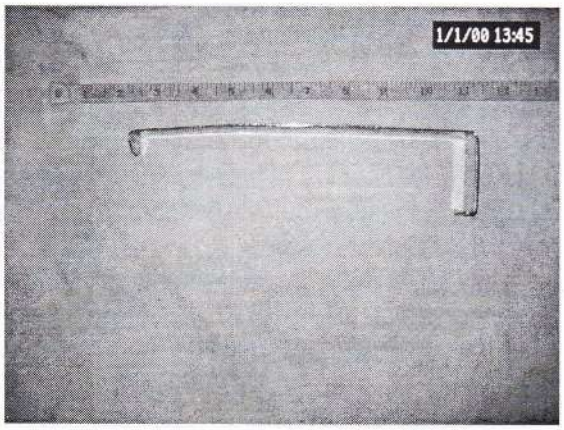

FIGURE 2
Hand-Held Base of Skull Retractor

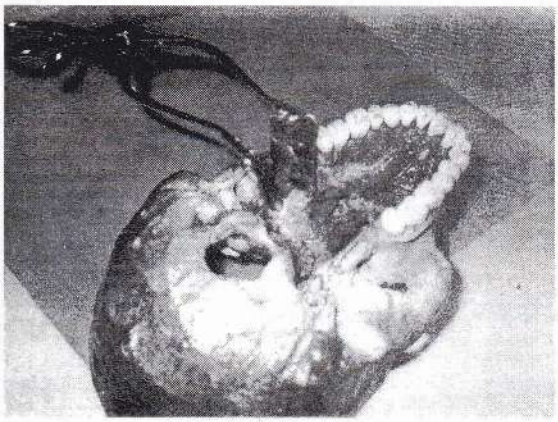

FIGURE 3
Self Retaining skull base retractor

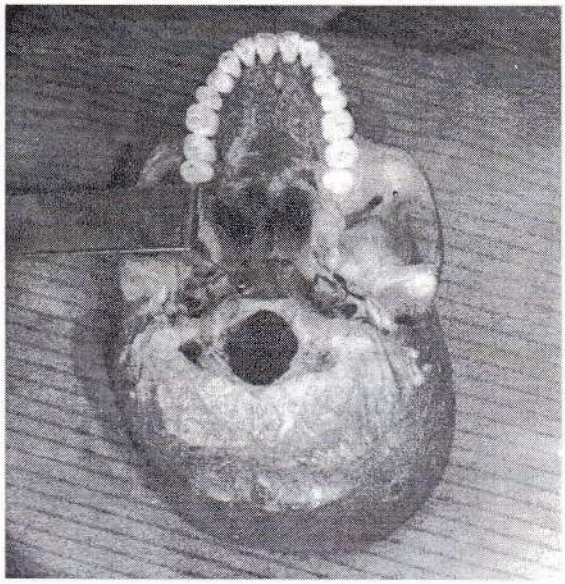

FIGURE 4
Handheld base of skull retractor

CONCLUSION

The base of skull surgery via a mandibular swing and lateral pterygoidectomy approach requires a good exposure. However, with the limitations imposed by the presently available tissue retractor difficulty in working in this complex region is experienced. Hence, base of skull retractors both self-retaining and hand held types were designed specifically for the purpose of facilitating adequate exposure and doing surgical procedure in this region.

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AURICULAR CARTILAGE GRAFT IN A MULTI-STAGED SUBGLOTTIC STENOSIS RECONSTRUCTION*

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EDGARDO S. ABELARDO, MD**
FILIPINA ENCARNACION T. CEVALLOS, MD, MPH***

ABSTRACT

OBJECTIVES: To present an update on our experience regarding the management of subglottic stenosis in a three-staged reconstruction using the auricular cartilage graft.
DESIGN: Surgical Innovation
SETTING: Tertiary Government Hospital
Patient: A 33/M, Filipino diagnosed to have subglottic stenosis (2000) who underwent a three-staged tracheal reconstruction
RESULTS: This procedure met the goals of laryngo-tracheoplasty: provided the framework and the mucosal lining utilizing the superior quality of the auricular cartilage graft. The simplicity of the materials and steps enables the novice surgeon to perform it with confidence. Minimal complications can be avoided with an acceptable aesthetic appearance.
CONCLUSION: Managing subglottic stenosis still posts various dilemma. With the numerous management options cited in literature, success depends on its individualized approach. This report showed our experience in treating a 33 yr. old male diagnosed to have subglottic stenosis via a three-staged tracheal reconstuction using the auricular cartilage graft. This procedure was shown to be effective and easy to perform with avoidable complications and acceptable aesthetic appearance all contributing to our patient's satisfaction.

INTRODUCTION

Management of subglottic stenosis posts difficulties in terms of various treatment options, timing of decannulation, tracheostomy dependence, recurrence of stenosis and success rates of definite plans. Individualized approach is being recommended. This report contains an update of our experience in using auricular cartilage graft in a three-staged laryngo-tracheal reconstruction of an acquired subglottic stenosis.

DESCRIPTION/DISCUSSION

This is a case of a 31 year old male, A.A. , married, Filipino from Rizal was admitted for dyspnea of 4 months. His problem started 2 years prior to admission when he noted occasional progressive dyspneic episodes. It was not related to activity. There were no fever cough or colds. He has neither asthma, hypertension, nor diabetes. He is a non-smoker and an occasional alcohol beverage drinker. His past medical history revealed multiple hospitalizations which included tracheal reconstruction with end to end anastomosis (June 2000) due to a subglottic stenosis secondary to prolonged intubation secondary to trauma; repeated direct laryngoscopy and bronchoscopy with percutaneous injection of hydrocortisone (dosage undocumented)for the excision of a recurring granulation tissue (September 2000). Physical examination was unremarkable. Patient was maintained on tracheostomy for 1 and ½ years and was lost to follow-up.

A CT scan of the neck was requested which revealed a circumferential subglottic stenosis approximately 1 cm. in length with a 70% occlusion of the lumen. He underwent direct laryngoscopy (January 2002) under general anesthesia which revealed a subglottic stenosis characterized to be circumferential, hard, 1 cm.

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in length with the lumen approximately 70% occluded (Grade III Cotton's Classification).

He underwent a three-staged tracheal reconstruction which is described in detail below:

A. Excision of the stenosis

Patient, under general anesthesia through an indwelling trachoestomy tube, was positioned with the neck extended, a shoulder roll in place and both ears exposed. Strap muscles were retracted exposing the area. Lidocaine-epinephrine cocktail (1:100,0000) was injected at the tracheostoma. We noted the skin to be edematous with granulation tissue at 4 o'clock position. We excised that area of the skin (Fig 1) and we noted an abnormal anatomy of the cricoid area: collapsed, melted-like appearance, hard with areas of perichondritis and the lumen was 70-80% occluded (superiorly) approximately more that 1 cm. in length. Granulation tissue at the posterior tracheal area was scraped using blade 15. Topical application of Mitomycin-C (0.5 cc 0.4mg/ml) for four minutes on the defect of the anterior tracheal rings and the posterior tracheal area. Inferior part of the trachea was noted to be unremarkable. The remaining skin was sutured to the tracheal wall with interrupted 2-0 silk sutures. Tracheostomy tube was re-applied. He was maintained on oral antibiotics and proton pump inhibitors. Tracheostomy tube was removed prior to discharge (3 days post-op). Sutures were removed after 2 weeks. Control of infection and examination of granulation tissue formation was done every week.

B. Harvesting and Implantation of ACG

Four weeks after, patient's stoma was noted to be free from infection. Under local anesthesia, an ACG was harvested as follows: after measuring the defect, a post-auricular incision (cymba conchae) (Fig 2) was done, the skin was elevated just superficial to the perichondrium. (Fig. 3). The cartilage was dissected from the anterior auricular skin. Perichondrium was present on both sides of the cartilage. (Fig. 4). The wound was loosely approximated with interrupted 5-0 silk and pressure was applied using bolster dressing. A subcutaneous implantation of the graft was tucked-in on the lateral side of the tracheostomy stoma with the arch opposite the lumen. Closure was done using interrupted 5-0 silk He was an oral antibiotic for one week after discharge. Around 1 week prior to the contemplated (third stage) procedure, the patient was slowly being weaned from the stoma by placing a gauze over the stoma to close the defect.

C. Tracheal Reconstruction

Four weeks later, under local anesthesia, a subcutaneous incision was done around the skin where the ACG was embedded and was flipped (Fig 5), making the skin serve as the new tracheal mucosa (Fig 6). The defect was closed by creating an advancement flap. (Fig 7). Skin closure using interrupted 5-0 silk was used. (Fig 8) Postoperative management included suture removal and wound healing. There was a minimal area of necrosis of the skin flap. At present, patient had no episodes of dyspnea and his voice was finally audible after 2 years of painstaking waiting.

Subglottic stenosis (SGS) posts a complicated problem up to the present time even with various studies on its management were conducted. Literature sites were mostly among pediatric patients. However, reports were scant in stating management advantages with acquired SGS among adults. Issues as tracheostomy dependence, voice quality and the high probability of recurrence proves significant in patients with acquired SGS. The authors aim at reporting its modified, individualized management in such a case.

The goals of laryngo-tracheoplasty (LTP) is summarized into two: to provide an adequate and stable framework with minimal violation of the mucosal lining of the laryngo-tracheal anatomy. Several methods have been cited in literature. Anterior cricoid splitting (decompression) which was introduced by Cotton and Seid serves as an alternative in tracheotomy in premature infants. It was found to be effective in managing mild SGS. Failure rate of ACS is 22%-23% [1]. Holinger et al found overall success rate of 71% for primary ACS and 85% for secondary ACS.[2] In our experience, with a diseased tracheal and cricoid anatomy, we resorted to expose and excise the granulation tissue by excising the skin for exposure. We likewise decannulated the patient and let the area

ILLUSTRATION

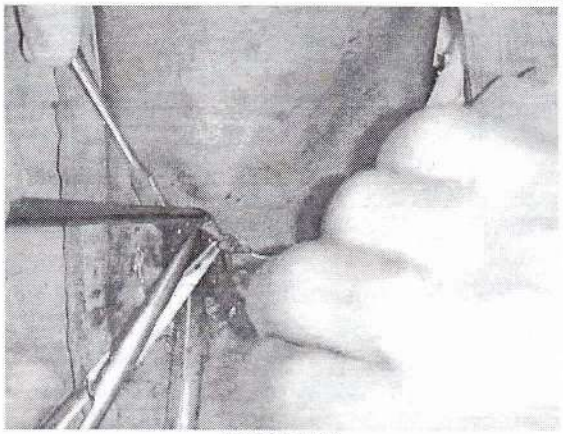

FIGURE 1

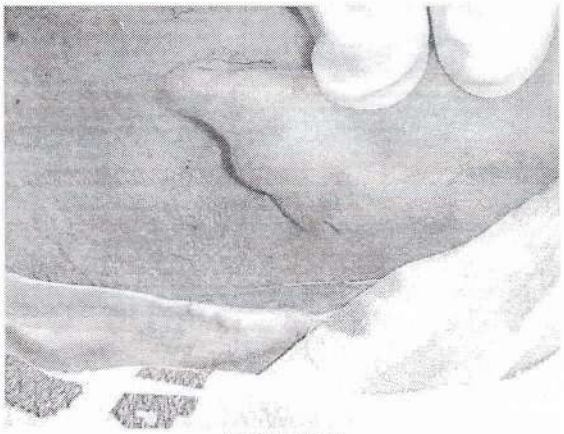

FIGURE 2

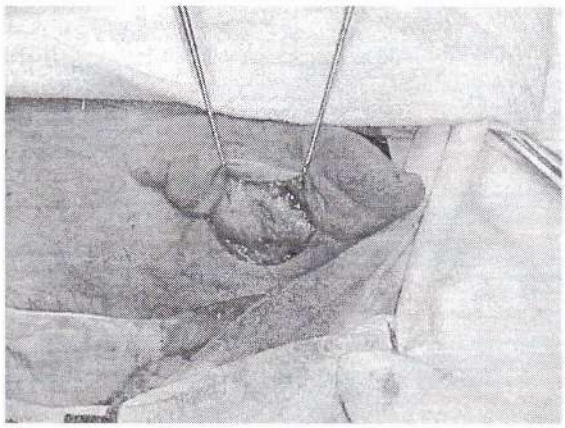

FIGURE 3

FIGURE 4

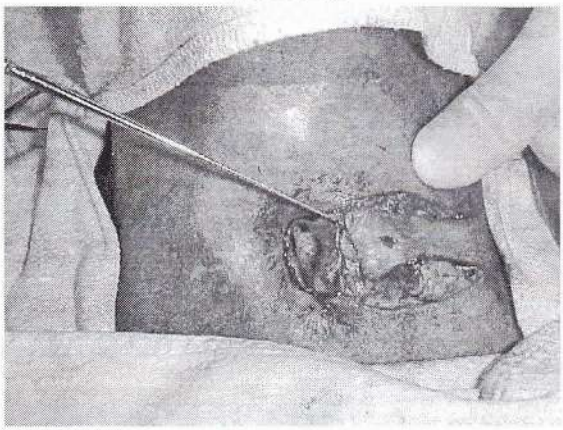

FIGURE 5

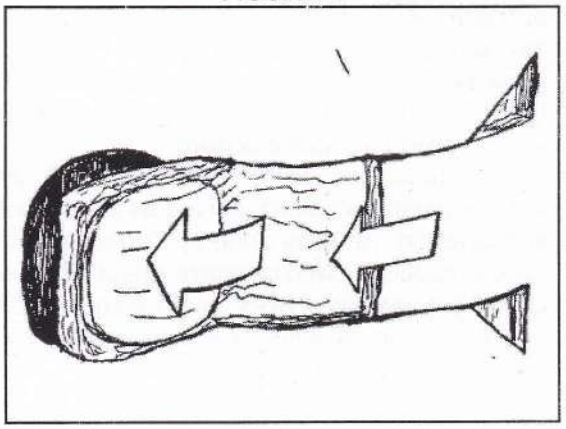

FIGURE 6

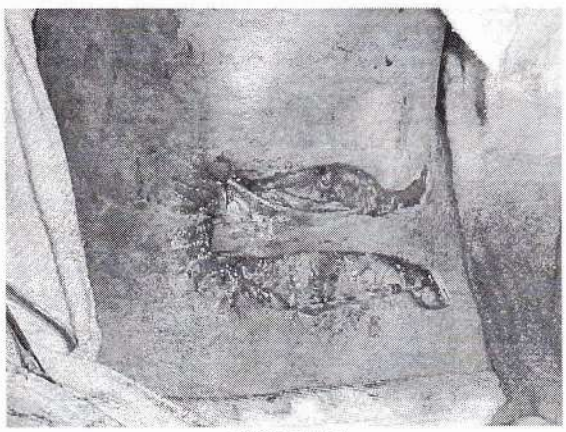

FIGURE 7

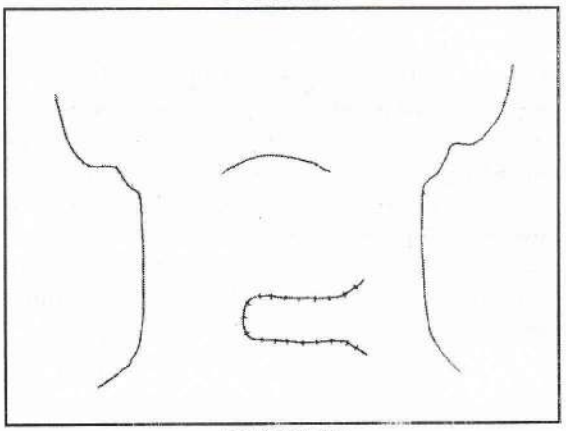

FIGURE 8

be aerated to control infection and easy accessibility for re-examination later on. Laryngotracheoplasty (LTP) with costal cartilage graft (CCG) is the most common form of management among tracheal and SGS reconstruction. Evaluation of this graft presented limitations on its use , specifically its harvesting, accessibility and physical qualities.[3]

The auricular cartilage graft (ACG) is a versatile grafting material. Its indications in the management of SGS was further expanded by a study done by Lusk et al. for mild to moderate SGS or failed ACS, failed CCG with ACS or in cases were both procedures were applied.[4]

Reports showed superiority of ACG over CCG in the healing characteristics among rabbits. It concluded that ACG showed more rapid and complete epithilialization as early as 7 days.[5] Physical properties of ACG make it an ideal grafting material for mild to moderate SGS. Its caliber matches the strength and thickness of the tracheal cartilage, the natural arch increases the cross-sectional area of the airway and prevents prolapse of the graft into the airway, easy accessibility and harvesting and minimal aesthetic deformity.[6]

Modifications in our experience included the transposition-advancement flap with the ACG embedded subcutaneously, and the arch opposite the lumen resulting into the skin serving as the new mucosa of the trachea with the purpose of minimizing recurrence of granulation tissue. Skin in this region is loose making more room for complete closure.

Topical application of Mitomycin-C, an anti-neoplastic antibiotic, served as an adjunct in this report. Studies done by Correa et al in canine models showed favorable alteration in the clinical progression of SGS, improved quantified air patency and reduced the amount of subglottic collagen formation among his models.[7]

RESULTS

Our three-staged tracheal reconstruction both met the goals of LTP: a stable framework using the versatility and excellent physical properties of the ACG and a lining which minimized recurrence of granulation tissue. We utilized simple and available materials. No T-tubes were used. The procedure can be done under local anesthesia and is simple enough to even to the novice surgeon.

CONCLUSION

Managing SGA is still complicated even with current clinical trials and experience. This report provided an update on the management of acquired SGS in a 33 year old male adult with subglottic stenosis who underwent a three-staged laryngo-tracheal reconstruction using the auricular graft cartilage, This confirmed the expected advantages of ACG as a grafting material. This multi-staged procedure provided the framework and mucosal lining of the diseased laryngo-traceal anatomy. This procedure utilized available materials, easy to perform even to the novice surgeon. Complications were likewise minimal. Post-operative follow-up showed success of this individualized approach.

RECOMMENDATION

This three-staged procedure can be documented in prospective clinical trials. Voice analysis can also be documented and a possible area to be studied. Clinical studies on the role of Mitomycin-C in SGS can be further explored.

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RECONSTRUCTION OF EXTERNAL AUDITORY CANAL STENOSIS WITH A POSTAURICULAR CUTANEOUS FLAP*

LOURDES THERESE MALLARI, MD**

ABSTRACT

OBJECTIVE:

General - To describe the use of postauricular flap in the partial reconstruction of external auditory canal stenosis.

Specific - 1. To describe the use of postauricular cutaneous flap in a case of Congenital External Auditory Canal Atresia.
2. To describe the use of postauricular cutaneous flap in External Auditory Canal stenosis secondary to an external auditory canal mass with Chronic Otitis Media and cholesteatoma formation.
3. To describe the use of postauricular cutaneous flap in External Auditory Canal Reconstruction following excision of nevus.

DESIGN: Case Series
SETTING: Tertiary Hospital
PATIENTS: Three Patients
RESULTS: We describe three cases of Partial Reconstruction of External Auditory Canal Stenosis with the use of our Postauriclar Cutaneous Flap. In all three cases, our flap was safely elevated, had good blood supply and reached the canal easily. The donor site was closed without difficulty and the resulting scar was inconspicuous. No diminution in the reconstructed canal diameter was noted at follow up of all three patients.
CONCLUSION: Because of the good functional and aesthetic results obtained, we conclude that our Postauricular Cutaneous Flap is a very feasible surgical option in the partial reconstruction of External Auditory Canal Stenosis.

INTRODUCTION

Stenosis of the External Auditory Canal, Congenital or Acquired is a commonly seen condition. Acquired stenosis result from various causes such as inflammation, tumors, trauma, and post surgery. Medline and library search for literature on post-inflammation and post mastoidectomy stenosis failed to gain results. In East Avenue Medical Center Department of Otorhinolaryngology-Head and Neck Surgery, a number of post inflammation and post mastoidectomy stenosis requiring surgical treatment have been noted.

Several techniques have been described to restore the patency of the canal from the use of skin grafts to the use of skin flaps. Different flaps such as The Snail Flap (Lateral Cervical Twisted Flap), Preauricular Transposition Flap,, Postauricular Chondrocutaneous Flap, Postauricular Transposition meatoplasty Flap, and Dual Flap were encountered in the review of literature on this topic.[2,3,5,7,8,9,10] These flaps were used in the reconstruction of the canal in congenital and some cases of acquired stenosis but none were described in the treatment of post inflammation or post-surgery stenosis.

We describe here a flap earlier suggested basically for Congenital atresia and for reconstruction of failed meatoplasty, which could

*Second Place, PSO-HNS Poster Session on Surgical Innovation Contest, December 02, 2002, Westin Philippine Plaza Hotel, Manila
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be adapted for reconstruction of other cases of canal stenosis.[1,6,8,10]

TECHNIQUE

A spindle-shaped flap is designed and outlined in the posterior surface of the auricle. The outline is extended preauricularly to the helical crus. The location of the post-auricular artery lying beneath the temporoauricular sulcus should be noted. The length of the flap, which is usually four to five (4 to 5) centimeters, is determined by measuring the recipient site, from the helical crus to the depth of the tympanic membrane. The width is 1 to 1.5 centimeters.

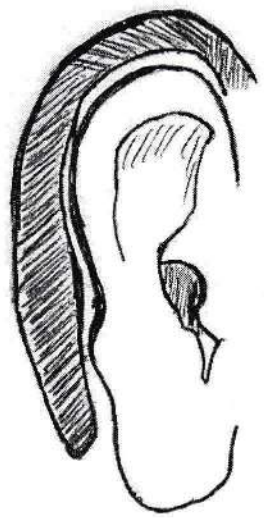

FIGURE 1

The postauricular incision is carried forward connecting to an endaural incision which is placed lateral to the stenosis. The canal skin is incised deeply extending laterally from the concha to medially just adjacent to the tympanic membrane, in the 2 o' clock position.

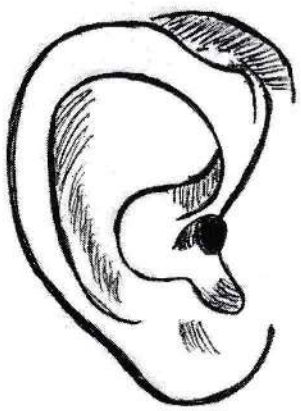

FIGURE 2

The flap is elevated, with the pedicle located at the helical crus. It is then transposed anteriorly without difficulty, passing it through the incised canal. The flap is then secured to the margins of the widened canal with adsorbable subcutaneous and interrupted skin sutures.

FIGURE 3A

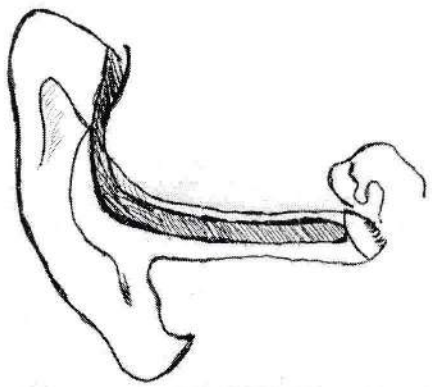

FIGURE 3B

The donor site is primarily closed. Undermining of the surrounding skin may be necessary.

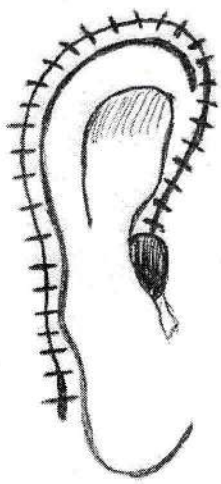

FIGURE 4

The enlarged canal is packed with an antibacterial ointment-impregnated gauze as large in diameter as the canal can accommodate. This packing is carefully placed in a manner that it reaches the apex of the flap which is otherwise difficult to suture to the canal. A bulky mastoid dressing is placed. The skin sutures are removed on the 7th to 10th day. The initial dressing is removed on the 14th day, the ear canal is cleansed and firmly repacked with antibacterial ointment-impregnated gauze. This is done every other day until the canal is dry.

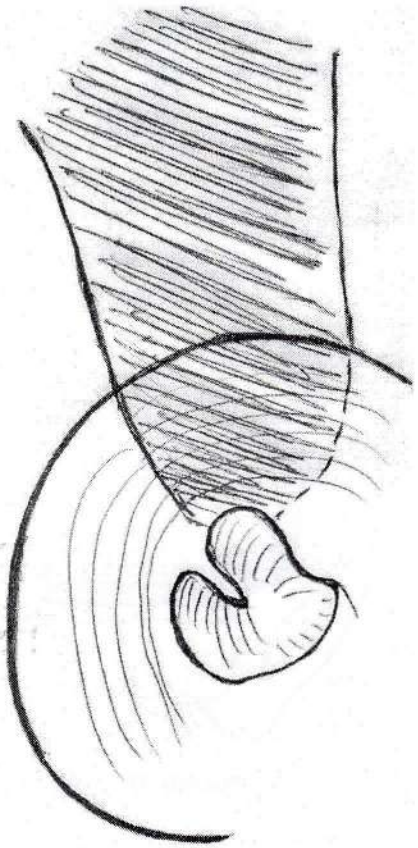

FIGURE 5

Our postauricular cutaneous flap was used in three different cases. (1) 6y/o male with congenital EAC atresia and Chronic Otitis Media who underwent Modified Radical Mastoidectomy, (2) 23y/o female with Nevus occupying the entire diameter of the EAC who underwent excision via a combined postauricular and endaural approach, (3) 31y/o male with EAC osteoma and Chronic Otitis Media with Cholesteatoma formation who underwent excision of the mass and Radical Mastoidectomy.

The stenosis in the case of the congenital atresia affected the bony canal. Further widening of the canal diameter was accomplished by circumferential drilling. Additional skin grafting of the anterior canal area was needed in the case of the nevus excision.

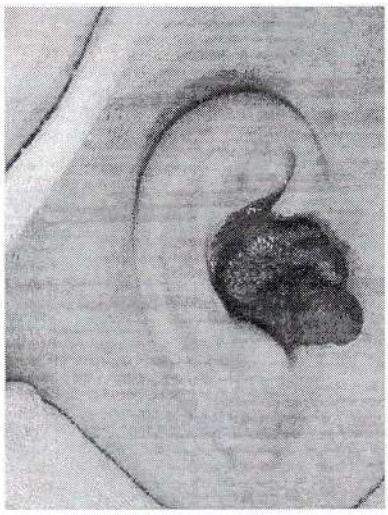

FIGURE 6A: Nevus of EAC

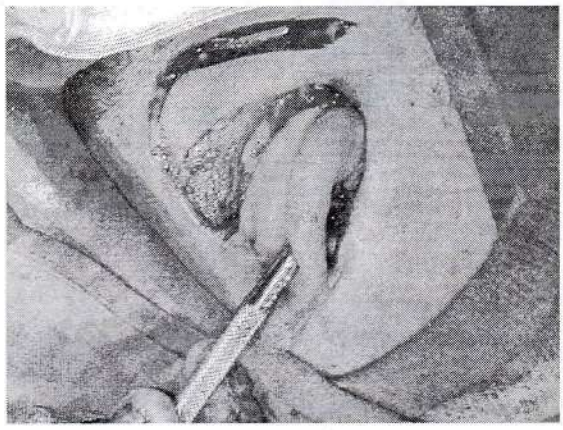

FIGURE 6B: Flap Design

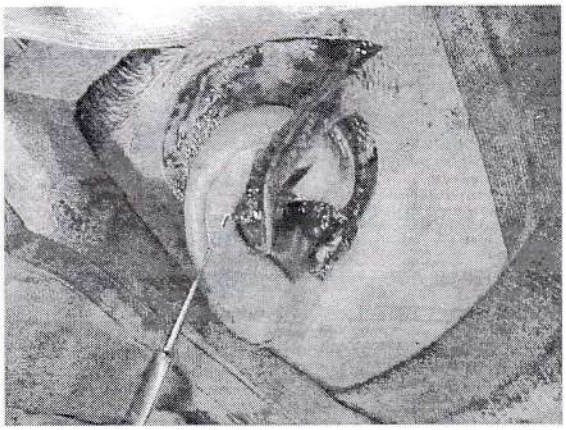

FIGURE 6C: Flap Elevation

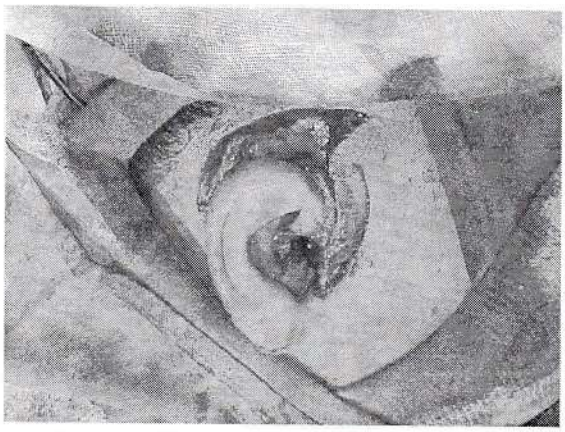

FIGURE 6D: Flap Transposition

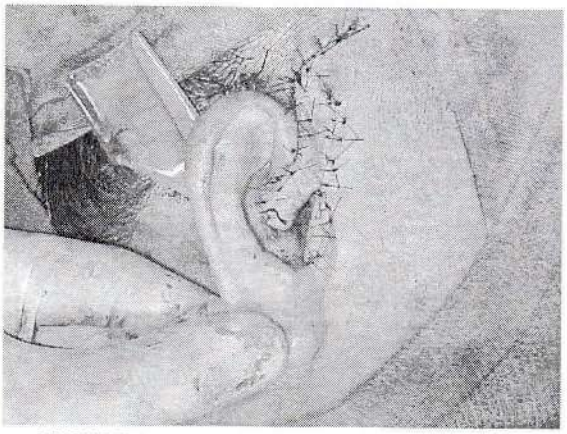

FIGURE 6E: Flap Secured To Recipient Size

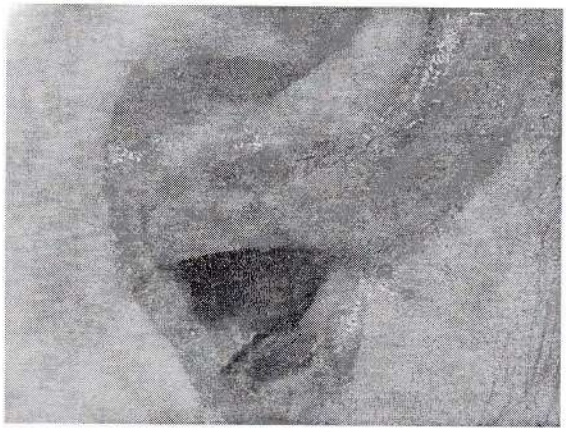

FIGURE 6F: One Month post operation

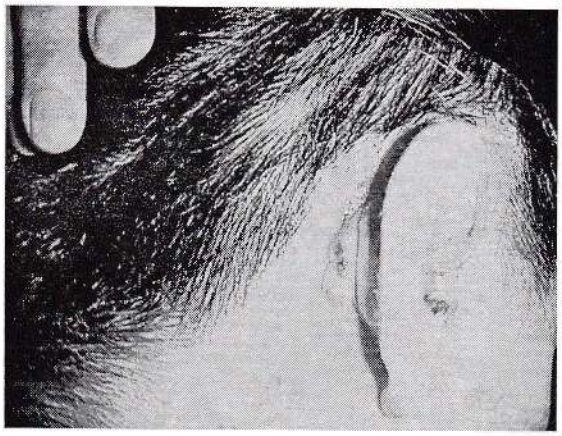

FIGURE 6G: Two months post operation

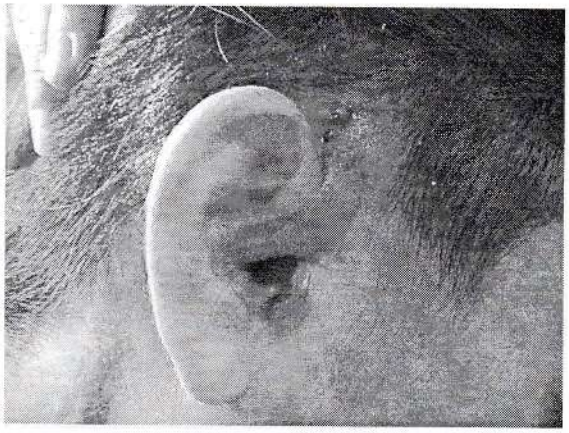

FIGURE 6H: The Donor Site

DISCUSSION

The external auditory canal must have an adequate diameter for the normal functioning of its self-cleaning mechanism and for inspections and manual cleansing when necessary. Stenosis can then result in a marked physical and functional impairment.

There are numerous advocated surgical techniques reported to address this problem, the most popular of which is the use of skin grafts. Since skin grafts may provide only a temporary solution because of wound contraction and cicatric shrinking which causes progressive reduction of lumen size, the main option is the use of skin flaps.[2,3,4]

In East Avenue Medical Center Department of Otorhinolaryngoly-Head and Neck Surgery OPD, forty percent (40%) of patients seen belong to the otology section. A significant number of these are those with chronic mastoid infection who eventually undergo surgery. Among the common noted post surgery morbidity is soft tissue stenosis of the external ear canal. Other encountered cases requiring canal widening and reconstruction are benign tumors, post-trauma, and congenital stenosis.

In all three cases, the flaps reached the defect without difficulty and the donor sites were closed primarily. The flaps survived without signs of vascular stasis. The diameter of the reconstructed canals were noted to be larger as compared with the normal opposite ears. Color match and texture of the flaps were excellent. Two of the patients were followed up to more than a year and no constriction of the reconstructed canals were seen. The other patient was followed up for three months and, likewise, showed no diminution in canal size. Manual cleansing and inspections were easily done.

In our three cases, we found that our technique is adaptable for the partial reconstruction of the stenosis of the external auditory canal. The advantages of our flap are as follows:

1. Reconstruction of the canal can be carried out with a single flap at a single stage.
2. Viability of the flap is ensured by the good vascularity provided by the postauricular artery.
3. The flap length and/or width can be easily varied.
4. Restenosis, a common complication of skin grafts is minimized.
5. Relative ease of dissection.
6. Aesthetically acceptable scar and the donor site can be primarily closed.
7. Skilled and novice surgeons can perform the procedure.
8. Postoperative cleansing and inspections of the reconstructed canal can be easily accomplished, even in pediatric patients.

In excisions of larger lesions, (malignancies, circumferential canal defects), additional skin grafts or use of dual flaps would preclude the use of our flap. In individuals with more anterior hairlines, hair maybe present in the flap, thus, periodic removal of hair may be indicated.

CONCLUSION

We conclude that our Postauricular Cutaneous Flap is a good and reliable method of partial reconstruction of External Auditory Canal Stenosis. It can be performed not only by experienced surgeons but also by training residents as a surgical option to decrease the morbidity of middle ear and external auditory canal surgeries.

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ENDOSCOPIC-ASSISTED TREATMENT OF LOW CONDYLAR FRACTURE*

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ABSTRACT

OBJECTIVE: To present an endoscopic-assisted trans-oral open reduction and internal fixation of low condylar fracture
DESIGN: Surgical innovation
SETTING: Tertiary government hospital
SUBJECT: One patient with mandibular fractures, condyle, left, and body, right (s/p open reduction and interosseos fixation of mandibular fracture, body, right, and an unsatisfactory result of intermaxillary-mandibular fixation for six weeks for the treatment of condylar fracture)
RESULT: An endoscopic-assisted transoral open reduction with limited incision and internal fixation using lag screws of a subcondylar fracture has been described. Post-operatively, the patient had no facial nerve injury and minimal cutaneous scarring. Repeat panoramic radiography revealed adequate reduction and fixation. The pre-operative complaints of pre-auricular pain and unstable occlusion resolved. Early mandibular mobilization and normal oral functions were likewise achieved.
CONCLUSION: Endoscopic-assisted trans-oral open reduction and internal fixation using lag screws can be a safe, easy, and reliable approach to treatment of low condylar fractures. This method combines the advantages of reducing the risk of iatrogenic damage to facial nerve and external scarring in a trans-oral approach and the rigidity in fixation leading to early jaw mobilization by the use of lag screws in an external approach.

INTRODUCTION

Treatment of condylar fractures has remained one of the most complex and controversial issues in mandibular fracture management. Although there is a general agreement about conservative, closed management with early mobilization for intracapsular (condylar head) fractures, numerous series argue against this management for all extracapsular (condylar neck) fractures.[1] According to Cummings, the standard treatment for most unilateral condylar neck fractures is a short period of intermaxillary-mandibular fixation (10 to 14 days) followed by progressive mobilization and placement of elastics at night for an additional two weeks. Rigid fixation techniques should be applied to any accompanying body or angle fractures to ensure that early mobilization is possible. If rigid fixation is not used on these fractures, thus necessitating a six weeks period of intermaxillary-mandibular fixation, the intermaxillary-mandibular fixation should be briefly released every two weeks to allow for jaw opening exercises. This reduces intra- and pericapsular fibrosis.[2]

Though closed reduction is the method most widely employed, some advocates open reduction and rigid fixation as a reliable method of anatomically restoring condylar position. However, established surgical methods of open repair have not gained universal application because of the risk of facial nerve transection, external facial scarring, impaired fracture visualization, and difficult dissection and fixation.[3,4] Yet recent journals comparing the open and closed treatment of condylar fractures showed that open reduction had better occlusal results,

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anatomic restoration and faster recovery rates than the non-surgical techniques.[5]

By using an endoscope-assisted extraoral and transoral approach for open reduction of condylar mandible fractures with limited incision, the risk of facial nerve damage and extensive visible scars are reduced. This paper would like to present an alternative treatment for low condylar fracture combining both the advantages of trans-oral approach and 'external' method.

Clinical History

E.M., a 27-year old male, from Davao City, was admitted for the first time at our institution due to painful mouth opening secondary to trauma. The condition started few hours prior to admission when patient figured in a fistfight sustaining injuries to the mandible. He noted pain on the right mandible, which was more severe with opening his mouth. Physical examination revealed swollen mandibular body, right, which was tender on palpation and note of step-deformity. Pre-auricular tenderness on the left was also elicited with pain on opening the mouth to 3 cm. No hyposthesia was noted and oral cavity examination revealed no mucosal break.

Radiographic examination revealed on postero-anterior view of the head a displaced, complete fracture of the mandibular body, right (Fig 1) and a laterally displaced fracture of the lower condylar neck, left. These were also confirmed in the oblique and Towne's views (Fig. 3).

The patient underwent open reduction and internal fixation of mandibular body fracture using wires while closed reduction was done on the condylar fracture. Intermaxillary-mandibular fixation using arch bars and wires were done to stabilize the mandible. However, six weeks post operation, the patient still complains of intolerable pre-auricular pain on the left and unstable occlusion. Repeat panoramic radiography revealed a persistently displaced condyle (Fig 4). Hence open reduction with fixation was planned for the condylar fracture.

Pre-operative radiographs:

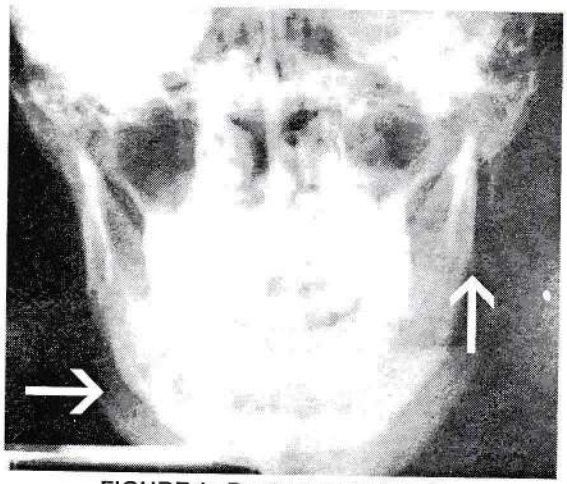

FIGURE 1: Postero-anterior view.

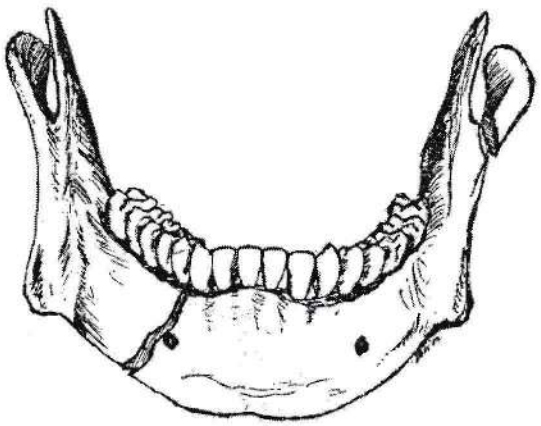

FIGURE 2: Mandibular body fracture right and condylar fracture left

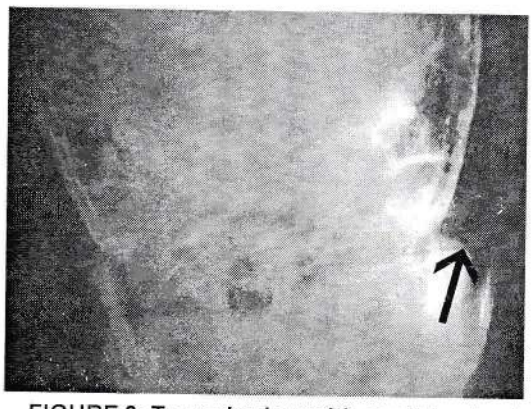

FIGURE 3: Towne's view with condylar fracture

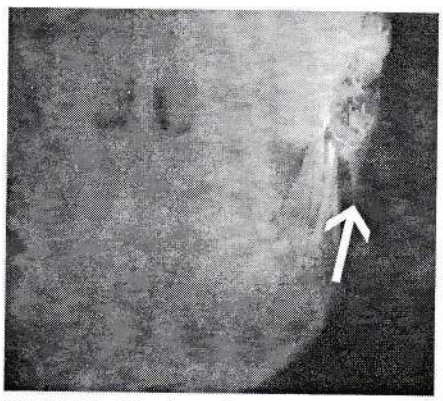

FIGURE 4: PA view. (yellow arrow showed dislocated condylar fracture, left)

MATERIALS AND METHODOLOGY

ENDOSCOPIC EQUIPMENT

The endoscope used was a 4-mm diameter, 0-degree rigid nasopharyngoscope (Karl Storz). The video attachment was Olympus video system (Olympus America, Inc) with 3-chip camera, light source (Olympus XLS), camera converter (Olympus 3C-TV), and monitor (OEV 201).

SURGICAL TECHNIQUE

1. ***Occlusion***

Best occlusion was established and stabilized using intermaxillary-mandibular fixation.

2. ***Incision***

A 3-cm vertical incision was made along the anterior border of the left ascending ramus of the mandible extending for a short distance down the lateral oblique line of the buccal surface of the mandible

3. ***Subcondylar exposure, optical cavity, and endoscope placement***

Optimal subperiosteal dissection was carried over the buccal surface of the proximal and distal fracture edges. The optical cavity for endoscope placement was created by elevating the entire soft tissues lateral to the ramus using a bended malleable retractor. The endoscope was placed trans-orally in the optical cavity. (Figs 5 and 6) A complete oblique displaced fracture was noted extending from the lower condylar head to the ramus of the mandible.

4. ***Reduction and fixation***

Granulation tissues and soft tissues in the fracture site were removed using a small curette. Using gauge-19 needle as guide, cutaneous puncture was created for trocar placement at a projected point perpendicular to the subcondylar fracture. Small stab incision using blade no. 11 and gentle hemostat dissection through the parotid gland and masseter muscle were done until the trocar was accommodated. Bone-holding forceps were applied and the fracture was pulled into reduction and stabilized. The trocar was replaced with a sheathed drill guide where subsequent drilling was done (Fig 7 and 8). Two pieces of 2.0 X 13mm lag screws under endoscopic visualization were placed to attain proper reduction and stable fixation.

5. ***Closure***

Buccal incision was closed using 3-0 chromic sutures.

6. ***Post-operative care***

The patient was maintained on intermaxillary-mandibular fixation for 2 weeks. Mouth opening was started a month after surgery and was maintained on blenderized diet per orem for a month.

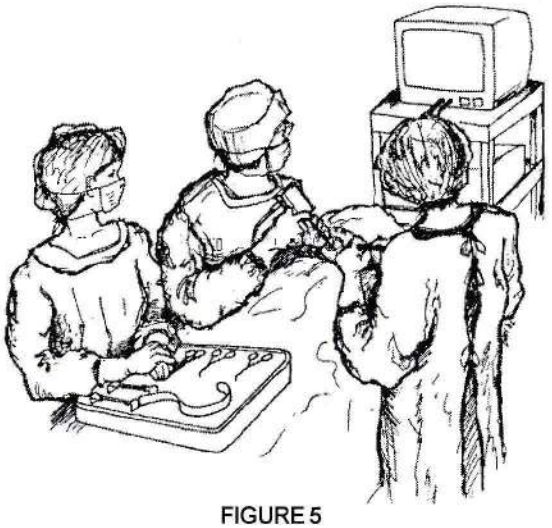

FIGURE 5

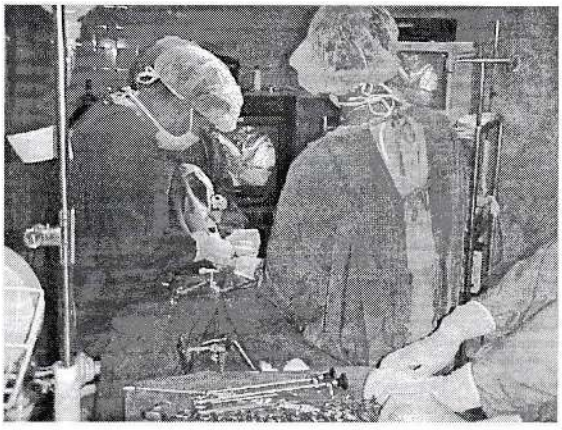

FIGURE 6

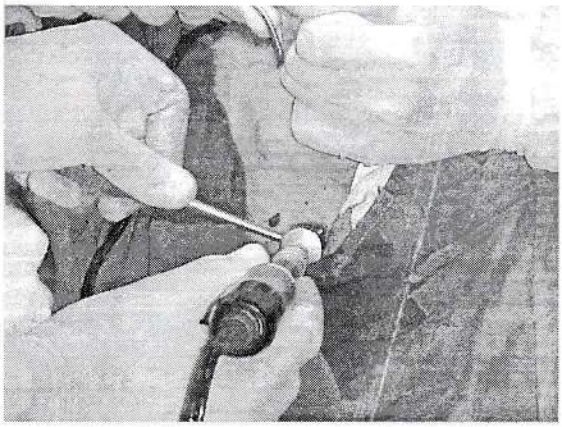

FIGURE 7: Percutaneous sheathed drilling

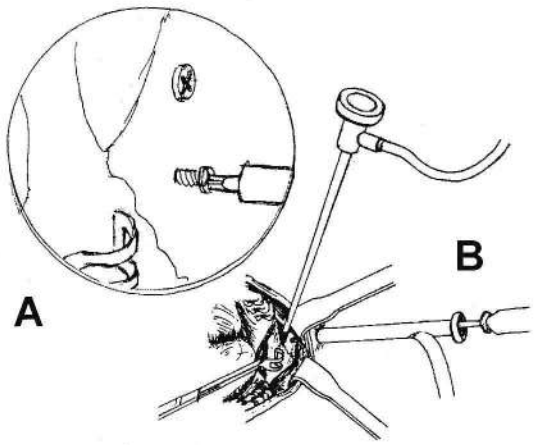

FIGURE 8: A. Endoscopic view of lag screw fixation. B. Macro view.

RESULTS

Patient had significant improvement post-operatively. Two weeks after surgery, the symptoms of pre-auricular pain and unstable occlusion resolved. No facial asymmetry secondary to facial nerve injury was noted. Immediate post-operative panoramic radiography revealed adequate reduction and fixation with lag screws (Fig 9). Approximation to normal oral function like early mobilization and absence of malocclusion were likewise achieved. One month after surgery, maximal inter-incisal distance on mouth opening was documented at 4.8 cm.

DISCUSSION

According to Cummings, indications for consideration of open reduction and internal fixation of condylar neck fractures include: 1) displacement of the condylar head from the glenoid fossa, 2) mechanical obstruction of jaw opening caused by a displaced condylar head, 3) telescoping of the proximal and distal fragments with the loss of vertical ramus height resulting in malocclusion, 4) displaced bilateral subcondylar fractures with malocclusion, 5) a unilateral or bilateral condylar fracture with severely comminuted midfacial fractures , 6) a comminuted symphysis fracture and condyle fracture with associated tooth or medically compromised adults with evidence of open bite or retrusion, and 7) an edentulous or partially edentulous mandible with posterior bite collapse and a displaced condyle.[6] Using these principles, our patient did not fit in the classical indications for open reduction and internal fixation. This was the main reason why we opted for a conservative management of the condylar fracture. However, the persistence of intolerable pre-auricular pain and unstable occlusion, and repeat panoramic radiography showing persistently displaced low condylar fracture unreduced by the intermaxillary-mandibular fixation prompted us to be more aggressive in the management.

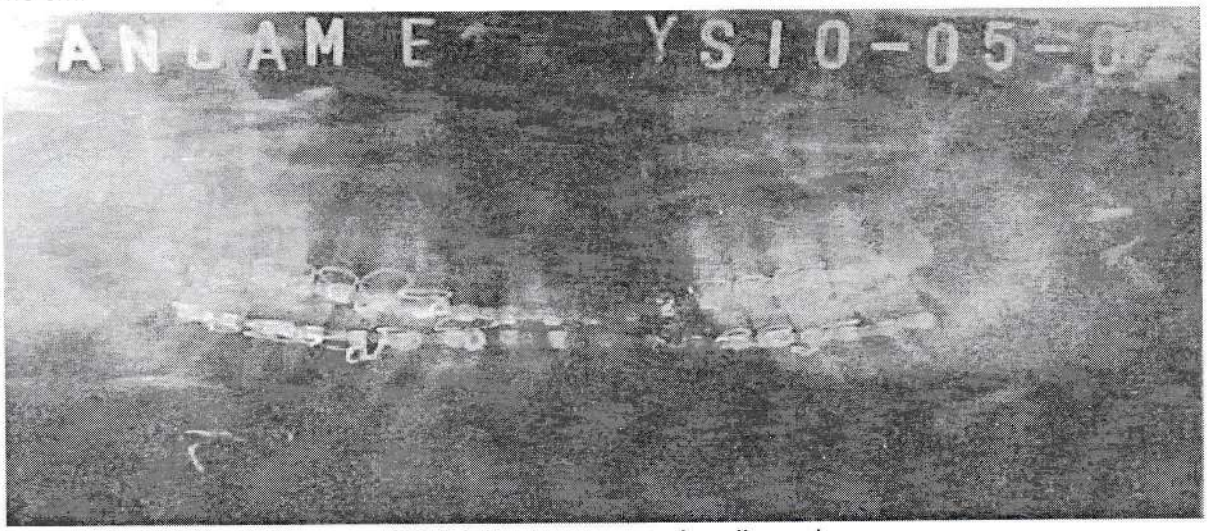

FIGURE 9: Post-op panoramic radiography

To date, there is no proof that any form of surgical therapy to realign a fractured condylar neck decreases the incidence of future degenerative problems within the joint, and that surgical exploration of the joint may worsen the damage if done injudiciously.[2] Unlike in pediatric population, adult fractures have very little capacity to self-correct malunited fractures anatomically.[8] Continued fracture mal-alignment leads to condylar head displacement and shortening of the mandibulat height.

Mathog proposed an approach thru an incision in the pre-auricular crease line from the lobule to the zygoma. This provides good exposure for adequate reduction either using

external pin fixation or interosseous wires. However, one must avoid the facial nerve and its branches, the superficial temporal artery and vein, and the maxillary artery deep to the condylar neck. Complications include salivary fistula formation and facial nerve paralysis or paresis.[7] These potential problems of 'external' approach were effectively reduced in a trans-oral method.

With the guide of the endoscope, the oblique fracture site was easily identified and reduced. Condylar fracture among adult population are usually oblique with posterior mandibular shortening from the lateral override of the proximal condylar segment over the ascending ramus.[8] Endoscopic subcondylar fracture repair is easier to perform in patients with lateral override at the fracture site, as seen in our case. Fortunately, majority (>90% as described by Lee, 1998) of the adult condylar fractures has lateral override, making this technique effective. Fixation was made possible by using only two 2.3 mm x 13 mm lag screws drilled percutaneously. Lag screws are indicated in the treatment of mandibular fractures to secure fragments when there is sufficient obliquity of the fracture such that the length of the overlap equals two or more times the thickness of the mandible.

The greatest advantage of this approach is the excellent exposure and visualization, which was classically possible only in open technique, with reduced risk of facial nerve injury and external scarring. Avoidance of facial nerve injury was achieved with gentle blunt hemostat dissection through the parotid gland and masseter muscle. Furthermore, the technique allowed rigid fixation, in this case we used lag screws but mini-plates can likewise be utilized, which can only be achieved in an external approach. The entire procedure would be technically be very difficult without the aid of the endoscope.

Post-operatively, the pre-auricular pain resolved and premorbid occlusion was restored. No facial nerve injury was noted and a visible scar was avoided. More importantly, there was good anatomic fracture reduction, restoration of normal condylar mechanics, and early jaw motion are tremendous advantages seen over conservative non-surgical management to condylar fracture.

CONCLUSION

Endoscopic-assisted trans-oral open reduction and internal fixation using lag screws offers a safe, easy and reliable approach to treatment of low condylar fractures. This method combines the advantages of reducing the risk of iatrogenic damage to facial nerve and external scarring in a trans-oral approach and the rigidity in fixation leading to early jaw mobilization by the use of lag screws in an external approach.

RECOMMENDATIONS

Greater sample size is recommended to further validate the conclusion. Furthermore, similar approach using titanium mini-plates instead of lag screws could also be done in the succeeding studies. Also, the early if not immediate removal of intermaxillo-mandibular fixation after surgery, as done by the authors, is another interesting area to explore in future studies.

ACKNOWLEDGMENT

The authors wish to thank Dr. Romeo Sanchez for his original illustrations in this paper.

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PLEOMORPHIC ADENOMA OF THE NASAL SEPTUM: A CASE REPORT*

JAREN R. CABUDOL, MD**
WINDOLYN PANGANIBAN, MD***

ABSTRACT

OBJECTIVE: To present a case of the most common benign epithelial salivary tumor identified in a highly rare location, the nasal cavity.
DESIGN: Case Report
SETTING: Tertiary Care Hospital in Metro Manila, Philippines
PATIENT: This is a case of a 67-year old male who consulted at the outpatient department due to recurrent epistaxis. Patient had one year history of gradually enlarging left intranasal mass. Initial punch biopsy of the mass showed results consistent with pleomorphic adenoma.
RESULT: Patient underwent excision of left intranasal mass via gingival incision and lateral osteotomy. Final histopatholgy results showed pleomorphic adenoma, left intranasal mass. Review of literature shows that its presence in the upper respiratory tract is highly unusual and it is indeed microscopically differentiated from salivary gland adenoma, its most common location.
CONCLUSION: The rare location of the lesion and the success of surgical treatment motivated the submission of this case report. Normally, minor salivary glands are located intra-orally, and are very rarely found in the nasal mucosa. This may be a result of embryological vestiges of salivary tissue in the nasal mucosa.

INTRODUCTION

Nasal tumors are infrequent. The most commonly seen in the nasal cavity are epithelial papilloma, angioma, transitional cell carcinoma, pavement carcinoma and adenocarcinoma.

Other less frequent tumors seen in the nasal fossa are divided into two categories: neural in origin (glioma, meningioma, olfactory neuroblastoma and neurilemmona) and non-neural in origin (osteochondroma, chondrosarcoma, leimyosarcoma, hemangiopericytoma, adenoid carcinoma, oncocytoma and pleomorphic adenoma).[1]

Pleomorphic adenoma or benign mixed tumor is the most frequent tumor in the major and minor salivary glands. It was described for the first time in 1929 by Denker and Kahler.[2] Next, by Stevenson in 1932, and Weidlen[3] in 1936. Compagno and Wong conducted a study of 40 cases of pleomorphic adenoma of the nasal cavity in the period between 1949 to 1974.[4-5] Though it is the most common benign glandular tumor originating in the head and neck, approximately only 6.5% of pleomorphic adenomas occur in the minor salivary glands,[6] and among these, only 1 % would occur in the nasal cavity and nasopharynx.[7]

For histopathologic diagnosis of mixed tumor, it is necessary to have two types of cells: on one side, epithelial and myoepithelial cells and on the other , stroma of fibroid, myxoid, chondroid, vascular or myxochondroid characterisitics. Treatment is surgical, either conservative or radical, depending on the progression characteristics of the tumor.[8]

CASE REPORT

This is the case of J.G., a 67-year old male from Marinduque who consulted atSLMC-OPD last November 26, 2001 due to recurrent epistaxis.

History started one year prior to consult, when patient noted a mongo-sized mass in the left nostril. This was associated with occasional epistaxis, left, brought about by manipulation of the left nasal mass. This would spontaneously stop or be relieved by cold compress or pressure

*First Place, PSO-HNS Clinical Case Report Contest, April 19, 2002, Subic Freeport Zone, Olongapo City
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***Consultant, Department of Otorhinolaryngology-Head and Neck Surgery, St. Luke's Medical Center

over the nose. There was no increase in the size of the mass, however, mild epistaxis would occur intermittently. No other symptoms were noted. No consult was done, at this time. Two months prior to consult, patient noticed increase in the size of the left intranasal mass to about a corn-kernel sized mass almost obliterating the left nostril. There was still persistent epistaxis which was relieved by pressure over the nose. Other symptoms include anosmia, nasal congestion and post-auricular pain on the left. No epiphora, facial numbness, dyspnea nor other symptoms noted. He consulted a private physician in their province and was given antibiotics and hemostatics affording temporary relief.

1 month prior to consult, there was progressive increase in the size of the mass, which was now obliterating the left nostril. There was also increased amount and frequency of epistaxis occurring almost everyday amounting to half a cup. Another consult was done in their province, he was advised to continue hemostatics and was referred for further ENT evaluation, hence consultation at our outpatient department.

On physical examination, there was note of a fleshy, fungating mass completely obliterating the left nostril (Fig. 1), with bleeding on manipulation. Septum was also noted to be deviated towards the right. The rest of the physical examination was normal.

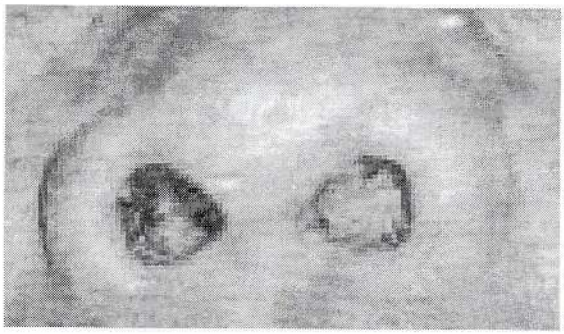

FIGURE 1
Left Intranasal Mass

CT scan of the paranasal sinuses done revealed a polypoid mass lesion measuring approximately 2.3 x 2.8 x 1.8 cms within the anterior left nasal cavity (Figs. 1 & 2).Punch biopsy of the left intranasal mass done revealed pleomorphic adenoma.

Patient then underwent wide excision of intranasal mass via transgingival approach with lateral osteotomy . Intraoperatively, it was found to be attached to the nasal septum. The mass was severed from its mucosal attachment using forceps preserving the septal cartilage. Anterior nasal packs applied, using uterine strips coated

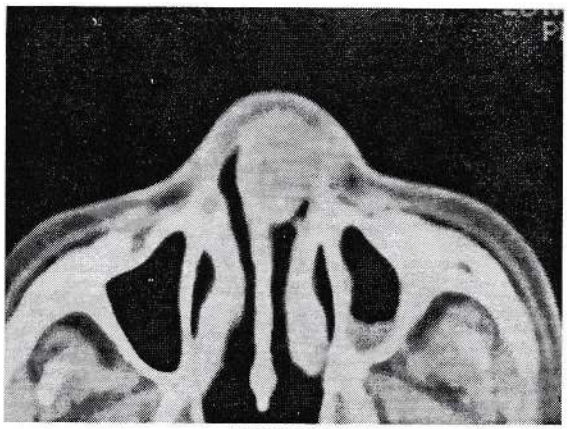

FIGURE 2
Axial View of Septal Mass, Left

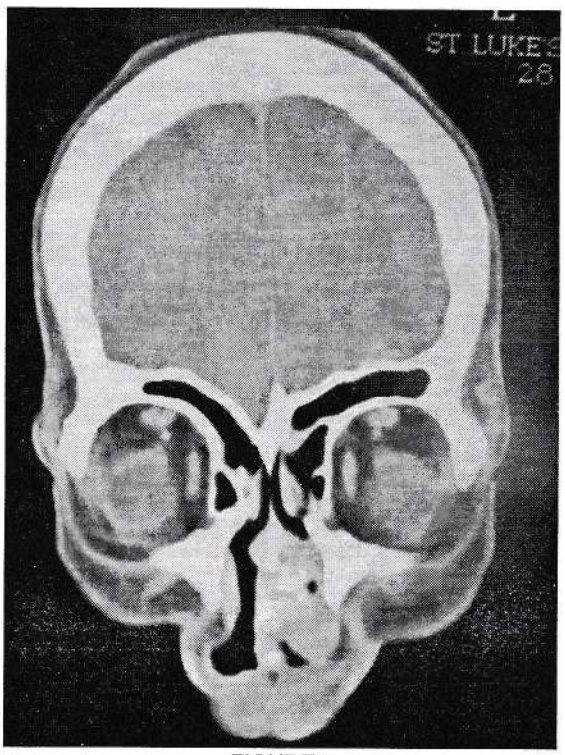

FIGURE 3
Coronal View of Septal Mass, Left

with antibiotic ointment. Specimen was sent for histopathologic analysis.

Post-operatively, packing was removed after 5 days, afterwhich, frequent nasal doucheing was done for crust removal. Immediate and late post-operative periods were complication-free (Fig. 4).

Histopathologic results, showed islands of epithelial cells with myoepithelial cells embedded in a fibromyxoid, fibrohyalinized and chondroid stroma. Hence, it was diagnosed as mixed tumor, Pleomorphic Adenoma, left Intranasal mass.

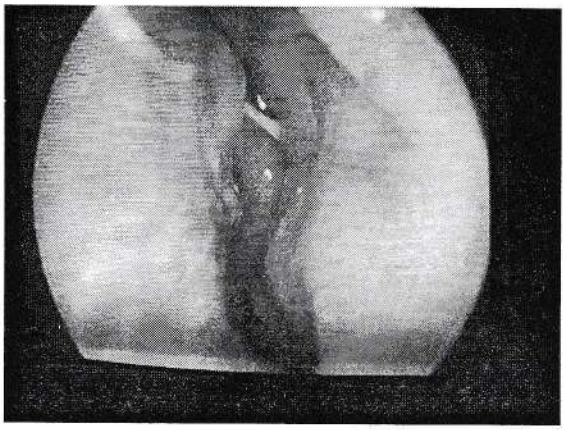

FIGURE 4
Post-op, Left nasal cavity

DISCUSSION

Salivary gland tumors comprise approximately 3% of all neoplasias .Out of these, most of them are benign and about 70% are pleomorphic adenomas.[9] Pleomorphic adenoma, a mixed tumor, occurs commonly in the major salivary glands which include the parotid, submandibular, sublingual. According to Batsakis (1979), minor salivary gland tissue is distributed in the mucosa of the lips and cheeks, palate, floor of the mouth, tongue, retromolar area and peritonsillar region. Histologically identical glands can be found in the nasopharynx, paranasal sinuses, larynx and trachea. Other locations for salivary gland tissue are considered abnormal, described as **HETEROTOPIA.** This term is defined as a mass of tissue that is histologically normal for an organ or tissue, but foreign to the site where it is located (Batsakis, 1986).[10] Approximately, 8% of pleomorphic adenomas are located in minor salivary glands and most frequent location is the oral cavity[9] specifically, the palate.[11] Though, it is rarely located in the lacrimal glands, it is highly exceptional in the nasal cavity. Rare as it may seem, cases of pleomorphic adenoma of the nasal cavity have been described by Spiro et. al (1977) wherein 11.8% of minor salivary gland tumors are benign and only 1% of the tumor is found in the nasal cavity and nasopharynx.[7] These results have been supported by several studies done by Compango and Wong (1977) (40 cases, USA), Suzuki et.al (1990) (41cases), Wakami et.al (1996) (59 cases, Japan) and Hassau Iqbal, et.al (2000). This type of tumor generally originates from the septal mucosa specifically the quadrangular cartilage followed by nasal external wall especially in the turbinates.[8] This was further verified by Suzuki et.al in a series of 41 cases of pleomorphic adenomas of the nasal cavity in Japan showed that only 9.8% originated in the lateral wall of the nasal cavity and all other cases
are from the nasal septum.[12] These findings agree with two similar reviews by Compagno and Wong(1977) and Wakami et.al (1996).

As to the origin of pleomorphic adenoma of nasal septum, there are many theories about it. One says that it would have originated from embryological debris of vomer-nasal organ or Jacobson's organ, a 6-mm long meatus with epithelial recovering, located in the cartilaginous portion of the septum, close to nasal-palatine orifice, which normally disappears early, but may persist in some adults (Stevenson, 1932).[13] Other says that it would have originated from aberrant cells of recovering epithelium of nasal septum (Ersner and Saltzaman, 1944).[14] A third says that it would have originated from ectopic glandular salivary tissue (Evans and Cruicksbank, 1970).

The majority of intranasal pleomorphic adenomas occur between the third and sixth decades of life, and are seen more frequently in women with no apparent race predilection. The clinical signs of this tumor are non-specific but most patients present with a painless, unilateral nasal obstruction, a mass within the nasal cavity, and epistaxis. This sort of tumor has no specific appearance and main diagnosis is based on histology. Typically, clinical description is of a polypoid, smooth, lobular, firm, gray mass or nodule with a well-defined capsule.

Histologically, pleomorphic adenoma of the nasal cavity contain both mesenchymal and epithelial components. Although, similar to tumor commonly seen in the major salivary glands, the histopathologic features of mixed tumor of the nasal cavity differ in certain characteristics.[15] Indeed, it differs from salivary gland adenoma for the predominance of the cellular component over the connective component. The epithelial cells are small, oval-shaped and often arranged in cordons; they are sometimes organized in small acinous structures.[16]

It is widely agreed that the treatment of choice for pleomorphic adenoma in the nasal cavity is local surgical with histologically clear margins (Compango and Wong, 1977; Suzuki et.al., 1990; Couloigner et.al., 1993).[2,4-5] Approaches depend on size and location and include intranasal excision (Wakami et.al., 1996),[16] facial degloving (Castello et.al., 1996)[15]

and lateral rhinotomy (Worthington, 1977; Nonomura, 1992).[2,17]

CONCLUSION

After encountering such common benign salivary gland tumor in a very unusual location, the nasal cavity, pleomorphic adenomas should be considered in the differential diagnosis of nasal tumors, and in view of their potential for recurrence, cases should be kept under review.

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A MASSIVE CERVICOFACIAL TERATOMA IN A NEWBORN "THE WHYS, THE HOWS AND THE WHERE TOS"*

MELVIN G. BERIN, MD**
CHESTER ROSARIO PUÑO, MD**
GIL M. VICENTE, MD, FPSO-HNS***

ABSTRACT

OBJECTIVE: To report a case of a massive cervicofacial teratoma in a newborn

SPECIFIC OBJECTIVES: 1) To describe a case of a massive cervicofacial teratoma in a newborn, its physical features and clinical presentation 2) To elaborate theories on pathogenesis 3) To discuss the question of definitive diagnosis and issues of malignancy 4) To discuss the management options and surgical complications
DESIGN: Case Report
SETTING: Tertiary Government Hospital
PATIENT: A female neonate
Conclusion: A case of a massive cervicofacial teratoma in a newborn was herein presented. Its possible mechanism of development, differential diagnoses and surgical dilemmas were likewise discussed.

INTRODUCTION

Cervicofacial teratomas are extremely rare neoplasms. They occur in about 1 in 20, 000 to 40, 000 live births. Head and neck teratomas account for approximately 5% of all neonatal teratomas. In the Philippines, teratomas of the cranium have been reported since the early 60's. Head and neck teratomas are most often benign in their histology, but result in a high degree of morbidity and possible mortality by virtue of their size and location. The enormous dimension of these tumors can be a prelude to airway obstruction. Further invasion to adjacent soft tissues in the neonatal host, a sign of malignant degeneration, occurs in much higher frequencies (>90%) in cases of cervical teratomas not diagnosed or treated until late adolescence or adulthood. Untreated lesions are associated with a mortality rate of more than 80%.

The purpose of this paper is (1) to present a case of a massive cervicofacial teratomas in the newborn, (2) elaborate possible intrauterine events leading to its development, (3) discuss the differential diagnoses (4) analyze the course of a surgical or non-surgical management; (5) and tackle the issue of fluid and hemodynamics and the problem of reconstruction in the surgical management of this patient.

THE CASE

A full term female was delivered via caesarian section to a 34 year old G3P2 in a government maternity hospital. The neonate had a gestational age of 38 weeks by LMP, an Apgar score of 7 and 9 at 1 and 5 minutes, respectively, a Ballard score of 38 and a birth weight of 5.27 kilograms. 1 ½ months prior to delivery, maternal abdominal ultrasound already detected 14 x 8.6 x 11.7 cm hyperechoic area suggestive of a cystic mass. Immediately following delivery a huge mass was noted at the right cervicofacial region. After initial neonatal care, she was brought to our institution for further evaluation and management. The patient was admitted under Pediatric service at the neonatal intensive care unit. She was referred to the department of Otorhinolaryngology.

*Second Place, PSO-HNS Clinical Case Report Contest, April 19, 2002, Subic Freeport Zone, Olongapo City
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On physical examination a 37 x 20 x 11 cm cystic mass in the cervical area starting from the right posterior triangle to the midline of the neck, then ascending to the ipsilateral side of the face until the frontal area was noted (Figures 1 and 2). Its horizontal span in the head was from the right pre-auricular area to the nose. The right buccal mucosa was bulging medially. The tongue however was freely mobile. She was not in respiratory distress. No subcostal nor intercostal retractions were noted. An orogastric tube was inserted and IV fluids were also infused. Ampicillin and Gentamycin per IV were started.

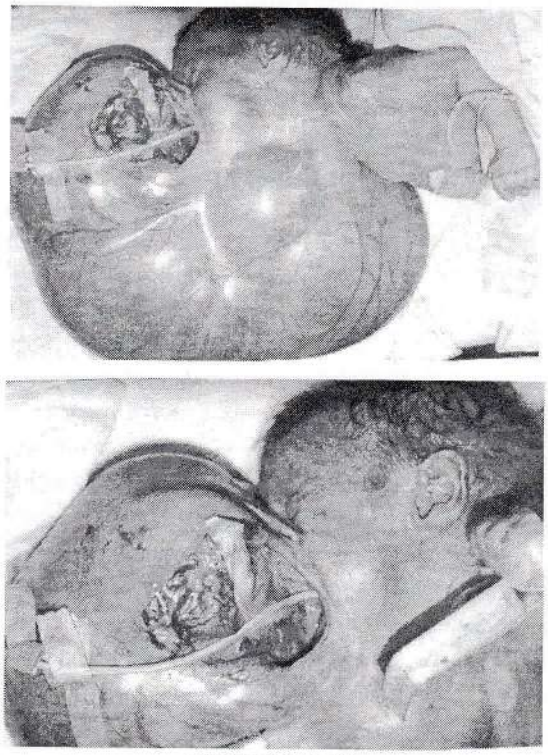

FIGURE 1 and 2
The patient with a 37 x 20 x 11 cm cervicofacial mass.

On the third hospital day, a tight air exchange was noted on auscultation. Medications were shifted to Ceftazidime and Amikacin on the fifth hospital day. Blood transfusion was also started on the same day and infusion of sodium bicarbonate as well. On the sixth hospital day, Oxacillin was started. Fresh frozen plasma was also transfused.

CT scan on the seventh hospital day revealed a predominantly cystic, septated slightly enhancing mass originating from the right side of the neck producing positional head and facial morphological distortion (Figures 3 and 4). The said mass was extracranial and extrathoracic with a mass-to head ratio of 2:1. On the tenth hospital day serial aspiration of the cystic mass 10 ml every 4 hours was done. Progressive signs of airway obstruction were noted.

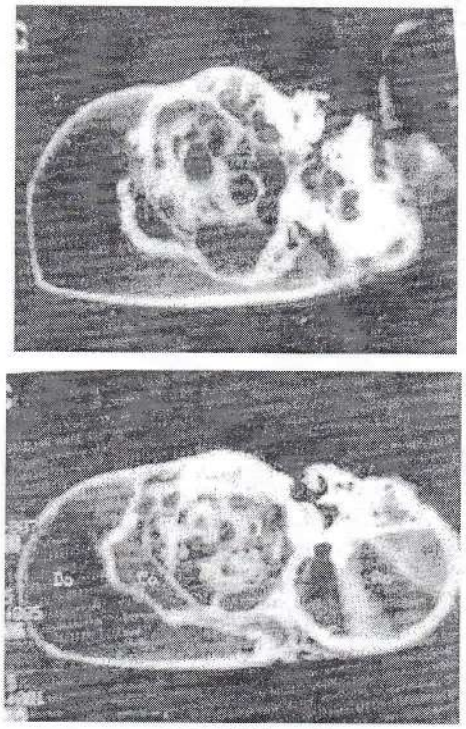

FIGURE 3 and 4
Cystic mass originating from the right side of the neck producing positional head and facial morphological distortion.

The patient was operated on the eleventh hospital day. By the second hour of operation the drapes soaked with cystic fluid were changed prompting the patient to be lifted from the operating table. A few minutes later she had bradycardia. A thorough search for its cause revealed a displaced orotracheal tube. Subsequently the patient went into cardiorespiratory arrest. She eventually expired after 15 minutes of cardiopulmonary resuscitation. Completion of the surgery proceeded post-mortem and the specimen was sent for final histopathological diagnosis. The reading came out as a mature cystic teratoma (Figures 5, 6 and 7).

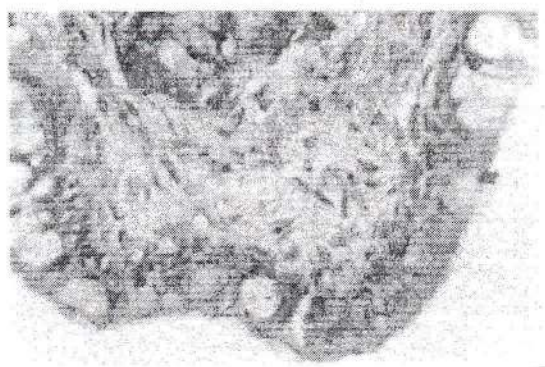

Figure 5
Microscopic view of the teratoma showing glandular elements.

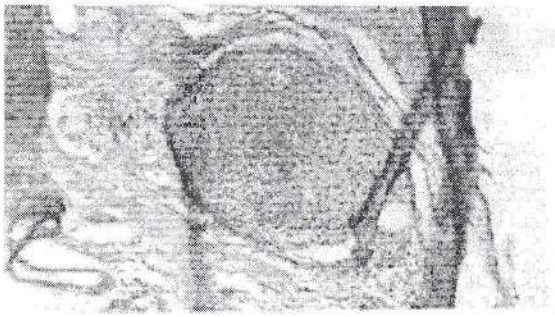

FIGURE6
Microscopic view of the mesodermal component of the teratoma showing cartilage

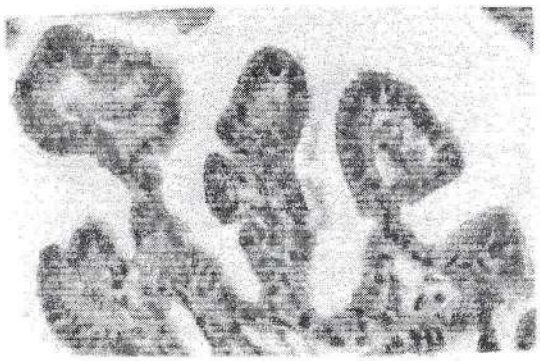

FIGURE 7
Microscopic view of the mesodermal component of the teratoma showing blood vessels

DISCUSSION

The salient features of this case are: a huge cervicofacial mass presenting in a newborn and behaving in a malignant manner. The size of the mass in itself draws interest as its enormity rivals the patient's head short of a 3:1 ratio. Its congenital presentation merits inquiries regarding in utero survival. An attempt to explain the pathophysiology of the case is likewise presented. Its malignant manifestation warrants considerable attention as to its definite nature and subsequent mode of management.

This case raises several highlights: (1) its pathophysiology; (2) the question of definitive diagnosis and issues of malignancy (differential diagnoses); (3) the dispute between immediate or delayed surgical intervention and (4) the problem of fluid, hemodynamics and reconstruction in surgery.

PATHOPHYSIOLOGY

A mass 37 x 20 x 11 cms in a newborn naturally elicits awe and amazement. This is a mass almost three times her head, and nearly the same size as her body. Questions arise in mind, foremost of which seek explanation for this phenomenon. How did it grow so huge? How could the fetus have survived despite harboring this humongous mass? What factors could have contributed to the evolution of a mass with this magnitude? Three possible explanations are presented which offers to elucidate this case: (1) Maternal factor (2) Fetal factor (3) and the X-factor.

Maternal Factor (Figure 8). In mammals, the maternal organism is the physical environment of the embryo as well as the immediate source of metabolites needed for maintenance and growth. Consequently, the physiologic state of the mother is of considerable importance. The efficiency of the maternal-embryonic interchange by way of placenta could be a factor in teratogenesis. Although maternal history per record showed no predisposing illness, exposure to teratogens or ingestion of the same, still the possibility of having missed a significant teratogenic factor remains. Excess of essential nutritional requirements or significant lack thereof can trigger abnormalities in the fetus. And after the tumor has formed, additional nutritional support through maternal ingestion subsequently nurtured the same to such considerable size. In much the same light as the transplacental route of teratogenesis, proteins and antibodies, which are defense factors, likewise cross from the mother to the fetus. These protective antibodies could be the reason for the fetus' fitness for survival despite a humonguous mass. This case is akin to a mother supporting twin fetuses, that while nurturing one fetus in utero, she was also fostering the other, in this case a tumor.

Fetal Factor (Figure 9). According to one theory, teratomas may arise from germ cells as indicated by the fact that they are most often located in the gonads. In their course of migration during embryogenesis, these tumors or developmental malformations arise from these primordial germ cells. The other theory asserts that they originate from multipotential embryonic nest that are displaced during ontogeny. It is now generally accepted that teratomas may arise from germ cells and non-germ, embryonic cells. As these tumors arise, the fetus now becomes a

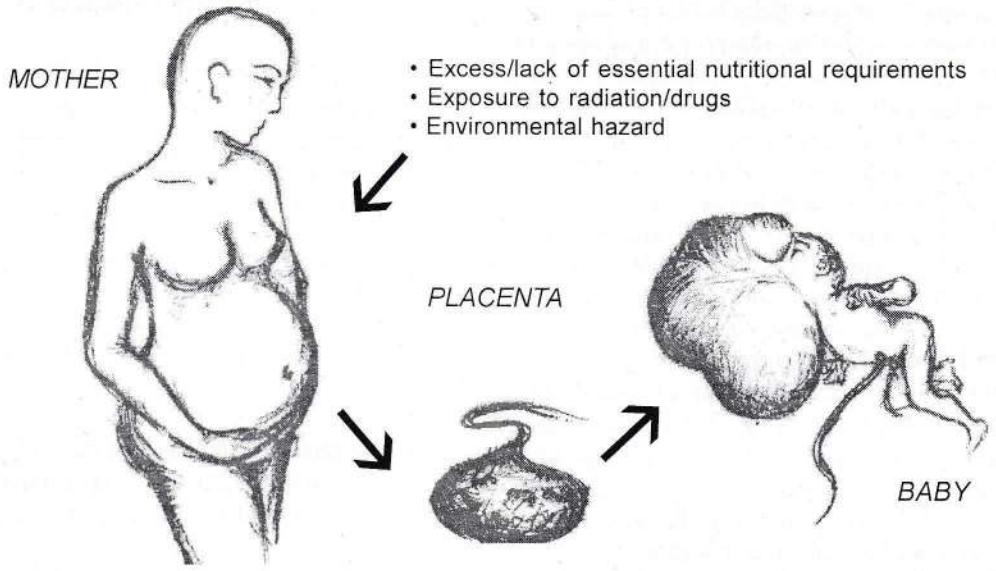

FIGURE 8: Maternal Factor

host to these neoplasms, feeding and nourishing them. More appropriately, the fetus now acts as a conduit of nutrition and a bridge for support between the teratoma and the pregnant mother. Still, the primary source of nourishment for these tumors is the maternal host, though indirectly, as blood courses through the fetus before it reaches the tumor. In turn, the fetus must have its own intrinsic capabilities to subserve the teratoma. All the nutritional support from the mother could have been the fetus', by natural right, were it not for this tumor that grew with her. These tumors can stretch skin, invade and distort bones and displace soft tissues, a fact confirmed by intraoperative findings. They must gain blood supply through angiogenesis if only to achieve enormous sizes. How do growing tumors develop a blood supply? Tumor-associated angiogenesis

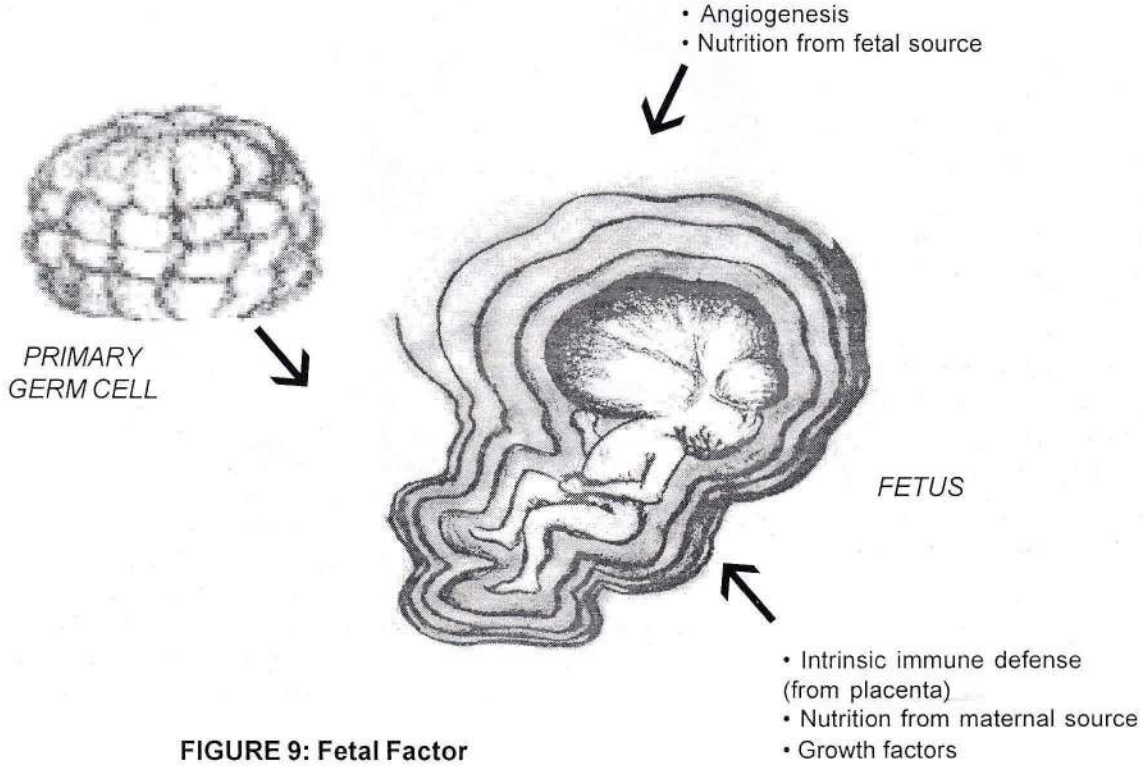

FIGURE 9: Fetal Factor

factors may be produced by tumor cells or may be derived from inflammatory cells that infiltrate tumors. Among the best characterized are fibroblast growth factors (FGFs), tumor growth factors (TGFs), platelet derived growth factors (PDGFs) and vascular endothelial growth factors (VEGFs). To subserve all these needs, the fetus suffers compression, expansion, gross morphological deformity, and even nutritional deprivation. If she were the weaker type of fetus, death in utero would have killed the teratoma as well. But she survived and reached a full term gestational age, which is testimony to her intrinsic capabilities to play host to a giant tumor, keeping herself and her dependent viable through all of those 38 weeks in utero.

The X-Factor (Figure 10). The causes previously stated fall under either genetic or environmental factors. The genetic factors and/ or preconception factors leading to the development of human congenital malformations include heredity anomalies, somatic germ cell mutations (as exemplified in the current theory of teratoma formation) and chromosomal aberrations. Environmental or postconception factors in the formation of these anomalies include nutrition, irridation, drugs, maternal diseases or infections. The interplay of both genetics and environment account for another arbitrary category of congenital anomaly formation. The X-factor are the errors of growth and differentiation in the embryo unrelated to exogenous or hereditary factors and due only to the statistical probability that a small percentage of embryos will fail to undergo the intricate process of growth and differentiations. As it is, X is the unknown.

THE QUESTION OF DEFINITIVE DIAGNOSIS AND ISSUES OF MALIGNANCY (DIFFERENTIAL DIAGNOSES)

The most important question often asked by the patients complaining of a mass, or their relatives for that matter, is that of malignancy: "Doctor, is this cancer?". So that addressing this query is of paramount importance.

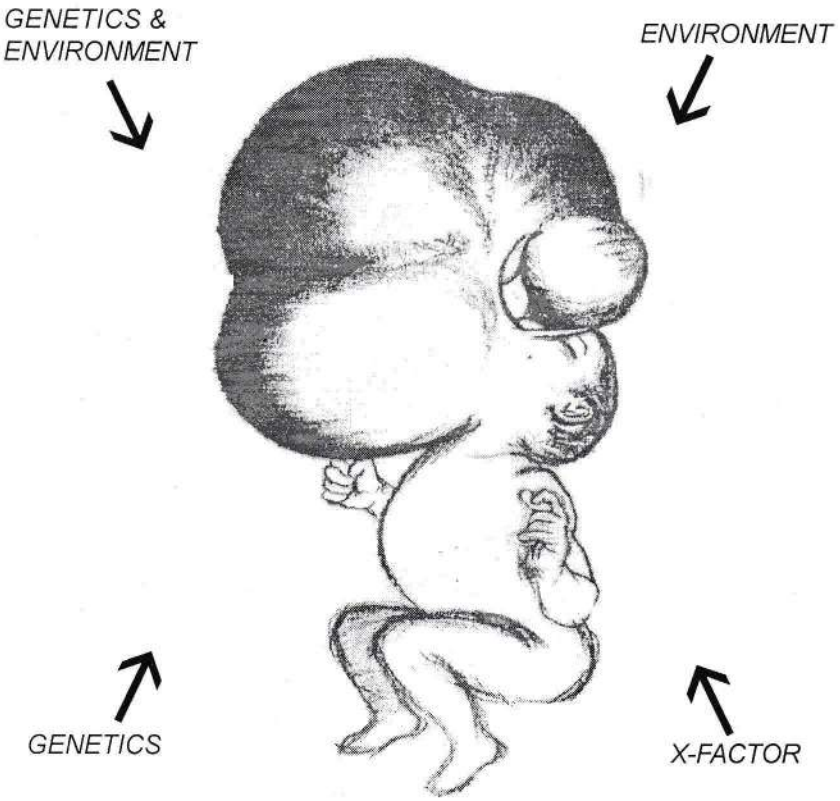

FIGURE 10: X-Factor

First we take into account that this mass already presented at birth. The congenital masses of the head and neck include branchial cleft cysts, thyroglossal duct cysts, lymphangiomas, hemangiomas, teratomas, dermoid cysts, laryngoceles, thymic cysts, venous malformations and sternocleidomastoid tumors of infancy. Congenital goiter and lipoma are other differential diagnoses. Or could this be an undeveloped twin?

The limited neck location of branchial cleft cysts, thyroglossal duct cysts, laryngoceles, thymic cysts, venous malformation (anomalies of the external jugular vein) sternocleidomastoid tumors of infancy and congenital goiter rule them out as diagnosis in this case. Although found at other sites like the orbit, nasopharynx and oral cavity, dermoid cysts typically present in the midline of the neck, usually in the submental region. The mass in question extended from the cervical region up to the face on the right rendering this side almost undistinguishable.

The typical red or bluish hue and characteristic bruit in hemangioma were not seen in this case. More likely, diagnosis would be a lymphangioma, which presents as a soft, smooth, nontender mass that is compressible and can be transilluminated. Another possibility on the hand, are teratomas, which characteristically do not transilluminate. They are usually ovoid, firm masses and may have palpable cystic areas. Majorities are fairly large at presentation, measuring between 5-10 cm in the longest axis. Typically they are midline lesions that tend to be more prominent on one side or the other. There usually is fixation to the deep cervical fascia and occasionally to the plastysma. Mobility, if present, is always in the horizontal plane, since the tumor is frequently attached to the hyoid bone or to a strand of fibrous tissue that is connected to the hyoid by the superior aspect of the pyramidal lobe of the thyroid. The initial diagnosis of the cystic hygroma, which is a type of lymphangioma, aside from its location, stemmed from a positive Transillumination test. This test may however be positive if light is introduced over the cystic component of the teratoma.

In 1922 Bland and Sutton described teratoma as an irregular conglomerate mass containing "tissues and fragments of viscera, belonging to a suppressed fetus attached to an otherwise normal individual". This old theory has been disproved however by Willis who found that the growth of teratomas is so different that is out of the question that it may be a suppressed fetus.

Practically, all of these congenital masses are benign in nature. Could we now assume that our mass is likewise benign? Not quite, because if this were teratoma, malignant forms can exist. However, they are not always easy to distinguish from the benign forms. Approximately 5% of neck teratomas were found to contain malignant elements. Distinguishing teratomas from other more benign masses is important so that surgical intervention is not delayed. Aside from their aggressive local infiltrative behavior, metastases of congenital cervical teratomas have been recorded. The metastatic sites have been included cervical lymph nodes, lungs, and liver. In children, the malignant component of head and neck malignant teratoma often takes the form of a yolk sac tumor (endodermal sinus tumor). Several treatments have been reported regarding this malignant type of teratoma, ranging from surgery alone to a combination of surgery, chemotheraphy and irridation. In this case, Final histopathologic diagnosis failed to show any indication of malignancy.

The question of malignancy, therefore has bearing not only on what mode of therapy to be employed, but also on the urgency of the procedure and the aggressiveness by which this procedure is to be carried out.

Distinguishing between cystic hygroma (lymphangioma) and teratoma is not without difficulty. Teratomas have ultrasound characteristics demonstrating both solid and cystic tissue components, but occasionally, the tumors have been incorrectly diagnosed as cystic hygromas. In this case, the patient's CT scan plates showed a predominantly cystic, septated, slightly enhancing mass. This would favor the diagnosis of cystic hygroma. Calcifications characteristic of teratoma were absent. The head and facial morphological distortion could suggest however an invasive lesion which swings towards the impression of a teratoma. At worst, this could possibly be a manifestation of a malignant behavior. Given this dilemna, surgery is usually the only way to arrive at a definitive diagnosis.

THE DISPUTE BETWEEN IMMEDIATE OR DELAYED SURGICAL INTERVENTION

Reasons cited in literature as to why an immediate surgical intervention is warranted in teratoma include the impending airway obstruction if the airway has not already been occluded by the size and location of the mass. The location of cervical teratomas, being adjacent to the airway is a very compromising situation. While majority of teratomas are in the sacrococcygeal region, which has no predisposition at all to airway compromise, the

5%, which are in the head and neck, almost always lead to difficulty of breathing, which is exactly what happened in this case. Airway compression may not be noted at birth, only to progress rapidly over several hours to life-threatening obstruction. Ward and April stated that surgical excision should be undertaken as an urgent, but not emergent procedure if the airway can be managed successfully. Gundry et al reviewed the literature and found that of 37 patients not operated on during the neonatal period, 29 (80%) died. This is in contrast to a mortality rate of 15 percent (10 patients) in the 66 patients who underwent surgical excision of the cervical teratoma. Of these 10 patients, four had their operation delayed from 4 days to 6 weeks postnatally and appeared to have died in the early postoperative period from ongoing respiratory distress. The malignant degeneration which occurs at much higher frequencies (>90%) in cases of cervical teratomas not treated until late childhood makes one contemplate of an immediate surgical intervention. The need to establish a definitive diagnosis for proper management likewise warrants immediate surgical intervention.

The reasons however for a delayed surgical intervention include a compromised general physical condition of the neonate, the absence of respiratory distress at birth, or conditions when surgical intervention after meticulous evaluation will not benefit the patient at all. Simply put, these are lose-lose situations. Whether the patient is to be operated on or not, her chance of survival is very slim if not downright nil. There is a 20% survival rate, after all, even without the benefit of surgery. Moreover, combination of chemotherapy with Bleomycin, Etoposide and Cisplatin produced complete remission in 70% of patients with germ cell tumor (teratoma being in this category).

The patient at the start had no respiratory distress. Aside from the mass, she appeared normal. The original plan of the service was to do an elective operation and to prepare the patient very well for this very invasive procedure. On the third hospital day, however, signs of respiratory distress were starting to show up. By the tenth hospital day, signs and symptoms got worst prompting the decision for surgical intervention the following day.

TABLE 1: Immediate versus Delayed Surgical Intervention.

Immediate Surgery	Delayed Surgery
• Provision of airway in cases presenting with obstruction • Prevents malignant degeneration • Early establishment of diagnosis for proper treatment modalities • 80% survival with immediate surgical intervention	• Thorough preparation of an immunologically compromised neonate • Indicated for those without airway compromise • Treatment of choice for lose-lose situations • 20% survival without surgical intervention • Teratomas respond to other treatment modalities like chemotherapy

THE ISSUE OF FLUID AND HEMODYNAMICS IN SURGERY

In the outset, the patient's birth weight was way over the average birth weight of a normal Filipino baby. At birth, a Filipino baby usually weighs 3000 grams or 6 ½ pounds. The weight of the subject was 5.28 kilograms. The margin between dehydration and fluid overload in an infant is small. The infant is born with a surplus of body water, but within a few days this is excreted. At birth and for the first 10 days of life, fluid requirements are 65 to 100 ml/kg. Because IV fluid orders are written as milliliters per hour this can be converted to 4 ml/kg/h up to 10 kg. For blood volume estimation, 85 ml/kg of body weight is used. For packed RBC, the transfusion requirement is calculated as 10 ml/kg. A mass 37 x 20 x 11 cm, nearly half the patient's body size, certainly takes up a significant amount of fluid and blood volume. Will the surgical procedure result in significant fluid and blood loss? If so, then the thin margin between dehydration and fluid overload takes meticulous attention if total excision of this humongous mass is to be completed. How much fluid to give? How much blood to transfuse? And at what rate of infusion? These are questions that need to be addressed if only to have an endpoint not just of a patient

free of mass, but, more importantly, a patient who is alive and well.

To answer the issue of fluid dynamics, its relationship with the patient's extracellular fluid. Specifically, it is trancellular fluid. This trancellular water compartment is influenced by transepithelial transport and, under normal conditions, is more accurately described as extracorporeal. Examples of transcellular fluid are those found in the gastrointestinal tract, bladder, cerebrospinal fluid, intraocular, pleural, peritoneal, and synovial fluids. Normally, the transcellular fluid compartment is less important than the extracellular and intracellular fluids, and takes up only 2% of an older child's total body water. Hence, excision of the mass would not result in a significant fluid shift despite its enormous size, so that the surgeon may not worry so much of a voluminous fluid loss.

The principle of intraoperative fluid replacement simply dictates compensation for the acute reduction of functional intersitial fluid that accompanies trauma, hemorrhage and tissue manipulation. The formulas above are then used for this purpose. Likewise, blood replacement is indicated only if the neonate has demonstrated circulatory instability or if considerable blood loss is anticipated. However, if the neonate is basically healthy and the anticipated blood loss is <25-30% of the blood volume and the final hemoglobin is in the range of 8g/dl, then blood transfusion probably can be avoided. The anesthesiologist can tailor the anesthetic to control the blood pressure and thereby reduce blood loss. In the neonate, fluid therapy should be administered at 2-3 ml/kg/hour of maintenance requirement plus the replacement fluid for trauma and blood loss.

RECONSTRUCTION

The extent of the mass in the cervical area started from the right posterior triangle to the midline of the neck, ascending to the ipsilateral side of the face until the frontal area. Its horizontal span in the head was from the right pre-auricular area to the nose. Excising a mass given such dimensions will leave a relatively large defect in this region of the head and neck.

In the case of Rothschild et al, after excision of a large cervical teratoma (confined to the cervical region and extended from the anterior vertebral bodies and one posterior triangle to the margin of the mandible and akin of the anterior aspect of the neck, effacing all normal anatomy), primary closure was done after removal of excess skin.

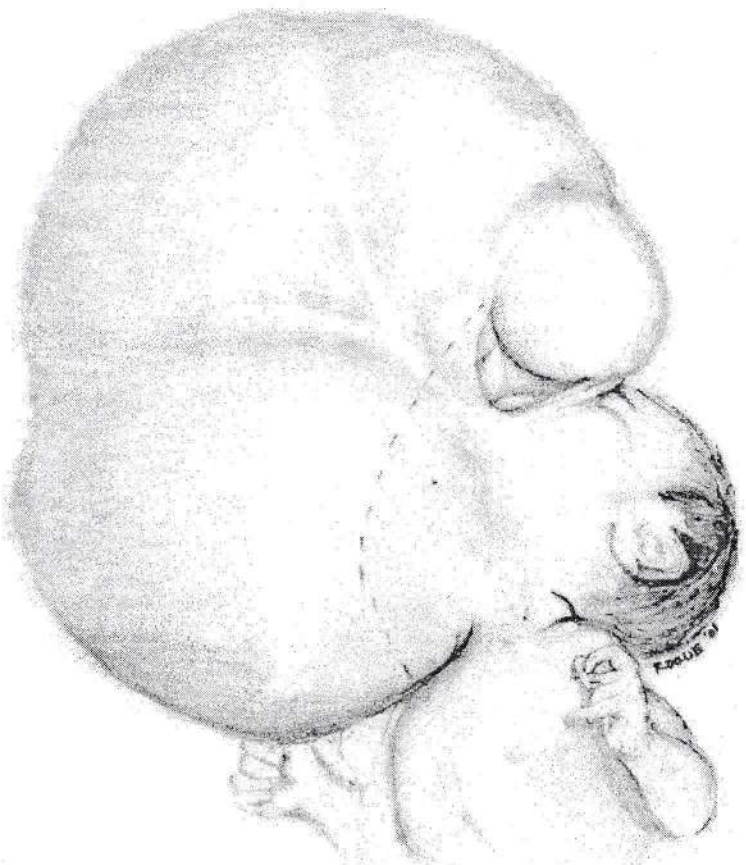

FIGURE 11: Dotted lines represent incision site allowing for primary closure after extirpation of mass

Azizkhan et al reported a case of teratocarcinoma in a female with severe left hemifacial hypoplasia and facial asymmetry who received radiation to the mandible. She underwent three reconstructive surgical procedures (details not presented) and remains free of disease at 9 years of age.

Considering the large defect resulting from the excision of this humongous mass, the most rational mode of closure would be the use of skin flap. This is the reason for the excision site located a few inches within the mass measured from its broad base (Figure 11). This skin flap was eventually used to close the defect in a primary manner.

SUMMARY AND CONCLUSION

A case of a massive cervicofacial teratoma in a newborn was herein presented. The questions of HOW did it come to be? HOW did we arrive at the definite diagnosis? WHY did we do surgery at a later date? and WHERE did the case lead to? were likewise discussed. This case raised the following highlights.

(1) We were able to describe a huge cervicofacial teratoma in a newborn which was behaving in a malignant manner. Head and neck teratomas are most often benign, but result in a high degree of morbidity and mortality by virtue of their size and location, as exemplified in this case.

(2) Three possible factors, namely, the Maternal factors, Fetal factors and the X-factor were presented to elucidate explanation for this phenomenon. A review of the differential diagnoses were presented.

(3) Ct scan was done to note the extension of the mass. The reading favored the diagnosis of a cystic hygroma. However, the morphological manifestation of the head and neck mass suggests an invasive lesion such as a teratoma. The question of malignancy was also addressed. Given the dilema, the surgery done paved the way for the definitive diagnosis.

(4) Questions whether to operate or not to operate was analyzed. And if it were to operate, will it be immediate or delayed surgery. The plan at the start was to do an elective procedure. However, signs of respiratory distress prompted the decision for immediate surgical intervention.

(5) Issues on fluid and hemodynamics as well as problems in reconstruction were tackled. This was intended to give the best for the patient.

This case is an example of what makes the medical profession so noble: that we keep on battling the maladies that afflict human life, struggling to extend it just a little more, though fully aware that we shall lose it in the end. But, we keep struggling just the same because it is a war we have sworn to fight.

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HYPOPHARYNGEAL REPAIR WITH SECOND STAGE VOICE RECONSTRUCTION IN A POST-LARYNGECTOMY PATIENT WITH HYPOPHARYNGEAL STENOSIS*

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ABSTRACT

OBJECTIVE: To present a case of a post-laryngectomy patient with hypopharyngeal stenosis who underwent successful hypopharyngeal reconstruction using pectoralis major mycocutaneous flap and a second stage voice reconstruction using the tracheoesophageal fistula (TEF) technique without voice prosthesis.
DESIGN: Case Report
SETTING: Tertiary Hospital
PATIENTS: One patient
RESULTS: In our patient, a second stage voice reconstruction using the TEF technique without voice prosthesis was done together with the planned hypopharyngeal reconstruction using the pectoralis major myocutaneous flap. After one month, the patient had already acquired speech and aspiration was very minimal.
CONCLUSION: The secondary TEF voice reconstruction technique without voice prosthesis is feasible and effective even with concomitant hypopharyngeal reconstruction and is a good option to post-laryngectomy patients without any prior voice reconstruction.

INTRODUCTION

Surgical removal of the larynx results to debilitating physical and psychosocial consequences. After undergoing total laryngectomy, most patients tend to be depressed and shy away from other people since they can no longer express their ideas, feelings and emotions. It is the goal of total laryngectomy to remove malignant tumor and restore airway patency and resume swallowing. However, with the advent of newer methods and techniques, it should also be the goal of the head and neck surgeon to reestablish acceptable voice and intelligible speech to the patient after accomplishing tumor extirpation.

In an early report by Guttman in 1931, a laryngectomy patient attempted suicide by plunging an icepick into his stoma. Instead of dying, he regained the ability to speak[1]. This paved the way of authors to develop techniques in voice reconstruction based on the principle of creating a fistula between the trachea and the esophagus. Voice is produced by ocluding the tracheostoma for the air from the lungs to be diverted onto the esophagus via the tracheoesophageal fistula.

Since the middle of the last century, there have been several authors such as Briani (1952), Conley (1958), Asai (1960), Calcaterra (1971), Arslan & Serafini (1972), Stafierri (1972), Iwai & Koike (1975) and Amatsu(1978), who reported various surgical techniques on primary voice restoration after total laryngectomy[2].

Dr. Celso Ureta modified the Amatsu primary voice reconstruction technique and reported a 90% success rate in voice acquisition with minimal aspiration[3].

However, no reported case of secondary voice reconstruction after total laryngectomy is seen among local literatures. Moreover, no case has been reported on second stage voice reconstruction using fistula technique without prosthesis together with other concomitant reconstructive procedures of the head and neck. This prompted the authors to report this first local case of a successful hypopharyngeal reconstruction with a second stage

*Third Place, PSO-HNS Clinical Case Report Contest, April 19, 2002, Legenda Hotel, Subic Freeport Zone, Olongapo City
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tracheoesophageal fistula (TEF) technique voice reconstruction without voice prosthesis after total laryngectomy.

OBJECTIVE

To present a case of a post-laryngectomy patient with hypopharyngeeal stenosis who underwent successful hypopharyngeal reconstruction using pectoralis major mycocutaneous flap and a second stage voice recostruction using the tracheoesophageal fistula (TEF) technique without voice prosthesis.

CASE REPORT

S.R., a 72 year old male from Indang, Cavite consulted at our institution due to dysphagia.

History of present illness started 16 months prior to admission when the patient was diagnosed to have Squamous Cell Carcinoma of the larynx. He underwent total laryngectomy afterwhich he had 33 sessions of radiation treatment. He claimed that he never acquired a voice after the surgery. He also claimed to have dysphagia to solid foods which started a few days after resuming a regular diet. The condition persisted, however, no consult was done.

Fifteen months after surgery, dysphagia to solid and soft foods persisted. He then consulted at our institution and was admitted for work-up and management.

On history,the patient is a known hypertensive, a chronic smoker and a non-habitual drinker of alcoholic beverage. Review of systems and family history were unremarkable. Physical examination revealed a patent tracheostoma with an apron figure scar. Indirect laryngoscopic findings revealed an absent larynx but with smooth mucosa with pooling of saliva. No mass was noted.

On admission, the patient underwent esophagogram which revealed a hypopharyngeal stricture noted at the level of C4 to C5 with a length of `2-3cm.

This finding was confirmed on succeeding CT scan evaluation. No mass was noted.

Rigid and flexible esophagoscopy done also revealed a constriction at the hypopharyngeal area beginning 0-12 cm from the upper central incisors. Several bougeys were attempted to be inserted through the constriction with the smallest being a size 12 (8mm) which was unsuccessful. He was then advised repair of the hypopharyngeal stenosis. Admitting diagnosis was Squamous Cell Carcinoma of the larynx; s/p Total Laryngectomy (sept. 99); s/p Cobalt theraphy (Nov. 99); hypopharyngeal stenosis probably secondary to previous surgery and cobalt therapy.

The plan of the service was to do hypopharyngeal reconstruction using the pectoralis major myocutaneous flap together with a second stage voice reconstruction using the TEF technique without voice prosthesis.

The patient underwent the procedure on the sixth hospital day.

The surgical procedure started with an apron incision along the previous scar and the flap developed and elevated.

A 3-4 cm midline vertical incision was made releasing the fibrosis and exposing the hypopharyngeal area. Intraoperative findings revealed a severe constriction of the hypopharynx with a length of `2-3cm. Intraluminal mucosa was smooth and no mass was noted.

The second stage voice reconstruction using the TEF technique without voice prosthesis was done as follows:

The tracheostoma was freed from its surrounding structures, mobilized upward and anchored.

The tracheal stump was cut diagonally to create the tracheal flap.

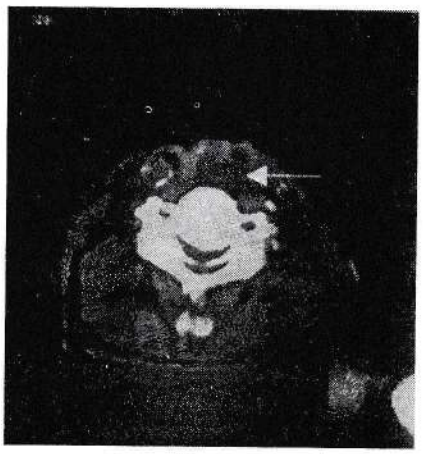

FIGURE 1
Esophagogram revealing a filling defect at level C4-C5

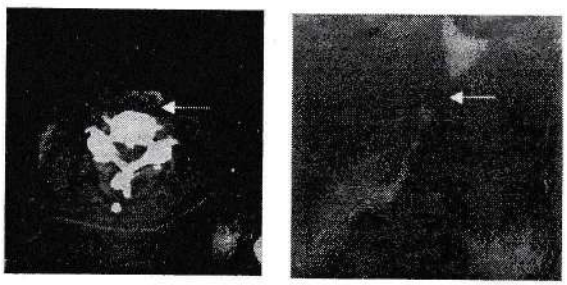

FIGURE 2
CT scan findings confirm constriction at level C4-C5

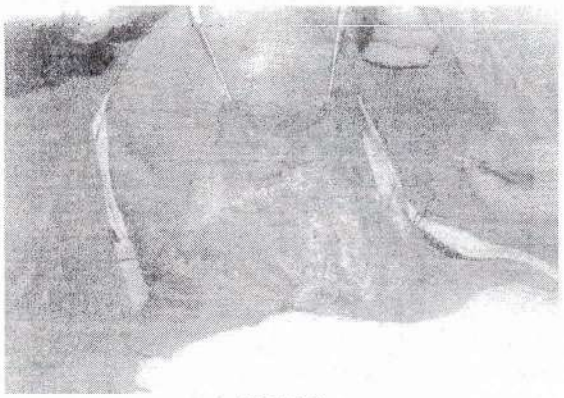

FIGURE 3
Apron incision

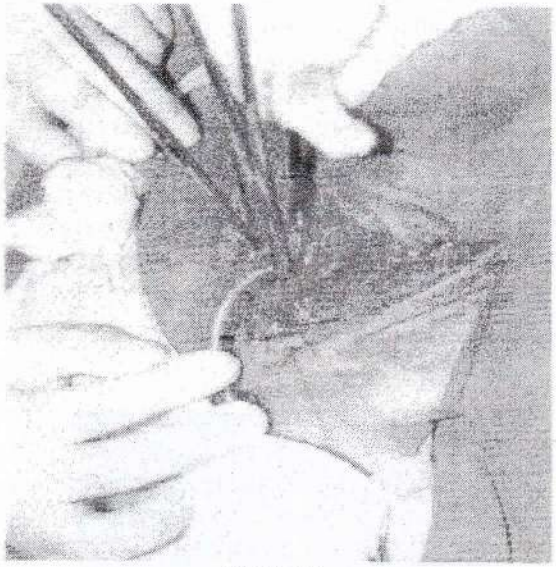

FIGURE 4
Anchoring of the Trachea to the
SCM and Periosteum of the Sternum

The index finger was inserted thru the hypopharyngeal opening and was placed into the esophagus and pushed forward.

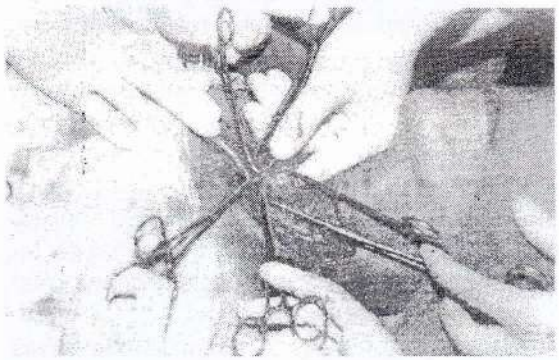

FIGURE 5
Creation of the TE Fistula

The tracheal mucosa was incised about 10mm up to the submucosal of the esophagus.

The esophageal mucosa was grasped with fine-tiped mosquito forceps and incised 3-5mm and brought toward the trachea and sutured side to side with the tracheal mucosa.

The tracheal flap was sutured to itself to form the tunnel flap with all the tracheal cartilages removed except the last one inferiorly.

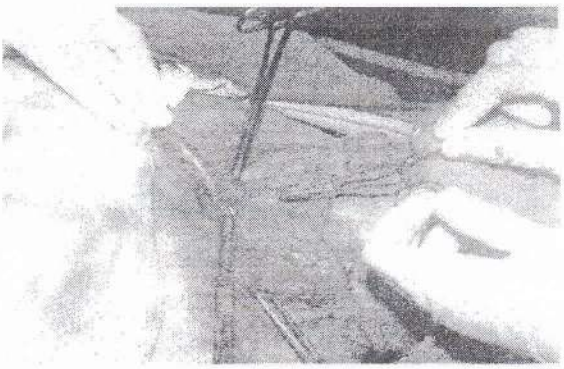

FIGURE 6
Creation of the tunnel flap

After the voice reconstruction was completed, the hypopharyngeal repair was done. The pectoralis major myocutaneous flas was prepared and harvested.

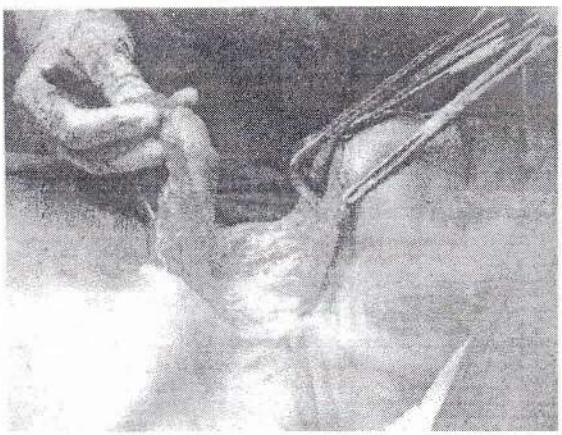

FIGURE 7
Harvesting of the Pectoralis Major MC flap
and Reconstruction of the Hypopharynx

It was tuneled under the skin into the hypopharyngeal defect and sutured. A nasogastric tube was inserted and drains were placed while wound margins were sutured.

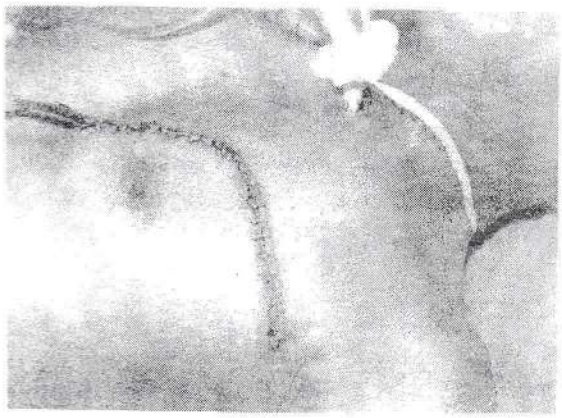

FIGURE 8
Closure of wounds and placement of drains

Post-operatively, the patient started to produce voice as early as the second week and after two weeks of practice, he could already speak intelligibly. No major complications were encountered and no aspiration was noted. The patient was discharged improved.

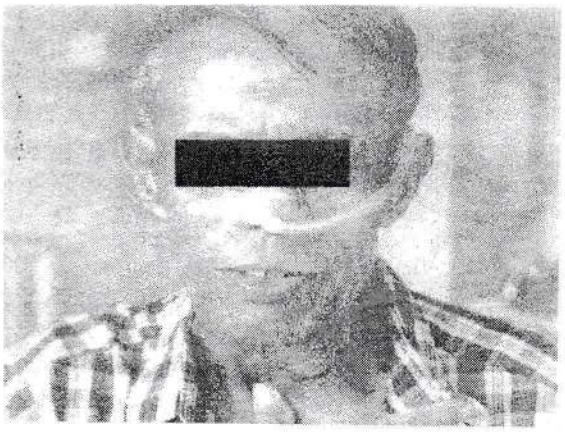

FIGURE 9
The patient two weeks post-operatively with inteliigibie voice

DISCUSSION

Head and neck surgery during the last decade has taken great strides in the management of head and neck cancer. Among laryngeal cancer patients, there are now several options in which patients can be managed. Aside from surgical removal of the diseased larynx, surgical procedures aimed at providing voice rehabilitation are already being offered. Howerver, published English literature regarding secondary voice reconstruction after total laryngectomy is scanty.

One of the most famous surgical procedures in voice reconstruction is the tracheoesophageal puncture with the use of voice prosthesis such as the Provox or the Blom-Singer[4]. Attempts of doing tracheoesophageal puncture with voice prosthesis as a second stage procedure and its acceptability has been done by Camilleri et. al. They found out that, out of the 58 laryngectomees who underwent second stage tracheoesohageal fistulas (TEF) with voice prosthesis, 83% had achieved intelligible speech and was found to be highly acceptable to almost all patients. They concluded that all fit and long standing laryngectomees should be offered secondary TEF creation[5].

Deschler et. al., analyzed six patients who underwent pectoralis major flap with voice reconstruction using the Blom-Singer voice prosthesis after laryngopharyngectomy. They found out that dependable voice is attainable after pectoralis major flap reconstruction of the neopharynx using the voice prosthesis. Although this voice does not differ significantly from voice of a standard laryngectomy evaluated by acoustic parameters, perceptual analysis does reveal significant differences[6].

McAuliffe et. al., studied functional speech outcomes among 30 laryngectomy patients and 13 pharyngolaryngectomy patients who also underwent tracheoesophageal puncture with voice prosthesis. Their results confirmed reduced functional intelligibility, reduced vocal quality and higher levels of disability in the pharyngolaryngectomy group[7].

However, the use of the voice prosthesis requires frequent replacement aside from it being a source of foreign body aspiration and infection. It is also not ideal in our setting because it is not readily available and is also quite expensive.

Second stage voice reconstruction among post-laryngectomy patients using the TEF technique without voice prosthesis has yet to be reported locally. In our search among English literatures, no secondary voice reconstruction using TEF technique without prosthesis has been found. Furthermore, we have not found any literature where secondary voice reconstruction in a post-laryngectomy patient with reconstruction of the hypopharynx was applied. We believe that secondary voice reconstruction in a post-laryngectomy with hypopharyngeal stenosis is even more difficult.

Hypopoharyngeal reconstruction has long been the subject of diverse methods and techniques. Different approaches and flaps have been employed such as the free jejunal interposition reconstruction. However, the most reliable technique in hypopharyngeal

reconstruction is still the pectoralis major myocutaneous flap due to its versatility, ease of harvest and high tissue survival owing to its good vascular supply[8].

In our patient, a second stage voice reconstruction using the TEF technique without voice prosthesis was done together with the planned hypopharyngeal reconstruction using the pectoralis major myocutaneous flap. After one month, the patient had already acquired speech and aspiration was very acceptable.

This report of the first local case of a successful hypopharyngeal repair with a second stage voice reconstruction in a post-laryngectomy patient, shows that second stage voice reconstruction can be a good option for postlaryngectomy cases even if done together with repair of hypopharyngeal stenosis.

CONCLUSION

I have presented the first local case of a post-laryngectomy patient with hypopharyngeal stenosis who underwent successful hypopharyngeal reconstruction using pectoralis major myocutaneous flap and second stage voice reconstruction using the TEF technique without voice prosthesis. The speech is intelligible and aspiration was very minimal. Therefore, the secondary TEF voice reconstruction technique without voice prosthesis is a good option to post-laryngectomy patients without any prior voice reconstruction.

RECOMMENDATION

A follow up study be done on this technique in a larger series of patients to determine the functional speech outcome of patients undergoing the same procedure.

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