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Editorial

A QUARTER CENTURY OF HISTORY

In 1956, against overwhelming odds and formidable circumstances, a tiny group of U. S. trained Otolaryngologists, all Fellows in good standing of the erstwhile Philippine Ophthalmological & Otolaryngological Society, inspired by a man of intimidating dimension – Dr. Tierry F. Garcia – agreed that it was time they incorporate a separate and an independent group if competent O. R. L. practice is to be had in this country. To quote Dr. Garcia "the fission (from the P.O.O.S.) need not assume atomic proportion" but then the old guards looked at the challenge with askance and suspicion.

Encouraged initially by Drs. Napoleon Ejercito and Angel Enriquez – the 2 other Otolaryngologists with the UP-PGH Medical Center then – the idea began to take shape. When the final draft of the Constitution and the By Laws of the future Society was completed by the troika at the Talk of the Town of the Manila Doctors Hospital the 5 other E.N.T. men in the country, Drs. Cesar Villafuerte, Antonio Roxas, Vicente Songco, Antonio Vicencio and Macario Tan, were invited to join. Dr. Ariston Bautista was still at the State University of New York but then it was decided to have him inducted in absentia. This was how the group became known as the "Heroic Nine", a quote attributed to Dr. Frank Co Tui – Creedmore Institute Science Director – who happened to be the guest of honor and speaker at the inauguration rites. Under secretary of Health Dr. Rafael Tombokon inducted the charter members, charter directors including the society's president – Dr. Tierry F. Garcia at the Dao Room of the Manila Hotel on February 17, 1956. With the inauguration and induction ceremonies came the birth of Philippine Society of Otolaryngology and Bronchoesophagology, Inc.

This brief story of how the PSO & B came into being is written for the succeeding generation of Ear, Nose & Throat Specialists before it is lost to history.

A quarter century of its existence, however, should offer an opportunity for introspection. Enmeshed in nurturing the new aggrupation, it nevertheless accomplished by leaps and bounds much to foster the ideals for which it was created – top among which is the complete separation of the specialty from its traditional combination with Ophthalmology. Although pursued with vigor, a lot remains in the attainment of this goal. Perhaps, Dr. Abelardo Perez, the incumbent president, was right when he wrote that "the society – being founded on a dream "' has no clear out methods to achieve that dream."

Apathy perhaps and indifference among its members are contributory factors. If the society is to attain that objective it must free itself from the shadows of the past. What it needs is a rebirth of the spirit with the same dedication which nurtured it through all those 27 years and a firm resolve to accomplish the very goal for which it was organized.

Re-baptized as the Philippine Society of Otolaryngology - Head & Neck Surgery during the annual meeting held at the Penthouse of the Hyatt Regency on December 3, 1981, this firm resolve may yet get the boost it has been waiting for and a re-direction of its efforts towards the attainment of its main goal.

angel enriquez, m.d.

ACKNOWLEDGEMENT

The publisher and the editorial staff would like to give due recognition to Ledesma Audiological Center, Inc., King Aid Philippines, particularly to its President and Audiologist, Nelly R. Ledesma, for the support & assistance, without which this would not have been possible.

PRESIDENT'S PAGE

"What's in a name that which we call a rose
by any other name would smell as sweet"

–William Shakespeare –

From now on our society will be known as the Philippine Society of Otolaryngology – Head and Neck Surgery, Inc. It is not the intention of the members to detract from the Founding Fellows the honor and appreciation for its formation but it is the general feeling that the name reflect the scope of its work. This only shows that the specialty is viable, vibrant, growing and with the help of new technology is progressing. This consensus is felt also abroad.

Past President Nani Caparas was elected in absentia as Vice-President of the Asean Otorhinolaryngological Federation in its organizational meeting in Medan, Indonesia in 1980. He led the Filipino Otolaryngologists in the First Asean Congress in Pattaya, Thailand last December, 1980. The Federation approved the constitution and it was decided that there will be a Congress every two years. Nani was elected as a Director of the incoming officers. The next Congress will be in Malaysia on December 7-10, 1983 and after this congress Head and Neck Surgery will be added in its name. You may ask if the federation is a duplication of Asia Oceania which was organized here in the Philippines. It is the feeling that it is not and in fact it is complimentary. The federation was formed for the following reasons:

1. *Being regional, the diseases could be discussed under similar medical and health problems, cultural and economic condition, and health care delivery system.*
2. *There will be closer cooperation amongst the member countries by having a forum for discussion and will encourage attendance of the otolaryngologists in the region.*

I would like to take this opportunity to give our sincerest thanks to Boehringer Ingelheim, who sponsored one of our scientific meetings last December, 1981 and established the first PSO-HNS Boehringer Ingelheim research award, to Wellcome (Philippines), who helped us last September and to United Laboratories, Inc., who sponsored our annual meeting last December, 1981.

It has been a year since we took the helm of our society. During this year we tried to continue what has been started by our predecessors and commit ourselves to a continuing medical education but this could not have been possible without the help and cooperation of everybody. I would like to specially mention the secretary, Dr. Llamanzares, who makes my work easier, to Dr. Nani Caparas, Chairman of the Scientific Committee, to the Editor of the Journal, Dr. Angel Enriquez, to Dr. R. Jarin who is always ready to help, to the treasurer Dr. M. Santos-Lopez, who keeps a tight hold of the money, and to the past presidents who are always ready with their advice and steadying influence.

Your society has programmed quarterly scientific meetings. The first meeting on Serous Otitis was held at the Manila Polo Club, March 26, 1982.

I would like to express my appreciation and thanks to the speakers and to the sponsor, Boie-Takeda. There will be a first Philippine Society of Otolaryngology – Head and Neck Surgery – United Laboratories, Inc. Research Award Contest. It is open to all otolaryngologists and training residents. The winners will be announced during the annual meeting. This is different from PSO-HNS Boehringer research award which was first given to the best paper presented last December and limited to the training residents.

My sincerest congratulations to the Ospital ng Maynila. It was accredited as a training hospital for Otolaryngology. I hope there will be more hospitals to follow.

DR. ABELARDO B. PEREZ

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CLINICAL FEATURES AND MANAGEMENT OF CHRONIC MIDDLE EAR CATARRH*

By: Manuel G. Lim, M.D., F.P.C.S. **

Clinical Features

Middle ear catarrh, also known as middle ear effusion, serous otitis media, glue-ear and others, is commonly encountered in the practice of otolaryngology.

In children, the most common clinical feature is conductive hearing loss, involving one or both ears. Usually, both ears are affected. The observant parents or teachers will notice the inattentiveness of these children. Very seldom do children complain about their hearing. Occasionally, the middle ear effusion may get infected, and the children may complain of earache. It is a common personal observation in many of my pediatric patients that after an episode of acute suppurative otitis media, usually secondary to an acute upper respiratory infection, for which massive antibiotics were given by our colleagues, the pediatricians, to control the infection, and although the acute symptoms – earache, fever, and upper respiratory infection, subsided, the conductive hearing loss persisted. This condition eventually becomes a form of chronic serous otitis media or chronic middle ear catarrh.

In the adults, serous otitis media is not as common as in children. The symptom they complain about is the "plugged up" feeling or fullness of the affected ear. Quite often, only one ear is involved. Usually, they relate the onset of the serous otitis media to an upper respiratory infection. Frequently, they will claim that in certain positions of the head, the hearing in the affected ear becomes very much improved or very much worse. Occasionally, tinnitus may be present. "Popping and cracking noise" are frequently noted by the patient. This is attributed to altered function of the eustachian tube.

The exact etiology up to the present is not definitely established, although allergy, infection of nose, sinuses and nasopharynx, neoplasm of the nasopharynx, adenoid hypertrophy and others are implicated.

The otoscopic findings can be divided into the following:

1. In cases of more recent origin, fluid levels or bubbles in the middle ear can be appreciated by otoscopy. In these cases, the fluid actually is serous or thin. The fluid resembles a transudate.

2. In more chronic cases, an opaque amber or slightly yellowish discoloration of the eardrum, which replaces the normal translucent appearance is seen. The eardrum may be slightly thickened and slightly retracted with the cone of light in the anterior inferior quadrant missing. In these cases, the fluid is viscid and amber in color. The viscosity varies with the duration of the fluid in the middle ear.

In some cases, the fluid is creamy or milky white and viscid in character. This is seen in those cases of non-resolved or incompletely resolved acute suppurative otitis media superimposed on serous otitis media.

3. Markedly retracted eardrum with a very prominent short or lateral process of the malleus, markedly retracted pars flaccida, and adhesion of the tympanic membrane to the long process of the incus and incudostapedial joint or the promontory.

4. Blue tympanic membrane. In these cases, the serous otitis media is of long standing duration, and the cause of the hemotympanum is not definitely known. It may be due to the formation of cholesterol granuloma. Very often, the ossicular chain may be destroyed.

Treatment

Before I talk about the treatment for chronic middle ear catarrh or serous otitis media, let me

* Read before the regular scientific meeting of the PSO-HNS March 26, 1982 at the Manila Polo Club.

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take up first the sequelae of chronic serous otitis media without proper treatment. This should serve as a warning to our colleagues as to the consequence of serous otitis media. Chronic middle ear effusion may lead to the following problems.

1. Adhesive Otitis Media or Atrophic Tympanic Membrane

   Long-standing middle ear effusion and negative pressure in the tympanum will result in the disappearance of the tunica propria (fibrous layer of the eardrum) of the pars tensa, leaving only the epithelial surfaces lining both sides of the tympanic membrane. In this way, the eardrum becomes very thin and may become attached to the ossicles and promontory producing irreversible conductive hearing loss.

2. Ossicular Erosion

   In some longstanding cases of middle ear catarrh, the presence of the fluid in the middle ear may interfere with the blood supply of the ossicles, or there may be enzymatic osteolysis of the ossicles producing erosion of the ossicles, particularly the incus, resulting to ossicular chain disruption and a severe form of conductive hearing loss.

3. Tympanosclerosis

   One of the sequelae in chronic middle ear catarrh is the production of hyalinized collagen on the pars tensa or anywhere on the middle ear mucosa enveloping the ossicles especially the stapes, causing fixation and persistent conductive hearing loss.

4. Cholesterol Granuloma

   The idiopathic hemotympanum seen in some cases of chronic middle ear effusion is actually due to the formation of cholesterol granuloma. This may lead to destruction of the ossicular chain. This condition may require mastoid surgery to remove the granuloma.

5. Cholesteatoma

   Because of the persistent negative pressure in the middle ear, retraction pockets may be produced in the pars flaccida which will eventually lead to cholesteatoma formation. The consequence of cholesteatoma is known to all of you.

Since the condition is due to dysfunction or temporary closure of the eustachian tube, the objective or aim of the treatment is for re-ventilation of the middle ear. The treatment is divided into: medical and surgical management.

Medical Management

Conservative or medical treatment can be tried in cases of early serous otitis media as manifested by the presence of air fluid level or bubbles in the middle ear. Some of these cases will resolve with the conservative therapy. The medical treatment consists of:

1. Antibiotics are given to prevent infection of the retained fluid in the middle ear. If the serous otitis media was secondary to acute respiratory infection, the antibiotics may help clear up the infection and improve or restore the function of the eustachian tube.

2. Systemic and topical decongestants are given with the hope that they will improve the function of the eustachian tube, and in the presence of infection of the nose and paranasal sinuses, they may help the drainage of the nose and sinuses.

3. In the absence of upper respiratory infection, the patient may be taught how to utilize the Valsalve maneuver to open the eustachian tube. Tubal politzerization may also be performed.

4. In allergic patients when the serous otitis media is suspected to be allergic in nature, complete allergic work-up and desensitization should be undertaken to prevent frequent recurrence of the middle ear effusions.

Surgical Management

Therapeutic myringotomy with insertion of a ventilation tube or grommet tube or collar button is done whenever a serous or secretory otitis media lasts more than a week and fails to respond or to clear up with the conservative management given above.

Usually, myringotomy is performed under general anesthesia, but it can be done conveniently under local anesthesia or with the use of the new electrophoresis machines.

The incision in the tympanic membrane can be made in the anterior inferior quadrant if the tube is to remain in place for a longer period of time or in the posterior inferior quadrant if a short time is desired. There are a wide variety of ventilation tubes which are available. A straight

polyethylene tube is used for a short period of time in children; this polyethylene tube can be removed easily. Other ventilation tubes have two flanged ends, and one of them is introduced thru the incision into the middle ear. In this way, the ventilation tube will stay for a much longer period of time. Some tubes may stay as long as 4-6 years. Usually, after 4 months, there is a possibility of spontaneous extrusion. After the incision is done, the fluid is removed with a suction. In some cases when the fluid is so viscid, another myringotomy opening has to be done to facilitate the removal of the thick fluid. Once the fluid is evacuated, the ventilation tube is introduced in with the alligator forceps.

References

1. Lim, M.G. & Tan, S.: Myringotomy, clinical findings in 100 cases. Phil. J. Otol. — Head and Neck Surgery. 72, 1982.
2. Echols, D.F., Norris, C.H. & Tabb, H.G.: Anesthesia of ear by iontophoresis of lidocaine. Arch. Otol. 101:418, 1975.
3. Shambaugh, G.E., Jr. & Glasscock, M.E., III : Operations on the auricle, external meatus, and tympanic membrane in Surgery of the Ear. 3rd ed. W.B. Saunders, Philadelphia, 1980.
4. Main, T.S. & Lim, D.J.: Experimental cholesterol granuloma. Arch. Otolaryn. 91: 356, 1970.
5. Paparella, M.M.: The Middle Ear Effusions. In Otolaryngology (Ear), Vol. 2. Paparella, M.M. & Shumrick, D.A. (eds.) W.B. Saunders, Philadelphia, 1973.

CONSERVATIVE TREATMENT OF CHRONIC MAXILLARY SINUSITIS

by:
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Dr. Rodolfo P. Nonato**
Dr. Felix P. Nolasco**

The maintenance of ventillation and drainage of the maxillary sinus is a well established principle in the treatment of infection of these cavities. Opinions as to the value of antibiotics administered topically within the sinuses are quite varied. Since 1955, Ballenger, Fenton and Larsell claimed beneficial results with installation of penicillin into the maxillary sinus after irrigation. On the other hand, Van Alyea feels that germicidal solutions injected into the sinuses did not produce any better result than plain irrigation.[1] Today, with the advent of multifarious antibiotics, the otolaryngologists are still faced with the same controversy. With the hope of establishing a definite conclusion to this quandary, a study has been designed with the following objectives:

1. To determine the effectivity of antral installation of atopical antibiotic (Fucidin ointment and cream) compared to a control group treated with intra-antral NSS lavage.
2. To determine the usual clinical presentation of bilateral chronic maxillary sinusitis among UP-PGH patients.
3. To determine the radiologic picture of bilateral chronic maxillary sinusitis before and after treatment.
4. To determine the bacteriology involved in chronic maxillary sinusitis among UP-PGH patients.

METHODS AND MATERIALS

Patients seen in the ENT Department of the Philippine General Hospital with suspected maxillary sinusitis were referred for radiological examination. Only patients who are 14 years old and above diagnosed by x-ray as having bilateral maxillary sinusitis and at least 2 months duration and refractory to conservative management were included in this study. Patients with structural and anatomic deformities in the nasal cavity or nasopharynx, history of allergy and bronchial asthma and those with dental caries were excluded.

The findings in 46 cases of bilateral chronic maxillary sinusitis were included in this investigation. These cases were divided into 2 groups. One group was treated with antral lavage using sterile Normal Saline Solution (NSS) and the other group was treated with intra-antral instillation of Fucidin cream on one side and Fucidin ointment on the other maxillary antrum. All subjects had complete clinical examination of the ear, nose, throat and neck. The x-ray views taken were Water's, Caldwell's and lateral views.

Antral puncture was done with the patient sitting erect, after the nasal cavity was anesthesized with cotton pledgets soaked in Xylocaine 4% and Ephedrine Sulfate Solution at 1:1 dilution for five to ten minutes. Antrostomy was done with a curved antral perforator at the inferior meatus.

For the control group, Abbocath G14 needles were inserted into the antrostomy site and sterile saline was used to irrigate the maxillary sinus and the character of the washing was noted. Daily antral lavage with sterile saline was done until the return flow of the washing was clear. Follow-up was done at 1 week, 2 weeks and 1 month after the Abbocath needles were removed, taking note of the subjective complaints, objective findings and changes in the radiologic findings compared with that of the initial consultation. All data were recorded in a prepared table which was also used for the second group.

For the experimental group, antral lavage was done after the puncture using sterile NSS. The character of the antral-washing was also noted. Instillation of Fucidin cream on one side and Ointment on the other maxillary antrum was done through the Abbocath needles. Follow-up was likewise done after the first, second and fourth weeks

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post Abbocath needles removal. The amount of Fucidin used per antrum is about 10 grams of 2% preparation.

RESULTS AND DISCUSSION

The subjective complaints of symptoms of the patients are:

	No. of Patients
Nasal Stuffiness	46
Anterior Nasal Discharge	46
Postnasal Drip	46
Headache	39
Malar Pain	17
Sore Throat	18
Halithosis	13
Ear Fullness	3
Total No. of Patients	46

The objective ENT findings are:

	No. of Patients
Congested Turbinates	46
Anterior Nasal Discharge	46
Posterior Nasal Discharge	43
Follicular Pharyngitis	35
Laryngitis	3

The radiologic findings on X-ray of the maxillary sinuses are:

	No. of Patients
Haziness or Luminal Opacity	27
Mucoperiosteal Thickening	5
Haziness with Mucoperiosteal Thickening	14
	46

Bacteriological Studies showed the following organisms:

	No. of Patients
Alpha Streptococci	6
Beta Streptococci	3
Staphylococcus Albus	3
Staphylococcus Aureus	3
Pseudomonas Aeroginosa	2
Gamma Streptococci	1
Neisseria Specie	1
Neisseria Catarrhalis	1
Staphylococcus Epidermitidis	1
	46

A comparison of the symtomatology between the experimental and control group is tabulated as follows:

	Treated with Fucidin Cream and ointment		Treated with NSS Washing	
	Improved	Not Improved	Improved	Not Imp.
Nasal Stuffiness	14(60.9%)	6(39.1%)	10	13
Anterior Nasal Discharge	19(83%)	4(17.8)	14	9
Posterior Nasal Discharge	17(80.9)	4(20%)	14	9
Headache	12(70%)	5(29%)	10	12
Malar Pain	5(70%)	2(29%)	4	6
Ear Fullness	3(100%)	0	0	0
Halithosis	2	0	1	10
Sore Throat	8	0	1	9
	No. of Patients = 23		No. of Patients = 23	

A comparison of the objective findings between the experimental and control groups are as follows:

	Treated with Fucidin cream and ointment		Treated with NSS Washing	
	Improved	Not Improved	Improved	Not Improved
Congested Turbinates	17 (74%)	6 (26%)	10	13
Anterior Nasal Disch.	21 (91%)	2 (9%)	12	11
Posterior Nasal disch.	21 (91%)	2 (9%)	15	5
Pharyngitis	15 (94%)	1 (6%)	4	15
Laryngitis	2 (100%)	0	1	0

The computed Chi Square values for the symptomatology between the experimental and control groups are:

Nasal Stuffiness	4.28
Postnasal Drip	2.10
Anterior Nasal Discharge	5.69
Headache	2.46
Malar Pain	1.76
Ear Fullness	0
Halithosis	7.87
Sore Throat	14.4

The computed Chi Square values for the signs or objective findings between the experimental and control groups are:

Congested Turbinates	2.93
Anterior Nasal Disch	8.66
Posterior Nasal Disch	2.07
Pharyngitis	18.49
Laryngitis	0

This study started 4 years ago when Dr. Caparas, Dr. Jadeleza and Dr. Zantua made a *Comparative Study of a Steriod-Antibiotic Combination in Petrolatum base Antral Instillation And Antral Lavage with NSS Using Abbocath as Modes Of Treatment For Chronic Maxillary Sinusitis.* In this study, the use of petrolatum base as an emolient or vehicle of the antibiotic-steriod combination was found to have caused more mucosal ede-

ma and aggravation of the signs and symptoms of sinusitis. In search of a topical antibiotic with a demulcent as a medium, Fucidin was used as an intra-antral medication. Since there are two types of preparations available in the form of ointment and cream, one maxillary sinus was instilled with ointment preparation and the other with the cream in the same patient. Changes in the initial signs and symptoms were noted and follow-up x-ray of the maxillary sinuses were done.

Intra-antral instillation of topical antibiotics like Sodium Fusidate, Polymixin B, Neomycin and Bacitracin should be a better way of controlling chronic sinus infection because the luminal mucosa is thin and the blood supply is easily damaged by the inflammatory process. Hence, systemic antibiotics do not effectively penetrate the sinuses.

Sodium Fusidate is the sodium salt of fusidic acid, an antibiotic obtained by fermentation from the fungus Fusidum coccineum. This agent has been found to be useful in infections caused by Staphylococcus which have developed resistance to other antibiotics. It shows synergistic relationship with penicillin, erythromicin and novobiocin against the penicillinase-producing strains of Staphylococcus aureus. Although the antibiotic has a cyclopentenophenanthrene nucleus, making it structurally related to the steroidal hormone, there are certain structural differences which apparently result in a lack of any hormonal or metabolic activity usually associated with the steroid structure.

The sodium salt of fusidic acid has the empiric formula $C_{31}H_{47}O_6Na$ and a molecular weight of 538.69 It is a white, odorless crystalline powder, soluble in water, methanol and ethanol and slightly soluble in acetone, chloroform and ether.

Godtfredsen et al. examined the antibiotic activity of sodium fusidate by serial dilution technics in appropriate culture media seeded with 10^4 organisms per millimeter. It was found out that Sodium Fusidate was active mainly against gram-positive microorganisms and Neisseria, whereas the activity against gram-negative bacilli and fungi was extremely low. Comparable results have been found by other workers, using a variety of penicillin-sensitive and penicillin-resistant strains of bacteria.[5]

ANALYSIS OF DATA:

The hallmarks in the diagnosis of chronic maxillary sinusitis among Filipino patients seen at the PGH are: nasal stuffiness, anterior nasal discharge, postnasal drip, headache, congested turbinates and pharyngitis. The usual radiologic finding is haziness or luminal opacity of the sinuses.

The bacteriologic picture presented is more of a gram-negative infection. However, 55% of the cases showed no growth and the presumption is anaerobic infection.

Statistical correlation of the improvement observed in the symptomatology between the experimental group compared to the control group showed significant statistical correlation among the symptoms tabulated except in ear fullness. The degree of improvement seen with the use of Fucidin cream is identical with the degree of improvement seen using Fucidin ointment. The only difference between the two preparations is the method of infusion or instillation when Fucidin cream is used.

On the other hand, statistical correlation of improvement of the signs or objective findings between the experimental and the control groups showed significant correlation in all of the findings except for laryngitis. Furthermore, the degree of improvement seen using Fucidin cream is the same with the improvement using the ointment preparation.

Among the patients with nasal stuffiness not improved with Sodium Fusidate, the possible explanations are: 1. Metabolic or endocrinologic causes like menses, pregnancy and emotional changes; 2. Heat and dryness of the air; 3. Environmental irritants; 4. Other drugs like aspirin and lycopodium coated pills; 5. Gram-negative organisms not responsive to Sodium Fusidate.

The small percentage of unimproved postnasal drip, headache and malar pain can be explained by non-responsive microorganisms to the antibiotic used since the antrostomy or drainage do not usually persist for one month. Hence, the postnasal drip occuring because of a good maxillary drainage will explain only the postnasal drip seen during the first week post-antrostomy but will not explain the postnasal drip observed later.

Pharyngitis, laryngitis or sore throat are extension of the paranasal infection produced by the postnasal drip.[7] The small percentage observed with the non-responsive pharyngitis to the antibiotic instillation conformed with the percentage observed among the non-responsive postnasal drip.

The radiologic follow-up of the patients showed inconclusive results. Among the 8 patients who consented for a repeat x-ray of the sinuses 7 revealed the same radiologic picture as the pre-antibiotic instillation. Only one patient showed clearing of the sinuses. The persistence of the opacity or haziness may be explained by the slow absorption of the ointment or cream within the sinuses.

This is consistent with chronic maxillary sinusitis since the mucosa in these cases are destroyed by the inflammatory process.

CONCLUSION:

This paper has presented a less radical approach in the management of chronic maxillary sinusitis. Instead of the standard Caldwell-Luc operation for sinusitis not responsive to medical management, intra-antral antibiotic instillation is advocated. Using Fucidin cream facilitates the procedure since it is much easier to instill than the ointment preparation. In the 23 patients, no complication was observed. However, care should be taken not to place the medication into the eyes since other investigators have reported conjunctival irritations with Fucidin Ointment.

BIBLIOGRAPHY

1. Elsen, John: The Treatment of Maxillary Sinusitis. Archives of Otolaryngology. 2, 1955.
2. Caparas, M., Jardeleza, T., Zantua, R.: Maxillary Sinusitis: A Comparative Study of Intra-antral Instillation of Antibiotic-Steroid Combination in Petrolatum Base and Antral Lavage with NSS As Modes of Treatment. PSOB, 1978.
3. Paparella: Textbook of Otolaryngology. WB, 1973.
4. Schumer, W. Abtahi, H.: Sodium Fusidate In Surgical Wound Infections. American Journal of Surgery. 115, April 1968.
5. Godtfredsen, W., Lorck. Fucidin: A New Antibiotic for Peroral Therapy, Ugesk. Laeger, 124: 715. 1962.
6. May, M., West J.: Diseases of Nose, Throat and Ear. 11th ed., Philadelphia, Lea and Febiger Publishers, 1969.

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IN VITRO CULTURE OF ORAL SQUAMOUS CARCINOMA CELLS IN COCONUT WATER

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"The main driving force in the development of animal cell culture techniques has been the conviction that it could provide the means for finding solution to the problem of cancer".[7-9] Because of the high cost and unavailability of the culture medium locally, animal cell culture has not gained much popularity in our country.

Today, in vitro culture of cancer cells has assumed multifarious functions:

1. It facilitates researches on cellular sensitivity to cytotoxic agents and possibly aid in the formulation of therapeutic schedule.[42]
2. It provides material for the isolation, identification, purification of tumor associated antigens which could be useful in the immunodiagnostic studies and immunotherapeutic manipulations.[8]
3. It is useful in the study of oncogenic viruses and malignant transformation of normal and dysplastic cells.[42]
4. It facilitates investigations dealing with cytogenetics, hormone production, specific receptor sites, the role of embryonic antigens in the malignant process, and cell membrane researches.[42]

In search of a cheap and locally available culture medium, for animal cell culture, this research was formulated using coconut water, with the following objectives:

1. To compare the efficacy of coconut water, coconut water with 10% calf serum with a standard culture medium (Eagle's minimum essential medium) in the culture of human squamous cell carcinoma.
2. To determine the cell viability of squamous cell carcinoma in an in vitro culture.
3. To compare the cell morphology of squamous cell carcinoma in vivo with that of an in vitro culture.

Since 1885, works on the composition of coconut water has been reported.[15] Today, it is known that coconut water contains sugar (2.08g)[17] in the form of glucose and fructose[55] (3.47-4.82), sucrose[15] 0.8 grams of which are reducing sugar[16] with an additional 1.2 grams reducing sugar after inversion of sucrose.[17] During the "kurumba stage" or seven months old fruit, the glucose content is highest with a maximum volume of water (500-600cc).[54] Coconut water also contains amino acid in the form of alanine, arginine, aspertic acid, cystine, glutamic acid, histidine, lysine, proline, phenylalanine, serine, and tyrosine.[43] Later, six more amino acids were identified: valine, aspargine, glycine, threonine. isoleucine, and gamma aminobutyric acid.[9] The mineral salt content of coconut water are: calcium (29-46mg), chlorine (105-160mg), phosphorus (5-5.5mg), potassium (134-220mg),[43] and magnesium (6.55mg).[54] In 1954, Palo and Lapuz reported 5.553% lime and 31.6% potash content in coconut water. The vitamin content are: Vitamin A[6], five Vitamin B (0.64mg/ml nicotinic acid, 0.52mg/ml panthothenic acid 0.02 mg/ml biotin, 0.01 mg/ml riboflavin, 0.003 mg/ml folic acid).[51,54,55] Likewise reported to be present are: traces of thiamine, pyridoxine, auxin, diphenylurea, sorbitol, m-inositol, Vitamin C[6], giberellin, kinetin, cytokinin, phylococosine, and iron.[51] Lately, a growth promoting factor[48,50] in coconut water reported to be indole-3-acetic acid[14] or coconut milk factor (CMF),[50] was identified. This was described by Mauney (1952) as heat stable, acid and alkali labile, non-volatile, water soluble.[32] The fat content in coconut water is 0.64-0.8.[19]

Since 1891, coconut water has been used as

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a culture medium for bacteria, fungus, and yeast.[11,27,38,49,50,52] Coconut water was also used in the plant embryo culture.[20,37,38] In the field of medicine in the local setting the use of coconut water dates back to Pradera, when he reported that it is not capable of producing anaphylaxis in experimental animals.[43] Atlaras and Barrios (1945), on the other hand, used fresh coconut water for hypodermoclysis. In 1974, Recio et.al. reported no change in the serum electrolyte levels of normal human males upon intravenous infusion of coconut water.[45] Loval-Santos in 1978 was able to culture human red blood cell in coconut protein based media for 4 days and was extended to 192 hours by Maguiguit (1980).[24,27] Adefuin (1980), was able to culture mice fibroblast for 72 hrs. at 38°C in coconut water with horse serum supplement.[1] Henus and Garana (1980) reported that a six month old coconut fruit is the best source of coconut water for culturing mouse liver cells and human leukocytes.[13,25] This research is, therefore, a first attempt to culture abnormal cells in coconut water.

In foreign literature, the first recorded attempt to cultivate human epidermoid carcinoma in vitro were Carrel and Burrows in 1911 but in vain.[5] Upon (1933) cultured several squamous cell carcinomas and produced sheets of epithelioid cells in hanging drop tissue cultures, one of which was maintained for 11 days.[30] Pinkus (1934) reported irregular and slowly decreasing growth of tumor cells in thirty days.[41] Cameron and Chambers (1937) did a tissue culture of squamous cell carcinoma metastatic in a lymph node with an outgrowth of epithelial cell sheets.[13] Coman (1942) cultured various human neoplasms using a rolle tube method.[18] However, HeLa was the first human carcinoma cell line to be established in vitro by Gay in 1951.[21] Rovin (1962) reported that there are two types of activities (proliferation in nest and formation of capsule around the explant) exhibited by epidermoid carcinoma.[46] Moore and Koike (1964) isolated a human tumor cell line from squamous cell carcinoma, RPMI 2650, with a distinctive growth pattern.[33] Giard et. al (1973) was successful in establishing three epidermoid carcinoma cell lines through explants and trypsinization technique.[26] Hadju et. al (1974) reported that Papanicolau smear technique was reliable in morphologic identification of cultured human tumor cells.[28] Aust et. al. (1977) reported that collagenase technique of cell dispersion was better than trypsinization for culture of head and neck malignancies.[8]

MATERIALS AND METHODS

This is a short term culture of human oral squamous carcinoma cells for a period of seven days without renewal of medium to lessen the variables involved.

Cancer cells were obtained from a patient with squamous cell carcinoma of the palate (moderately differentiated) and a histopathologically neck node metastasis. The specimen was taken from a portion of the involved node, part of which was sent for a routine histopath staining in PGH. A section of the lymph node was chosen to facilitate identification of the epidermoid cancer cells. The tissue was placed in a test tube containing NSS after several washings with 500 cc. of NSS. It was immediately transported to U.P. Los Baños. The tissue was then treated with an antibiotic mixture in NSS containing 7,000 units/ml of Penicillin, 500 mg/ml of Streptomycin, and 500 mg/ml of Terramycin to avoid bacterial contamination. The tumor tissue was then trimmed of non-neoplastic stroma under the microscope.

Isolation and Inoculation of Cells:

The tissue was then minced to approximately 0.5 mm with a sterile scalpel blade in a petri dish containing 25 ml. of the respective culture medium. The minced tissue was then placed into a 750 ml. Erlenmeyer flask containing 0.5 mg/ml of collagenase and the respective growth medium and then incubated at 37°C. There were three groups of growth media used: coconut water, coconut water with 10% heat inactivated calf serum, and the standard Eagle's minimum essential medium (control). The cultures were checked at the end of 24, 48, and 72 hrs. for maximum collagenase digestion. Once this was achieved, 95% of the collagenase solution was decanted off leaving behind viable cell clusters. These were then diluted to 600 ml. of the respective growth medium without collagenase and was gently pipetted back and forth to disperse the medium. This was then divided into 30 aliquots and distributed into 30 125 ml. Erlenmeyer flasks (20ml. each). Initial cell counts per flask were made. Each group was assigned 30 flasks, which were randomly picked for the cell viability tests daily for 7 days. The 90 culture flasks were placed in one incubator with 3 partitions and set at 37°C.

Daily cell count with three trials each reading was done for the three groups. Acridine orange test was also done daily for the individual groups. The pH of the tested flask was checked daily.

Preparation of Culture Media:

Experimental media were composed of two groups: plain coconut water and coconut water with 10% heat inactivated serum. Both groups contained Penicillin, Streptomycin, and Terramycin at a concentration of 100 mg/ml.

The control consisted of Eagle's medium supplemented with 10% heat inactivated fetal calf serum (FCS), Penicillin, Streptomycin and Terramycin at the same concentration.

All the media were adjusted to pH 7 by 0.2 sodium bicarbonate buffer solution using Beckman pH meter. To detect pH changes, 5ml. of 0.4 phenol indicator in one liter of coconut water/ Eagle's medium was used.

Cell Liability Tests:

1. Cell Count:

The culture medium was decanted and the cell monolayer was twice washed with 0.25% trypsin solution prepared in Ca and Mg free phosphate buffered saline. The film of trypsin solution was allowed to remain in the cell sheet after a second washing. Culture vessels were incubated at 37°C until the cell monolayer detaches from the growing surface. Repeated washing of culture vessels were done with growth medium containing 10% FCS. Cell clumps were then dispersed by aspirating with a pipette. A drop of dispersed cell suspension was placed on a hemocytometer and counted after four minutes dispersion. Both the dead and live cells were included in the count, and this procedure was done daily for 7 days for all the 3 groups.

2. Acridine Orange Test:

The cell suspension was placed in 5 ml. buffered formalin (10%) and left overnight for fixation. The mixture was then contrifuged and the supernatant discarded. The cell pellets were rinsed with Ringer's solution. Again the solution was centrifuged and 1ml. of 0.009 acridine orange and 1ml. of Walpole buffer was added. A drop of this solution was examined under fluorescence microscopy and the live cells were counted and recorded daily for the three groups.

Sterilization Procedures:

The working table was cleansed and wiped with 1:1000 mercuric bichloride. An ultraviolet lamp was used before and after work for sterilization of the room. Glasswares and instruments were washed with detergent, rinsed with tap water, then boiled with 5 sodium bicarbonate and then rinsed with tap water 5 times followed by distilled water 3 times. They were then oven dried for 2-3 hrs. at 1500°C or autoclaved for 15 min. at 15 psi. Cotton plugs and aluminum foils were used for cover. Cloth, mask etc. were also autoclaved for 30 min. at psi. Sterile, disposable syringes were used.

Six month old coconuts were used. Dirt, cracks, bruises were avoided. A sharp bolo whose blade was sterilized over a flame was used to cut the mesocarp on the flatter side at the point near the shell. Ninety-five percent alcohol was used to wipe the nut. To extract the coconut water, 2 sterile spinal g. 14 needles were used.

Papanicolau Stain:

Three samples were taken daily for staining with Pap smear and this was done at PGH. These were used for the morphologic comparison of the cells in vitro and in vivo.

Statistical Evaluation:

The cell count data was evaluated with a two way analysis of variance (Anova) for statistical significance. The data on acridine orange test was initially evaluated multifactorial experiment and then with one way a Anova and Duncan multiple range test.

Statistical correlation showed no significant difference of the viability of squamous carcinoma cells in coconut water, coconut water with 10% serum, and the standard Eagle's medium. The data, however, show a seemingly better cell viability on coconut water than in the Eagle's medium on day 6 and day 7. Perhaps, this can be an effect of the growth promoting factor found in coconut water and not found in the Eagle's medium.

Cell Morphology

Papanicolau's criteria for the identification of cancer cells in smear are: anisocytosis, anisokaryosis, hyperchromatism, abnormal mitotic figures.[41]

Comparison of the hematoxylene-eosin stained slide of the lymph node tissue and the Papanicolau smear of the cells cultured in coconut water and Eagle's medium showed the following features:

IN VIVO	IN VITRO
Cytoplasm:	
—Well outlined with stromal cells	-Poorly outlined cytoplasm that merges gradually with the background of the smear
Nucleus:	
— Enlarged and prominent with variation in size	- Occurence of variation in the size

- Irregular, coarse chromatin with visible mitosis.	and shape of the nucleus - Irregular, coarse, and net-like chromatin
– Prominent nucleoli	- Prominent nucleoli

The findings in cell cytology are comparable to those described by previous workers.[41]

CONCLUSION

1. Coconut water is as efficacious as the standard Eagle's Minimum Essential Medium in the culture of squamous carcinoma cells for 7 days.
2. The viability of squamous carcinoma cells is not enhanced with the addition of 10% calf serum into the culture media.
3. The cell morphology of squamous carcinoma cells, in general, is not altered or changed after in vitro culture.

Because coconut water is a natural solution, solubility, purity, compatibility of materials in a synthetic medium is not a quandary. However, the chemical components of coconut water varies with the age or the age of the fruit.[16,17] Chemical stability of coconut water is at the optimum at pH 5.59 0.23.[54] Unlike other media, coconut water needs no stock solutions to maintain stability.

However, it is the observation that coconut water is prone to fungal contamination. Fungal growth was noted since the second day of culture both in the coconut water and the coconut water with 10% calf serum. This was not observed in the control medium. This phenomenon was explained in 1967 by Serrano et-al., when they reported enhancement of fungal culture when coconut water was used as the nutrient medium.[48,50] Coconut contains milk factor (CPF) or a growth promoting factor conducive to the growth of fungus and bacteria.

The Viability Of Squamous Cell Carcinoma In Coconut Water

Two cell viability tests were used: cell count and acridine orange tests.

Cell count is not a very reliable test, especially for neophyte readers. Hence, three trials have to be done before the final procedure. Also, the specimen was taken from a lymph node, histopathologically known to have been metastasized with epidermoid carcinoma. Since the lymph node does not ordinarily contain squamous cells, all the epithelial cells read in the culture are, therefore, cancer cells.

The early demise of the cells in all the media was attributed to the one hour power failure experienced on three occasions, thereby altering the temperature in the incubator. Since all the culture flasks of the three groups were kept in one and the same incubator, these changes in temperature is a constant variable in the experiment.

Since both alive and dead cells are counted, this method is a rough index of cell viability. This explains the inconsistency of the day during which the decrease was recorded on day 3, while in the cell count, decrease was noted on day 4.

The technique and mechanism of acridine orange test has been extensively studied. Acridine marange is a molecule that intercalates in between the bases of the strands of structurally intact DNA, thereby emitting yellow to green fluorescence,[22,23] RNA of the nucleolus and the cytoplasm fluoresces in reddish brown to orange. Proliferating malignant cells are readily characterized by an RNA content which greatly exceeds that of the non-malignant cells.[61] In this experiment, the malignant cells fluoresced in green with an orange halo.

Table 4: Composition of Coconut Water and the Eagle's Minimum Essential Medium Compared to the Optimal Nutrient Requirements Of Cultured Epidermoid Cancer Cells.

coconut water (contents)	Eagle's MEM (milligrams/1000 ml)	Requirements for optimal growth of epidermoid cell CA
Amino acids	L-arginine-105	(milligrams/1000ml.)
alanine	L-cystine-24	**amino acid**
arginine	L-histidine-31	glutamine-1.0
aspartic acid	L-isoleucine-52	arginine-0.05
cystine	L-leucine-52	cystine-0.03
glutamic acid	L-lysine-58	histidine-0.02
histidine	L-methionine-15	tyrosine-0.03
lysine	L-phenylalanine-32	Isoleucine-0.1
proline	L-threonine-48	leucine-0.1
phenylalanine	L-tryptophan-10	threonine-0.1
serine	L-tyrosine-36	valine-0.1
tyrosine	L-valine-46	lysine-0.1
valine	L-glutamine-292	phenylalanine-0.05
aspargine	choline-1	tryptophan-0.01
leucine	nicotinic acid-1	methionine -0.03
methionine	panthothenic acid-1	
isoleucine	pyridoxal -1	**Vitamins**
aminobutyric acid	riboflavin-0.1	choline
Minerals and Salt	thiamine-1	folic acid
calcium	I-inositol-2	nicotinamide
chlorine	folic acid-1	panthothenic acid
phosphorus	glucose-2000	pyridoxal
potassium	NaCl -8000	riboflavin
calcium	KCl-400	thiamine
magnesium	CaCl -140	
Vitamins	$MgSO_4 \cdot 7H_2O$-100	
Vitamin A	MgCl.6H20-60	
Vitamin B	Na2HPO4-60	
	NaHCO3-350	

nicotinic acid
panthothenic acid
biotin
thiamine
riboflavin
folic acid
pyridoxine
Vitamin C
sorbitol
inositol

Phenol red-20
Penicillin-0.5

panthothenic

The Efficacy Of Coconut Water As Culture Medium For Squamous Carcinoma Cells

Table 4 shows a comparison of the composition or contents of coconut water and the standard Eagle's Medium. Previous studies have shown that for optimal growth of epidermoid carcinoma cells, the culture media must contain the following amino acids: tryptophan, histidine, cystine, tyrosine, methionine, phenylalanine, arginine, leucine, threonine, valine, lysine, isoleucine, and glutamine.[59,61] Also, it should contain the following vitamins: choline, folic acid, nicotinamide, panthothenate, pyridoxal, riboflavin, and thiamine.[60] The essential salts are: sodium, potassium, magnesium, calcium, chlorine, and biphosphate. Glucose is necessary as the carbon source.[61] Since all the needed elements except choline are contained in coconut water, it is comparable to the Eagle's minimum essential medium.

Statistical analysis of the data on cell count and acridine orange test showed no significant statistical difference among the three groups of culture media. Hence, coconut water, like Eagle's minimum essential medium may be classified among the media essential for prolonged survival (i.e., there are four general types of culture media for cell culture: 1. media essential for immediate survival, 2. media essential for prolonged survival, 3. media essential for indefinite growth, 4. media essential for specialized function).[41,40] However, there remains to be determined about the function of small amounts of protein (10% calf serum), because our data revealed no significant statistical difference in the viability of squamous cancer cells in plain coconut water and coconut water with calf serum.

The use of coconut water as culture medium for epidermoid carcinoma cells accords the following advantages over the Eagle's minimum essential medium:

1. It is locally and readily available.
2. It is cheaper.
3. It precludes the requirements for a good culture medium (i.e., solubility of materials, compatibility of components, purity of materials, and chemical stability).[41]

Coconut is grown in all parts of the country, whereas Eagle's medium has to be imported at a cost of ₱498.50 per 10 liters, 10 liters of coconut water is provided for by twenty fruits, since a six to seven months old coconut contains 500 to 600 ml. of water. At ₱1.00 per coconut, 10 liters of coconut water costs ₱20.00.

Table 1: Cell Count As Viability Test To Determine The Survival and Growth Of Epidermoid Carcinoma Cells In Coconut Water, Coconut Water plus 10% Calf Serum and Eagle's MEM (Mean Cell Count from 3 Trials)

	MEDIA		
DAY:	Coconut Water	Coconut Water plus Serum	Eagle's MEM (control)
1	20	20.3	22.3
2	22.3	23	25
3	23.5	23	25
4	20	20	19.6
5	18.6	19.3	19
6	18.3	18	14.3
7	16.6	16.6	15.3

Table 2: Acridine Orange Test To Determine The Number Of Live Cells of Epidermoid Carcinoma Cells When Cultured In Coconut Water, Coconut Water plus 10% Calf Serum, and Eagle's MEM (Mean Count From 3 Trials)

	MEDIA		
DAY:	Coconut Water	Coconut Water	Eagle's MEM
1	18.3	19.6	21.6
2	22	22.3	24.6
3	21.3	19.6	20
4	16	16	15.6
5	14.3	14.3	15
6	14.3	14	7.6
7	13.6	10.6	3.6

RESULTS:

Three trials were done in all the readings. Table 1 shows the mean individual cell counts in the three groups of culture media (i.e., coconut water, coconut water with 10% calf serum, and the Eagle's minimum essential medium), from day 1 to day 7. Figure 1 illustrates the comparison of the mean cell counts among the three groups as the culture days progress. From day 1 to day 3, a relative increase in the cell count was observed in all the groups. But from day 4 to day 7, a gradual decrease was noted. A two way analysis of variance showed no significant statistical difference among the three groups of culture media (p .05).

The cell count included both the live and the dead cells. Epidermoid cells were identified by the size and shape of the cells. The fungal contaminants noted in the coconut water were easily identified and were not included in the count.

The mean cell count of the live cells as determined with the acridine orange test from day 1 to day 7 are listed in table 2. Figure 2 shows the comparison of the mean cell count of live cells among the three groups from day 1 to day 7. In all the three groups of culture media, the number of live cells increased up to day 2. Starting day 3, the number of live cells decreased. After the fifth day, cell viability was relatively better in the coconut water and the coconut water with 10% calf serum. Daily single analysis of variance, however, showed no significant statistical difference of cell viability among the three culture media (p .05). The computed values of the single analysis of variance are tabulated in table 3.

TABLE 3: Summary of the single analysis of variance to determine any significant statistical difference in the viability of cultured squamous carcinoma cells among the three culture media.

DAY	F Value	Probability
1	5.06	p) .05
2	2.48	p) .05
3	4.18	p) .05
4	0.057	p) .05
5	3.2	p) .05
6	1.07	p) .05
7	0.34	p) .05

BIBLIOGRAPHY

1. Adefuin, C. 1980. Preliminary Studies on the In Vitro Culture of Fibroblasts in Coconut Water Medium. Unpublished BS Thesis, UPLB.
2. Adriano, F. and M. Manahan. 1957. "The Nutritive Value of Green, Ripe and Sport Coconuts." Phil. Agr. 20 (3): 195-198.
3. Alejar, M. 1974. Coconut Water as a Microbiological Birth Culture Medium. Unpublished BS Thesis, UPLB.
4. Aliwalas, P. et. al. 1968. "Mass Culture of Rhodoturula Pilimine Hadrick et Burke in Coconut Water Medium" Phil. J. Sci. 97 (1): 57-72.
5. American Cancer Society, 1978. Facts on Oral Cancer (brochure).
6. Anonymous. 1952. "The Value of Coconut as a Human Foodstuff." Ceylon Coconut Quar, 3 (4): 201-205.
7. Anonymous. 1957. "Coconut Water Speeds Growth of TB Germs." Sci. Newsl. 72(2): 25.
8. Aust J. et. al 1977. "Tissue Cultured Head and Neck Tumors: Their Use In Vitro Assays of Immune Response." Trans. Am Acad. Opht. Otol 84:603-608.
9. Baptist N. 1956. "Amino Butyric Acid and Other Free Amino Acids in the Coconut." Nature 178 (4547): 1403-4.
10. _____. 1963. "Free Amino Acids in the Endosperm of the Developing Coconut." J. Exp. Bot. 14 (40):29-41.
11. Blauvelt, L. and Ashville, N. 1938. "The Use of Non-Cooked and Non-Sterilized Milk as an Additional Nutrient Substance in Culture Media." J. Lab. Clin. Med. 24: 420-423.
12. Bonus, BM. 1980. Studies on the Culture of Mouse Liver Cells in Coconut Water Based Media. Unpublished BS Thesis, UPLB.
13. Cameron, G. 1950. Tissue Culture Techniques. 2nd ed. N.Y: Acad. Press, Inc.
14. Caplain and Steward, 1948. "Effect of Coconut Milk on the Growth of Explants from Carrot Root." Science 108 (2814): 655-657.
15. Caray, E. 1924. "Isolation and Identification of Some of the Sugars in Copra Meal and Coconut Water." Phil. Agr. 13(6): 229-253.
16. Child, R. and W. Nathanael. 1947. "Utilization of Coconut During Maturation and Germination." J. Sci. Food Agr. 1(11): 326-329.
17. Coman, D. 1942. "Human Neoplasms in Tissue Culture." Cancer Res. 2(9): 618-625.
18. Consignade, T. et al. 1976. "Physio–Chemical Changes in Stored Young Coconut." Phil. Agr. 60 (5-6): 256-270.

19. Cutter, V., K. Wilson, and J. Dube, 1952. "The Endogenous Oxygen Uptake of Tissues in the Developing Fruit of Cocos Nucifers". Am. J. Bot 39(1): 51-56.

20. Dodson, M; Klegerman, M. 1978. "Establishment and Characterization of Squamous Cell Carcinoma of the Vulva in Tissue Culture and Immunologic Evaluation of the Host," Amer. J. Ob-Gyn 131 (6): 1978.

21. DeOcampo et.al. 1970. "Tests of Cell Death and Their Applications," J. Phil. Med. Ass. (JPMA) 46(7): 371-390.

22. _____ 1971. "Acridine Orange Test for Corneal Endothelial Viability," Phil. J. Opht. 3 (2): 37-43.

23. Doval-Santos, R. 1978. "In Vitro Culturing of Human Blood Cells in Coconut Protein-Based Media". Unpublished BS Thesis, UPLB.

24. Garana, R. 1980. "Studies on the Culture of Human Leucocytes in Coconut Water Based Media". Unpublished BS Thesis, UPLB.

25. Giard et al., 1973. "In Vitro Cultivation of Human Tumors: Establishment of Cell Line Derived from a Series of Solid Tumors". J. Nat. Cancer Inst. 51 (5): 1417-1423.

26. Gonzales, B. 1914. "The Changes Occuring in the Ripening Coconut". Phil. Agr. 3(2):25-30.

27. Hajdu, S. et al. 1974. "Papanicolau Smear of Cultured Human Tumor Cells". Acta Cytol. 18(4): 327-332.

28. Heaysman, J. 1980. "Processes in Cell Culture" Experimentia 36(5)503.

29. Krusse, P. and M. Patterson (ed) 1973. Tissue Culture Methods and Applications, NY: Academic Press.

30. Matthews, C. 1924. Chem. Abstracts. 18 (18):2926.

31. Mauney, J. et al. 1952. "Bioassay, Purification and Properties of a Growth Factor from Coconut"

32. Moore and Koike, 1964. "Growth of Human Tumor Cells In Vitro and In Vivo". Cancer 17(1): 11-20.

33. _____ and Sanberg, 1964. "Studies of a Human Tumor Cell Line with a Diploid Karyotype". Cancer 17(2): 170-175.

34. _____, Gerner and Franklin, 1967. "Culture of Normal Human Leucocytes". J. Amer. Med. Ass. (JAMA) 199 (8): 519.

35. Nathanael, W. 1952. "The Sugars of Coconut Water". The Ceylon Coconut Quarterly 3(4): 193-199.

36. Nickell, L. 1950. "Effect of Coconut Milk on the Growth In Vitro of Plant Virus Tumor Tissues". Bot. Gaz. 112(2): 225-8.

37. Padua, L. and Gabriel, B. 1975. "Coconut Water as Culture Medium for Entomophtora Coronata". Kalikasan 4(1): 17-22.

38. Paguio and Lopez, 1970. "Coconut Water Medium in the Laboratory Diagnosis of Cholera". JPMA 46(7): 429-435.

39. Parker, R. 1950. Methods of Tissue Culture. Paul B., Hober, Inc.

40. Paul, J. 1970. Cell and Tissue Culture. (4th ed) Baltimore: William and Wilking.

41. Porter, J.C. et al. 1978. "New Tissue Cell Lines Derived from Humna Squamous Cell Ca of the Cervix and Vagina". Amer. J. Ob-Gyn 130(4)

42. Pradera, E., Fernandez, E. and Calderino, O. 1943. "Coconut Water, A Clinical and Experimental Study". Amer. J. Dis. Child 64(6): 977-995.

43. Recio P., et al. 1974. "How Safe and Effective is Coconut Water as an Intravenous Infusion" JPMA 50 (7-8): 1974.

44. Rovin, S. 1962. "The Influence of CO_2 on the Cultivation of Human Neoplastic Explants In Vitro" Cancer Res. 22(3): 384-387.

45. Saguiguit, A. 1980. "Further Studies on the In Vitro Culturing of Human RBC in Coconut Protein Based Media". Unpublished BS Thesis, UPLB.

46. Serrano, L. et al., 1967. "Studies on the Growth Factor Present in Coconut Water" Phil. J. Sci. 96: 229-238.

47. Sevilla, et al. 1976. "The Coconut Water Egg Malachite Green Medium (CEM) for the Isolation of Mycobacterium Tuberculosis". JPMA 52:251-262

48. Sierra and Velasco. 1976. The Growth Factor of Coconut Water-Isolation of the Growth Promoting Activity". Phil. J. Coco. Studies 1(2): 11-18.

49. Simbulan, D. 1979. "Further Studies on the Culture of Embryonic Chick Somatic Cells in Coconut Water Media". Unpublished BS Thesis, UPLB.

50. Sison, B. 1977. "Disposal of Coconut Processing Waste" Phil J. Coco. Stud. 2(2): 39-41.

51. Southam and Goettler. 1953. "Growth of Human Epidermoid Carcinoma Cells in Tissue Culture" Cancer 6(4):809-827.

52. Tibayan, E. 1967. "Studies on the Chemical Composition of Coconut Water and Coconut Skim Milk" Unpublished BS Thesis, UPLB.

53. Vista, T. 1915. "Chemical Changes in the Ripening Coconut" Phil. Agr. 4(5-6): 109-115.

54. Wasley, G. 1970. Animal Cell Culture Methods, Blackwell Scientific Press.

55. Willmer, E. and Nevill. 1963. Cells and Tissues in Culture, Methods, Biology and Physiology. Acad. Press, Inc.

56. Wilson and Cutter. 1952. "The Distribution of Acid Phosphatases During Development of the Fruit of Cocos Nucifera" Am J. Bot. 39 (1): 57-58.

57. Eagle, H. 1955. "The Specific Amino Acid Requirement Of A Human Carcinoma Cell In Culture, J., Exp. Med. 102(1).

58. _____, 1955. "The Minimum Vitamin Requirement of the L and the HeLa Cell In Tissue Culture." J. Exp. Med: 102(5)

59. _____,1955. "Nutrition Needs of Mammalian Cells In Tissue Culture" 122,3168.

The Phil.
Jour of Oto.
Head & Neck
Surgery

MASTOIDECTOMY UNDER LOCAL ANESTHESIA: REVISITED*

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INTRODUCTION

In 1891, when Kuster, Zaufal and Stacke described the procedure of radical mastoidectomy as we now know it, they were doing the procedure under local anesthesia.

With the turn of the century, however, inhalation anesthesia like ether were introduced. Surgeons gradually shifted to general anesthesia. The trend progressed when intravenous anesthetics like Pentothal and microsurgery came.

The Department of E.N.T., U.P.-P.G.H., because of a lot of constraints like lack of general anesthetics, machines, and lack of hospital beds, not to mention the great number of patient load, has tended to lean more on the less expensive, yet safe and effective approach to a problem.

With this in mind, we ventured on doing mastoidectomy under local anesthesia.

The purpose of this paper is to present to you the technique of local anesthesia in mastoidectomy and to relate to you our experiences among 23 patients.

Methodology:

Patients admitted in PGH whose age ranged from 15-50 with no cardiovascular or other medical problems were included in this study from 1980-1981.

The patients were prepared psychologically for the procedure telling them what to expect, what they would feel and hear during the entire procedure.

Anatomical Consideration : (Shambaugh)

The sensory nerve supply of the auricle and meatus comes from the trigeminal, vagus and the third cervical nerve.

The great auricular nerve (C_3) supplies the skin of the mastoid process and both sides of the auricle. *The auriculotemporal nerve from the mandibular division of the trigeminal supplies the skin of the meatus and the tympanic membrane and then the anterior part of the auricle and skin of the temple. The auricular branch of the vagus supplies part of the posterior auricle and the floor of the meatus,

The tympanic cavity is innervated by the tympanic plexus formed by:

1. the tympanic branch of the glossopharyngeal nerve.
2. the superior and inferior carotico-tympanic branches of the sympathetic plexus of the internal carotid artery.

Technique of Anesthesia:

Premedications are given 45-60 minutes prior to the operation. This consists of the following:

1. Demerol – 1.5 mg/kg body weight
2. Phenergan – 1 mg/kg body weight
3. Atropine Sulphate – 0.4 mg
4. Ativan – 2 mg (optional)

The drugs are given intramuscularly. An additional 25 mg of Demerol is given if the patient is still very much awake or anxious.

The patient is then properly draped and the head positioned in the standard way, taking note that the drapes are not too heavy or obstructive as to compromise the air exchange of the patient.

Bupivacaine HCl .25 mg with epinephrine at a dilution of 1:100,000 is then injected at three points in the skin of the mastoid process. One cc. of the anesthetic is given per injection. *For the auricular branch of the auriculotemporal nerve, an injection is made around 1 cm just above the tragus. For the tympanic and auricular branches of the auriculotemporal nerve, injections are made

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* Second Prize – "PSO-HNS – Boehringer Ingelheim Resident's Research Contest – Dec. 1, 1981 – held at the UP-MAS Hall"

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at the junction of the cartilaginous and bony meatus, anterior wall. This is infiltrated superficially and then deeper into the nonarticular portion of the mandibular fossa. For the auricular branch of the vagus, an injection is made into the soft tissue of the anterior aspect of the mastoid process.

The middle ear is then packed with cottonoid soaked in Xylocaine 4% with epinephrine 1:100,000 dilution.

We then wait for 15 minutes and the operation is started.

Results:

The criteria used for evaluating the effectivity of the technique were as follows:

1. absence of pain,
2. good sedation as suggested by absence of head or body movement, and
3. completion of operation contemplated.

Excellent means that all criteria were met. Good means that there is presence of head and body movement during the procedure. Tolerable means there is the presence of head and body movement plus the presence of pain at low level. Failed means that all these were not met.

We had a total of 23 patients but 25 procedures. Two had both ears operated on at an interval of 2 weeks. Both patients tolerated the procedure well. The youngest patient was 15 years old and the oldest 41. Thirteen were males and 10 were females. We had one case of chronic tympanomastoiditis with cholesteatoma, meningitis and lateral sinus thrombosis who could not be cleared for general anesthesia. Although we had some difficulty because the patient was uncooperative, we were able to do radical mastoidectomy with removal of the thrombus from the lateral sinus. No complication developed. In fact the patient improved and the meningitis got controlled.

One patient had excellent result. Twelve had good results, nine were under the "tolerable" group and three were failures. One would note that seven out of nine in the tolerable group had granulation tissue present in the middle ear and/or antrum. This would suggest that the topical anesthesia was not so effective if granulation tissue is present, or probably, since it is one of the last procedures in the operation, the sedation given is already wearing off so the patient is already sensitive.

The other two in the tolerable group had no granulation tissue but had a relatively longer operation namely, combined approach tympanoplasty and modified radical mastoidectomy. Both operations lasted more than two hours so again the sedation was wearing off and the patients were starting to feel pain.

Three had failed. The first was a 17 year old female, who was just too anxious and uncooperative that we did not start the procedure. The other was a 39 year old male whom we can only do simple mastoidectomy. The last was a 41 year old male who could not tolerate the cleaning of the middle ear that we had to inject Ketalar to finish the procedure.

As to the gauging and drilling of the mastoid cortex, no pain was noted except in two patients who complained of irritation on drilling the sinodural angle at the latter part of the procedure. This could again be due to the wearing off of the sedation.

The developing of the meatal flap and closing of the wound were without pain.

No complications secondary to the pre-medications given were noted.

However, we had one patient who developed transient facial nerve palsy secondary to the injection of Marcaine close to the stylomastoid foremen. This, however, recovered 90 min. after the injection.

Discussion:

Mastoidectomy under local anesthesia can be done. It can be done with ease and comfort both for the patient and the surgeon if only the patient is mentally prepared for the procedure. Of course the skill of the surgeon cannot be discounted.

Doing the procedure more than two hours after the injection of the pre-medications would compromise the operation because Demerol would only last that long. The procedure should be timed and should it last longer than two hours, it is suggested that an additional 50 mg of Demerol be given intravenously. This was not well followed in the study.

As to the pain noted by most patients with granulation tissue in the middle ear, a repeat application of topical anesthesia should be done. If this fails, we feel that giving Ketalar anesthesia should be done.

On the whole, despite its limitations, it has proven its worth.

It has the advantage of:

1. having less bleeding so cleaner field of operation,
2. being safe,
3. having a patient with faster recuperation post-operatively,

4. being able to test the facial nerve better when bringing down the bridge (for the neophyte), and
5. being less expensive both for the patient and the hospital.

One more important feature of this procedure is the fact that it can be done for patients who cannot be cleared for general anesthesia, making it a valuable tool in helping out patient who would need the procedure badly as in our case of Meningitis 2^{o} to CTM.

With this in mind, we hope to gain more experience and probably perfect the procedure as to make general anesthesia "obsolete" in the field of otology.

References

1. Eriksson, E., Illustrated Handbook in Local Anesthesia, 2nd Ed, 1979
2. Lee, A., A Synopsis of Anesthesia, 7th Ed, 1973
3. Mawson, Disease of the Ear, 1967
4. Shambaugh, Surgery of the Ear, 1969
5. Saunders and Papparella, Atlas of Ear Surgery, 1971

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INEXPENSIVE IMPROVISED BATTERY HEADLIGHTS*

by: Felix P. Nolasco MD**
Mariano B. Caparas, MD (Adviser)***

Introduction

It cannot be overemphasized that the use of headlight is invaluable in the ENT routine examination and operations where cavities are involved. In almost all of the intranasal, paranasal sinuses, oral and ear surgeries, the headlight is indispensable as far as optimum lighting of the operative field is concerned.

As of today, the headlight being sold in the market are electrically powered. The cost of which amounts to a thousand pesos or more. Considering economy, handiness, non-electricity dependence and brown outs, it was thought that it could be of much help and convenient to everyone in our field of specialty, if we have a cheap, readily available and handy battery powered headlight device that could approximate or match the electrically powered headlight, functionwise.

The purpose of this paper is to share with you a "built it yourself" Battery Powered Headlight device which is inexpensive and improvised.

Materials and Methods:

There are two models of battery headlight to be presented. The materials used for Model No. 1 as shown in the slides cost only about ₱35.00.

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Instruments Used:

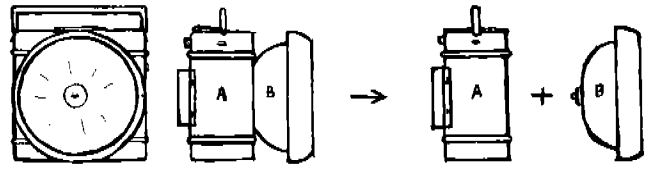
The Department of Otolaryngology, UP-PGH is very lucky to have its own WORK Shop in the ward. This Maxillo-Facial Prosthesis Shop is being established through the effort of the Chairman of the Department. It is here where we make simple ENT instruments like ear curettes skin hook, metal tongue depressor, suction tip and the like.

The Instruments used in assembling the battery headlight are shown in the slides. But, of course, these instruments were not especially bought for making the headlight. Actually, the device could be assembled using simplier tools.

1. electric drill
2. metal plate cutter
3. soldering gun
4. vise grip
5. hammer
6. file
7. pliers
8. screw driver
9. small saw

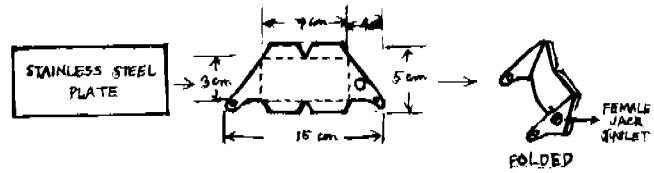
Going to the procedure of assembling Model No. 1.

A. Headlight

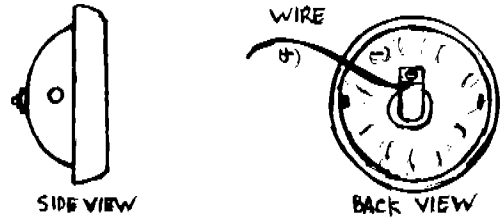


LANTERN

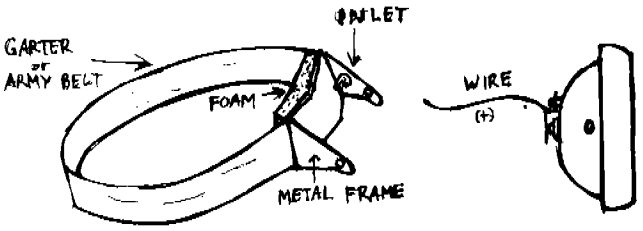
1. The battery pack (A) of the lantern flashlight is disengaged from the lighting head (B) as illustrated in the slide.



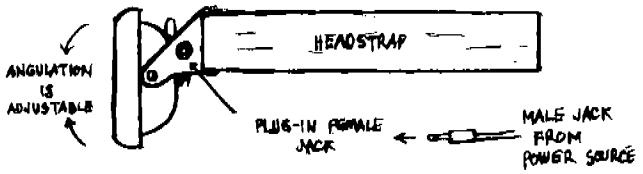
2. The stainless steel thin plate, is cut out and molded. The holes for the screws and female jack (Inlet) are drilled. This metal frame will hold the lighting head in front and the headstrap at its back.
3. Holes are drilled on both sides of the lighting head, and electrical connection at the back is fixed.



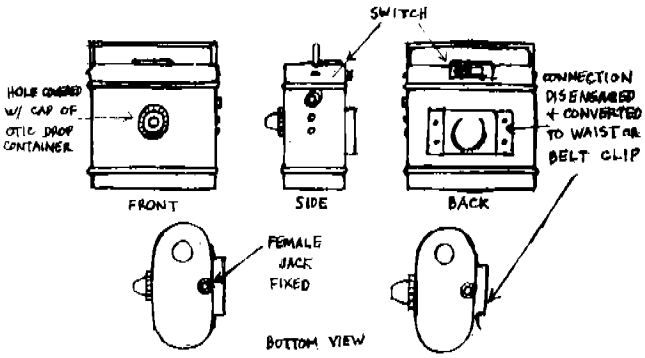
4. Garter or army belt headstrap is fixed in place, with a piece of foam behind the metal frame. The wire of the lighting head is connected to the female jack inlet, and the lighting head itself is screwed and fixed on the frame to form the complete headlight unit.



5. The slide shows the side view of the Headlight Model No. 1 — The angulation of the lighting head is adjustable.

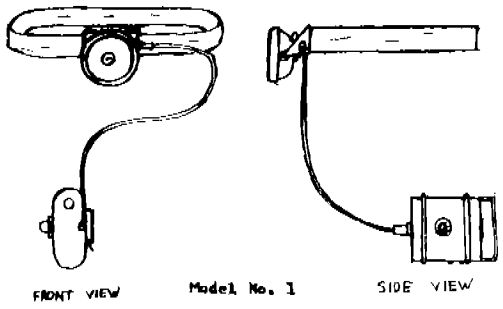


B. Battery Power Track



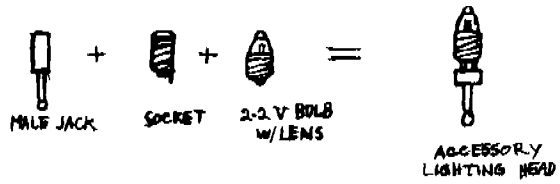
1. For the battery power back, a hole is drilled at the bottom of the battery case, and electrical connection with female jack outlet are fixed. The belt or waist clip is formed as shown above by disengaging one connection of the case holder, and folding it accordingly to function as a belt clip.

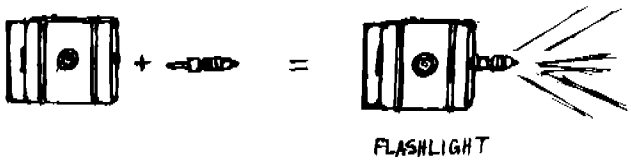
2. A male jack plug is connected to both ends of a 1 meter electric cord. This cord will convey the battery direct current from the battery pack to the Headlight unit.



The slides show the completed battery headlight Model No. 1

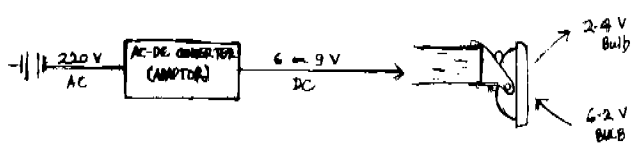
C. An **Accessory for the Battery Power Pack** is assembled by connecting a male jack, socket & a **flashlight bulb** as illustrated.





The battery case could then function as a flashlight with the use of the assembled accessory.

D. Furthermore, the slide also shows that the Battery powered Headlight, could easily be modified or converted to an electrically powered one, for brighter and longer continuous use. The bulb is changed from a 2.4 volts to a 6.2 volts. Appropriate adaptor or AC-DC Converter is readily available in the market, the cheapest of which is about ₱30.00. Model No. 2 is built by making use of the headband or headstrap of a discarded or broken E.N.T. head mirror. A flashlight lighting head is attached to the headband, instead of the head mirror. The result would then be a co-axial type.

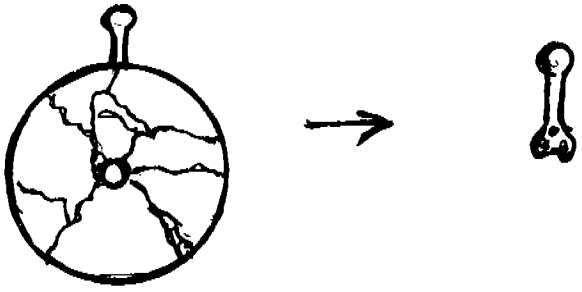


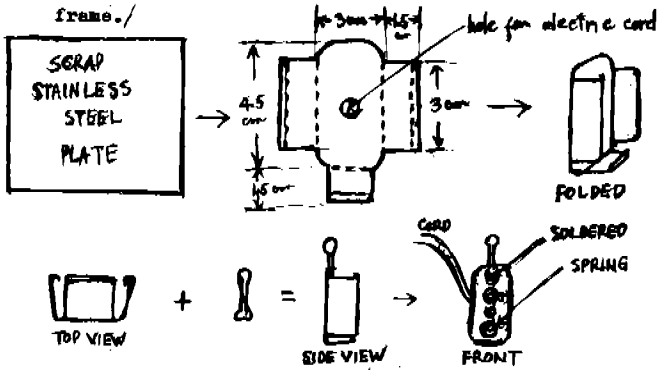
The materials used in Model No. 2 are: shown in the slides and the total material cost for the complete unit is about ₱45.00

1. Headband of discarded E.N.T. Headmirror unit
2. Pocketsize Flashlight ..... ₱10.00
3. a piece of scrap stainless steel plate (5x5.5 cm) .....
4. female jack (inlet) (1) 3.00
5. small spring (2) 1.00
6. electric cord (1 foot) 1.00
7. assembled battery pack of Model No. 1. ..... 30.00

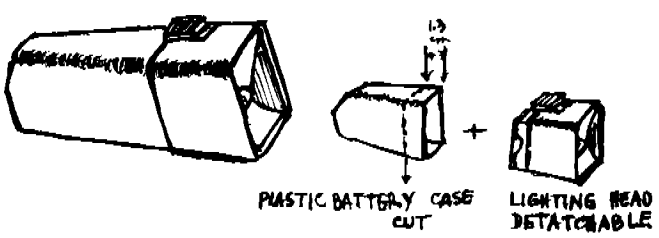
₱45.00

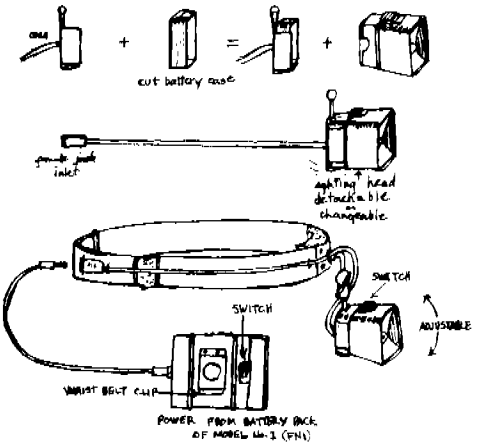
Procedure In assembling Model No. 2





1. The Head mirror holder is disengaged from the broken mirror frame.
2. The metal frame is cut with the above measurements and folded as shown above The head mirror holder is soldered to the metal frame and electrical connection with terminal springs in the lighting head are fixed.





3. The flashlight battery case is cut 1.3 cm anteriorly.
4. The cut plastic battery case is fixed to the metal frame. A female jack in outlet is connected to the other end of the electric cord. The lighting head unit with the cord, is now fixed to the discarded headmirror headband, which completed the Headlight Device unit Model No. 2. The Battery Power Pack of Model No. 1 is the source of power.

Discussion:

The focus or quality of light of the Battery Powered Headlight compared to the electrically dependent models is satisfactory. As shown in the slides from L to R we have Model 1, & Model 2, the third is Model 2 converted to electrical plug dependent and the last is that of the ordinary Switch Allyn Headlight. The limitation of course is that the intensity of the light in the Model 1 & 2 will depend on the power of the battery. The focal point is fixed at a working distance of about 1 to 1½ feet. Hence, the area & brightness of the lighted operative field would depend on the distance to the working area.

Model No. 1 which has a big parabolic reflector, provides a better lighting of the antral cavity in Caldwell-Luc operation because of a bigger angulation of the crisscrossing of the light rays after the focal point, if the focus is adjusted properly hence, there would be lesser unlighted areas at one moment during the procedure (Fig. 1). Figure 2, shows that the light rays of the electrically powered headlight in the market, which make use of a lens & a tube. A do not crisscross much and the rays gradually disperse with distance. Hence, there are more unlighted areas in the antral cavity at one position.

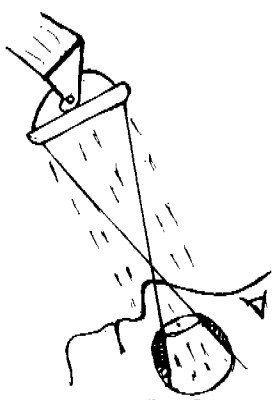


Fig. 1

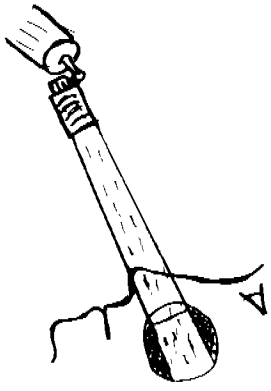


Fig. 2

However, Model No. 2 and the electrically powered headlight models which are the co-axial types give better lighting in nasal cavity operations than Model No. 1 Model No. 2 lighting head could be closely parallel to each other. Hence, the light rays direction could always be adjusted toward the desired visual field (Fig. 3)

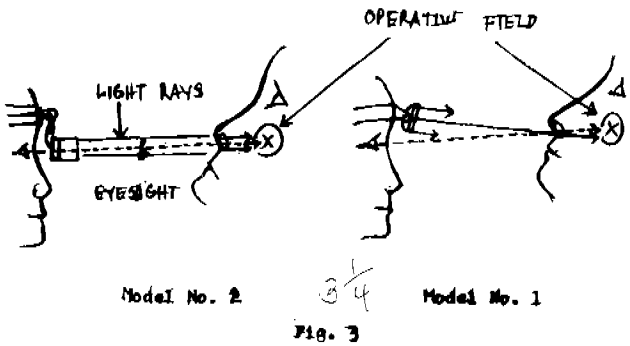


Fig. 3

Nevertheless, both models are very handy and invaluable when performing an emergency tracheostomy at bedside in the ward, or at the emergency room.

As regards the life span of the battery for which (2 1.5 size D batteries are used as a power source, in my personal experience in the past 1½ years of using the device, a new battery has still a satisfactorily serviceable power after 2 hours of non-stop use of the headlight. Hence, it could be used in procedures like tonsillectomy; polypectomy, ethmoidectomy, antrostomy, septoplasty; Caldwell-Luc operation, etc.

The maintanance of the device is very economical and simple. The battery and the flashlight bulb cost only about ₱5.00.

Furthermore, I would like to point out several of the advantages of a battery headlight compared to the available electrically powered headlight and the conventional ENT headmirror.

1. The first is that it is cheap and economical. The material cost of which ranges from ₱35.00 to ₱45.00. In comparison the cheapest ENT Headmirror cost about ₱60.00, while the ordinary Welch Allyn in the market is ₱1,100 and the Halogen type cost ₱2,000.00.

2. It could be assembled at home without the use of very sophisticated tools.

3. Being not an electrical plug outlet dependent, it could be carried around and used in examining or treating ENT patients anywhere, anytime.

4. It is very useful during brown outs.

Furthermore, simple procedures could be made to go on even with a sudden electrical power failure.

And in major operations, a "stand by" battery powered source of light could be invaluable, especially in a place like in the PGH where unannounced brown outs are frequent.

5. The fifth advantage is that it is very convenient and handy during ENT emergencies especially when the time element is very important.

6. Lastly, it is invaluable for the otolaryngologist in the rural areas, where electricity may not be readily available. It is also very convenient to use in answering housecalls and bedside follow-up of patients.

The limitation would be that the battery power source has a life span.

SUMMARY

Two models of inexpensive and improvished Battery Powered E.N.T. headlight had been presented, in the light of the inavailability of such battery operated device, and the high cost of the available headlight in the local market today. Each model has its own use, but both are essentially invaluable to the practicing otolaryngologist being very handy and non-electrical plug dependent.

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MELANOTIC NEUROECTODERMAL TUMOR OF INFANCY*

Alfredo Pontejos, M.D.**
Jan Eero Lopez, M.D.***
Adonis Jurado, M.D.***

INTRODUCTION:

Melanotic neuroectodermal tumor of infancy is a rare, benign, and locally aggressive lesion which occurs almost exclusively in infants less than 1 year of age. The lesion almost always occurs in the maxilla. Although there is agreement concerning the clinical behavior and management of this lesion, there is still a lot of controversy over its pathogenesis.

The purpose of this paper is to present to you a local case which is the first reported case at the UP-PGH Medical Center (and probably in the Philippines), and to review some of the cases already reported in the world literature.

CASE REPORT:

E.B., a 4 month old girl from Quezon City was admitted for the first time at PGH last April 30, 1981, for a mass at the left upper gingival area. The lesion apparently started 3 months PTC and progressively enlarging.

ENT findings revealed a 5-6 cm mass, firm, non-tender, with bluish hue at the left upper alveolar area, with involvement of the palate. VMA is negative and punch biopsy revealed melanotic progonoma.

X-ray revealed a soft tissue mass at the anterior maxillary area with left protrusion of the tooth and haziness of the maxilla.

The patient was prepared for surgery and on the 21st hospital day the patient was operated on under nasotracheal intubation. A Weber incision was made. The mass was excised. Operative findings showed the mass to extend to the junction of the hard and soft palate and pterygoid area. Superiorly, it has involved the lateral portion of the floor of the orbit. The mass measured 15 x 10 cm and it was firm, not well encapsulated and with a bluish hue. A long strip of gauze impregnated with Terramycin was placed in the cavity. The incision was then closed in layers.

Post-operatively, convalescence was uneventful. The pack was removed on the 7th hospital day. Sutures were also removed on the 7th day.

One month post-operatively, there were no signs of recurrence and no feeding problem.

DISCUSSION

Melanotic Neuroectodermal Tumor of Infancy (MNTI) has been designated by many, a name attesting to the plethora of divergent opinions regarding its genesis.

Since it was 1st described by Krompecher in 1918, it has been known by the following names: congenital melanocarcinoma, melanotic epithelial odontoma, pigmented teratoma, atypical melanoblastoma, melanotic adamantinoma, melanotic (pigmented) amelobastoma, melanotic (congenital) tumor, pigmented epulis, retinal anlage tumor, retinoblastic teratoma, retinal choristoma, melanotic progonoma, melanotic anlage tumor and retinal teratoma.

There are about 102 cases already reported in the literature (Karma).

A number of articles have already been written about the possible pathogenesis of this lesion and they are as follows:

1. that the lesion is a congenital melanocarcinoma
2. that the lesion is odontogenic in origin,
3. that it arises from the retinal anlage, and
4. that it has a neural crest origin.

The first claim which is that of Krompecher does not merit further consideration because the behavior of the tumor is benign and is histologically non-invasive.

That the tumor is odontogenic was first pointed out by Mummery and Pitts, thus the term pigmented or melanotic ameloblastoma. This is due

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* Second Prize – Interesting Case Report Contest held at the the Manila Garden Hotel – Sept. 19, 1981.

*** Consultant, Dept. of Otolaryngology, U.P.-P.G.H. Medical Center

to the fact that the proliferating odontogenic epithelium is near the mass. However, Borrello and Gorlin pointed out that no odontogenic tissue was noted in the tumor found outside the maxillofacial area, as in the MNTI of the shoulder.

That the tumor is from the retinal anlage is supported by Halpert and Patzer, noting that the cleft-like spaces lined by pigmented cells resembled the ciliary processes of the eye and further that the small unpigmented cells resembled neuroblasts. They conceived that the tumor arose from a pinching-off process of retinal neuroepithelium in the formation of the embryonal eye. Reports of this neoplasm outside of its predominantly cephalic location, close to the eye is an argument against this hypothesis (Stowen and Lin). Furthermore, no affected child has been found to have abnormally formed eyes (Borrello and Gorlin).

That the tumor is of neural crest origin is supported by reports of increased 3-methoxy-4 mandelic acid (VMA) at high urine levels in some cases of MNTI. This though was not borne out by our patient. Other in vitro experiments seem to support this theory.

Avery showed that the neural crest cells migrate into the region of the future maxilla and mandible, intermingling with the mesodermal cells along the outer border of the stomadeal collar in the future oral ectoderm.

Raven also demonstrated that the dermal bones of the head originate from neural crest ectomesenchyme.

Johnston in 1961 extirpated midbrain neural crest from chick embryo and obtained frontonasal and mandibular defects.

As to the association of melanin-forming cells and nervous elements, melanocytes may be seen in the leptomeninges. Pigmented cells and cartilages apparently arise from the neural crest (Avery).

INCIDENCE:

The vast majority of cases were among young infants aged 6 months or less. Borrello and Gorlin compiled 48 cases of these 25 were females and 23 were males. The age range was 3 weeks to 12 months.

Karma has compiled already a total of 102 cases and the most common site is the maxilla. The other areas where it is found are at the anterior fontanelle, mandible, epididymis, temporal bone, shoulder, thigh and mediastinum.

CLINICAL PRESENTATION:

The usual complaint of the patient is a mass at the anterior maxilla which is fast growing. The child is usually healthy. Grossly the mass is firm with a blue or blackish hue, the overlying mucosa being intact. It is not encapsulated thus producing expansile changes in the maxilla with protrusion of the alveolar processes and displacement of the tooth buds.

Later, the feeding of the child becomes difficult and then their breathing.

Radiologically, the involved bone would have circumscribed areas of radiolucency and displaced tooth gums.

HISTOPATHOLOGY:

On light microscopy it displays slit or gland – like spaces with an outstanding lining of cuboidal cells filled with melanin pigments. Within these alveolar-like spaces and slits are intensely hyperchromatic and undifferentiated looking cells which are like neuroblasts. The pinkish stroma has fibrocollagenous tissue with a variable number of ill-defined cells. There is no capsule (Batzakis).

TREATMENT:

The treatment is primarily surgical. Total extirpation is a must. The patient of Borello and Gorlin was irradiated first with 4000 rads. The mass shrank in size and excision was facilitated with no recurrence. Radiation in the young is, however, frowned upon because of the possibility of post radiation neoplasia.

RECURRENCES:

Recurrences have been reported. These were re-excised with control of disease. Out of 53 cases compiled by Borello and Gorlin, 8 had recurrences.

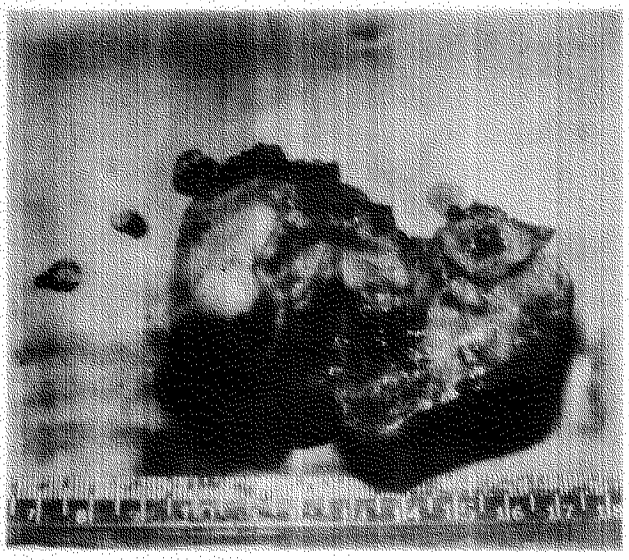
Brekke and Gorlin noted that MNTI recurrences are found only in the maxilla and mandible. And of the 13 cases of reported recurrences, 4 had recurrences within 30 days and 9 cases had recurrences anywhere from six weeks to 2 years.

For the palatal defect, palatal obturator may be used until such time that the patient can be pronounced cured. This is for feeding and speech.

If cured, only then do definitive reconstructive procedure be done.

CONCLUSION:

The 103rd case of MNTI has been presented and it is hoped that it has broadened the sphere of horizon in our already vast knowledge of head and neck diseases.



BIBLIOGRAPHY

1. Arey, L.D.: Developmental Anatomy A Textbook and Laboratory Manual of Embryology. Philadelphia & London, W.B. Saunders Company, 1965.
2. Batsakis, John G.: Tumors of the Head and Neck Clinical and Pathological Considerations. 2nd Ed. Baltimore/London, Williams & Wilkins, 1980.
3. Borello E.D., Gorlin, R.J.: Melanotic neuroectodermal tumor of infancy associated with elevated VMA levels. Cancer, 19: 196, 1966.
4. Brekke, J.H., Gorlin, R.J.: Melanotic neuroectodermal tumor of infancy. J Oral Surgery, 33: 858-865, Nov. 1975.
5. Dodge, O.G.: Tumors of the jaw, odontogenic tissues and maxillary antrum (excluding Burkitt's Lymphoma) in Uganda Africans. Cancer, 18:205-215, Feb. 1965.
6. Karma, P., Rasanen, O., Karja, J.: Melanotic neuroectodermal tumor of infancy. J Otolaryngol, 91: 973-979, 1977.
7. Kerr, D., Pullon P.: A study of the pigmented tumors of the jaws of infants (melanotic ameloblastoma, retinal anlage tumor, progonoma). Oral Pathology, 18:6:759-772, 1964.
8. Kukreja, H.K., Chhangani, D.K., Duggal N. et al: Melanotic progonoma of the maxilla. J Otolaryngol, 91:981-984, 1977.
9. Lurie, H.I.: Congenital melanocarcinoma, melanotic adamantinoma, retinal anlage tumor, progonoma and epulis of infancy. Cancer,, 14:1090, 1961.
10. Misugi, K., Hiroyuki, O., William, N. et al: Mediastinal origin of a melanotic progonoma or retinal anlage tumor (ultrastructural evidence for neural crest origin). Cancer, 18: 477-484, Apr. 1965.
11. Pontius, E.E., Marvin, D.D., Foster, J.A.: Multicentric melanoameloblastoma of the maxilla. Cancer, 18: 3:381-387, Mar 1965.
12. Stowens, D., Lin, T.H.: Melanotic progonoma of the brain. Human Pathol. 5:105, 1974
13. Stowens, Daniel: Pediatric Pathology, Baltimore, Williams & Wilkins, 1959.
14. Snyder, M.B., Cawson, R.A.: Jaw and pulpal metastasis of an adrenal neuroblastoma. Oral Surgery, 40:6: 775-784, Dec 1975.

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JUVENILE LARYNGEAL PAPILLOMATOSIS*

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Jeremias Marino A. Mina, M.D.***

INTRODUCTION

Papillomatosis is a condition which is very distressing to children. Treacherous in its potential, defying all forms of treatment, eluding successful research into its cause, it still remains a serious challenge to the otolaryngologist because of:

a) the obstructive location of the disease,
b) its multiplicity,
c) its high recurrence rate,
d) its ability to invade previously uninfected mucosa.

In a chapter in The Practice of Medicine in 1897, the proposed treatment of papillomata were the use of "causticum, sanguinaria, thuja, belladonna, calcarea phosphate, conium silica, and when all these failed, surgery." The physicians during that time felt that surgery should be done only when the tumor threatened the airway but reminded the reader that surgery caused the tumor to recur more rapidly.

Present literature indicate that very little has changed in regard to the many and varied forms of medical, physical, and surgical modes of therapy. That treatment is no closer to a cure is disappointing in the light of remarkable achievements which have been made in basic immunological research. Surgical extirpation is the essence of therapy and will remain so until a cure is found.

* Third Prize – Interesting Case Report Contest held at the Manila Garden Hotel – Sept. 19, 1981.

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III. CASE REPORT

H. L., 7 months old, male, was admitted for the fourth time on March 28, 1977 because of hoarseness of more than three months duration.

The mother claims that the patient at age 3-4 months, had an abnormally weak cry, hoarse voice and frequent cough. She did not mind at all such symptoms until the child developed occasional difficulty of breathing. The parents brought him to a physician who prescribed antibiotics and mucolytics. No relief of symptoms was noted. So they brought the child to the GSIS General Hospital. The patient was advised confinement.

All systems were normal on admission except for the hoarse voice and abnormally weak cry.

The mother denies any history of an infectious disease during the course of pregnancy. Neither was there a history of warty growths in her skin and genitalia.

The child underwent two previous admissions in this hospital because of upper respiratory tract infection and bronchopneumonia.

The patient was then prepared and scheduled for direct laryngoscopy the next day. A pertinent operative finding was a membrane at the right true vocal cord which was then excised. The child was discharged as improved on the fourth hospital day.

Histopathological examination showed squamous papilloma.

SUMMARY OF OTHER ADMISSIONS

On July 20, 1977, the patient was brought to the hospital because of fever of one day duration and hoarse voice. He was then confined.

Because the patient had a concomittant upper respiratory tract infection, it was decided that it be controlled first before doing a direct laryngoscopic examination.

On the sixth hospital day, direct laryngoscopy was done. The papillomatous growths did not only involve the right true cord but the left as well. The growths were excised. After the procedure, the patient developed severe respiratory obstruction, so that a tracheostomy was done. The post-operative course was uneventful.

Histopathological examination showed squamous papilloma.

On November 17, 1977, the patient was brought to the hospital for follow-up. He was observed to have a hoarse voice on crying. He was again advised to undergo another direct laryngo-

scopic examination. The procedure was done the next day. Examinations showed recurrent papillomas in both true cords. They were excised.

Histopathological examination showed squamous papilloma.

On February 10, 1978, the patient was admitted because of fever and difficulty of breathing. In this manner, it was observed that the papillomas were seen extruding from the tracheostomy tube. Because of the presence of an upper respiratory tract infection, it was decided that it be controlled first before direct visualization and excision be done. The procedure was done on the fourth hospital day. The growths were excised from both true cords.

Histopathological examination showed squamous papilloma.

On September 4, 1978, the patient was admitted because of difficulty of breathing. He was then prepared for surgery. On the second hospital day, the patient underwent laryngo-fissure, excision of papillomas and cryosurgery of the bases of the growths. Post-operative period was uneventful.

Histopathological examination showed squamous papilloma.

On mid-March, 1979, the patient was brought to the hospital for follow-up. At this time, the patient had no more hoarseness and difficulty of breathing. He was subjected to another direct laryngoscopic examination. A very pertinent finding was the absence of recurrent growths. In view of this it was decided that he be decannulated. The patient showed signs of good breathing after this. In addition, he has also regained his voice.

Regular monthly check-up showed no respiratory obstruction. and a good voice.

IV. DISCUSSION

A. ETIOLOGY

1. VIRAL

a) It is thought that there is a double-stranded tumor producing DNA containing virus belonging to the papovavirus group as has been studied by Zur Hansen. In view of this, he differentiates between a juvenile and adult papilloma as follows:

	JUVENILE	ADULT
Virus Particles	Demonstrable	No
Transmissibility	Possible	No
Malignant Transformation	Rare unless irradiated	Common

Spoendlin and Kistler point out that in rapidly growing papilloma the virus is less likely to be found than in slow growing lesions as in skin warts in which the virus is frequently demonstrated. Critically minded authors who have been unable to demonstrate the virus in extracts or electron microscopy sections conclude that the papovavirus in laryngeal papilloma exists most of the time as invisible genomes in the nuclear chromatin and that the mature virus particles are only found under certain though not well defined conditions.

Ullman and Ishikawa were able to transfer children's laryngeal papilloma to laboratory animals and to the skin using a filtrate of papilloma tissue.

b) HPV (human papilloma virus) exists in minute quantities of free DNA and more probably as integrated DNA in the host cell chromosome as studied by Quick et al.

In this study, anogenital warts and laryngeal papillomas were assayed for HPV using an immunoperoxidase stain on formalin-fixed histological sections to ascertain if viral staining could be detected, and if so, to determine the site of virus particle production.

The study also showed a high indication of the role of HPV in laryngeal papillomatosis where it exists rarely as a whole virus but usually as minute quantities of free DNA and more probably as integrated DNA in the host cell chromosome. Although they have only confirmed the presence of type 2 HPV DNA in laryngeal papilloma, less stringent Southern blot results suggest that other HPV are present which have not yet been identified with respect to type. However, the presence of HPV 2 in both condyloma acuminata and laryngeal papilloma provided a good evidence of a direct etiological relationship between these lesions.

2. OTHERS

Many other etiologic agents as endocrine factors, infection, chronic irritation, racial, sexual, geographic, abnormalities of calcium, magnesium or zinc metabolism are all factors which have never been consistently proven in any large series of patients.

B. SEX DISTRIBUTION AND DURATION

Sex distribution is equal among both sexes and duration may last from 8 months to 20, 30 or even 40 years.

C. AGE AT THE ONSET OF SYMPTOMS

The age at the onset of a papilloma could be correlated with the age at the onset of symptoms. In the study by Cohen et al 21 patients developed symptoms between birth and 6 months, 14 had symptoms between 1-2 years and 12 between 3-4 years. Decreasing frequency of the disease occurred as the child became older by 6 years.

D. SYMPTOMS

The most common symptom in this series of patients was voice change which is moderately severe and progressive and in some children aphonia may be present. There may also be airway obstruction which may vary from moderate to very severe some requiring immediate attention. There may also be stridorous breathing. Others would be an abnormally weak cry, cough and dysphagia.

E. MOST COMMON SITES OF A PAPILLOMA

The most common sites of a papilloma are in the true cords and the anterior commissure.

F. OTHER SITES OF INVOLVEMENT

Other sites of involvement outside of the larynx are the palate, tonsils, pharynx, tracheobronchial area, skin and perineum in decreasing frequency as revealed by Cohen et al.

The study showed a low incidence of a tracheobronchial papilloma and is rare in patients without laryngeal lesions and uncommon where a tracheotomy has not been performed.

G. DIFFERENTIAL DIAGNOSES

The usual erroneous diagnoses prior to a direct laryngoscopic procedure would be the following:

a) vocal nodules
b) vocal paralysis
c) bronchitis
d) asthma
e) allergy
f) tracheoesophageal fistula
g) obstructive tonsils and adenoids
h) laryngomalacia
i) emphysema
j) croup

It is quite clear that a direct laryngoscopic examination is the only method of making a correct diagnosis as evidenced by Cohen's study.

H. TYPE OF LESION and COURSE OF THE DISEASE

In the study made by Cohen, the lesions of the larynx may be divided into three kinds:

	Ave. Age at Onset	No. of Procedures	Mean Duration of Symptoms
1) Solitary local	2.8	3.8	3.2
2) Multiple local	3.0	12.8	11.9
3) Multiple diffuse	3.2	15.9	5.34

Worthy of mentioning is that the solitary localized lesions occur in the younger child and these patients may undergo resolution at an earlier age and would require fewer procedures. The least common, those with multiple localized papilloma carries the poorest prognosis with symptoms lasting the longest.

The most common form, the multiple diffuse type, required the largest number of procedures but resolved at a much earlier age.

I. HISTOPATHOLOGICAL CONSIDERATION

The usual pathology of a papilloma is "a papillary formation composed of stratified squamous epithelium on a fibrovascular core." In a report, there may be atypia or non-atypia. This is so because atypia or non-atypia is correlated to the number of procedures done. Atypia is associated with more procedures than in the non-atypia group.

J. RESOLUTION OR CURE

It is a well known fact among laryngologists that the disease can recur after years of being quiescent. Patients have no papilloma when last seen but their follow-up may be of insufficient length of time to regard them as having undergone resolution.

K. MANAGEMENT

I. MEDICAL

Medical treatment with the use of hormones, escarotics, podophylline, systematic magnesium and steroids have been utilized but with little success.

II. SURGICAL

a) Surgical removal of papilloma under endoscopic examination has by far been proven to be the most successful modality of treatment in combination with other modes of management.

b) Electrocautery has been employed with varying results. However, Hollinger reported a significant incidence of scarification and stenosis.

c) The use of cryosurgery resulted in minimal post-operative fibrosis and structure as well, as rapid resurfacing of the respiratory tract occurs with normal epithelium preventing web formation and metastatic implantation of the papilloma.

d) Endolaryngeal application of ultra-sound causes damage to the papilloma and a destructive effect on the virus. It also causes inhibition on the growth of the virus.

e) The carbon dioxide surgical laser has revolutionized the management of juvenile laryngeal papillomatosis. The lesion can be managed with a high degree of success with preservation of a normal functioning larynx. It instantaneously vaporizes the lesions in an almost bloodless field. It further permits very meticulous removal with minimal damage to adjacent soft tissues. Papilloma

can be managed with greater facility and the need for a tracheostomy to maintain an adequate airway should be diminished in very small children.

III. IMMUNOLOGIC

a) There has been little success with the use of smallpox and BCG vaccines because they produced mucosal ulceration and sterile abscess respectively.

b) Leukocyte interferon therapy has been used in the management of both viral diseases and tumors in humans. It has been found out in the study by Haglund et al that exogenous leukocyte interferon causes regression of the papilloma and affects the course of the disease. During treatment, tumor masses were found to be severely degenerated that they virtually disappeared, by sucking at the surface layers of the papillomatous tissue. In so doing, they advised that the tumors be removed under endoscopic examination which will not traumatize the vocal cords and impair the glottic function. Since this mode of treatment is still under study, it has to be determined what doses and what time schedules should be used to achieve optimal effects.

IV. CHEMOTHERAPY

Topical chemotherapy using 5-FU has been described by Smith. 5-FU has several modes of action. It is a competitive inhibitor of thymidine synthetase and thereby blocks the methylation of deoxyuridylic acid to thymidyllic acid. This effect directly interferes with the synthesis of DNA and indirectly inhibits the synthesis of DNA dependent RNA. The drug can also directly inhibit RNA synthesis by acting as a "false-base".

Despite the precise and complete eradication of visible disease, papillomas can recur and progress. An adjuvant treatment is needed which can eradicate microscopic deposits of papillomatous and pre-neoplastic lesions.

The properties of 5-FU suggest that it may be a useful adjuvant therapy. The study of Smith confirms that topical 5-FU can be applied repeatedly to mucosal surfaces without severe complications or interference with normal healing functions.

V. CONCLUSION

Juvenile laryngeal papillomatosis is indeed very distressing to children. In fact, it places the otolaryngologist in a quandary as to how to handle and manage such a case. What is puzzling, however is its high incidence of recurrence. Furthermore, mysterious as its recurrence is its spontaneous reggression.

Moreover, in view of the scientific advances that have been employed in elucidating its etiology, elusive as it is, has there been little success in defining the causative agent of this condition.

As regards its management, there is no accepted definitive treatment of such case. It is important to keep in mind, however, that removal under endoscopic examination may prove more successful when combined with another modality of treatment.

Lastly, it is everyone's hope that we will be able to know the cause of such a distressing condition so that a definitive treatment will come about with God's help and guidance.

BIBLIOGRAPHY:

1) Szpunar, J.: Juvenile Laryngeal Papillomatosis. Symposium of Pediatric Otorhinolaryngology, 10: 67-70, 1977.

2) Bone, R.C., Feren, A.P., Nabum, A.M., Winkelhake, B.G.: Laryngeal Papillomatosis: Immunologic and Viral Basis for Therapy. The Laryngoscope, 86: 341-347, 1976.

3) Haglund, S., Lundquist, P., Cantell, K., Strande, H.: Interferon Therapy in Juvenile Laryngeal Papillomatosis. Archives of Otolaryngology, 107: 327-332, 1981.

4) Kiem, R.J.: Malignant Change of Laryngeal Papillomas: A case Report. Otolaryngol. Head and Neck Surgery, 88: 773-777, 1980.

5) Cohen, S.R., Seltzer, S., Geller, K.A., Thompson, J.W.: Papilloma of the Larynx and Tracheobronchial Tree in Children. Annals of Otolaryngology, 89: 497-502, 1980.

6) Smith, H.G., Vaughan, C.W., Healy, G.B., Strong, M.S.: Topical Chemotherapy of Recurrent Respiratory Papillomatosis. Annals of Otolaryngology, 89: 472-477, 1980.

7) Quick, C.A., Krzyzek, R.A., Watts, S.L., Faras, A. J.: Relationship Between Condyloma Acuminata and Laryngeal Papilloma. Annals of Otolaryngology, 89:467-471, 1980.

8) Tucker, H.M.: Double-Barreled (Diversionary) Tracheostomy in the Management of Juvenile Laryngeal Papillomatosis. Annals of Otolaryngology, 89: 504-507, 1980.

9) Becker, W., Buckingham, R.A., Holinger, P.H., Korting, G., Lederer, F.L.: Atlas of Otorhinolaryngology and Bronchoesophagology, 1969.

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SURGERY FOR HEARING IN A CASE OF CONGENITAL MEATAL ATRESIA AND MICROTIA*

by: Zenaides Wi M.D.**
Edwin Cosalan M.D.**

Congenital malformations of the ear results from a developmental failure of the first and second elements of the branchial apparatus. The mechanism of how this comes about is still unknown.

These malformations may be unilateral or bilateral and the hearing problem encountered is usually due to malformations of the sound conducting apparatus alone or malformations of the sensorineural apparatus alone. Simultaneous involvement of both is the exception rather than the rule. This is because the two have different embryonic origins. The sensorineural labyrinth is derived from the ectodermal otocyst while the sound conducting system is derived from the branchial apparatus.

In the past, management of such deformities were equivocal. Surgery as a treatment mode to correct such malformations and improve hearing were then considered useless and dangerous. This was also due to the fact that the first surgery done to improve hearing by Kiesselbach in 1883 resulted in facial paralysis. In later years, this cloud of pessimism slowly began to dissipate as more and more reports of successes in the use of surgery to improve hearing accumulated. In 1947 Ombreddane in Paris and Pattee in America helped effect a change of attitude with their reports of successful treatment of atresias with surgery. In the next few years, an increasing report of cases and the works of such otologic surgeons as Shambaugh, House, Meurman and others helped establish surgery of congenital malformations of the ear as desirable and useful.

Aims of management:

The aims of management or the indications for surgery are twofold: 1) Functional – to improve hearing levels. This is the more important indication. 2) Cosmetic – to correct or restore a deformed pinna and to create a good external auditory canal. This is of secondary importance.

Contraindications to this surgery are: 1) sensorineural deafness, 2) age below 18 mos. because of the immaturity of the middle ear cleft.

Case Report:

In the following case, we would like to share with you our experience in a case of congenital malformation affecting the sound conducting apparatus for which surgery to correct the hearing has been employed.

L.V. is a 20 year-old male, an engineering student from Manila, who consulted at our OPD for congenital malformations of both ears. His chief complaint was "hard of hearing". Although speech was normal, his problem manifested itself chiefly in his inability to use the phone and some difficulty in listening to classroom lectures.

He is the sixth in a family of ten children, 3 of whom have bilateral congenital malformations. A first cousin has a similar problem.

Physical examination revealed essentially normal findings except for the otologic findings:

1) Both ears had microtic pinnas.
2) The left ear had no external auditory canal, the right ear had a shallow canal that ended in a blind pouch.
3) Valsalva maneuver revealed patent Eustachian tubes on both sides.
4) Tuning fork examination indicated a bilateral conductive hearing loss.

X-ray of the mastoids revealed a sclerotic right mastoid and a well pneumatized left mastoid. There was no evident cholesteatoma formation on both sides.. Pre-operative puretone audiogram (see fig. 1) done revealed the following:

1) Right ear: conductive hearing loss with an average air bone gap of 51 dB.
2) Left ear: conductive hearing loss with an average air bone gap of 57 dB.

Both audiograms revealed an adequate cochlear function.

* Consolation Prize – "Interesting Case Report Contest held at the Manila Garden Hotel – Sept. 19, 1981"

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Pre-operative diagnosis then was: *Bilateral congenital microtia and meatal atresia with bilateral conductive hearing loss.*

Plan of management was to do an exploration of the mastoid and middle ear with possible tympanoplasty. The left was done first on the basis of its being the better ear in terms of a more developed pinna and a well pneumatized mastoid. The positive Valsalva maneuver confirmed clinically the presence of a middle ear cleft.

Technique of operation:

Shambaugh points out that NO SINGLE TECHNIQUE IS APPROPRIATE FOR ALL CASES, as such, the technique in each operation must be modified to fit the particular lesion found so as to construct the most effective impedance matching mechanism. It is important therefore, that the surgeon be prepared to modify his plan of attack as he proceeds armed with a clear comprehension of the mechanics of hearing and a familiarity with tympanoplastic techniques.

Basically, the technique employed was:

1) A postauricular incision with the development of a triangular flap from the postauricular skin is made. (Fig. 2)

2) An attico-antrotomy approach to the middle ear via the postauricular incision is done until the ossicles or incus is exposed.

3) Construction of the external auditory canal and reconstruction of the tympanic membrane with temporalis fascia graft as in modified radical mastoidectomy with tympanoplasty.

4) Closure of the wound with rotation anteriorly of the posterior pedicle flap to line the antero-superior portion of the external auditory canal; Koerner's flap for the posterior portion of the canal.

The operation was done under general anesthesia with xylocaine 2% and adrenaline injected along the incision sites. A post auricular incision was made extending over the deformed pinna anteriorly and into the meatal depression. Posteriorly, a pedicle flap of triangular skin was made. Elevation of the skin flaps and pinna revealed an intact mastoid cortex and the absence of an external auditory meatus. The site of the bony meatus was solid bone.

We proceeded by doing a simple mastoidectomy starting with an antro-atticotomy approach. Normal air cells in a well pneumatized mastoid were found. (Fig. 3). The incus was identified and its articulation with the malleus head as well as the facial ridge were exposed and identified by drilling around the attic air cells and some portions of the thick solid bone around the bony atresia plate. Using the short process of the incus as a guide and aware of possible displacement of the facial nerve, we drilled down the bony atresia plate and did a posterior tympanotomy, thereby entering the middle ear and visualizing the stapes and the incudostapedial joint. Noting fusion of the head of the malleus and its lateral process to the remaining atresia plate and with the use of a small burr tip we practically carved out a lateral process of the malleus from the bony plate. There were remaining suspensory ligaments of the malleus and incus so that they remained suspended in their normal anatomic positions in the middle ear. Although the head of the malleus and incus were fused, we were fortunate enough to discover mobility of the incus and stapes by moving of the malleolar process. The middle ear mucosa was normal.

With mobile and continuous ossicular chain, a temporalis fascia graft was placed over the fashioned process of the malleus to act as the tympanic membrane, extending this over the additus and into the mastoid bowl to compartmentalize the middle ear from the mastoid bowl and the external environment as is done in modified radical mastoidectomy with tympanoplasty. The graft was then held in place by gelfoam and chloromycetin powder packing.

In closing, the posterior triangular skin flap was rotated anteriorly and inserted into the created external auditory canal to line the antero-superior portion of the canal and anchored in place by chromic 4-0 sutures and gelfoam and terramycin packing, a traditional Koerner's flap was done posteriorly. On top of the gelfoam pack, laterally was also placed a terramycin impregnated gauze as additional packing. The rest of the incision was closed in two layers. A pressure dressing was applied for 24 hours.

Post operative care:

1) The terramycin impregnated gauze was removed in 72 hours.
2) The gelfoam packing was removed in a week's time while some gelfoam in the attic were allowed to lyze by themselves in order to prevent disturbance of the graft over the ossicular chain.
3) Skin sutures were removed in 5 days.
4) The patient was seen periodically for check up and cleaning of any debris in the ear.
5) A post operative audiogram was taken after a month. (Fig. 3).

Discussion:

Our operative findings of: 1) a slightly deform-

ed pinna, 2) absent external auditory canal and tympanic membrane, 3) of a malleus head fused to the incus; presence of a long process of the incus with a normal joint to a normal and mobile stapes, and 4) presence of a normal middle ear cleft, mastoid process, and patent eustachian tube, classify this anomaly into a post-operative diagnosis of type two congenital anomaly according to Gill's classification.

Good operative results can be expected of type I and II lesions but surgery of type III lesions which are usually associated with the Treacher Collins syndrome is not recommended. Surgery for type IV lesion are best left until adult life when the patients can make their own decisions.

In evaluating our results, two problems were considered. 1) Was there a successful reconstruction of an external auditory canal? 2) Did the surgery provide serviceable and improved hearing levels?

To the first question, there was a good post-operative external auditory canal which was large enough and did not stenose. The microtia was not corrected because the deformity was minimal and was cosmetically acceptable.

To the second question, we did a post-operative audiogram a month later showing a diminished air bone gap. Here there is an average gain of about 25 decibels. Subjectively, the patient reported a very noticeable increase in his hearing which was most acute immediately post-operatively. Two and one-half mos. postop, the patient enjoys the added pleasures of using telephone and not having to strain too much in his classroom lectures.

Possible complications of this type of operation are:

1) Facial nerve injury because of the occasional aberrant course of the facial nerve in congenital malformations of the ear.
2) Sensorineural impairment due to injury to the cochlea or labyrinth.
3) Post-operative infection.
4) Stenosis of the ear canal postop.
5) Failure to improve hearing. The presence of any of these makes the operation a failure. Fortunately we never developed any.

Summary:

The rationale of the surgical management of congenital anomalies of the ear was discussed. The surgical technique and postoperative results were taken up in detail. The possible complications were also mentioned.

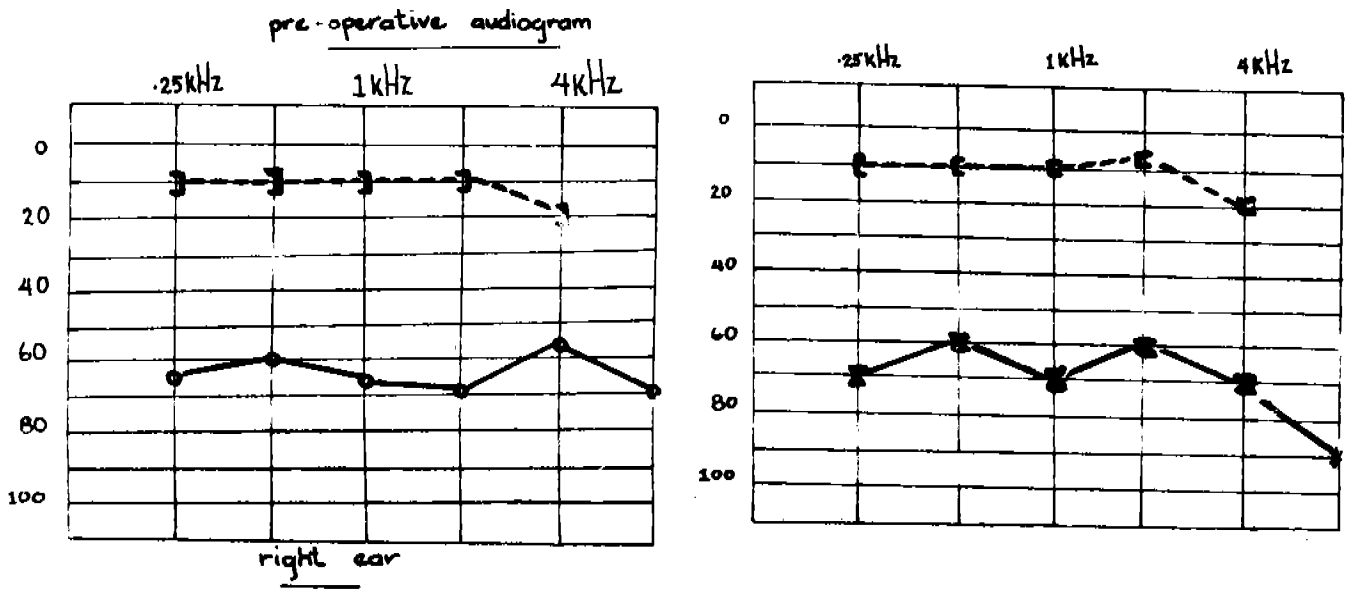


Fig. 1

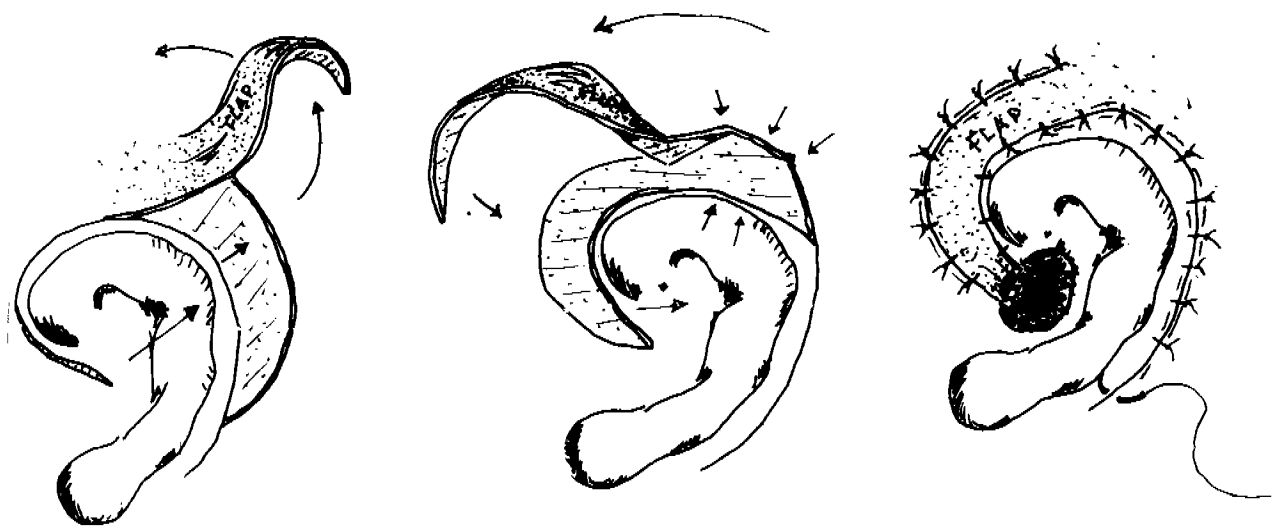


Fig. 2 - Posterior pedicle flap.

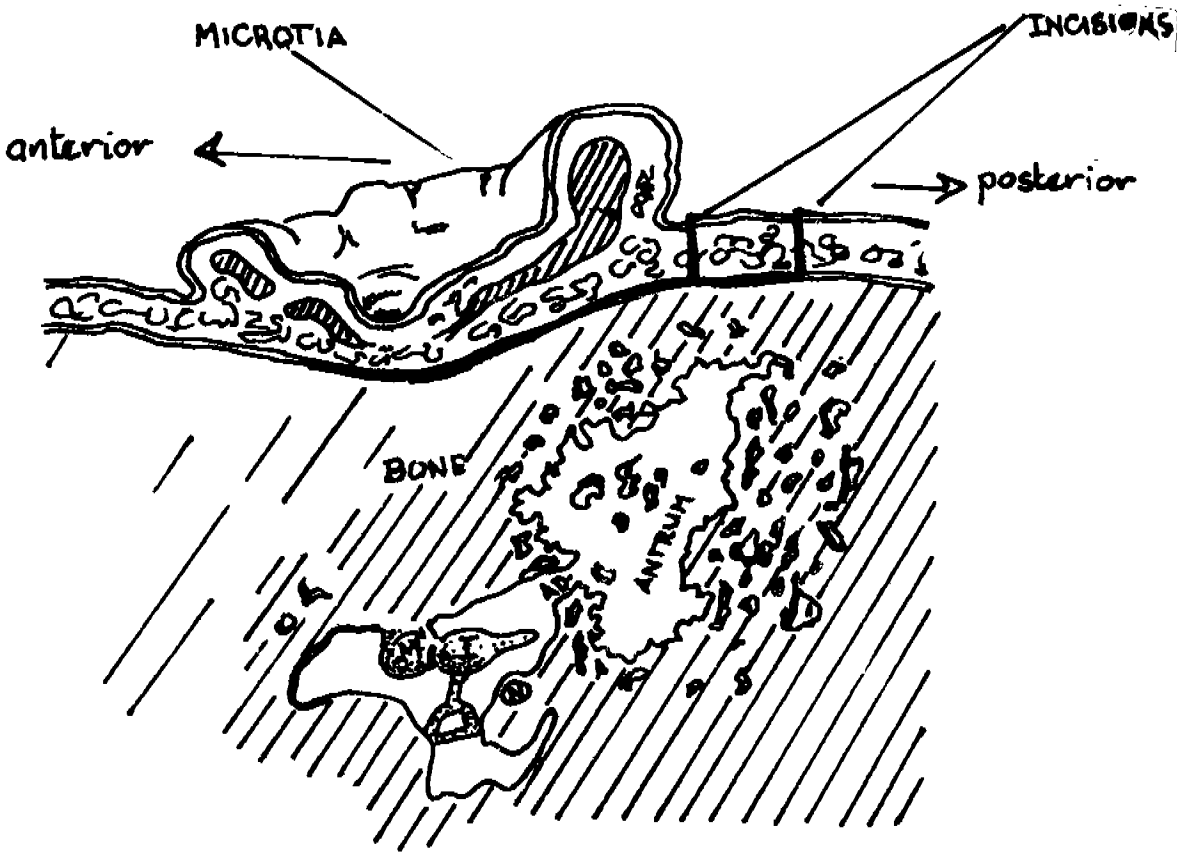


Fig. 3 - Transverse view showing relationship of antrum, aditus and middle ear, absence of bony EAC.

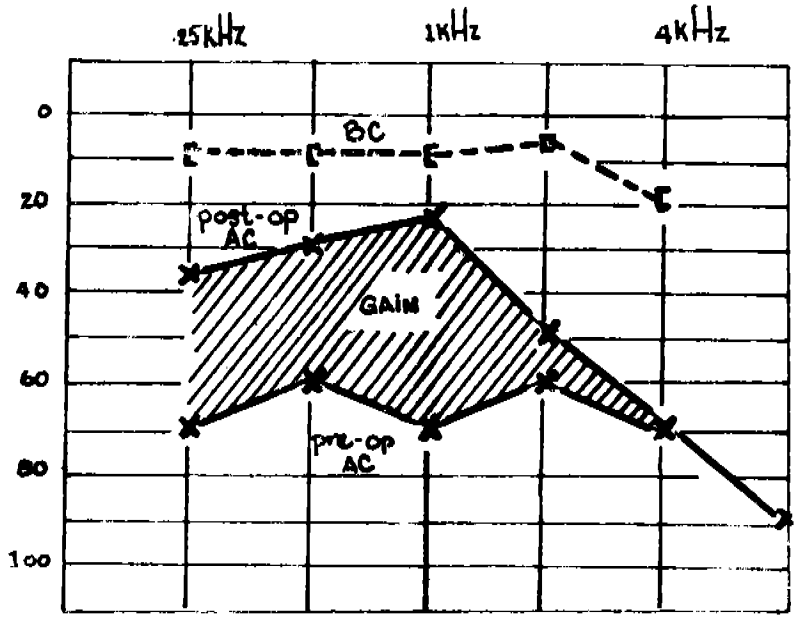
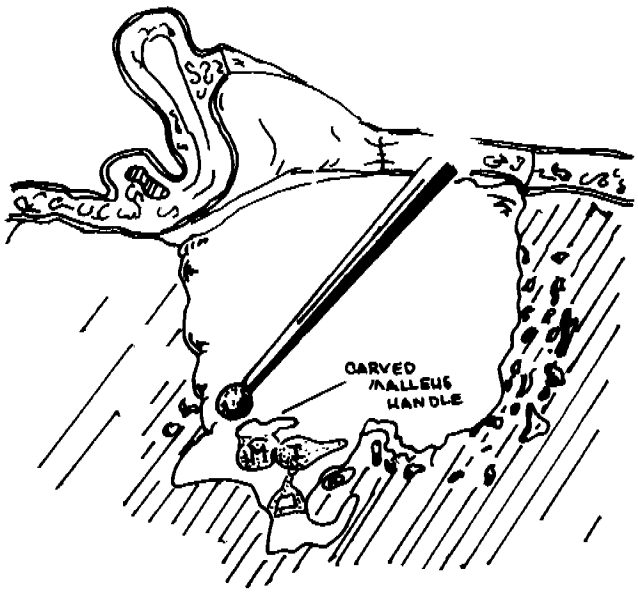
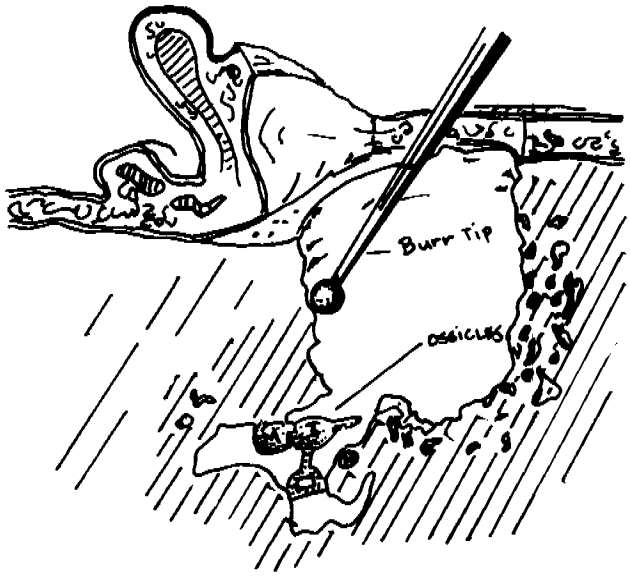
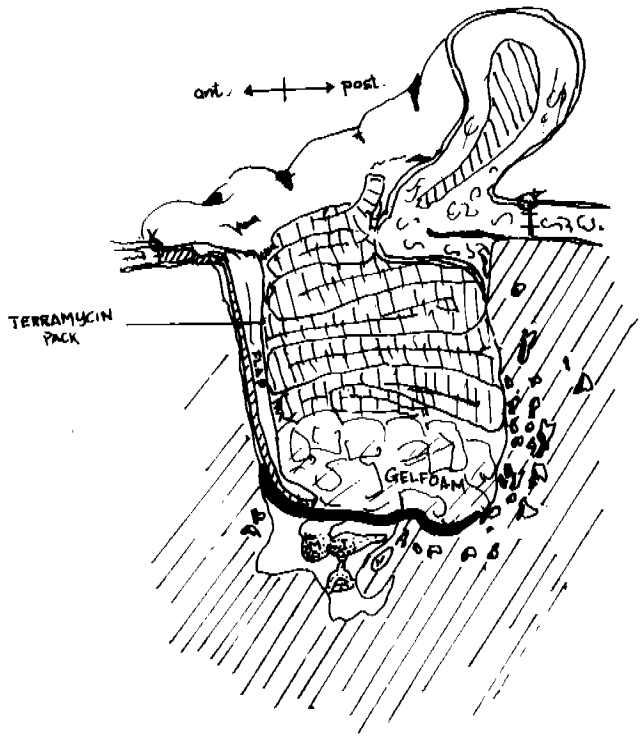
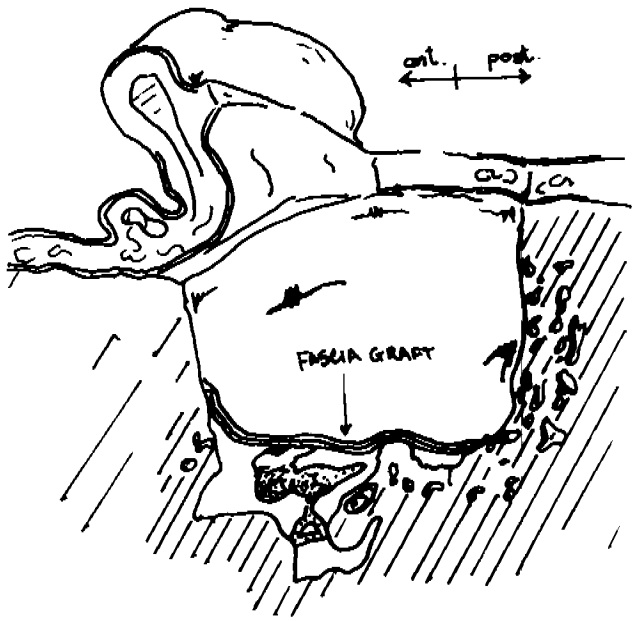


Fig. 4









Ballantyne, J : *Operative Surgery of the Ear* Butterworths, London

Crabtree, J.A.: Tympanoplastic Techniques in Congenital Atresia. Archives of Otolaryngology, 88: 89, 1968

Mawson, S.R.: *Diseases of the Ear.* 4th edition, Edward Arnold Ltd., 1979

Pulec, J.L.: Management of Congenital Ear Abnormalities. Laryngoscope, vol. LXXXVIII, No. 3, 420-434 March, 1978

Shambaugh, G. E. Jr.: *Surgery of the Ear.* 3rd edition W. B. Saunders Company, 1980

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SCALPING FLAP FOR SUBTOTAL NASAL RECONSTRUCTION

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INTRODUCTION

This is a case study of a plastic reconstructive patient enduring a traumatic amputation of the nose. A three-stage one year reconstruction was done initially starting with the scalping flap, then, amputation of the pedicle flap and finally, rhinoplasty.

The Indian flap was initially recorded in India 2000 B.C. - 500 B.C. where the prevailing punishment of adultery was amputation of the nose. This particular flap has undergone evolution taking into account the following factors:

(1) *The vascular supply of the flap-kinking of the Indian flap made it prone to necrosis.*

(2) *The raw area under the flap:*

The danger of a raw area under the flap open to suppuration fibrosis and contraction came to be realized. The necessity of providing a lining was the next advance in development. This culminated with the work of Blair in 1925 when the distal end was folded upon itself to provide the columella, the tip and the lining of the alae and was lined with the adjacent flaps.

(3) *The length of the flap*

Providing tissue to be folded upon itself in the Indian forehead flap resulted in a short columella and downwardly retracted tip. The length of the flap became longer as it slanted obliquely, up and down, and horizontally, ultimately developing with the scalping flap of Converse in 1942.

(4) *Importance of a long columella*

Increase in the length of the forehead flap provides adequate projection of the tip of the reconstructed nose which depends upon a columella of adequate length. The columella must be reinforced by lining its posterior surface with a hinge flap from the recipient site. Millard in 1966 used a flap of labial mucosa brought up through a button hole in the lip for this purpose, a useful methods if the recipient site of the columella is scarred and poorly vascularized.

(5) *The skeletal framework*

Work on providing a skeletal framework using the frontal bone, tibia, and costal cartilage culminated with the work of Gilles. He advocated the use of the remaining portion of the septum, swinging it forward on an inferior pedicle at the time of the reconstruction of the nose to support the tip. This was modified by Millard using a superior pedicle.

This is the case of Celso Cadusale, 38 years old, male, taxi driver who on *September, 1980* was allegedly bitten on the nose by a would be hold-upper who got into his cab. At the ER-ENT, the tip, supratip, parts of both ala and columella were missing. The avulsed part of the nose was never recovered in the scuffle. The wound was left to heal by secondary intention.

On *April 27, 1981,* he consulted the Plastic-Reconstructive Service of the Department of ENT-UP-PGH. The tip, supratip, and parts of both ala and columella as a whole was to be reconstructed.

On *May 8, 1981,* he was presented before the Friday Grand Rounds. Opinions vary as to how he would be managed. The nasolabial flap and the median forehead flap were presented. The median forehead flap and the nasolabial flap may be used to reconstruct the columella and a portion of the ala but not when there is more extensive tissue loss such as the supratip, the tip, both sides of the ala, and the columella as we find in this case. Obviously, this type of deformity requires a greater amount of tissue in a one piece reconstruction. That tissue is supplied by the scalping flap for subtotal nasal reconstruction.

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Specific reasons why I opted for the scalping flap:

(1) The scalping flap can be loosened from the cranium until adequate length is obtained, thus permitting the infolding of the distal portion of the flap for the reconstruction of the columella.

(2) Most of the incisions outlining the flap are placed behind the hairline of the scalp and the resulting scars are, thus, mostly hidden.

(3) The skin grafted area of the permanent defect is placed over the lateral aspect of the forehead, where it is less conspicuous.

(4) The large size of the flap permits it to be rolled on itself and tubed, thus, greatly diminishing the area of the exposed raw tissue.

(5) The scalping flap provides a reconstructed nose which has a satisfactory color and texture match with the skin of the face.

(6) The scalping flap is provided with an abundant blood supply from the superficial temporal artery, branches of the frontal, supra-orbital and supratrochlear arteries thereby, doing away with the delay procedure.

On *May 18, 1981,* the operation was scheduled. The scalping flap was begun by outlining the area of the permanent defection on the forehead as well as provide local lining of the transposed flap. Careful sharp dissection separates the cutaneous layer from the frontalis muscle in the area of the permanent defect thus preserving the expressive movements of the forehead under the skin graft which later resurfaces the area.

The incision delimiting the lateral boundary of the defect was extended upward toward the vertex of the cranium until it reached approximately the level of a transverse line extending through the upper tips of the auricle.

The dissection of the skin from the frontalis muscle was extended until the galea aponeurotica was reached. The galea was then sectioned transversely. Subsequent raising of the scalping flap was accomplished with a loose areolar layer separating the galea from the pericranium. The galea was thus raised together with the flap as well as the remains of the frontalis muscle with the exception of the portion of the muscle on the area of the permanent defect.

The scalping flap has reached sufficient length to permit its transfer when it reached the lower lip. Infolding of the distal end of the flap reproduced the tip, columella and ala. A chromic catgut suture was placed to maintain the flaps in a position. The distal part of the flap was infolded to form the columella. The suture maintained the infolding by approximating the tip to the undersurface of the flap. The degree of infolding determined the length of the new columella. The nasal tip, columella, and ala, thus was formed by the folded flap.

Local lining of the flap were important to prevent raw areas under the flap which are open to suppuration, fibrosis and contraction. The dorsal flap from the nasal stump, the turned in hinge flaps from the bases of the alae and a flap from the median portion of the lip were outlined. The various flaps were turned in for the lining. I would like to direct you to our modification. Median lip flap was de-epithelialized and sutured to the de-epithelialized portion of the columella remnant. This was important to provide continuity of the whole nasal structure as well as provide greater blood supply coming from the septal area.

A full thickness retro-auricular graft was placed over the area of the permanent defect situated over the frontalis muscles. Collagen felt was placed over exposed areas of pericranium as a substitute to split thickness graft. A pressure dressing was applied over the area of the temporary defect.

Good take was obvious during the post-operative course as the following slides will show:

The amputation of the scalping flap was carried out on June 2, 1981 (or 2 weeks later). The skin grafted over exuberant permanent defect was taking well. Granulation over areas covered by the collagen felt was noted. I would like to direct your attention to these epidermal islands migrating from skin grafted over the collagen felt. These were trimmed. The pedicle flap was severed. The tube portion was unfurled. The flap was returned to its original site and sutured in position. The nasal stump was integrated in the nasal dorsum by the technique of Penn. This entails cutting a V-shaped tissue and approximating this in a T-closure. Please take note of the hump hugging the closure which we hoped would level off. The post-op course was again uneventful. Third and seventh day post-op showed excellent take. One month post-op showed the hump still present giving a sagging nasal expression. Three months post-op, expressive frontalis muscle movement was obvious.

The story does not stop here. The sagging of the tip on profile and trimming of excess tissue presented a problem. A rhinoplasty with silastic implant was contemplated. A rim incision was done

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continued over the upper and lower lateral cartilages up to the dorsum and the naso-frontal angle. Silastic was inserted and trimmed. Closure with silk was uneventful.

On *August 19, 1981* (2 weeks later) purulent discharge was noted over the rim incision. He was admitted to ward 3 for Culture and Sensitivity and IV meds. C/S showed light growth of **Proteus** mirabilis sensitive to chloramphenicol. While in the ward, he was given Chloro 500 mg IV every six hours as well as Penicilin 2 millions.

On *August 26, 1981*, he was discharged free of any infection.

Complications of Forehead Flap

(1) The loss of a portion of the flap resulting from inadequate vascularization. The usual cases are inadequate design of the flap, tension of the flap, hematoma formation, and excessive thinning of the distal portion of flap.

(2) Stenosis of the reconstructed area.

Fortunately, we did not encounter these complications. The only complication was noted after the third stage (the rhinoplasty). The discharge from the rim incision was noted early enough and treated.

Observations

We have learned from this case and would like to share with you our observations:

(1) The scalping flap for subtotal nasal reconstruction is not a formidable procedure. Its presentation here to reconstruct a traumatic injury of the nose hopefully would open new vistas for other otolaryngologists in their management of tumors of the nose.

(2) The unreliability of the silastic implants in our transplanted tissue. Better I think is the restoration of the skeletal framework using the Gilles technique which entails utilizing the septum for skeletal support of the lower portion of the nose.

(3) Color and texture match of the skin was not as good as we expected.

BIBLIOGRAPHY

Reconstructive Plastic Surgery, Vol. II, Converse John, p. 1234 - 1246, W.B. Saunders Co., 1977.

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Head & Neck
Surgery

MUCOEPIDERMOID CARCINOMA OF THE SUBMANDIBULAR GLAND PRESENTING AS A HUGE MANDIBULAR MASS: A CASE REPORT*

By
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Leandro C. Maranan, M.D.***

INTRODUCTION

Submandibular gland masses present mostly as inflammatory,[4] obstructive disease of the duct or benign tumors, and a small percentage comprises the malignant ones. Delay in the diagnosis is frequently encountered because of patients' complacency, reliance on self-medications or to the services of the local paramedics or quacks. Nothing more is done until the mass becomes symptomatic. It is rather common that the malignant nature of the mass is discovered to the chagrin of the surgeon after histopathological report is handed down.

The following case report is being presented for the following reasons: Firstly, because of its clinical presentation as a huge mandibular mass that a built-in deception is created for the clinician. Secondly, because of the controversy in histological morphology in the criteria of the said tumor in relation to its clinical behavior, and thirdly, to emphasize that there is no uniform approach to the treatment of this tumor. In fact, surgeons today are in controversy concerning the relative value of radical versus conservative surgical procedures.

CASE REPORT

A.E., a 39 year old female from Bacolod City, Negros Occidental, was admitted for the first time in our hospital on September 5, 1979 because of a huge mandibular mass. The condition apparently started 20 months PTA as a hard, movable, painless, 1 x 1 cm. mass located at the right submandibular area not accompanied by fever nor inflammation. The patient consulted a physician who prescribed different antibiotics which gave no relief. She was later referred to a dentist who did extraction of her carious right upper and lower molars. However, the submandibular mass did not regress. The patient remained asymtomatic, until 9 months PTA the right submandibular mass had progressively enlarged involving the mandible accompanied by ulceration and boring pain from the mass radiating to the angle of the jaw. The patient was brought to several herbolarios who massaged and placed lime on the mass which eroded the lesion resulting to severe blood loss at times. The patient became weak, anorectic and pale as a result of repeated maneuvers by the herbolarios. With signs and symptoms unabated for sometime, the patient was referred to us and was subsequently admitted.

On initial examination, the patient was noted to be fairly developed, poorly nourished, pale, ambulatory, conscious, and apparently not in any form of distress with vital signs of T 37.6 °C. BP =110/60 mm Hg, HR= 108/min., RR= 20/min. weight = 83.5 lbs., height = 58.7 in. Pertinent PE findings were centered on the mouth, mandible and neck. Examination of the mouth revealed pale lips, no cheilosis, loose carious lower set of teeth, elevated gingiva and alveolar ridge, with limitation of movement of the lower jaw. The tongue was coated and with limited protrusion. Examination of the mandible revealed a huge mandibular mass measuring about 17 x 13 x 13 cm. in its greatest diameter extending superiorly to the lower alveolar ridge, inferiorly involving the whole mandibular floor, lateralwards to the rami of the mandible which was loculated, lobulated, doughy and with areas of ulcerations and crusting. The blood vessels were prominent. The overlying skin was shiny and overstretched and no egg crackling was noted on palpation. On examination of the neck, bilateral middle jugular neck nodes were noted. On the right side, there was a 3 x 2 cm. fixed, firm, non-tender, well-delineated mass, and on the left side, a 2 x 1 cm. slightly fixed, firm, non-tender and well-delineated mass. Other organ systems did not reveal any significant findings.

The initial laboratory work-up revealed anemia with an elevated serum phosphorus and slightly elevated alkaline phosphatase. Chest x-ray, EKG, and skeletal survey revealed normal findings. There were extensive radiating ossifications from the mandible located within the large soft tissue mass. There was a bony defect within the mandibular

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bone and the cortical margin was partly irregular. Primary consideration was sarcoma based on the x-ray of the mandible.

On subsequent hospital days, the patient's condition was built up with blood transfusion, ferrous sulfate 1 tab. TID p.c. and high caloric diet. With an impression of periosteal sarcoma rule out submandibular gland tumor, cervical lymph node, wedge biopsy of the submandibular mass were done on the 8th HD. These revealed undifferentiated malignant tumor consistent with mucoepidermoid carcinoma. On the 30th HD, the patient underwent total mandibulectomy, tracheostomy, right radical neck dissection and skin grafting. Post-operatively, Garamycin 80 mg. q 8 hrs. IV and hyperalimentation fluid were instituted. On the 2nd POD, the patient was started on head and neck formula from 1200 cal/day gradually increasing to 3000 cal/day. Daily dressing and tracheostomy care were aseptically performed. However, on the 7th POD, mucocutaneous fistula was noted at the hypoglossal area with yellowish green discharge revealing Pseudomonas, sensitive to Carbenicillin. The antibiotic was shifted and in addition, zinc oxide paste was applied over the fistulous area to no avail. On the 66th HD, the patient underwent a second operation – left radical neck dissection and repair of the fistula. Succeeding hospital days were unremarkable. The patient progressively recovered gaining 12 lbs. from the time of admission till the patient was discharged on the 85th HD with instructions for radiotherapy. The patient followed-up 3 times for three weeks and on her 3rd follow-up, multiple nodular masses were noted over the right side of the neck. Patient was advised readmission, but was lost to follow-up. A month later the service was informed of the patient's demise from the recurrence.

HISTOPATHOLOGY

Gross specimen of the mandibular mass consisted of a huge, roughly spherical mass, covered mostly by skin, measuring 17 x 13 x 18 cm in diameter. It includes the mandible with the teeth. The skin of the chin is drawn into large nodular, elevations with ulcerations averaging 3 cm. in dimension. Some hard bony tissue was noted beneath. The gingiva was markedly swollen, grayish-white and firm. The base of the tongue showed some whitish tissue next to the teeth.

Microscopic description of the section of the skin nodules of the chin showed an underlying tumor composed of nests of fairly large cells with relatively large vesicular nuclei. Some cells appeared cuboidal to columnar and formed ribbons to ill-defined glands. The stroma is fairly dense, fibrous tissue. The gingival epithelium is free of tumor which is seen just beneath it. The main tumor in the chin and mandible showed an abundant amount of dense fibrous tissue stroma with a few islands of cartilage and bone. Fragments of the mandibular mass, exhibited scattered, well-defined nests of tumor cells which are moderately pleomorphic and have relatively large vesicular to hyperchromatic nuclei, the appearances of which are consistent with mucoepidermoid carcinoma, Grade III.

Sections of the entire sternocleidomastoid muscle showed carcinomatous replacement at levels I, II, III and IV.

DISCUSSION

Of the malignant salivary gland tumors of the palate, parotid gland and submandibular gland, the mucoepidermoid carcinoma make up approximately 26, 21 and 10% respectively.[5] Table I presents a comparison of the different types of salivary gland malignancy.[2]

Author	Benign	Malignant	Adenoid Cystic CA	Mucoepidermoid CA	Adeno CA	Undiff. CA	CA expleomorphic Adenoma
Eneroth et al. (157 cases)	95 (60%)	62 (40%)	25 (40%)	6 (10%)	0	15 (24%)	3 (5%)
Conley et al. (115 cases)	61 (53%)	54 (47%)	17 (31%)	17 (31%)	8 (15%)	4 (7%)	4 (7%)
Spiro et al. (217 cases)	96 (44%)	121 (56%)	42 (35%)	23 (19%)	14 (12%)	3 (2%)	23 (19%)

In 1945, Stewart[8] and his associates coined the term mucoepidermoid concerning lesions of salivary glands. This distinct group of neoplasms apparently arises from the epithelium of the large ducts of both major and minor salivary glands. Mucoepidermoid carcinoma are basically composed of 3 different cell types – a mucin producing cell, an epidermoid cell, and an intermediate or basal cell of which are divided into two main histologic features: a mucous secreting glandular type and as an epidermoid type. In addition, many of these tumors contained large hydrophic cells not productive of mucous and contain swollen cells frequently referred to as intermediate or basal in type.

The mucoepidermoid tumors were also classified into two groups: the benign and those that metastasize. However, in 1953, Foote and Frazell recognized these tumors classified as benign, had metastasized. Because of the above observations, Foote and Frazell as well as Healey stated that these tumors should be classified as carcinomas, some of these being low grade and others high grade. And since a number of these tumors have histological overlapping qualities they labelled these group as medium grade tumors. The following is the description of the criteria as used by Healey:[7]

Grade I: The well-differentiated or low grade carcinoma were those in which the tumor produced well-formed glandular or cystic spaces. These cysts were lined by a single layer of mucin-producing cells. In some areas, these were unfoldings into the lumen where a proliferation of intermediate cells were present. The cysts were focally lined by flattened epidermoid cells. The cells everywhere had small dark nuclei with no hyperchromatism or pleomorphism. Nucleoli were not prominent. Mitosis were extremely rare. These neoplasms showed a variable degree of infiltration into the adjacent tissue. The smaller lesions showed minimal invasion. The larger tumors showed extension into adjacent structures including bone and skin. These often were in the manner of a broad advancing front rather than in a highly aggressive manner.

Grade II: In the moderately differentiated tumor, there was a greater tendency to form solid nests of cells. These were composed either of intermediate or epidermoid cells or combination of the two. In general, intermediate cells are more frequent. Cystic spaces are also formed. In contrast to the well-diffferentiated tumors, these had a greater tendency to have intra-cystic proliferation of intermediate or epidermoid cells. The cell showed slight to moderate pleomorphism. Some of the nuclei, had prominent nucleoli. Occasional mitosis were present. These tumors had a greater tendency to be locally invasive than the Grade I lesions, with extension into the adjacent tissue being clearly evident. The advancing margin was usually less discrete than in the well-differentiated neoplasm.

Grade III: There is even a greater tendency to form solid nests composed of either intermediate or epidermoid cells. Glandular or cystic structures were usually evident. Mucicarmine positive secretions could be shown in the cytoplasm of scattered tumor cells. The cells showed pleomorphism, prominent nucleoli and numerous mitosis. They demonstrated greater local aggressiveness and infiltrated adjacent tissue readily.

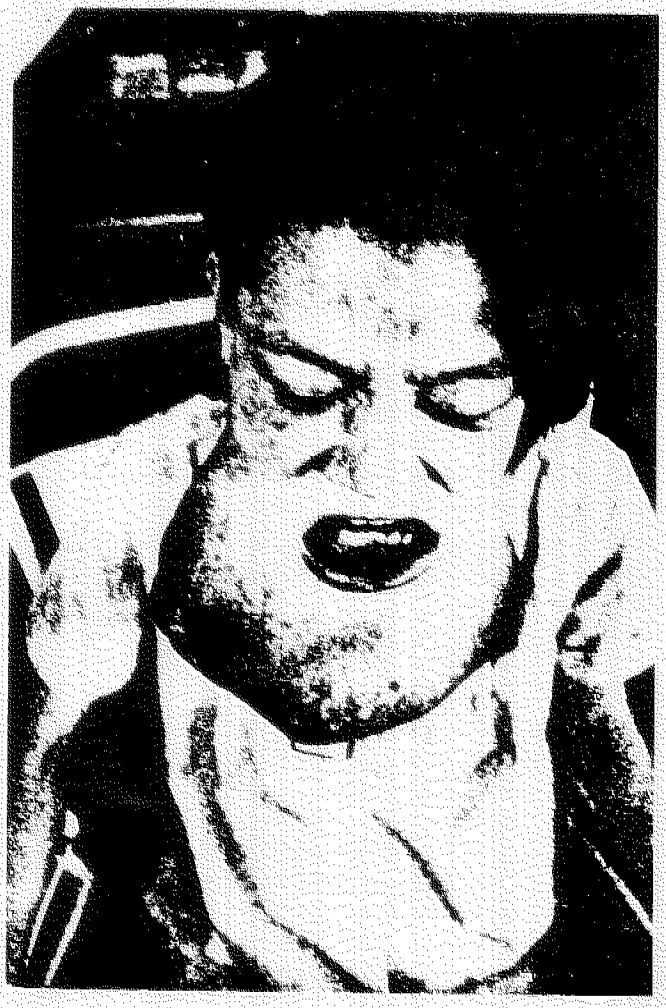
Mucoepidermoid carcinomas of the submandibular gland may occur at any age with the highest incidence in patients in their 4th and 5th decades of life with slight female predominance.[2,4]

The clinical presentation varies from pain and tenderness in the lesion. In all other instances, the only complaint was the presence of a painless enlarging mass at the submandibular region, usually not alarming. On PE, the size of the tumor mass measures from 0.5 to 10 cm in diameter at the time of diagnosis and found to be irregular or nodular, ulcerating and fixed to the adjacent structure.[8] In general, there was no correlation with any of the above clinically observed phenomenon prior to biopsy and could not be used in determining the degree of differentiation of the tumor as experienced by Healey et al. The clinical silence of the lesion permitted growth of the tumor to a size which made therapy more difficult. Metastasis of mucoepidermoid carcinoma varies according to different studies. In the study of Foote and Frazell, 66% of high grade types are associated with local lymph node metastasis and in 33% multiple metastasis such as osseous, pulmonary and cerebral. Invasion of the mandibular bone was studied either as an initial finding or as one that appeared later in the course of the disease.[3] It invades the periosteum or break into the cavity of the mandible where they may compress or invade the dental nerve and cause pain referred along the jaw or to the region of the ear and temple.[1] Metastatic foci may contain only pure epidermoid forms, pure mucous producing adenocarcinoma or be mixed in character usually with more anaplastic forms of mucoepidermoid carcinoma.

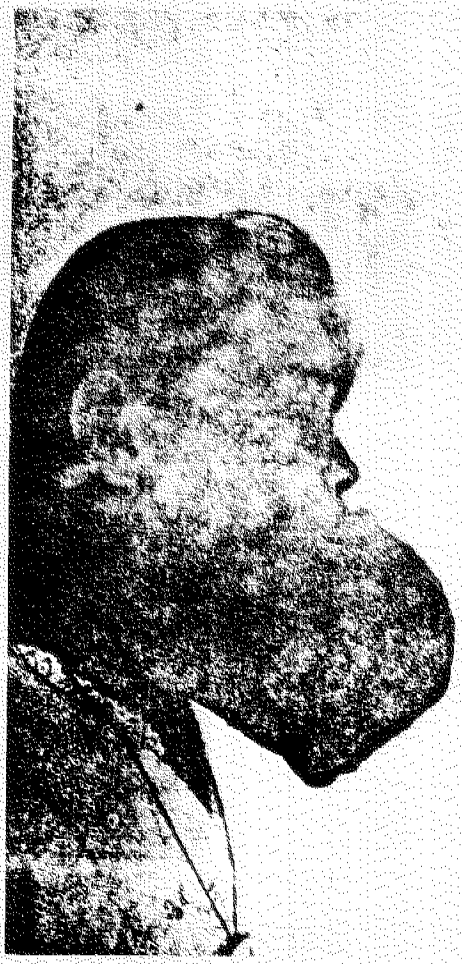
In the past, the inadequate practice of resection of the gland only has compelled an extensive to an augmented local resection and composite resection. Since malignant tumors of the submandibular gland appears to be more malignant than in the other salivary gland system, in assessing the different modalities of treatment, it appears that wide, adequate, local surgical excision of grade I tumor is sufficient to control the lesion. In grade II lesions, if the original surgical margins showed no tumor, no further treatment is needed. However, if there is a recurrence, further surgery is done with radiotherapy. In grade III, the fact that the tumor has invaded areas that are difficult to treat by surgery and by radiotherapy, both radical surgery and radiotherapy are advised. Recurrences appeared to be ominous.

Healey would not recommend lymph node dissection for grade I carcinomas since none of them had metastasized to the cervical lymph nodes. In grade II, the question of lymph node dissection to regional lymph nodes is unsettled. In the series of 26 patients by Healey, one had lymph node metastasis. However, since grade II carcinomas are unusual, it may be advisable to do lymph node dissection only if the regional lymph nodes are enlarged and suspicious clinically.

The appearance of the gross specimen may be deceptive with tumor actually extending much farther than what is grossly visible. Therefore, if the lesion is thought to be operable, a wide bloc excision is advisable. An incontinuity elective radical neck dissection is also recommended because these tumors frequently metastasize to regional



Front view picture showing the huge mandibular mass measuring 17x13x13 cm. with overstretched overlying skin, limitation of movement of the lower jaw, and elevated gingiva and alveolar ridge with carious lower set of teeth.



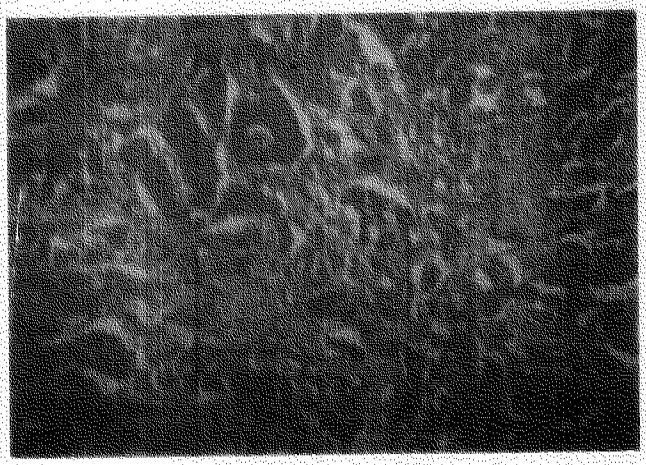
Lateral view showing the extension of the lesion to the ramus of the mandible and its loculations, lobulations, areas of ulceration and crusting.

lymph nodes.

In other words, prognosis worsens with increased incidence of metastasis. Moreover, least favorable when it is in the submandibular gland. The mucoepidermoid carcinoma of the submandibular gland behaves in an aggressive manner regardless of microscopic picture and all of these information emphasize the need for more aggressive operation as the initial treatment.

SUMMARY

A 39 year old female presented a progressively enlarging mandibular mass of 20 months' duration that started as an innocent looking submandibular mass that grew into a huge lesion that created a built-in deception that turned out to be a high grade mucoepidermoid carcinoma of the submandibular gland giving the clinician a dilemma concerning the value of radical versus conservative surgical procedure.



Section shows nests and sheets of cuboid looking cells with hyperchromatic and vesicular nuclei, some exhibiting mitosis. Occasional glandular structures are evident. The stroma is fairly dense, consis-

BIBLIOGRAPHY

1. Ackerman, LV, del Regato, JA: Cancer, Fourth Edition, St. Louis, The C.V. Mosby Company 1970, pp. 533-551.
2. Batsakis, JG: Tumors of The Head and Neck, Second Edition, Baltimore, Williams & Wilkins 1979, pp. 34-39, 94-96.
3. Byers, R, et al: Malignant Tumors of the Submaxillary Gland, Am J Surg. 126: 458-465, 1973.
4. Conley, J, et al: Analysis of 115 Patients With Tumors of the Submandibular Gland, Ann. of Oto. 81:323-330, 1972.
5. Eneroth, CM: Salivary Gland Tumors in the Parotid Gland, Submandibular Gland and The Palate Region, Cancer 27: 1415-1418, 1971.
6. Fu, K, et al: Carcinoma of the Major and Minor Salivary Glands, Cancer, 40: 2882-2890, 1977.
7. Healey, W, et al: Mucoepidermoid Carcinoma of Salivary Gland Origin, Cancer 26: 368-388, 1970.
8. Woolner, L, et al: Mucoepidermoid Tumor of the Major Salivary Gland. Am J Clin Path 24: 1350-1362, 1954.

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Surgery

RECONSTRUCTIVE SURGERY IN MAXILLARY CARCINOMA: REPORT OF A CASE

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I. INTRODUCTION

Malignancy of the maxillary antrum is fortunately uncommon. The overwhelming majority of the malignant epithelial tumors of this antrum is squamous carcinoma. Mode of management from various studies and reports ranged from surgical resection, radio-therapy and chemotherapy; combined or otherwise. In this report, all three are tried not as combination therapy but separately.

Contemporary otolaryngology possesses a rich tradition in the field of head and neck reconstruction. Although tissue transfer and flap transposition techniques date back to the early Roman period, it is only in the recent decades that surgical refinements have permitted appropriately aggressive attitude towards immediate reconstruction of head and neck tissue deformities.

Regional pedicle flaps are a basic and necessary tool for the head and neck surgeon. In this case, a temporal forehead flap is used. It is considered to be unmatched in its usefulness in the closure of craniofacial and intraoral defects. With the external carotid system intact, the flap with an incision camouflaged along the hairline and eyebrows provide a pliable skin of an excellent color match. A deltopectoral flap is also proved excellent by Konno, et al.

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Hand in hand with flaps go skin grafts. Mainly used to cover the donor site, an intermediate split thickness skin graft is used in this case.

II. OBJECTIVES

The treatment of carcinoma of the maxillary antrum has evolved through many stages. At the turn of the century, excision with fulguration and cautery were the only available modalities. X-ray therapy became the treatment of choice during the subsequent decades. As techniques of anesthesia, blood replacement and antibiotic treatment improved, major ablative surgical procedures became a reasonable consideration.

In 1963, Ketcham et al introduced the concept of combined craniofacial approach for the surgical management of malignant tumors involving the ethmomaxillary complex. In this case, a radical surgical procedure involving the unilateral removal of the entire maxilla as a "box" was done, together with total exentheration of the orbital contents due to its involvement. Spread of the carcinoma to the soft tissues of the face required a large resection of the skin overlying the maxilla which posed a problem for reconstruction.

The concept of restoration of form as well as function challenges the otolaryngologist to carefully plan and execute a successful surgical and functional course of rehabilitation. Thus, in this case we aim for:

1. Total resection of the carcinomatous lesion; en bloc dissection of the maxilla with orbital exentheration.
2. Immediate reconstruction of the extensive wound surface left by the large resection of the skin overlying the maxilla.
3. Cosmesis by split thickness graft for the large raw surface of the donor site.
4. Reconstruction of the maxillary and orbital framework by prosthesis for optimal yet satisfactory functional rehabilitation.

III. CASE REPORT

Case Summary:

A 28 year old, male, married, corporal (Phil. Army) from Villasis, Pangasinan was admitted on 20 February 1980 because of a wound at the right cheek.

It was 14 months prior to admission when the patient noted a pustular lesion on an erythematous nodular base at the right cheek. It enlarged into a warm, fluctuant mass, with a foul purulent discharge upon incision and drainage at the Army Station Hospital at Camp Eldrich. Oral, parenteral and topical medications consisting of antibiotics,

analgesic and anti-inflammatory agents afforded improvement. Several months later, there was recurence and similar management was done, now at Bonifacio Station Hospital where he was referred. Four (4) months prior to admission, the mass reappeared, now bigger and more nodular. Then assigned in the North, he sought consultation at the Baguio General Hospital where a biopsy revealed epidermoid carcinoma of the maxillary antrum, right. Radiotherapy was done. There was very minimal improvement, so he decided on coming to AFPMC for consultation and management.

His first admission to our Center was in 1978, March, because of a foul, mucopurulent nasal discharge. He was diagnosed to have chronic maxillary sinusitis and he underwent Caldwell-Luc operation. Histopathologic result of the antral contents revealed parakeratosis, marked.

Initial physical examination findings were centered on the right cheek, nose and sinuses. The mass of the cheek was about 1-1.5 cm in the longest diameter, fluctuant, erythematous warm and tender. There were no cervical lymphadenopathies appreciated. The nasal mucosa was congested, turbinates were hypertrophied and there was mucopurulent discharge from the right nostril. No septal deviation was noted. The right maxillary area was tender and transillumination was negative. The rest of the organ systems were found to be unremarkable. Laboratory work-ups consisting of CBC, blood chemistry, urinalysis and fecalysis were normal. ECG was within normal limits. The x-ray of the PNS, though, revealed a markedly dense right maxilla, associated with destruction of the right inferior orbital ridge and maxillary wall. Chest and skull x-rays were radiologically negative.

COURSE IN THE WARD:

With the histopathologic diagnosis of epidermoid carcinoma, well-differentiated, surgical intervention was contemplated. But due to the risk and the resulting facial deformity, the patient did not consent to the procedure. He requested for a trial chemotherapy and radiation and promised to undergo resection if conservative management proves ineffective. Together with supportive medications in form of multivitamins and iron preparations, the patient was given Cytoxan and Methotrexate. His blood count was monitored. This afforded very little improvement since the drugs were given only until the stock lasted.

After five (5) weeks of chemotherapy, irradiation was tried. He was given a total of 6,000 rads in ten (10) weeks. There was slight regression of the mass. Parenteral Cytoxan was then given weekly and at the same time, the patient was prepared for surgery. Unfortunately, the patient went on AWOL, only to come back three (3) months later with his condition worsened. On PE, the mass had extended downwards, about three (3) cm. medial to the right mandibular area and upwards to the lower lid margins with congestion of the bulbar and palpebral conjunctivae. The buccal and the gingival mucosa directly underneath had ulcerations with erythematous tender edges. With that condition, the patient consented and underwent radical maxillectomy with orbital exentheration and primary reconstruction.

SURGERY:

1. **Resection and Primary Reconstruction:**

With the proposed procedure, the line of incision extended from the right nasolabial fold to the superior orbital ridge just below the brows, through the margins of the alar cartilages and the lateral nasal cartilage. Dissection was continued from the temporal area in a lateral direction along the medial aspect of the mandible as far as the lateral wall of the maxilla. Posteriorly, the bony wall of the maxillary sinus has signs of invasion that dissection was done along the back of the pterygoid process. The zygomatic arch and the nasal process of the maxillary bone were cut by Giggly saw. The part of the palate removed included the soft palate partially and the ipsilateral hard palate extending to the alveolar ridge and teeth of the same side. The entire orbital contents were removed en-bloc including the periosteum of the orbital fornix. Finally, the pterygoid process and the maxilla were separated from the middle cranial base by a chisel.

Primary reconstruction consisted of covering the skin loss with a large horizontal forehead flap. The line of incision followed the hair and brow lines. The flap was raised with only the periosteum left behind. The raw surface which was to serve as the buccal mucosa was covered with split-thickness skin graft from the right thigh and sutured in place with Chromic 4/0. The donor flap was turned on itself reaching and covering the entire defect. The flap and skin edges were approximated layer by layer with Chromic 3/0 for the subcutaneous tissues and Silk 4/0 for the skin. The unused portion was sutured to form a tube in order to preserve the blood supply. The incision line from the nasolabial fold to the lateral alar areas was sutured layer by layer with Chromic 3/0 and Silk 4/0. The donor area, being left bare with the pericranium was temporarily covered with lano-paraffin gauze. Granulation tissue was allowed to grow until the unused section of the pedicle was returned.

2. **Secondary Reconstruction:**

To allow sufficient granulation tissue to grow on the donor site, this phase of reconstruction was done eight (8) weeks later. The unused pedicle flap was bissected and fibrotic tissues were scraped off. The overgrowth of granulation tissue on the donor site was scraped off. The unused flap was then sutured back to the periosteum and the uncovered area had an intermediate split-thickness grafting from the thigh. The graft was sutured to the periosteum with Silk 4/0 and lano-paraffin gauze was applied until a "take" was evident.

3. **Prosthetic Phase:**

Reconstruction would be incomplete without the use of maxillofacial prosthetics. Although reconstruction with the patient's own tissues is the ideal method, the size of the defect plays a great role in the guideline for reconstruction. It would be impractical to repair a large defect with its own tissues, thus, the use of prosthesis becomes ideal.

Prosthesis aims to improve the aesthetic appearance of the patient and to restore or improve physiologic function. This contributes greatly to the rehabilitation of patients who, otherwise, would not have the potential for satisfactory restoration.

IV. DISCUSSION

Primary reconstruction aimed upon repair of the post-operative facial defect is improvement of appearance and function. It is most advantageous after radical maxillectomy for it allows sufficient removal of the maxilla and the surrounding tissues without much regard for post-operative facial deformity and functional impairment, thereby expanding the range of maxillectomy as a curative treatment.

A large horizontal forehead flap is based on the superior temporal and post-auricular arteries of the same side. The flap is aimed to cover the defective area after radical dissection and resection, leaving exposed scars in the donor site. Since a skin graft is mandatory, it is of importance that the procedure must leave an inconspicuous donor area. Following the hair and brow lines, the flap is raised with the frontalis muscle, leaving behind the pericranium bare for the skin graft. This leaves a poor cosmetic result as it appears atrophic and shiny and have no motion. So, instead of grafting right away, the donor area was covered with lano-paraffin gauze and granulation is allowed until it almost levelled with the skin layer of the scalp. Eight (8) weeks later, a split-thickness graft from the thigh is utilized to cover the donor area resulting to a satisfactory cosmetic appearance.

In the past seven (7) years and six (6) months since 1972, Konno et al performed a combined therapy on seventy (70) patients with maxillary cancer. The large operative defect after maxillectomy is covered with a deltopectoral flap. The result was satisfactory.

Between December 1966 and July 1977, Terz et al did a craniofacial resection on thirty-three (33) patients with tumors arising from the paranasal sinuses. A forehead skin flap is also utilized. It provided an excellent support to the dura in the region of the bony defects created in the base of the skull.

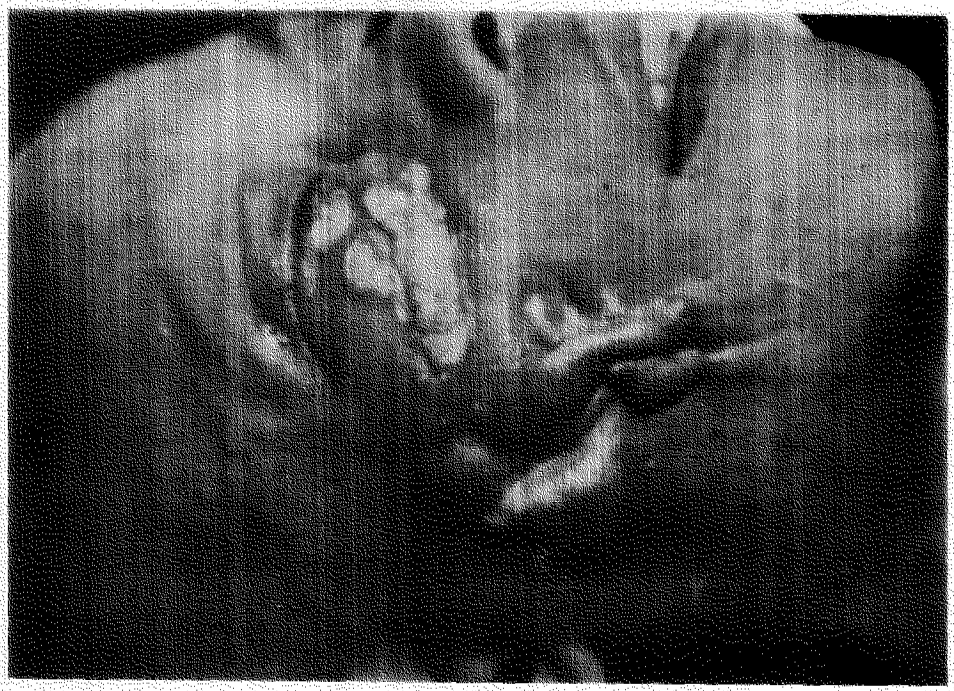
Reconstruction is not complete without maxillofacial prosthesis for it has contributed greatly to the rehabilitation of patients, who, otherwise, would not have the potential for satisfactory restoration.

At present, in spite of the facial deformity the patients outlook in life is bright. So far, there are no signs and symptoms of recurrence nor metastasis. He is now engaged in farming since his condition has been a strong ground for complete disability discharge. Hopefully, we are looking forward to a prosthetic phase soon.

V. CONCLUSION

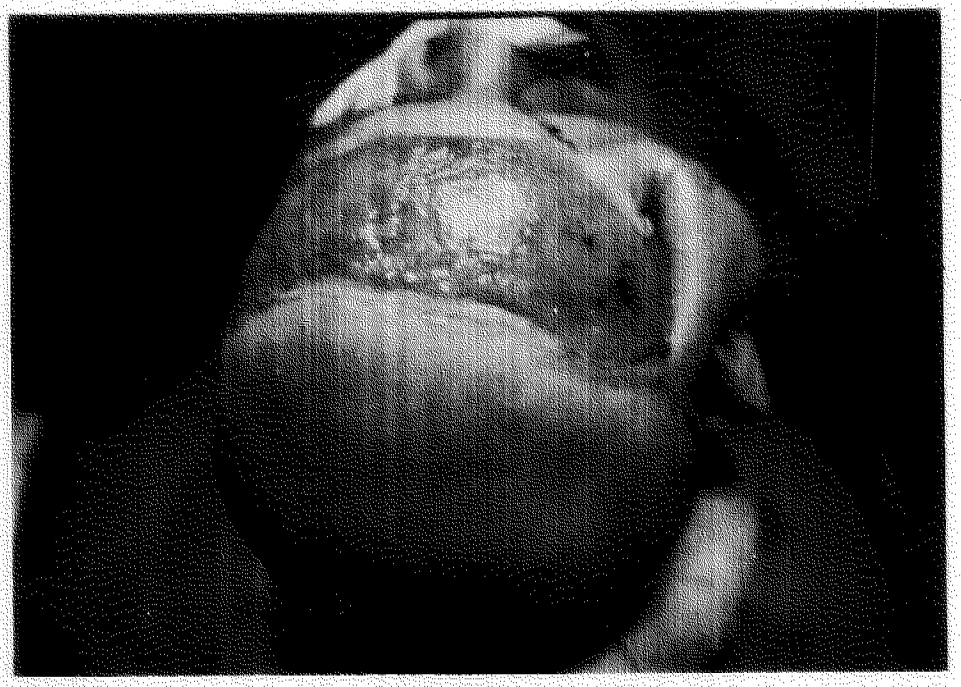
After total resection, primary reconstruction and secondary reconstruction by split-thickness skin graft of the donor site, it can be said that this one case is successful. Although we cannot conclude with just a single try, delayed skin grafting, especially in the forehead area results to a good cosmetic appearance since atrophy and the shiny look is not evident.

Having no signs of recurrence or metastasis, we aim to have a good prosthetic phase of reconstruction. But the success of this procedure will be proven only after many more similar cases that will undergo delayed split-thickness skin grafting. Only time will tell.

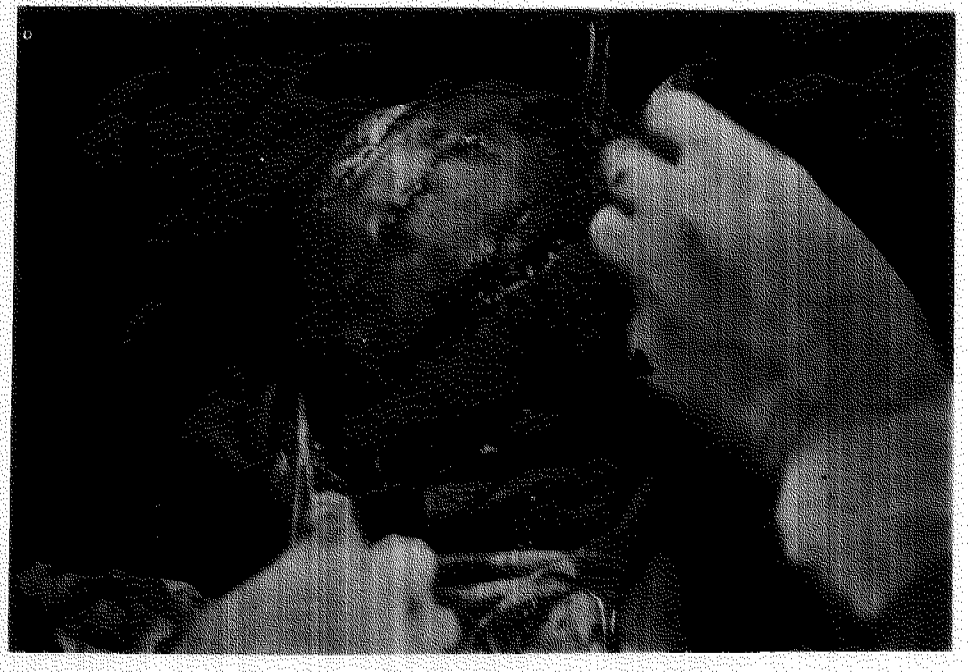


EXTERNAL EXTENSION OF THE MALIGNANCY

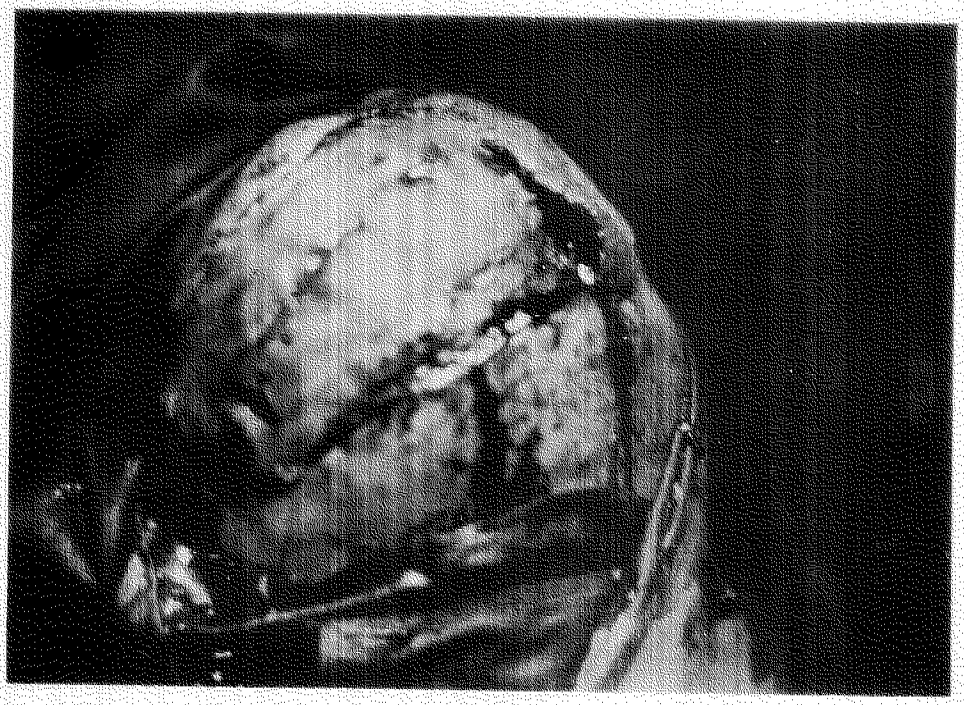
AFTER RADICAL RESECTION AND ORBITAL EXENTHERATION



8 WEEKS POST-PRIMARY RECONSTRUCTION



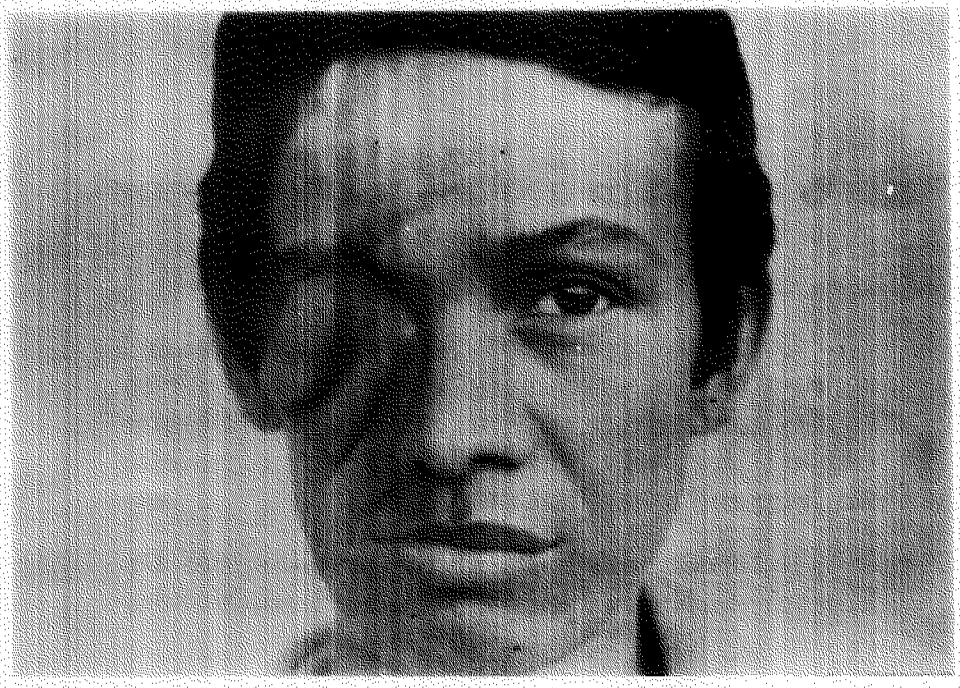
SKIN GRAFTING ON DONOR SITE



SKIN GRAFTING ON DONOR SITE

AFTER SKIN GRAFTING

PRESENT APPEARANCE



References:

1. Ahmad K; Cardoba R; Fayos J: Squamous cell carcinoma of the maxillary sinus
   Archives of Otolaryngology; 107:000, 1981
2. Konno A; Togawa K; Iizuka K: Primary reconstruction after total or extended total maxillectomy for maxillary cancer
   Plastic and Reconstructive Surgery; 67:4, 1981
3. Terz J; Young H; Lawrence W: Combined craniofacial resection for locally advanced carcinoma of the head and neck
   1. Tumors of the skin and soft tissues
   2. Carcinoma of the PNS
   The American Journal of Surgery; 140:000, 1980
4. Weymuller E; Reardon E; Nach D: A comparison of treatment modalities in carcinoma of the maxillary sinus
   Archives of Otolaryngology; 106:000, 1980
5. Regato J; Sojut H: Cancer: Diagnosis, Treatment and Prognosis
   1977; 5th edition, pages 233 - 241
6. Converse JM: Reconstructive plastic surgery principles and procedure in correction, reconstruction and transplantation
   1977; 2nd edition, pages 1211 - 1242
7. Batsakis: Tumors of the Head and Neck: Clinical and Pathological Considerations, 2nd Edition

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AUDIOLOGICAL ASSESSMENT OF THE HEARING IMPAIRED IN THE PHILIPPINES

Nelly R. Ledesma, M.A. *

Hearing measurement is relatively new in the Philippines. What is audiological assessment? Why do we measure hearing? These questions motivated the author as she started to write this paper.

It seems logical to mention some ways in which hearing impairment is first recognized in children. Textbooks and articles on the subject usually review the observations that lead to the discovery or suspicion of deafness. Most mothers of hearing impaired children would know of their child's failure to hear long before the evidence would have much meaning to anyone else.

Of course, it becomes fairly obvious to any observer when a baby of 12 to 18 months is normal in all respects except his response to sound. By that time he is expected at least to notice the speech of others, even if he does not produce intelligible words. The possibility of hearing impairment can hardly be ignored if an otherwise alert child is not awakened or occasionally startled by loud sound.

This writer thinks it is the rule, rather than the exception, for the observant parents to be relatively sure in their own minds whether or not their child hears before the audiologist ever gives an opinion. Yet, even if this is true, it does not lighten the audiologist's responsibility in making a careful diagnosis and recommending a definite cause of action.

* President & Audiologist, King-Aid Philippines

Before the diagnosis is established by a competent audiologist and accepted by the parents, the latter are likely to go from one physician to another, seeking assurance that the child is normal or that he will out-grow this difficulty. In the face of behavior that is different from normal, intelligent parents cannot accept the very assurance they are looking for. Thus the guess goes until someone examines and studies the child carefully enough to convince the parents that an accurate diagnosis has been made. This conclusion needs to be followed by a frank discussion of the problem and a decisive recommendation for the type of home management and special training that is desirable.

A thorough history of the child's behavior, as well as of his health, will form an important part of the basis for the differential diagnosis. In addition to the physical and otologic examination, a battery of tests and observations can be made which, taken singly, may mean very little, but which when taken as a whole, yield valuable information. These measurements will properly include both audiological and psychological tests.

The time-honored procedures of using bells, whistles, drums, rattles and other noise-makers to attract attention are still valuable in testing a child's hearing. With some study of the quality and control of the intensity and distance at which these instruments are used, it is possible to make an approximate assessment of the amount of residual hearing that is left. Incidentally, this writer in the school year 1975-76, directed a thesis on the Relative Effectiveness of Some Calibrated Noisemakers. Results show that these calibrated noisemakers are reliable only to a certain extent.

In the Philippines, electronic audiometers were first used about 10 years ago and few ENT clinics and the School for the Deaf owned a pure-tone audiometer at that time. Fewer still had any sort of a sound-treated testing room. Then, and for a number of years to come, audiological service actually consisted of audiometric evaluations, which were usually made by a member of the school staff and technicians, in addition to their other duties and responsibilities.

Audiology – as a service for the hearing impaired was established in the Philippines only in 1974. One of the clinical services provided by an audiologist is that of audiometric testing. The audiologist routinely tests the hearing of each student with a pure-tone audiometer and a record of his hearing loss which is plotted in an audiogram is forwarded to his teacher, as well as kept on file.

Based on the results of an audiometric examination, an audiologist can identify the type of hearing impairment and quantify the degree of

hearing loss. If the impairment is of the conductive type the patient is referred to an otologist or otolaryngologist for further otological evaluation. When the loss is of the sensori-neural type he is given a hearing aid evaluation, and proper hearing aid fitting is recommended.

In the absence of an audiometer, here is a checklist that can guide the parents in identifying hearing loss. The parents are the first persons to find out if their baby has normal hearing, provided that they know what to look for.

1. Birth to 3 months. The baby is startled by loud sound and is soothed by mother's voice.
2. Three to 6 months. Turns eyes and head to search for location and sound. Responds to mother's voice. Imitates his own noises as oohs, ba - bas, etc. Enjoys sounds making toys.
3. Six to 10 months. Responds to his own name, telephone ringing, and someone's voice, even when not loud. Understands "no", "bye-bye", and similar common words.
4. Ten to 15 months. Can point to & look at familiar objects or people when asked to do so. Imitates simple words and sounds.
5. Fifteen to 18 months. Follows simple spoken directions. First words are well on their way — go, bye-bye, bed, no — no, out. By 18 months there should be noticeable increase in vocabulary.

The information above is a basic guide. As the weeks and months go by, check to see if your baby can do most of the things listed. IF NOT, DON'T WAIT! He may have a hearing problem.

Your baby's hearing can be tested as early as six months of age, and sometimes even earlier. If you suspect your baby has a hearing problem, tell your audiologist or ENT Specialist immediately. It's important that he gets proper medical help and receive special training if needed.

Steps to be taken if hearing loss is suspected:

1. Pediatric Assessment with particular attention to the upper respiratory system.
2. Otologic and Audiologic Assessment to answer these questions:
   a. What is the cause?
   b. Is hearing involved?
   c. If, so how much does the child hear?
   d. How does the child hear?
   e. What course of treatment is indicated?
3. Specific attention to factors affecting developmental language and speech, including social and economic deprivation.
4. If an irreversible loss is established (sensori-neural type) the audiologist and otologist should help parents bridge the gap from the medical to an educational program by referring them to the Philippine Normal College Special Education Center for:
   a. Information kit for parents.
   b. Location of nearest school or class for children with hearing losses.
   c. Auditory rehabilitation.

Audiological assessment in the Philippines today is done by a team of ENT Specialists, audiologist, hearing aid consultants, psychologists, and special education teachers.

Differential diagnosis of hearing disorders can now be achieved using the expertise of different specialists. At the Ledesma Audiological Center, Inc. a battery of tests using modern hearing instruments like Speech Audiometers, Acoustic Impedance Meters, Tympanometers, Reactometers for neonatal screening, and others are administered before a child is labelled deaf or hard of hearing. The center also provides rehabilitation services to the hearing impaired through the use of amplification (21 models of hearing aids) loop systems and development and acquisition of language through speech reading and auditory training.

REFERENCES

1. Anderson, Charles. "Screening the Hearing of Preschool and School-age Children." Katz (ed.), *Handbook of Clinical Audiology*. Baltimore: The Williams and Wilkens Co., 1972.
2. Hirsh, Ira J. *The Measurement of Hearing*. New York: McGraw Hill Book Company, 1952.
3. Ledesma, Nelly R. "Speech Audiometric Materials in Pilipino." Berger (ed.) *Speech Audiometry Materials*. Herald Publishing House, Kent, Ohio, 1977.

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HEARING LOSS – SILENT EPIDEMIC IN SCHOOLS

Nelly Reyes Ledesma, M.A. *

Many people suffer from hearing loss. The universal estimate of the prevalence of hearing loss according to the National Institute of Health in the United States is one out of fifteen persons is affected.

Hearing loss is a problem that is least recognized in the Philippines as an ailment. When it comes to hearing impairment we are backward compared to some other countries in Southeast Asia.

The deaf and hard of hearing themselves are not willing to do much about their problem. They don't even admit that they have impaired hearing.

What does progressive hearing loss mean? It means that – 1. You ask people to speak up; 2. You turn up the TV and radio louder; 3. You find it difficult to follow conversation; 4. At parties, you have to concentrate harder on the face and lips of the speaker in order to hear what they are saying; 5. You begin to withdraw from social contacts, have tendencies to become irritable and moody; 6. You make life difficult for those around you; 7. You miss much of the fun of living.

The problem of hearing loss affects the social life of an individual. Take the case of 32-year old bank employee who had difficulty understanding customers. One day the manager of the bank informed him that due to his auditory problems he might loss his job. The employee went to an audiologist (hearing specialist) upon the recommendation of an ENT doctor and found that his hearing loss which he had for many years could be corrected simply by acquiring a hearing aid. He got one – a near invisible aid concealed in his eyeglasses – and his career improved. He is now an assistant manager of the bank.

There are indications that hearing problem in our country is getting worse every year.

Loss of hearing is prevalent among the elderly and because of modern science and medicine people are living longer and deafness among the aged is rising.

Preliminary investigations of hearing tests using Elementary school children as subjects conducted by the Bureau of Elementary Education and the author "Prevalence of Hearing Loss in the Philippines from 1974 up to present" have shown that 15% of children tested suffer from a certain degree of conductive or sensori-neural (SN) type of hearing loss. This is a serious problem because good hearing is so crucial to learning. Some children have already been labelled mentally retarded and placed in a school for the retarded because the real problem, loss of hearing, had not been diagnosed.

Some of the common causes of hearing disorders are German measles, chronic ear infections, prolonged medication nad noise pollution. "If the present trend continues . . ." James Macmahon, Administrator of the New York League of Hard of Hearing, says that "by year 2000 we won't be able to hear one another without using hearing aids."

Only a small percentage of the estimated 48 million Filipinos suffering from significant hearing loss can be helped by surgery. The majority must be given auditory rehabilitation (hearing aids), speech-reading, auditory training, sign language and total communication or a combination of all these approaches. Advances in miniaturization enable the manufacturers of hearing aids to come up with models that can be worn almost invisibly and inconspicously.

Hearing experts advise that the average person can protect his hearing or make up for what he has lost by doing the following:

1. Have your hearing checked at least once a year by an ENT doctor or an audiologist.
2. Avoid exposure to loud noise. Use earplugs or ear protectors if you will be exposed to loud sounds.
3. If you suspect that you have a hearing loss go to an ear specialist to see if a medical correction is possible. If not, the doctor will refer you to see an audiologist who will measure the extent of your hearing loss, as well as the type and determine if it can be corrected surgically or by using a hearing aid.
4. Contact a speech and hearing center which generally have an audiometrist on its staff supervised by ENT doctor or an audiologist.
5. Don't try to hide a hearing loss. Admit that the problem exists and do something about it.

* President & Audiologist, King-Aid, Philippines

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CURRENT TRENDS IN ANTIBIOTIC THERAPY*

K. H. SPITZY **

Speaking on "Current Trends in Antibiotic Therapy" is of importance as the wrong use or misuse of antibiotics is not only affecting the individual patient but also his environment and in particular the microflora of his family.

I think one could say that the actual situation regarding the oversupply with new antimicrobial substances is comparable with a typhoon which is not only mixing up and confusing the medical doctors. On the one side, this antibiotic typhoon still does not eradicate all pathogens in the sense of "Therapia Sterilisans Magna" and therefore, lead to adaptation and selection of dangerous microbes.

On the other side, I believe that an adaptation of doctors to such stormy conditions is easier for doctors of typhoon areas; but I can tell you that we are also suffering from heavy storms in the Alps, meaning we have the same or a similar chaotic situation regarding the number of antibiotics offered today, but we have to understand the industrial management and scientists are forced to show new results constantly.

What are the substances we have to deal with today?

TABLE I

First of all the beta-lactam antibiotics, the PENICILLINS and CEPHALOSPORINS and some others. The next and also bactericidal group is that of the aminocyclitols represented mainly by the AMINOGLYCOSIDES. Those two groups had the quickest development recently and are the most important ones in chemotherapy, but also bringing the highest confusion due to the great number of new substances, each claimed to be more and more active. I think those two groups, the beta-lactams and the aminoglycosides and their actual therapeutic value will be the main points of our discussion.

Regarding the progress in the other groups one could find rather more new aspects of therapeutic use than new substances.

This is, for instance, valid for the MACROLIDES and the related substances like LINCOMYCIN and vancomycin. Lincomycin resp. CLINDAMYCIN did find a new indication field with the use against anaerobic bacteria. They have also a good activity against staphylococci. We shall talk about the specific problem of selection of staphylococci caused especially by the newest cephalosporins and others later on. VANCOMYCIN has also a strong activity against selected resistant staphylococci but additionally acts against other bacteria as, for instance, Clostridia difficile, selected by lincomycins.

With TETRACYCLINES there is no further essential development since Doxycycline and Minocycline, but there is a certain tendency in dermatology to go back to the classical tetracycline-hydrochloride using low doses with 50 up to 250 mg per day for acne-therapy.

CHLORAMPHENICOL has regained its importance in complicated cases with resistant enterobacteria and this in spite of the previous condemnation that resulted from the evidence of very rare cases of irreversible anemiae.

There is nothing new to report about POLYMYXINS. Still the use is more or less limited to local application mainly in combinations.

In the group of sulfonamide-trimethoprim-combinations the development, except the recent introduction of a better tolerated intravenous form, is characterized by new preparations only and not by real innovations.

There are studies done in England by BRUMFITT, 1980, who assumes that trimethoprim alone unfolds the same antibacterial activity as the combination with sulfonamides.

FOSFONIC ACID could be an interesting compound due to its different mechanism of action

* Read before the regular scientific meeting of the Philippine Society of Otolaryngology, Head & Neck Surgery, February 21, 1981 in Manila.

** Head, University Clinic for Chemotherapy – Vienna, Austria.

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and the pharmacokinetic properties, provided it will be possible to fill up some existing gaps within the new beta-lactams or aminoglycosides.

Now let me come back to the center of the antibiotic typhoon, the beta-lactam-group, and we start with the penicillins.

(Table 3)

With FLEMINGS' NATURAL penicillin originated from the medium of the fungus Penicillium chrysogenum a new era of antimicrobial chemotherapy had been started. The BIOSYNTHETIC ACID-STABLE PENICILLIN V, an Austrian invention from the Tyrolian scientists Brandl and Margreiter, 1953, in the laboratories of Biochemie Kundl, not only opened the possibility for reliable oral application but also the way to the synthesis followed by isolation of the penicillin nucleus the 6-aminopenicillanic-acid, the 6-APA.

I am mentioning this because there was a close cooperation between this industrial laboratory and my clinical department with respect to the development of oral Penicillin V.

The 6-APA enabled the formulation of several different SEMISYNTHETIC compounds.

Except the development of further new acid stable alkyl-penicillins like Propicillin and Phenethecillin the main task was to find penicillin against resistant staphylococci which appeared as a result from the abuse of the classical broad-spectrum antibiotics Tetracycline and Chloramphenicol and the world-wide habit to use Penicillin G and V in very low dosages as from todays point of view.

This primary concern consequently led to substances active against penicillinase-producing staphylococci. There was the parenteral Meticillin and the oral Nafcillin followed by the oxacillins which are still of high therapeutic value. But it soon was evident that the dosage of Oxacillin had to be increased in order to reach a sufficient activity against resistant staphylococci. Some grams per day were necessary and this induced us to revise the dosage scheme for the classical Penicillin G and V. In collaboration with HITZENBERGER, 1960, we have found that much higher doses of penicillins, analogue to the gram-doses of the oxacillins, could overcome many of the resistance problems existing around the year 1960. One of which was described by FINLAND as a worldwide pandemic situation with resistant staphylococci.

I consider it important to underline that we are facing a similar situation now again after 20 years as there is a wide use of broad acting compounds together with an unreasonable underestimation of the classical penicillins noticeable. There are more and more reports about the incidence of septicemia with resistant staphylococci, especially from surgical departments and intensive care units.

A different direction in research was to broaden the spectrum of the bactericidal penicillin vis a vis the classical bacteriostatic broad-spectrum antibiotics tetracycline and chloramphenicol. With the introduction of the first aminopenicillin, the *ampicillin,* an important step forward was done. But whereas the danger of *resistant staphylococci* was diminished the risk to select *resistant gram-negative strains* was increased.

This actually happened with the incidence of resistant Klebsiellae but the situation was again under control with the introduction of the first cephalosporins shortly after the introduction of ampicillin.

But the further selection of Enterobacteria especially Serratia, and Pseudomonas necessitated the development of additional compounds in the two groups of Penicillins and Cephalosporins contemporary.

Against Pseudomonas the first active penicillin was carbenicillin and shortly later, ticarcillin and again here the principle of high doses was valid. The effective dose was 2 to 3 times, 10 to 15 mg carbenicillin per day, quantitatively comparable with 2 to 3 times, 10 to 20 million units of Penicillin G.

Contemporary with the development of new pharmacokinetically interesting analogs to ampicillin, a new way was found with the acylureidopenicillins. There was the Azlo- and Mezlocillin and, perhaps the most important one, the Piperacillin.

The Mecillinam up till now interests only because of a different mode of action.

We see a lot of substances available today but this does not mean that the early substances Penicillin G and V lost any of their important value in modern antimicrobial therapy.

In the hospitals we are giving high dosaged sodium Penicillin G in short infusions with individual doses of 10 to 20 million units which is equivalent to 6 respectively 12 grams in 100 or 200 ml agua bidest in 10 or 20 minutes twice or three times daily.

(TABLE 3a)

The indications of the penicillin monotherapy with high doses are mainly severe and deep infections caused by streptococci – except enterococci-pneumococci, meningococci, gonococci, and relatively sensitive staphylococci, including weak beta-lactamase producers (33% in our material 1981).

The water-soluble sodium Penicillin G might also be used outside the hospital in doses of 5 million units intramuscularly. Some depot-preparations contain also a higher portion of Benzylpenicillin Sodium. A dose of 1 million units is considered as a minimum. The depot salts mostly used are still procaine, clemizole and benzathine penicillin.

For pharmacokinetic reasons the main combinations for intramuscular application contain Penicillin G + Procaine Penicillin + Benzathine Penicillin or Penicillin G + Clemizole Penicillin.

In the hospital we prefer the combination of Penicillin G and oxacillin for initial therapy this reaching also penicillinase-producing staphylococci and additionally it is of advantage in avoiding a dangerous selection of highly and multiresistant gram-negative pathogens. Previously we also added an aminoglycoside intramuscularly to enhance the bactericidal activity and also to reach for example mycoplasmas, but with today's possibilities for more accurate and quicker diagnoses we can in most of the cases wait for the test result.

Among the oral penicillins, the oxacillins are reserved for cases when there is no doubt about the incidence of staphylococci. Today flucloxacillin 3 times, 1 to 2 gram per day is mainly used but it has to be considered that this substance has a high rate of protein binding (more than 90%) and rather poor pharmacokinetic properties.

A much broader use is given for phenoxymethylpenicillin or propicillin.

Also for phenoxymethylpenicillin, the Penicillin V, the principle of higher and therefore more efficient doses should be applied. This does not mean any higher risks for side effects.

The higher efficiency at higher doses can be demonstrated on the example of weak penicillinase-producing strains of staphylococcus.

We have collected 270 hospital strains from inside patients in our laboratory 1980/81. Only 5% were not producing beta-lactamase. Nevertheless, we have tested the efficiency of 1 mega unit in comparison to 1.5 mega units of phenoxymethylpenicillin. Under consideration of the principle of half, meaning half of the half-life-time we found 23 strains sensitive after applying 1 mega unit but 38 strains after application of 1.5 mega units.

(TABLE 4)

We therefore recommend for adults 1.0 to 1.5 mega units Penicillin V as an individual dose. Only in cases of evident streptococcal infections such as pharyngitis a reduction to 0.5 mega units

(TABLE 5)

Penicillins of ampicillin type, the aminopenicillins, do have a broader spectrum and are 5 to 10 times more active than Penicillin G or V in the gram-negative field, but are not stable against beta-lactamases and are 10 times less active against gram-positive strains in comparison to Penicillin G and V. One of the most important properties is the activity against Haemophilus and some of the enterococci. The disadvantage of this substance is certainly the higher rate of exanthema which is up to 10%. This percentage is increased up to 90% in cases of Mononucleosis.

The pure penicillin allergy is nevertheless only 1 to 2%, as it is with all other penicillins. Allergic shock is extremely seldom.

There are not much differences between the individual substances although amoxycillin is a little bit better absorbed. Azidocillin probably has a higher activity against Haemophilus and cyclocillin has in total a weaker activity.

Our clinical point of view is that we have previously used in many cases ampicillin also in combination with high-dosaged penicillin as initial therapy, but we have given up completely this routine, because of a distinct selection of beta-lactamase producing gram-negative strains and staphylococci as well. Only in cases of proven Haemophilus – or enterococcal infections and with urinary tract infection during pregnancy ampicillin is still the substance of choice.

For use outside the hospital, ampicillin, certainly has a justified position in cases of sinusitis, bronchitis and urinary tract infections but for reason of selection and exanthema the indication should be selected carefully. The minimal individual dose of 1 gram should be observed.

The prodrugs of ampicillin namely the esters given every 6 to 8 hours seems to be possible. Piv-, Tal-, Bacampicillin are, except the aspect of a good absorption, equivalent to ampicillin.

Just to complete the overview over penicillins, Mecillinam and Pivmecillinam should be mentioned. As I said already, they might be of interest due to a different protein interaction and by this they might be able to overcome certain resistance.

The carboxyl - and sulfapenicillins are constructed to reach specifically Pseudomonas. From this group carbenicillin is considered obsolete because of interference with coagulation at those doses which are therapeutically necessary. The most useful member of this group is ticarcillin in doses of 2 to 3 times, 5 gram per day.

The prodrugs of carbenicillin are limited to

selected cases of chronic pyelonephritis.

The group of ureido-penicillins has a real importance. Today one can say that PIPERACILLIN in doses of 2 to 3 times, 5 gram per day intravenously is superior in this group. It combines the properties of azlocillin and mezlocillin in respect of activity against resistant enterobacteria and Pseudomonas.

We have seen quite a development in the group of penicillins. Some of them opened new therapeutic possibilities, especially for the clinic, but still the classical penicillins, Penicillin G and V and even the ampicillins in correct indications and doses are of unchanged high value.

(TABLE 6)

The other important group of beta-lactams are the cephalosporins. The development was in some phases contemporary to the development of the penicillin group.

Originally, the basic substance was Cephalosporin C which was found by BROTZU in the medium of the fungus Cephalosporinum. Later cephamycin was isolated from Bacteria streptomyces paving the way for substances such as thienamycin and clavulanic-acid.

After isolation of 7-aminocephalosporanic-acid the first parenteral cephalosporins, cephalotin and cephaloridin were introduced. It took some time to develop new improved injectable cephalosporins but today we can choose from a big offer.

Compared with the classical penicillins the first cephalosporin, CEPHALOTIN, showed a good activity against penicillinase-producing staphylococci and had a broad spectrum including gram-negative strains. The cross allergy with penicillin is only 5 to 10% but cephalotin was only applicable intravenously with a half-life of only 30 minutes and it was not without danger for the kidneys. With these disadvantages the targets for research were set.

The next compound, CEPHALORIDIN, had already a longer half-life-time, an excellent tolerability after intra-muscular application and an increased stability against staphylococci.

But the potential nephrotoxicity was distinctively higher.

It took some time until CEFAZOLIN was available. Cefazolin has a longer half-life with approximately 2 hours and a reduced toxicity and an acceptable toleration when used intramuscularly. Cefazolin kept the position of a standard cephalosporin for initial therapy.

At this point we had two generations. Generation I with the intravenous cephalothin with the short half-life-time and generation II with the intramuscular cephaloridin and cefazolin with a longer half-life-time. Both are metabolized to a relatively high extent in the body. Similar to cephalothin are cephacetrile and cephapirin, thus belonging to generation I. In the meantime, the oral cephalosporins were found and could be named as generation III according to 0' Callaghan, 1979. The most prominent compound in this group is *cephalexin.*

So far with the I to III generation of cephalosporins the beta-lactamase-stability was, in spite of the existence of many substances, still not satisfying especially concerning gram-negative producers.

With the invention of CEFAMANDOL followed by CEFUROXIM some of the expectations were fulfilled. Up till now cefamandol has the highest activity against staphylococci. This generation IV was enriched with substances with an even more pronounced stability In this connection we have to name CEFSOLUDIN with its special action on Pseudomonas and CEROTAXIM with its extreme broad spectrum. CEFOXITIN derived from the other nucleus, the cephamycin, and has a specific activity against anaerobics like Bacteroides fragilis.

With all advantages the substances of generation IV are unfortunately only applicable intravenously and have a short half-life-time and are therefore limited to the use in hospitals.

To have a more complete picture about all the different cephalosporins we can also classify them in those without increased beta-lactamase-stability and with the exception of cefazolin and probably of CEFAZEDON none of them is today of particular importance.

From all the oral cephalosporins cephalexin has the position number 1. Although the newer compounds cefaclor and cefadroxil are different in respect to certain pharmacokinetical aspects.

CEPHALEXIN in doses of minimal, 1 to 3 times daily is a suitable alternative to Penicillin V in case of allergy (cross allergy 5 to 10%) except in cases of shock of course, and an alternative for oxacillin in staphylococcal infections and is the substance of second choice for urinary tract infections.

For clinical use the most important group today is the one with cephalosporins with increased stability.

For some of them there are special indications as for example cefamandol for staphylococcal infections and cefsulodin against Pseudomonas. Broad spectrum antibiotics are cefotaxim, the ana-

log cefotriaxim with a longer half-life, the cefoperazon, however, showing an intolerance with alcohol and CEFTIZOXIM which is under clinical investigation. Most of our experience is done with cefotaxim, cefotriaxim and cefoperazon.

According to our investigations they are strongly active but are able to select some strains of resistant staphylococci, Pseudomonas and Enterobacter and we have to face and always consider a situation similar to the one I have described before, an epidemic reappearance of the dangerous putrifactive strains of staphylococci. Therefore, the misuse of the new cephalosporins must be avoided by all means.

Cefoxitin is also a broad spectrum cephalosporin and very active against resistant Bacteroides.

Moxalactam is a compound without sulphur in its structure and still under investigation. Sofar, we found that the beta-lactamase-stability against producing staphylococci is completely unsatisfying.

Aside from the penicillins and cephalosporins there are other beta-lactams with a different nucleus. It is too early for a definitive evaluation. The clavulanic-acid blocks some production of beta-lactamases and is therefore tried in combination with beta-lactams. Thienamycins seem to be a promising new group of beta-lactams.

We have seen that the beta-lactams are really in a very quick progress and the last word is not yet said.

Similar to the problems of beta-lactams and their instability to beta-lactamases is the activity of bacterial enzymes against AMINOGLYCOSIDES, as a limitation factor in respect to therapeutic use.

To this group the well known substances streptomycin and neomycin belong. Streptomycin today is reserved for tuberculosis and neomycin is only used topically.

(TABLES 7 and 8)

Also in the group of aminoglycosides a development has to be noticed. GENTAMICIN is the standard preparation, however, already inactivated by four different transferases. The semisynthetic compound of gentamicin, SISOMICIN, did not bring any advantages in this respect. NETILMYCIN is more stable. A real higher stability is achieved with members of the Kanamycin group especially with AMIKACIN.

In a pattern of resistance it can be demonstrated that amikacin still has the most favourable results against pathogens isolated from clinical sources whereas gentamicin already has a tremendous increase in resistance in Pseudomonas and today also in staphylococci.

Concerning the always discussed possible damage of Nervus auricularis and vestibularis (VIII) and the nephrotoxicity there is no significant difference with normal doses. There is certainly a higher difference from one patient to the other than from one substance to the other.

We have to note a more or less rapid development of resistance against aminoglycosides. Therefore the monotherapy should be rather avoided.

The misuse leads to predictable problems of resistance. Aminoglycosides are for the use in hospitals particularly. Because of the well known toxicity, therapy must be done under steady controls.

New trends in antibacterial chemotherapy are logically more evident in the clinical era. Nevertheless, I think it is important for the practitioner to hear something about the danger of selection that is higher and more severe, the broader the spectrum of the used substances is and the more those substances are administered uncritically.

For chemotherapy outside the hospital a completely new trend in therapy does actually not exist. The bacteriological situation still enables the employment of standard antibiotics such as classical penicillin, ampicillin and cephalexin just to name the beta-lactams. But more attention is given to the aspect of how to avoid the danger of selection. Careful selection of the indication for broad-spectrum antibiotics and the chemotherapeutic rule "high enough and long enough" are two aspects that are characterizing the therapy today.

CONTENT

Table 1

ANTIBACTERIAL CHEMOTHERAPEUTICS

BETA-LACTAM-ANTIBIOTICS:	Penicillins
	Cephalosporins
	others
AMINOCYCLITOLS:	Aminoglycosides
	Spectinomycin

ERYTHROMYCIN - LINCOMYCIN - CLINDAMYCIN

VANCOMYCIN

TETRACYCLINS - CHLORAMPHENICOL

POLYMYXINS

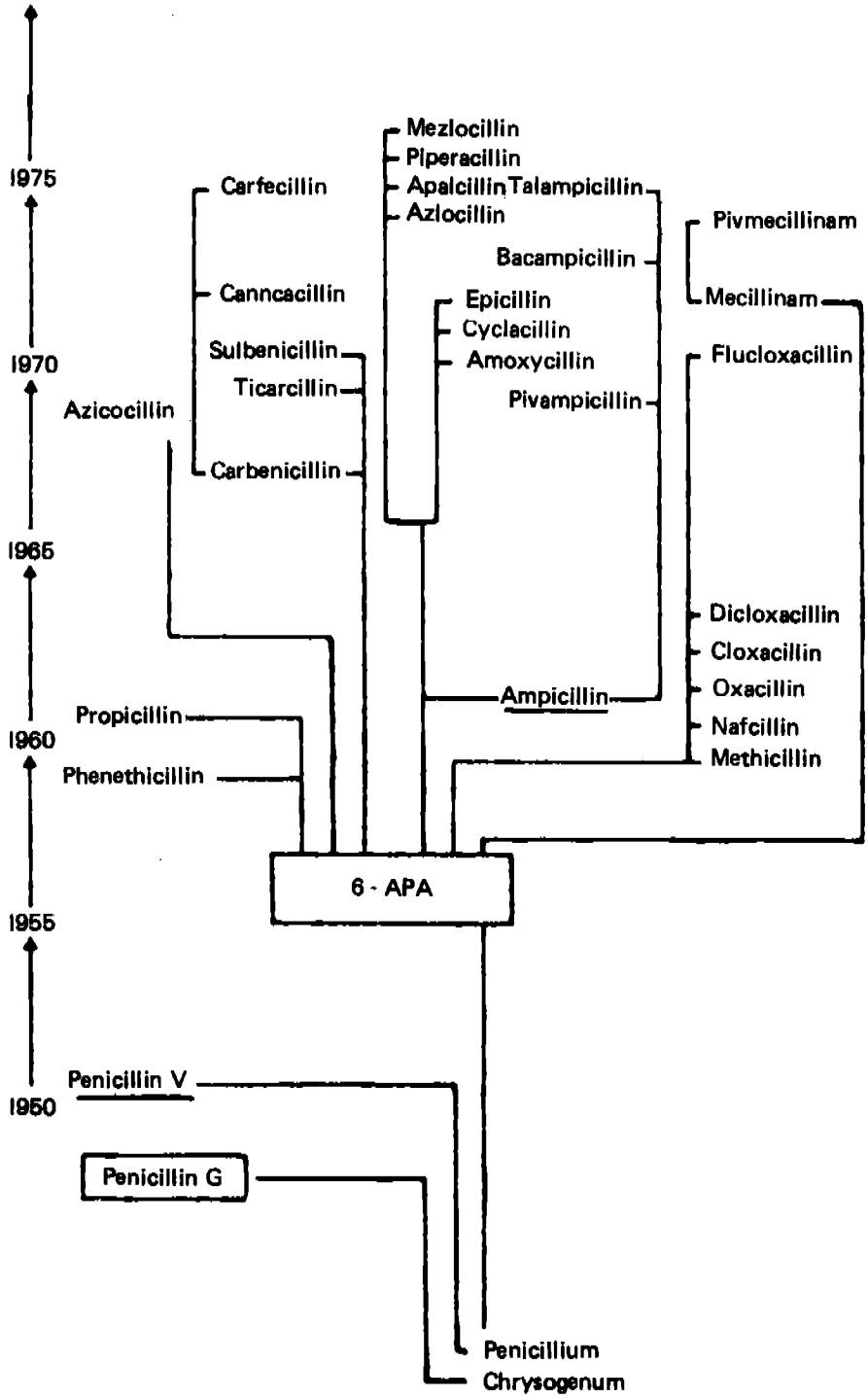
SULFONAMIDES - TRIMETHOPRIM

URINARY-TRACT-INFECTIONS:	Nalidixic-Acid
	Oxolinic-Acid
	Nitrofurantoin
NITROIMIDAZOLS:	Metronidazole
	Ornidazole
FOSFONIC-ACIDS:	Fosfomycin

Others e.g. topical agents, tuberculostatics etc.

Table 3

PENICILLIN GROUP



Penicillin V : Phenoxymethylpenicillin

Penicillin G : Benzylpenicillin

Table 3a

PENICILLIN-G-SALTS

PENICILLIN G - Na

PENICILLIN G - K

PROCAIN-PENICILLIN G

CLEMIZOL-PENICILLIN G

DBED-PENICILLIN = BENZATHIN-BENZYLPENICILLIN G

PENICILLIN G - Na HIGH DOSAGE

10 Mega U = 6 g individual dose

10 Mega U 100 ml aqua bidest 10 minutes

max. dose/day: 3 x 20 Mega U i.v.

COMBINATIONS:

10 Mega U Sodium Penicillin G 1 (2) g Oxacillin i.v.

3,0 Mega U Sodium Penicillin G 0,3 Mega U Procain- Penicillin G +
0,6 Mega U Benzathin-Penicillin G i.m.

3,5 Mega U Sodium Penicillin G 1,0 Mega U Clemizoli i.m.

Table 4

STAPHYLOCOCCUS AUREUS

(hospital strains) n 270

B-lactamase neg. 5%

B-lactamase pos. 95%

0,4 ug/ml	n	23
0,7 ug/ml	n	38

Univ. Clinic of Chemotherapy, Vienna 1980/84

Table 5

DOSAGE OF ORAL PENICILLIN

Penicillin V		individual dose
MIC	0,1 ug/ml	0,5 Mega Units
MIC	0,4 ug/ml	1,0 Mega Units
MIC	0,7 ug/ml	1,5 Mega Units

AMINO-PENICILLINS

Ampicillin (Incl. analogies)

minimal oral dose 3 x 2 (I) g per day

Selection of:

Klebsiella, Enterobacter, Serratia sp.

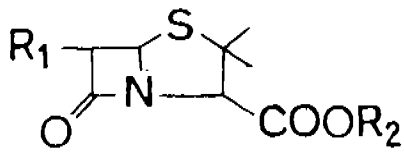
Pseudomonas sp.

Proteus sp. (indo pos.)

B-lactamase pos. strains

(Staph. aureus, E. coli)

AMPICILLIN AND THE "PRO DRUGS"



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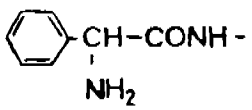
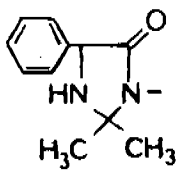
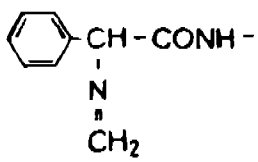
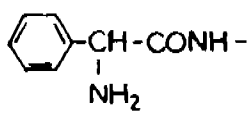
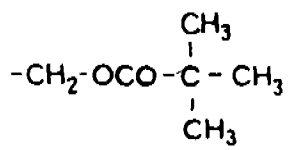
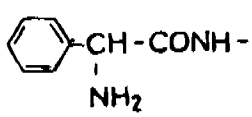
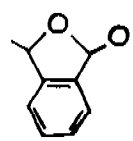
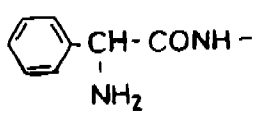
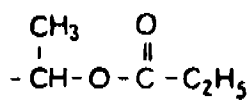
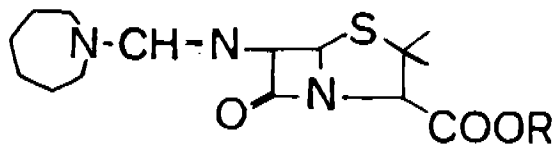
Ampicillin		H
Hetacillin		H
Metampicillin		Ca
Plvampicillin		
Talampicillin		
Bacampicillin		

MECILLINAM AND THE "PRO - DRUG"



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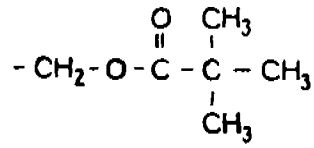
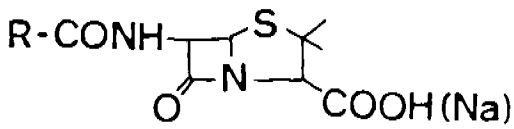
Mecillinam	H
Pivmecillinam	

CARBOXYL - AND SULPHAPENICILLINS



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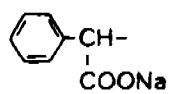
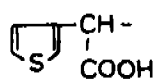
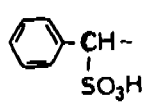
Carbenicillin	
Ticarcillin	
Sulbenicillin	

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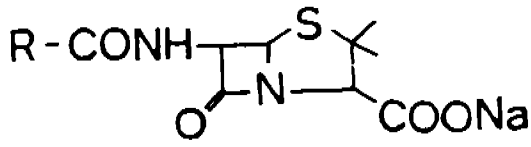

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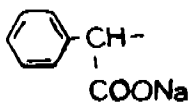
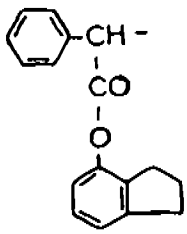
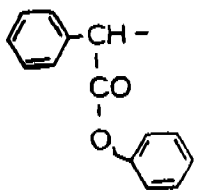
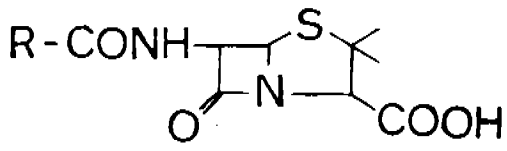
Carbenicillin	
Carindacillin	
Carfecillin	

Ureidopenicillins



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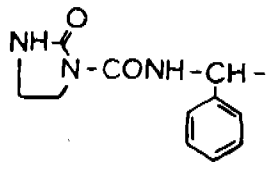
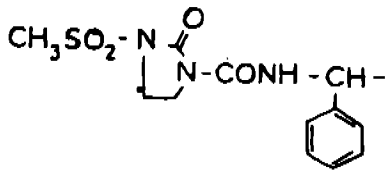
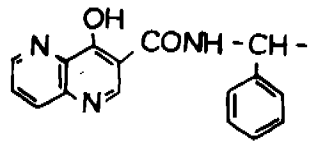
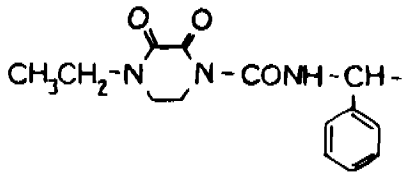
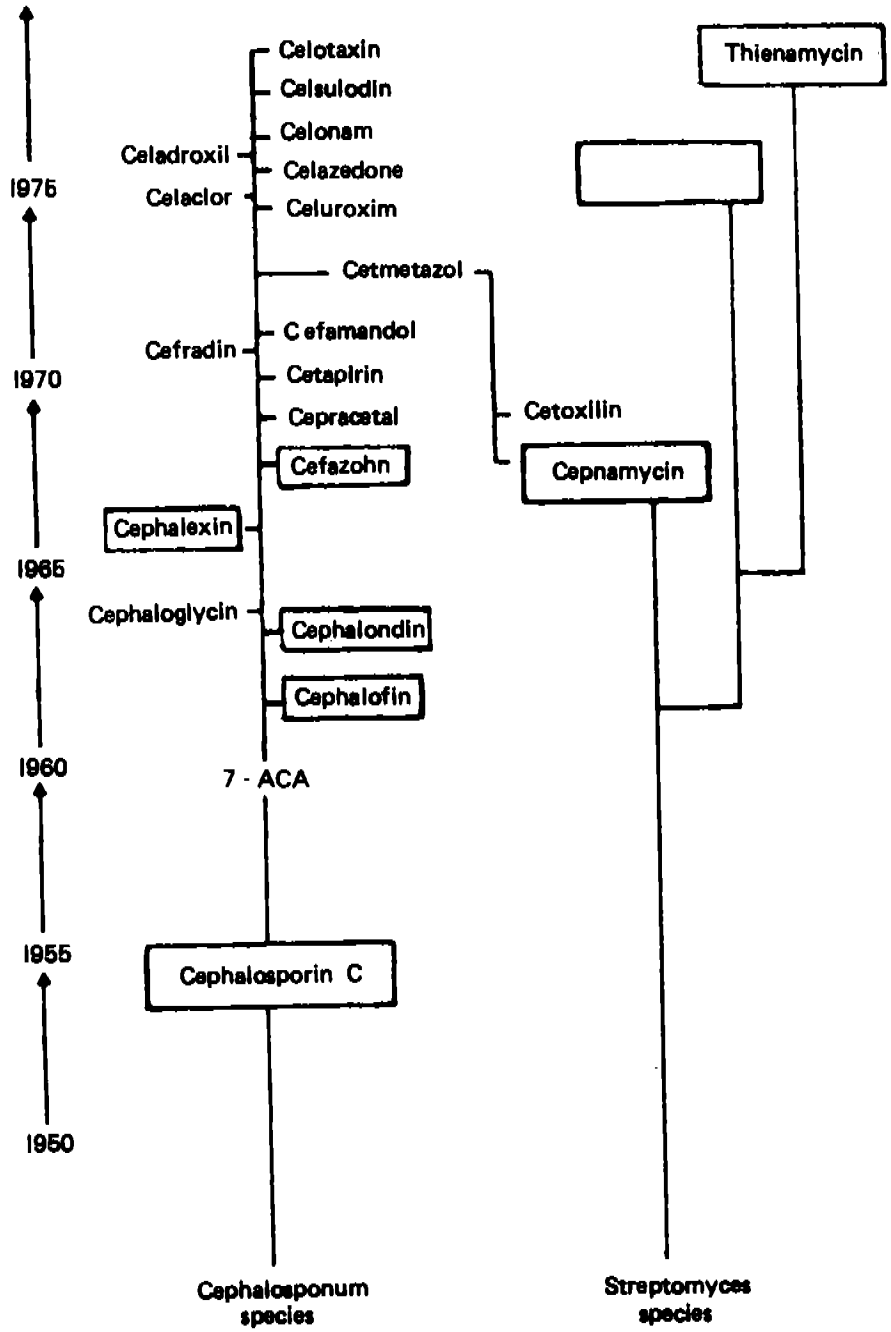
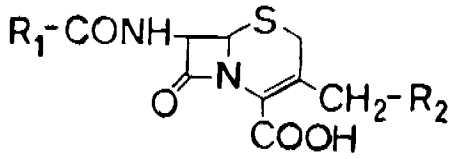
Azlocillin	
Mezlocillin	
Apalcillin	
Piperacillin	

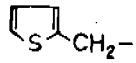
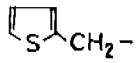
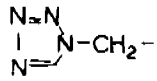
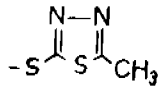
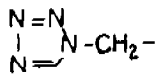
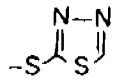
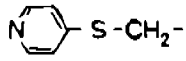
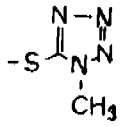
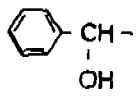
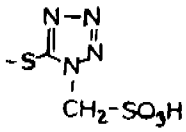
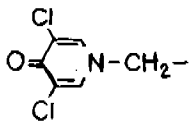
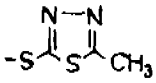
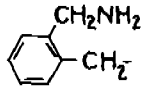
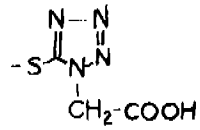
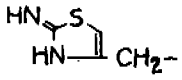
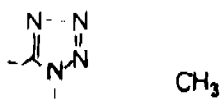
Table 6

THE CEPHALOSPORIN GROUP

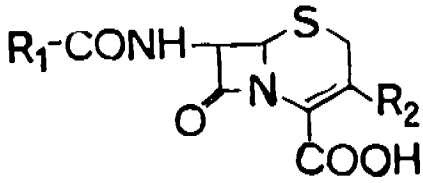


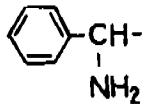
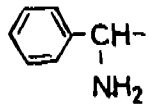
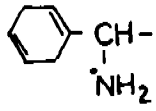
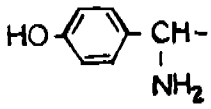
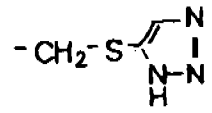
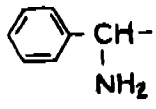
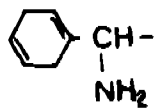
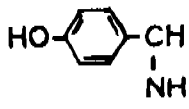
CEPHALOSPORINS FOR PARENTERAL USE WITHOUT INCREASED B-LACTAMASE-STABILITY



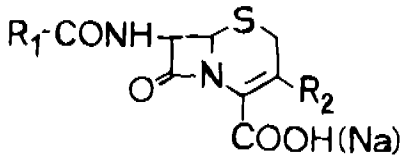
Generic name	R_1	R_2
Cephaloridin		
Cephalotin		$-OCOCH_3$
Cefazolin		
Ceftezol		
Cephacetril	$NC-CH_2-$	$-OCOCH_3$
Cephapirin		$-OCOCH_3$
Cefazaflur	CF_3-S-CH_2-	
Cefonicid		
Cefazedon		
Ceforanid		
Cefotiam		 $\cdot 2HCl$

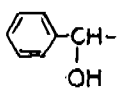
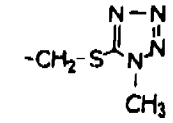
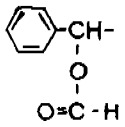
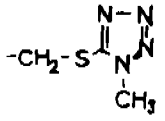
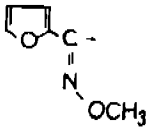
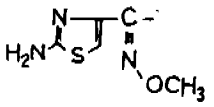
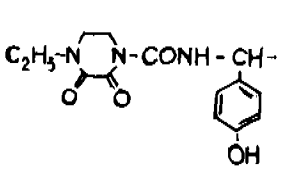
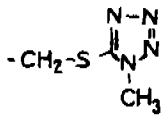
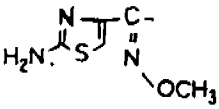
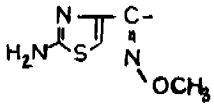
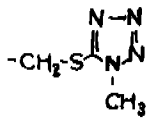
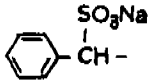
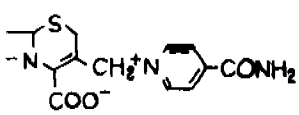
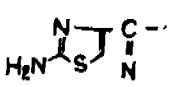
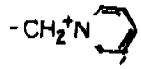
ORAL CEPHALOSPORINS



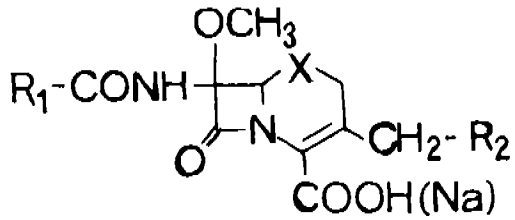
Genericname	R_1	R_2
Cephalexin		$-CH_3$
Cephaloglycin		$-CH_2-OCOCH_3$
Cephradin		$-CH_3$
Cefatrizin		
Cefaclor		$-Cl$
Cefroxadin		$-OCH_3$
Cefadroxil		$-CH_3$

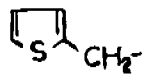
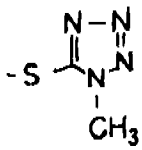
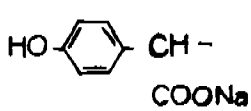
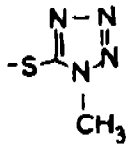
CEPHALOSPORINS FOR PARENTERAL USE WITH INCREASED B-LACTAMASE-STABILITY



Genericname	R_1	R_2
Cefamandol		
Cefamandol-Nafat		
Cefuroxim		$-CH_2-OCONH_2$
Cefotaxim		$-CH_2-OCOCH_3$
Cefoperazon		
Ceftizoxim		H
SCE 1366		
Cefsulodin		
GR 20263		

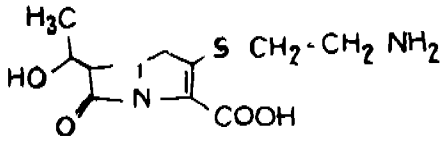
7-METHOXYCEPHALOSPORINS FOR PARENTERAL USE (B-LACTAMASE-STABLE)



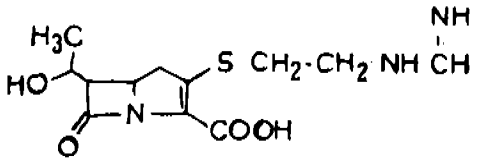
Genericname	R_1	R_2	X
Cefoxitin			S
Cefmetazol			S
Moxalactam			O

B-LACTAM-ANTIBIOTICS WITH DIFFERENT NUCLEUS

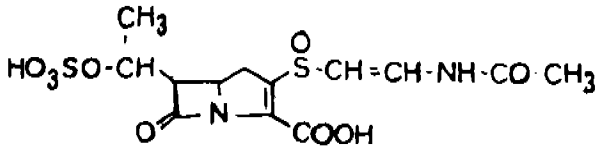
Thienamycin



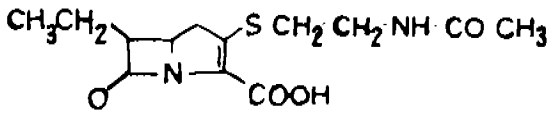
MK 0787



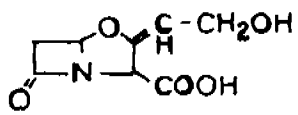
MM 4550



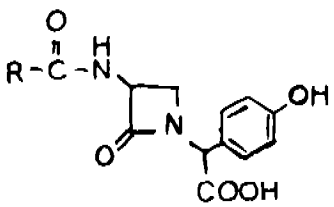
PS 5



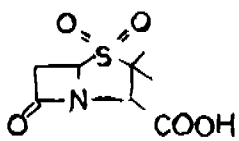
Clavulansaure
(Clavulanic acid)



Nocardicin

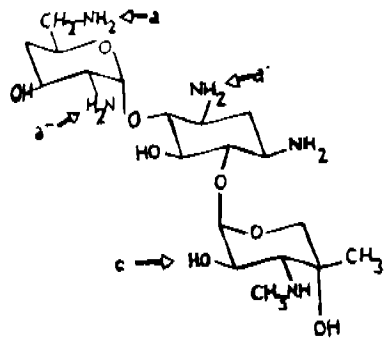
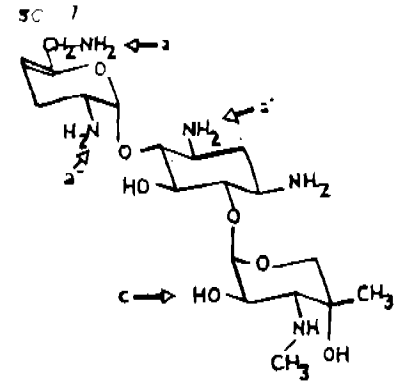
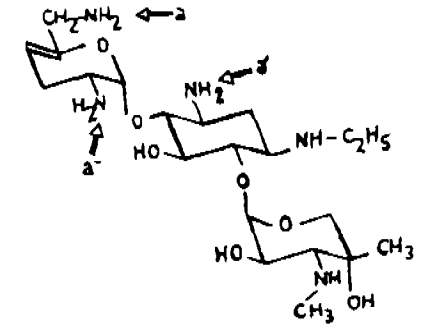


CP 45, 899



AMINOGLYCOSID-ANTIBIOTICS

Table 7

GENTAMYCIN-GROUP	inactivating enzymes					usual dosage (adults)
	a	a'	a''	b	c	
Gentamycin C_{1a} 	(+)	+	+	–	+	4–5 mg/kg/day divided in 4 doses
Sisomycin 	+	+	+	–	+	3 mg/kg/day divided in 3 doses
Netilmycin (1-N-Aethyl-Sisomicin) 	+	+	+	–	(+)	(3 mg/kg/day)

Sites of destruction by inactivating enzymes

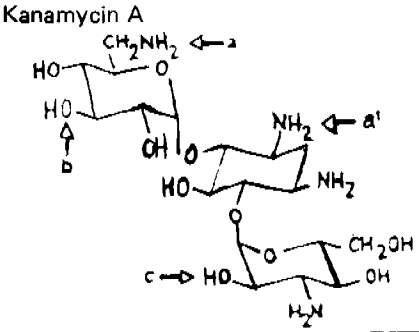
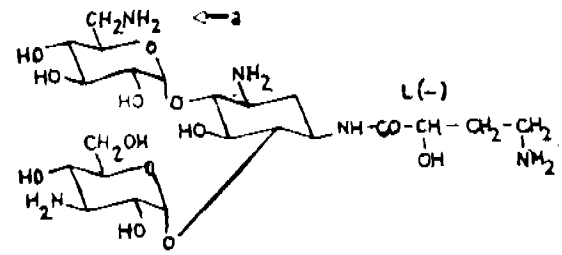
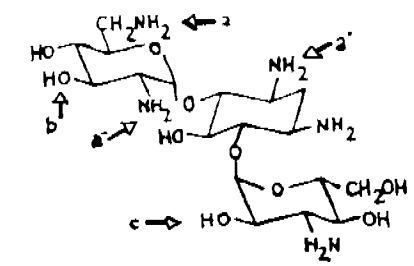
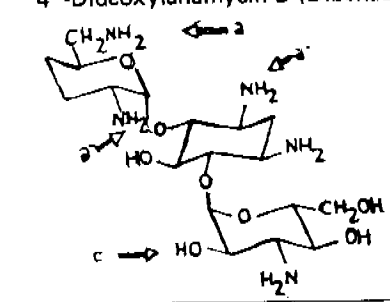
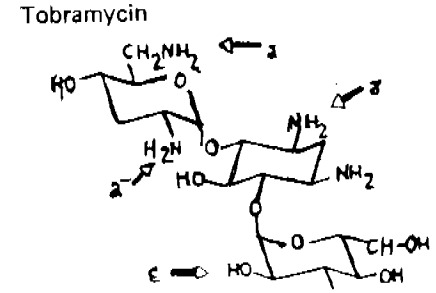
a - 6' -N-Acetyltransferase
a' - 3 -N-Acetyltransferase
a'' - 2' -N-Acetyltransferase

	⟷ 4 µg/ml →			← 16 µg/ml →	
	Siso-	Genta-	Tobra-	Amika	Kana
Staph. aureus	-	-	-	-	1
E. coli	-	-	-	-	5
Prot. mir.	-	-	-	1	3
Prot. indol.	1	1	2	-	3
Klebsiella	-	6	7	-	27
Enterobact.	2	7	10	-	29
Serratia marc.	6	15	15	-	28
Ps. aerug.	19	20	8	1	63
	28	49	42	2	157
	7.6 %	13.2%	11.4%	0.6%	42.4%

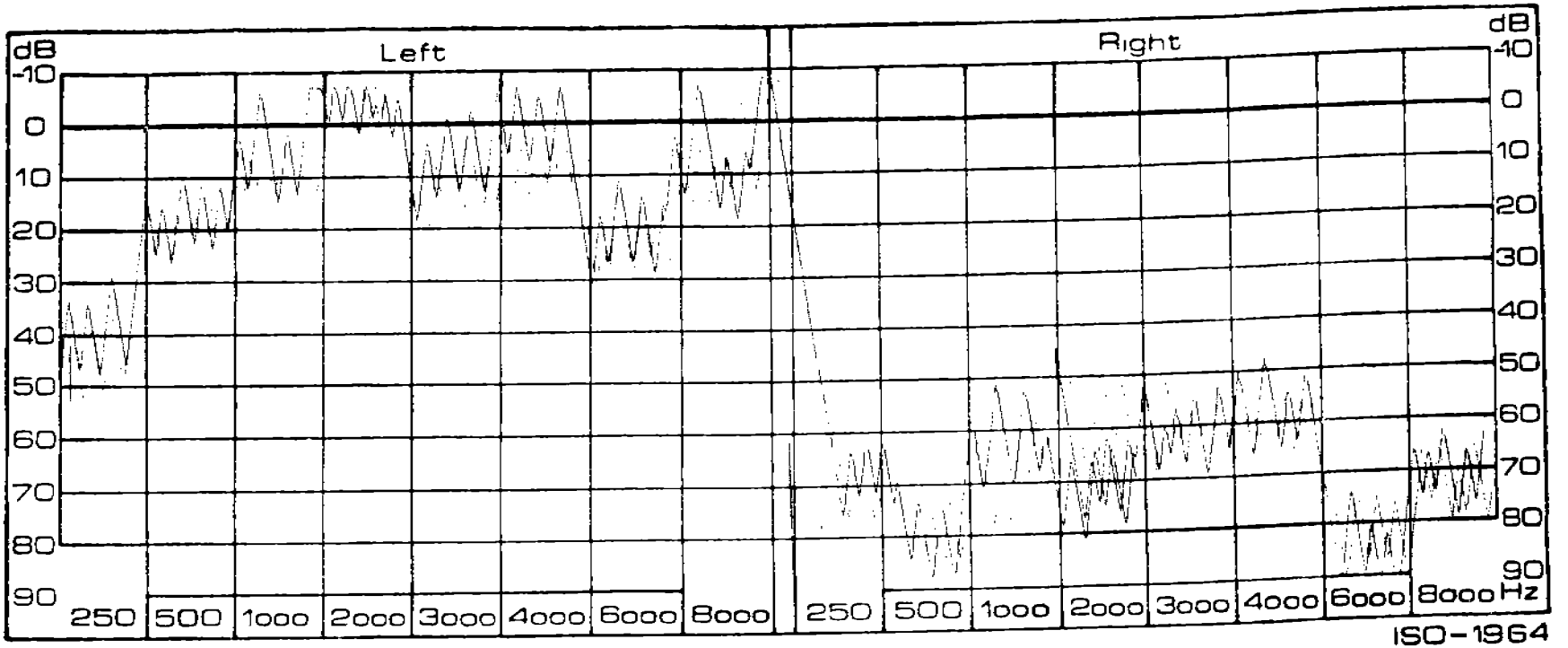
PATTERN OF RESISTANCE OF IMPORTANT PATHOGENS AGAINST AMINOGLYCOSIDS (a. Plempel/Otten)

AMINOGLYCOSID-ANTIBIOTICS

Table 8

KANAMYCIN-GROUP	inactivating enzymes a	a'	a''	b	c	usual dosage (adults)
Kanamycin A 	+	(+)	–	+	+	15 mg/kg/day divided in 2 doses
Amikacin 	+	–	–	–	–	15 mg/kg/day divided in 2 doses
Kanamycin B 	+	(+)	+	+	+	8 mg/kg/day divided in 2 doses
4''-Dideoxylanamycin B (Dibekacin) 	(+)	(+)	+	–	+	4 mg/kg/day divided in 4 doses
Tobramycin 	(+)	+	(+)	–	+	4 mg/kg/day divided in 4 doses

PICTORIALS



ISO-1964
ANSI-1969

Bekesy tracings

3-14-91

Type 1, both ears.

Type AF2

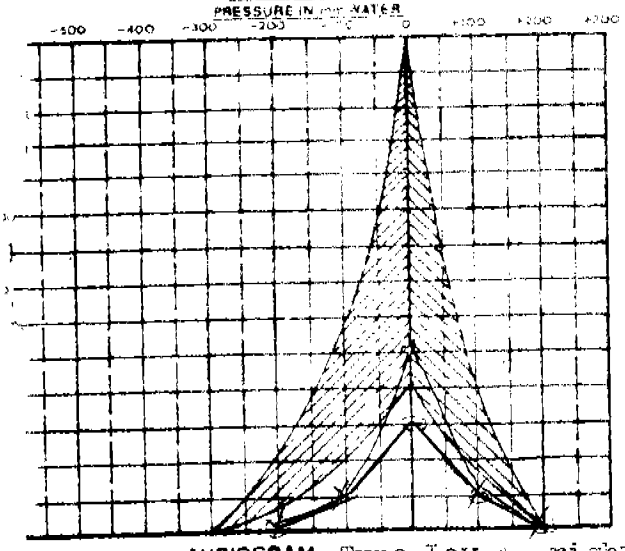
SISI WORKSHEET

Ear	Freq.	SL/Th.	Score %
Right	5 KHz	[illegible]	[illegible]
	1 KHz	[illegible]	[illegible]
	2 KHz	[illegible]	[illegible]
	4 KHz	[illegible]	
Left	5 KHz	40/20	0%
	1 KHz	35/15	0%
	2 KHz	25/5	0%
	4 Khz	30/10	0%

Opposite ear masking level: PE _____dB

LE _____dB

TYMPANOGRAM



STATIC COMPLIANCE

EUSTACHIAN TUBE FUNCTION

LEFT			RIGHT	
YES	NO		YES	NO
		NORMAL FUNCTION		
		NORMAL TOYNBEE		
		NORMAL VALSALVA		
		PATENT		

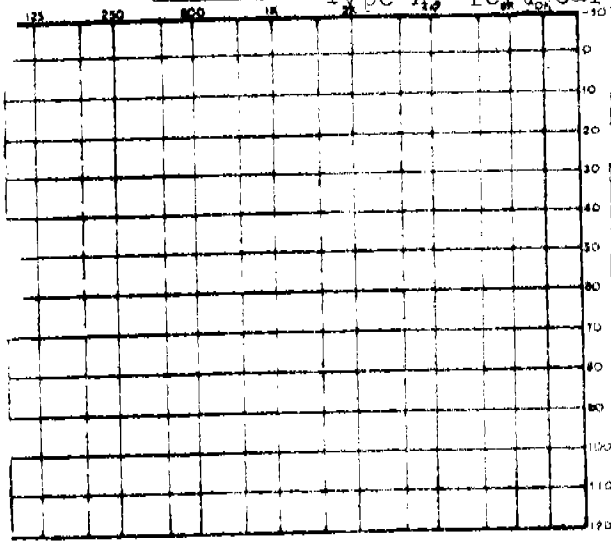
MIDDLE EAR PRESSURE

LEFT RIGHT

IN mm H_2O

AUDIOGRAM

Type Low A, right ear.
Type A, left ear, indicating no middle ear pathology.



LEFT	KEY	RIGHT
X	AIR	O
□	AIR MASKED	Δ
>	BONE	<
⊐	BONE MASKED	⊏
N/R	NO RESPONSE	
DNT	DID NOT TEST	
CNT	COULD NOT TEST	

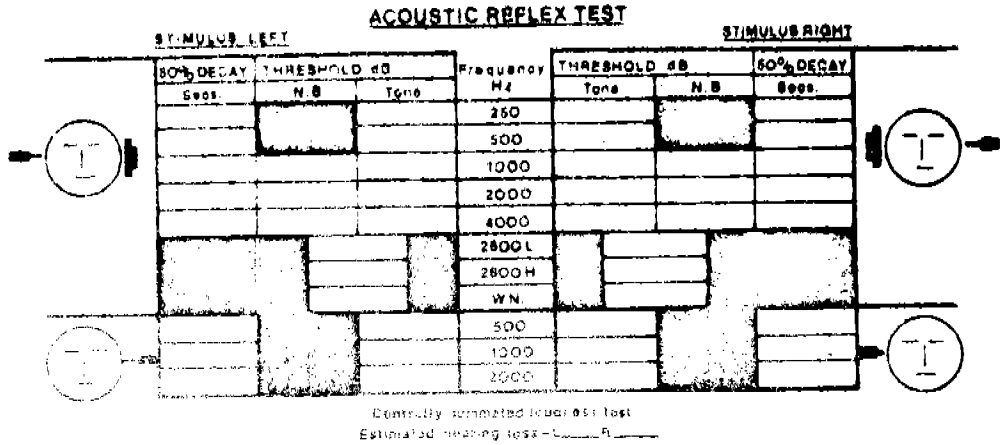
STIMULUS - LEFT EAR PURE TONE

250	500	1000	2000	4000	
					REFLEX THRESHOLD
					PURE TONE THRESHOLD
					DIFFERENCE

STIMULUS - RIGHT EAR PURE TONE

250	500	1000	2000	4000	
					REFLEX THRESHOLD
					PURE TONE THRESHOLD
					DIFFERENCE

ACOUSTIC REFLEX TEST



Centrally summated loudness test

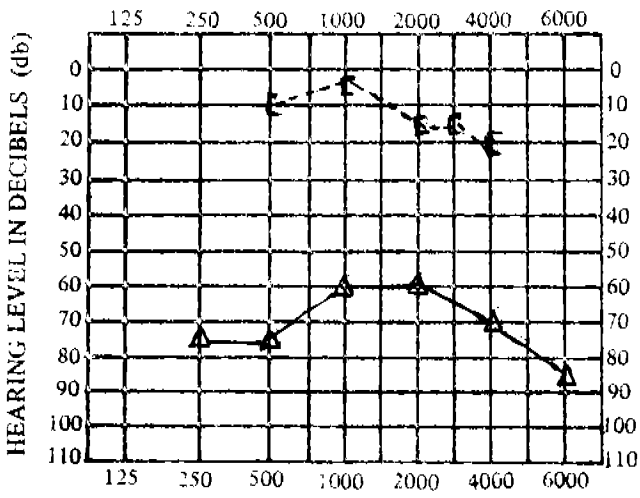
Estimated hearing loss – L ____ R ____

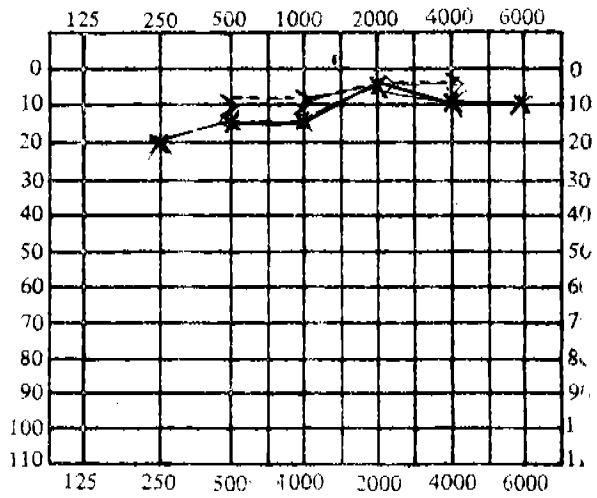
RE-ORDER FORM ZA24

PURETONE AUDIOGRAM

AIR	250	500	1000	1500	2000	3000	4000	6000
R. E.								
L. E.	20	15	15		5		10	10
BONE								
R. E.								
L. E.		10	10		√		√	
F. F.								

CODE: W/O maski
upper 1/2 of split l
-w/masking-lower 1,
of split box.
MASKING TYPE:
MASKING LEVEL:





FREQUENCY IN HERTZ (H_Z)

RIGHT EAR

LEFT EAR

AUDIOGRAM KEY:

	R.E.	L. E.
AC – Unmasked	○	×
AC – Masked	△	□
BC – Unmasked	<	>
BC – Masked	⊏	⊐
NR	▽	▽

Per cent Impairment: R. E. ____ %
L. E. ____ %

Per cent Binaural Impairment ____ %

SPEECH AUDIOMETRY

TEST	R	L	EF	AIDED
SRT				
PB				
MCL				
TOL				
DR				
SP AW				
NOISE AW				

Materials Used:
SRT: ___ Pilipino ___ Harvard ___ PB - K
PB : ___ W-1 ___ Pilipino ___ Children's Spodee

Method Used: ___ Live Voice ___ TApe
Opposite ear masking level:
R.E. ____ dB L. E. ____ dB

REMARKS:

Audiometric test results indicate a normal hearing sensitivity on the left ear and a moderate conductive hearing loss on the right ear. Speech reception threshold conformed with pure - tone average. Speech Discrimination scores 100% on both ears.

Tympanometry - Type low A, right ear.
Type A, left ear.

TONE DECAY

H.L.	500		1000		2000		4000	
	R	L	R	L	R	L	R	L
0								
5						T		
10						60		T
15				T				60
20		T		60				
25		60						
30								
35								
40								
45								
50								
55								
60					T			
65					60			
70							T	
75	T		T				60	
80	60		60					
85								
90								
95								
100								
105								
110								

Opposite Ear masking level: R.E. _____ L.E. _____

Remarks: Negative for tone decay at all frequencies, bilaterally.

What is your diagnosis?

Answer: Fixation of the footplate of the stapes at oval window.