PAKISTAN JOURNAL OF

VOLUME 29 NUMBER 2 ISSN 0257-4985

OTOLARYNGOLOGY

HEAD & NECK SURGERY

AUGUST 2013

Contents

Pakistan Journal of Otolaryngology 2013; 29 : 37-39 Editorial

The Scourge of Drug Trials

Shabih H. Zaidi

Research is inevitable for the progress of medicine. Drug trials are a part and parcel of medical research. New cures have to be found not only for the new diseases but also for the old but hitherto incurable diseases. Without drug trials such a progress is simply not possible. The pharmaceutical industry in collaboration with the physicians and scientists is obliged to carry out such drug trials; and they deserve to be complemented for their efforts. Safety and efficacy of the drug is the objective in such human trials, which are often conducted under scrupulous and controlled conditions.

It is indeed a global practice that the scientists carry out lots of research putting in several years of toil , sweat and labour into developing a molecule ,then testing and trying the substance in many different laboratory and controlled environments before developing a medical formula to be tried on animals. Phase 4 trial is finally carried out under strictly monitored conditions on human volunteers. This is the job of the clinical scientists who have to seek approval of ethics committees and go through several protocols all designed to ensure the safety of the human subjects, before actually launching an experiment on the healthy volunteers. It is usually a long and tedious exercises and mat take several years' even decades from the development of initial chemical compound to actually launching the finished product for physician's prescription.

It is very minutely monitored by many parties involved in such an evolutionary process. Most of all the quality control scientists of the parent manufacturer, whose financial as the moral responsibilities could be boundless.

On 13 March 2006, such an exercise was carried out on eight young and healthy volunteers at the renowned Northwick Park hospital in London.

The first clinical trials on healthy individuals, was about to commence at Parxel's chemical pharmacology research unit. The drug under trial was labelled as TeGeneros TGN 1412, a pseudonym, until a formal trade name could be given; .It was T cell antagonist which was supposed to open new vistas in the field of immunology.

Each volunteer was duly explained and fully informed of the trial and its possible hazards, before the introduction of the drug. Each person was also paid a sum of £2000. In lieu of the services offered a practice not uncommon in the field of pharmaceutical research. Whether, therefore it became a paid job or a volunteering service remains debateable. Nevertheless the human subjects were health and joined the trail of their free choice.

What followed next could not be called anything but a total disaster. The clinical trials went horribly wrong, and the healthy subjects became critically ill patients. Some even developed multiple organ failure, caused by unknown and totally inexplicable immunological response to TGN1412.

The news of the tragedy became the hottest news of the days and weeks to come. Hourly reports of their progress was displayed on nearly all channels on British TV, and regularly broadcasted on hourly news bulletins on the radio... The medial frenzy was typical of news hungry media, who are always eager to jump and grab anything exciting, and thrilling. The paparazzi do not have any colour code or indeed any moral boundaries.

For nearly two weeks the subjects under trial remained in a critical condition, obviously receiving first grade clinical care. No one knew how to undo the effects that they had developed and the diverse reaction of the drug under trail so far unknown and unseen created unprecedented dilemmas for the clinicians and the scientists. Top clinical immunologists and physicians and a team of pharmacologists continued to pour over the evidence and vast numbers of investigative tests that these subjects were obviously exposed to. No stone was left unturned in saving their lives and enabling them to regain their formal health.

Former Founder Chair, Medical Education Dow Medical College, Karachi / West Midlands, UK.

Eventually the tide turned in favour of the patients, and they gradually began to recover; finally returning to normal after a long and hard battle against the most horrendous immunological adverse reaction that any one had ever seen. Some have not quite fully regained their formal status of immunity and resistance. Infact as the media informed us, one of them had shown early signs of developing a malignancy, possibly a lymphoma.

All of them are now leading a normal though somewhat traumatised life, contemplating litigation and compensation from the parent pharmaceutical company, which has now ceased to exist.

Following this near fatality, new guidelines for research and clinical trials have been published by the competent authority. Obviously more vigilance and better scrutiny to ensure the safety of human volunteers would be the objective of these reforms.

Investigations and enquiries are a part of the British system of probing into such mishaps. The causes and the effects are always thoroughly searched and duly published in due course of time. Incident recording and monitoring is a way of life, which in turn prevents such incidents from happening which may otherwise turn into accidents and tragedies.

The Medicines and Health care Products Regulation Agency conducted an investigation on the TGN1412 mishap, which has been questioned by the parties involved as well as the BMJ.

An independent Expert Scientific group was hence appointed, by the Government 'to learn from the Parexel clinical trials incident a' as reported in the BMJ of 5 august 2006.

The usual saga of denials and disapprovals etc continues in the press. The BMJ has reported that the recommendations fall into several broad categories' Preclinical development that is both directive and consultative' Evidence based transition to testing in humans, more open regulatory and ethical review, including independent scientific expertise and most importantly the need for more transparency'.

It is indeed heartening to note that the recommendations will ensure safety and transparency of any future clinical trials.

The clinical trials will undoubtedly continue to be carried out and it is also beyond a shadow of a doubt that once in a while adverse reactions and incidents will occur. But, it is expected that an important lesson will be learnt from this tragedy. Safety of the human volunteers is of paramount importance in all clinical trials. What is equally important is that constant and acute monitoring of any trials by regulatory bodies, who obviously would observe the code of ethics, based upon universal principles an autonomy and fair play, shall be genuinely carried out.

The Thalidomide tragedy is not yet forgotten and shall never be in the future either. One has to pay visit to the Trafalgar square in London, where just in front of the National Art gallery and in the shadows of the Nelson column there is the controversial new monument of a limbless mother erected as a constant reminder of the follies mankind and its dire consequences. The Tuskegee trial of Alabama and many such tragic episodes in human history are for some to remember and reflect so as to avoid untoward happenings, some unforeseen , others deliberate and total evil.

While the question of ethical values, monitoring and transparency of trials on human beings is quite obviously of paramount importance in the developed countries, I am not entirely sure if they have the same significance in practice in the developing countries too. There is a lot of lip service in many such nations, but little to show in terms of actual practicality.

Couple of decades ago, I recall participating in an international debate on the ethical issues related to human clinical trials, held in hotel at Karachi. A scientist from the UK, a renowned ethicist, mentioned several illustrations of abuse of the powers of the Western scientists in employing the colleagues for the developing counties. The agenda was mutually beneficial to the promoter and the collaborator, but not nearly enough to the human volunteers, who often enough were grateful to be given some form of treatment, at all!

One illustration of the abuse and misquoting of the data was mentioned by this visiting speaker, which was an eye opener for the whole audience, some very senior professors of medicine, who simply couldn't believe what they were hearing. In a drug trial conducted in a western country on geriatric

population, the data was gathered and employed in favour of the drug in question to be prescribed to young healthy pregnant mother in many Asian countries. Some of the subjects on whom the study was carried out were in their eighties and mighty sick; some even might have had near death experiences only Lord knows. To use such data is not only unethical but quite contrary to the basic principles of medical practice.

The contrast between the health services in the Western nations and those in the developing countries in enormous. There is no shortage of talent, the knowledge or the skills in our nations, but the lack of resources make the services totally incomparable.

Malaysia is a developing nation, which has excellent health services which can be taken as a model for many other developing nations. In Malaysia, medical ethics is not only highly developed but pioneering in many ways. They practice what they preach. Some of their teaching modules are simply far superior to many Western countries and some of their ablest physicians and surgeons can simply outclass nay University hospital staff in UK; and yet they are extremely humble and modest in their approach.

In the Indo Pak subcontinent we have some fine examples of institutions where excellent care is provided and can be the role model for other institutions, I can only quote an example of the Sindh Institute of Urology and Transplantation in Karachi and the Shaukat Kahanum Hospital in Lahore as two charitable organizations that are indeed beacons of light for many corrupt government institutions. All India Institute Delhi and the Postgraduate centre at Chandigarh are two examples amongst many in India. Where students from the US and UK area routinely despatched for hands on training. These institutions follow the strict guidelines of the final moral values that are universal and have no limits or bounds of faith or religion.

The greener pastures of England and Wales and the majestic lochs and hills of Scotland offer too much to resist in terms of natural beauty and charm . The lure of the West is far too much to discard or ignore. Therefore if a Western company or an institution, involves a group of scientists or a person with authority to carry out a collaborative research, it obviously becomes quite difficult if not impossible to refuse such an offer.

Majority of such programmes are genuine and highly productive, but some evil scientists may barge in, and exploit the situation to their personal advantage and for their personal glory, even at the cost of human lives. Such evil people have no religion or faith or values. They are far too greedy and far too self centred and egoistic to care about a thing in the world. To them self interest is supreme and good enough cause to embark upon any exercise good or evil.

A fine illustration of a collaborative programme was the Basic Institute of Medical Sciences, established in 1960s at the Jinnah Hospital in collaboration with an American university. Honest and ethical people controlled it and the result of it is visible anywhere in Pakistan. Despite the closure of the collaboration the BMSI remains an excellent institution producing the finest scientists to the country. An institution whose foundations were laid upon honesty has continued to serve its people with integrity.

There are many similar illustrations of such collaborative programmes elsewhere in the developing nations. A British charity by the name of BRINOS has provided excellent medical and surgical care to the ENT patients of Nepal over many years. As a fall out of their effort the young British trainees learn the art of Mastoid surgery under the watch full eyes of the masters. Such a mutual contract is quite commendable.

Since many developing nations are often enough hard pressed for drugs and equipment, collaborative programmes are to be recommended for the mutual benefit of both parties. Keeping the principles of distributive justice in view it is mandatory the benefits of such trials and research must reach both the researcher and the population under study equitably and without any restraints. It is incumbent upon the rich and the famous to involve the developing nations in research activities so as to benefit the mankind , but also to strictly observe the ethical code of clinical and research trails on human beings so clearly mandated by the WHO and other agencies.

Regrettably though the Tuskegee and similar experimental works continue to remind us that the mighty and the powerful do what they want and would not care to pay even a lip service to what the critics say. Haven't we seen it too clearly in the recent debacles of Iraq and elsewhere? Socrates believed in the 'might of the right' , but he would be sad to witness for himself that in today's world , or at least in the developing nations sadly enough,' might is somehow right'.

Pakistan Journal of Otolaryngology 2013; 29 : 40-42 Original Article

Microvascular Decompression in Patients with Intractable Idiopathic Trigeminal Neuralgia

Riaz ur Rehman, Azmatullah

ABSTRACT: OBJECTIVE: To know the surgical findings and post-operative outcome of microvascular decompression (MVD) for trigeminal neuralgia in intractable idiopathic trigeminal neuralgia. PATIENTS AND METHODS: This descriptive study was conducted in Neurosurgery department of Hayatabad Medical Complex, Peshawar from January 2007 to December 2009. Patients with idiopathic trigeminal neuralgia from all ages and both sexes were included. Patients responding to medical treatment were excluded. MRI brain was done for all patients to exclude secondary causes. Microvascular decompression was performed in all patients under general anesthesia. Patients were examined on seventh post operative day and the clinical findings were documented. Outcome of surgery was declared as successful when there was complete relief of both paroxysms and deep background pain and total withdrawal of medications. Results were presented as graphs and tables. RESULTS: Fifty two patients were operated for trigeminal neuralgia. Males were 23 (44%) and females were 29 (56%). Age ranged from 20-70 years, mean age was 56 years. Right side was involved in 34 (65%) cases. In 50 cases(96 %) a neurovascular conflict was found, the superior cerebellar artery (SCA) being the cause of compression in 45 (86.53%) patients, anterior inferior cerebellar artery (AICA) in two patients, posterior inferior cerebellar artery (PICA) in one, basilar artery in one and in one patient petrosal vein was implicated. In 2 patients trigeminal nerve was found encased by tight arachnoid adhesions. Trigeminal Nerve Entry Zone was the commonest point of conflict i.e. 38 cases (73.07% cases). The mandibular division(V3) was most commonly involved i.e. 30 (57.70%) patients followed by maxillary (V2) 18 (34.61%) and ophthalmic division (V1) 4 (7.69%). The combination of V2 and V3 were seen in only 6 (11.53%) patients. Distortion of the nerve was noticed in 25 (48.07%) patients followed by marked indentation i.e. 22 (42.31%). Simple indentation of the nerve root was present only in 5 (9.61%) patients.Complete pain relief was noted (free of medication) in 49 (94.23%) patients. Cerebrospinal Fluid (CSF) leakage occurred in 3 (5.76%) patients. One (1.92%) patient developed wound infection. There was one (1.92%) post-operative mid brain stroke and this patient died. Two (3.85%) patients had transient vertigo after surgery. CONCLUSION: The main etiological factor of trigeminal neuralgia is vascular compression of the 5th nerve roots at brain stem. The most common vessel is superior cerebellar artery. The patients in whom medical treatment fails to respond, microvascular decompression should be the treatment of choice in trigeminal neuralgia. Microvascular decompression is safe, effective and recommended for all ages.

Key Words: Idiopathic trigeminal neuralgia, Microvascular decompression, Outcome.

INTRODUCTION: Idiopathic trigeminal neuralgia is one of the most distressing pain syndromes. It is characterized by stabbing or shock like paroxysmal pain in the distribution of one or more branches of the trigeminal nerve[1]. Various triggers may commonly precipitate a pain attack. Light touch or vibration is the most provocative maneuver[2]. Superior cerebellar artery is the commonest cause of 5th nerve root compression[3,4].This lead to focal demylination of the nerve due to its pulsatile compression. Demylination results in short circuiting of neuronal flow and hence trigeminal neuralgia[5]. Diagnosis is based on detailed history and thorough clinical examination[5]. MRI brain differentiates idiopathic from trigeminal neuralgia secondary to space occupying lesions in cerebellopontine (CP) angle and multiple sclerosis (MS)[3,6]. Usually the pain responds to carbamazipine therapy, at least in the initial days of treatment[3,7]. Microvascular decompression is safe, effective and treatment of choice for intractable pain[4,8,9]. Jannetta worked on trigeminal neuralgia and strongly supported the hypothesis of microvascular compression and popularized the microvascular decompression for the treatment of trigeminal neuralgia[10]. Barker et al showed in a study that microvascular decompression has got 70% cure rate[11]. It is important to ascertain which artery, vertebral or basilar, is compressing the nerve, as the risk of operating in these patients is higher than in patients where the superior cerebellar artery is the trigger[12,13]. The purpose of this study was to bring new insight about this topic. The results of this study will help neurosurgeons in opting microvascular decompression as the treatment of choice in case of intractable idiopathic trigeminal neuralgia.

MATERIAL AND METHODS: This descriptive study was carried out in Neurosurgery department of Hayatabad Medical complex, Peshawar from January 2007 to December 2009. Permission was taken for this study from the ethical committee of Hayatabad Medical Complex, Peshawar. Informed written consent was taken from all patients. Patients with idiopathic

Department of Neurosurgery, Hayatabad Medical Complex, Peshawar.

S. No.	Location of Conflict	No. of Patients	Percentage
1	Trigeminal Nerve Entry Zone	38	73.07%
2	Mid third of nerve	12	23.07%
3	Exit at Meckle's Cave	2	3.84%

Table 1: Location of Neurovascular Conflict.

S. No	Feature	No of Patients	Percentage
1	Pain relief	49	94.23%
2	CSF leakage	3	5.76%
3	Transient Vertigo	2	3.85%
4	Wound infection	1	1.92%
5	Facial Nerve Palsy	1	1.92%
6	Mortality	1	1.92%

Table 2: Surgical Outcome after one week.

trigeminal neuralgia from all ages and both sexes were included. However patients of trigeminal neuralgia due to space occupying lesion at CP angle, multiple sclerosis, iatrogenic or traumatic lesion to trigeminal nerve were not considered as these confounders would bias our results. Patients responding to medical treatment were also avoided to be operated. Complete history was taken and thorough physical examination was done at the time of admission. MRI brain was done for all patients to rule out secondary causes. Microvascular decompression was performed in all patients under general anaesthesia and in the contra lateral decubitus position. A retromastoid incision was made 1 cm behind the hairline, and a keyhole craniectomy at the asterion was performed. The intersection of the transverse and sigmoid sinuses was exposed and the dura mater was opened along the line bisecting their angle. The cerebellum was gently elevated, and the trigeminal nerve was identified and examined for vascular contact at the nerve root entry zone. All compressive arteries were decompressed away from the fifth cranial nerve and its root entry zone in the Pons with spongeston. Pre-operative, per-operative and post-operative findings were documented in semi structured performa. Patients were examined on seventh post operative day and clinical findings were documented. Outcome of surgery was declared as successful when there was complete relief of both paroxysms and deep background pain and total withdrawal of medications. The collected data were then entered in statistical package of social sciences (SPSS) version 10. Qualitative data expressed in percentages while quantitative date in means. Results were presented as graphs and tables. RESULTS: Fifty two patients were operated for trigeminal neuralgia. Males were 23 (44%) and females were 29 (56%). Age ranged from 20-70 years, mean age was 56 years. Right side was involved in 34 (65%) cases. In 50 patients (96%), a neurovascular conflict was found, the superior cerebellar artery (SCA) being the cause of compression in 45 (86.53%) patients, anterior inferior cerebellar artery (AICA) in two patients, posterior inferior cerebellar artery (PICA) in one, basilar artery in one and in one patient petrosal vein was implicated. In 2 cases (4%), no vascular loop was found. In these patients the trigeminal nerve was found encased by tight arachnoid adhesions. Trigeminal Nerve Entry Zone was the commonest point i.e. 38 cases (73.07% cases). Other locations of neurovascular conflict are shown in table 1. The mandibular division (V3) was most commonly involved in this study i.e. 30 (57.70%) patients followed by maxillary (V2) 18 (34.61%) and ophthalmic (V1) division 4 (7.69%). The combination of V2 and V3 were seen in only 6 (11.53%) patients. Distortion of the nerve was noticed in 25 (48.07%) patients followed by marked indentation i.e. 22 (42.31%). Simple indentation of the nerve root was present only in 5 (9.61%) patients, complete pain relief was noted (free of medication) in 49 (94.23%) patients as shown in table 2. Cerebrospinal fluid (CSF) leakage occurred in 3 (5.76%) patients. One (1.92%) patient developed wound infection. There was one (1.92%) post-operative mid brain stroke and this patient died. Two (3.85%) patients had transient vertigo after surgery. DISCUSSION: Various treatment options for idiopathic trigeminal neuralgia have been described. Medical treatment rely on damage of the trigeminal nerve to relieve pain. Surgical options are based on the neurovascular conflict. Microvascular decompression directly modifies the well known etiology of vascular compression[1]. So keeping the above facts in mind; we opted for microvascular decompression rather than any other form of surgical treatment. In this study female patients are predominant with female to male ratio of 1.27:1, which is similar to previous 4 studies. In Pollack and Jannetta series it was 1.4:1[12]. Female sex has been reported as risk factors by some authors for recurrence after microvascular decompression[14]. The elderly population is commonly affected probably due to age related changes in blood vessels. In this study, the mean age was 56 years. These findings are pretty close to the findings of other researchers[4]. Per operatively we found that superior cerebellar artery was involved as the causative factor of trigeminal neuralgia i.e. 45 cases (86.53%) which is comparable to 87% reported by Shams S et al[8]. In the present study trigeminal nerve entry zone is the commonest point of neurovascular conflict i.e.38 cases (73.07%) which is in line with the reports of previous series[8]. So trigeminal root entry zone should be explored in all cases peroperatively. The current study reveals pain relief in 94.23 % patients. This figure is quite close to the work done in lady reading hospital, Peshawar[4] and other renowned national and international hospital. CSF leak is the most frequent complication after microvascular decompression. The incidence of CSF leak following microvascular decompression is in the range of 0.9-12%[15].CSF leakage is the commonest complication in our study as well i.e. 5.76%. One patient (1.92%) died during post operative period . The overall complications profile is pretty close to the findings of other studies[4,8,15].

Some critics presume that MVD has got high mortality and morbidity. In our series only one patient died but it was not because of surgical procedure. This patient

suffered midbrain stroke post operatively. There was no permanent morbidity. CSF leak ,vertigo and facial nerve palsy were transient and recovered without further intervention. This study however has got certain limitations as well. It was confined to limited number of patients with a short follow up period. The operations were performed by different surgeons. Randomized clinical trials are needed to provide evidence based findings.

CONCLUSION: The main etiological factor of trigeminal neuralgia is vascular compression of the 5th nerve roots at brain stem. The most common vessel is superior cerebellar artery. The patients in whom medical treatment fails to respond, microvascular decompression should be the treatment of choice in trigeminal neuralgia. It is safe, effective and recommended for all ages.

REFERENCES:

1. Greenberg MS. Pain: Hand Book of Neurosurgery. 6th ed.NewYork: Thieme, 2005: 378-9.
2. Huff JS. eMedicine specialities: Trigeminal Neuralgia. eMedicine [from webMD on internet]. Mar 24, 2010. Available from : http://emedicine.medscape.com/article/794402-overview.
3. Mouregela S, Sakellaropoulos A, Anagnostopoulou S. Middle cranial fossa ndoscopy using a rigid endoscope. Minim Invasive Ther Allied Technol 2007;16: 355-9.
4. Ali M, Ansari SR, Khan MP, Rasool G. Microvascular decompression for idiopathic trigeminal neuralgia: ultimate solution to the management dilemma. Pak Oral & Dent J 2009(29)2:193-6.
5. Lee SH, Levy EI, Scarrow AM, Kassam A, Jannetta PJ. Recurrent trigeminal neuralgia attributable to veins after microvascular decompression. Neurosurgery. 2000; 46:356-62.
6. Ali M, Khan KM, Khanzada KA, Ayub S, Khan H. Significance of trigger point in trigeminal neuralgia. J Postgrad Med Inst 2007; 21: 183-6.
7. Tanrikulu L, Hastreiter P, Troescher R, Buchfelder M, Naraghi R. Intraoperative three-dimensional visualization in microvascular decompression. J Neurosurg 2007; 107:1137-43.
8. Shams S, Butt FS. trigeminal neuralgia. Professional Med J 2005;12(4): 408-11.
9. Kabatas S, Albayrak SB, Cansever T, Hepgul KT. Microvascular decompression as a surgical management for trigeminal neuralgia: A critical review of the literature. Neurol India 2009;57:134-8.
10. Shenouda EF, Coakham HB. Management of petrous endostosis in posterior fossa procedures for trigeminal neuralgia: Operative technique. Neurosurgery 2007;60: ONS63-9.
11. Barker FG 2 nd , Jannetta PJ, Bissonette DJ, Larkins MV, Jho HD. The long-term outcome of microvascular decompression for trigeminal neuralgia. N Engl J Med 1996;334:1077-83.
12. Linskey ME, Jho HD, Jannetta PJ. Microvascular decompression for trigeminal neuralgia caused by vertebrobasilar compression.J Neurosurg 1994;81:1-9.
13. Singla V, Modi M, Singh P, Khandelwal NK. Dolichoectasia of vertebrobasilar system: A rare cause of tic douloureux. Indian J Med Sci 2007;61:30-1.
14. Kureshi SA, Wilkins RH. Posterior fossa re-exploration for persistent or recurrent trigeminal neuralgia or hemifacial spasm: surgical findings and therapeutic implications. Neurosurgery 1998; 43(5): 1111-7.
15. Park JS, Kong DS, Lee JA, Park K. Intraoperative management to prevent cerebrospinal fluid leakage after microvascular decompression: Dural closure with a "plugging muscle" method. Neurosurg Rev 2007;30:139-40.

Pakistan Journal of Otolaryngology 2013; 29 : 43-46

Original Article

Management of Nasolacrimal duct Obstruction through Endoscopic Dacryocystorhinostomy in Patients with Compromised Nasal Airway

*Muhammad Umar Farooq, *Murtaza Ahsan Ansari, **Shanila Feroz, *M. Shuja Farrukh

ABSTRACT: OBJECTIVE: To study the effects of endoscopic dacryocystorhinostomy in obstructed nasolacrimal duct in patients with compromised nasal airway. DESIGN: Quasi Experimental Study. PLACE & DURATION OF STUDY: The study was conducted at the department of ENT-Head & Neck Surgery, Dow University of Health Sciences, Karachi from September 2002 to September 2012. Patients were selected from different hospitals including Faiz-e-Aam Hospital, National Medical Centre, Mid City Hospital and Civil Hospital, Karachi. PATIENTS & METHODS: Clinical records of 82 patients, who were diagnosed to have nasolacrimal duct obstruction and managed by endoscopic approach, were reviewed. Patients were divided in two groups. Group 'A' comprised patients with normal nasal patency and Group 'B' with compromised nasal airway. Data was collected including age, gender, associated nasal pathologies, or concomitant nasal surgery performed, post-operative relief of epiphora and complications if any, were recorded. Patients were followed up for 3 to 9 months. Surgical success was defined by complete relief from epiphora and free drainage of nasolacrimal duct, after 6 and 9 months of follow up. RESULTS: A total of 82 surgeries were performed in this series. Mean age was 41 years, and 52.4% (n=43) were female. Associated nasal pathology was found in 30.5% (n=25/82) patients. The commonest nasal pathology encountered in this study, was deviated nasal septum which was found in 18.3% (n=15/82) cases. Post-operative nasal synechiae and subsequent failure from relief of epiphora was observed in 32% (n=8/25) patients with reduced nasal patency (Group B). In contrast, occurrence of post-operative nasal synechiae was rare 5.2% (n=3/57) cases in other patients where the nasal patency was adequate and not compromised (Group A). CONCLUSION: Nasal anatomical or pathological variations are very common which result in reduced nasal patency. Among different nasal conditions, septal deviation is the most common, followed by concha bullosa. These anomalies increase the chances of post-operative synechiae formation. It can be minimized if these nasal conditions are concomitantly corrected.

Key Words: Nasolacrimal duct, Dacryocystorhinitis, Dacryocystorhinostomy, Epiphora, Nasal endoscopy.

INTRODUCTION: Epiphora and dacrocystitis are common clinical problems worldwide, which are mostly caused by obstruction of nasolacrimal duct. About 3% to 5% of the population suffers from this problem[1]. This condition more commonly affects females in their fifth or sixth decade of life[2]. This obstruction can occur anywhere, but at the junction between the lacrimal sac and nasolacrimal duct is commonly involved[3]. Local massage of the sac or probing of nasolacrimal duct may help in relieving its symptoms[4]. The history of lacrimal disease dates back from Hamurabi (2,200 B.C.)[5], since then many treatment strategies have been suggested. The established surgical treatment to treat this condition is dacryocystorhinostomy (DCR). It is a surgical procedure by which lacrimal flow is diverted into the nasal cavity through an artificial opening made at the level of the lacrimal sac. The operation can be carried out by using either an external or endonasal surgical approach. The external approach was popularized first and became the surgery of choice for ophthalmologists. This procedure was first described by Toti in 1904[6], McDonogh[7] was the first to perform nasal endoscopic DCR in 1989[7,8]. In 1990's, use of minimal invasive, nasal endoscope revolutionized the surgical treatment by producing scar-less surgery in relatively short period of time, without damaging medial canthal structures[8]. Success rate varied from 60% to 90%, depending on the site of obstruction of nasolacrimal duct (NLD), use of lasers and endoscopic approach[6,8,9]. The main cause of failure of DCR remained obstruction of the common canaliculus and closure of the osteotomy site by synechiae or nasal adhesions[1,2]. Over a period of time, different measures were taken to minimize nasal synechiae. Silicon stents are used to maintain the patency of the ostium after DCR procedure. But prolong use of silicone tubes resulted in granulation tissue formation at the neo-ostium, resulting in the failure of the procedure[4]. Mitomycin C, which is an antimitotic and antiproliferative agent, was used to prevent nasal adhesion formation, with varying degrees of results. Narrow nasal passage may also adversely

Department of ENT-Head & Neck Surgery, *Dow University of Health Sciences, & Civil Hospital, Karachi, **Sir Syed Medical College. Karachi.

affect post-operative success rate by increased chance of nasal synechiae formation due to narrow working space and close approximation of different anatomical structures. A variety of anatomical and pathological conditions of nose result in reduced nasal passage, so the purpose of this study was to determine the role of different nasal anatomical condition which reduce nasal patency on the outcome of endoscopic nasal dacryocystorhinostomy.

PATIENTS AND METHODS: The study was conducted at the department of ENT-Head & Neck Surgery, Dow University of Health Sciences, Karachi from September 2002 to September 2012. Patients were selected from different hospitals including Faiz-e-Aam Hospital, National Medical Centre, Mid City Hospital and Civil Hospital, Karachi. Patients who were diagnosed to have post saccal nasolacrimal duct obstruction were included in the study. All patients were operated under general anaesthesia, using O^0 and 30^0 rigid endoscopes, by the same surgeon. Patients were sorted in two groups. Group 'A' comprised patients with normal nasal patency. Patients with reduced nasal patency were included in group 'B'. History, clinical examination and computerized tomographic scans of nose and paranasal sinuses were obtained to document the evidence of anatomical or pathological cause of reduced nasal airway, e.g. nasal septal deviation, concha bullosa or polypi etc. All patients had distal canalicular obstruction. Endoscopic dacryocystorhinostomy was performed under general anaesthesia. A 2% lignocaine in 1:100,000 solution of adrenaline was injected anteriorly and superiorly to anterior attachment of middle turbinate. A vertical mucosal incision was given in the lateral wall of nose, just anterior to the anterior attachment of middle turbinate. Mucoperiosteal flap was raised up to anterior attachment of middle turbinate. Lacrimal bone was identified and removed to expose lacrimal sac that was confirmed by passing a probe from the canaliculus. The lacrimal sac was opened by giving a crisscross incision in the medial wall of lacrimal sac, which was partially resected. Silicone stents was passed through upper and lower canaliculus into the nose. A stay suture was applied to retain for a period of 6-8 weeks, till the patient is symptom free or there is free flow of tears into nose. All patients were given prophylactic topical and systemic antibiotics with saline nasal douches, post-operatively for about three weeks. Main outcome measures were complete relief from epiphora, with free drainage of fluid through nasolacrimal duct, and presence or absence of nasal synechiae formation after 6 and 9 months of follow up. The results were statistically analyzed by Chi Square test and Fisher Exact test and significance level of $p<0.05$ was taken as reference value.

RESULTS: From September 2002 to September 2012, altogether 82 surgeries were performed in this series. Age of the patients ranged from 8-60 years with mean age was 41 years. Females were slightly more in number 52.4 % (n=43). Male to female ratio was found to be 1: 1.2 (Table-1). Associated nasal pathology was found in 30.5% (n=25) patients. The commonest nasal pathology encountered in this study was deviated nasal septum which was found in 18.3% (n=15/82). Other nasal pathologies found were concha bullosa in 9.7% (n=8/82), and nasal polypi in 2.4% (n=2/82), (Table 2). Failure from relief of symptoms i.e. epiphora was associated when patients were found to have associated nasal pathologies. Failure due to nasal adhesions and subsequent epiphora were more commonly noticed in 32% (n=8/25) in group 'B', who had compromised nasal passage. Post-operative nasal adhesions were rare occurring in 5.2% (n=3/57) in group 'A' which comprised 69.5% (n=57/82) patients, who were free from associated nasal pathologies. Corrective surgery in the form of septoplasty, turbinectomy or endoscopic sinus surgery was performed where required in other cases. After corrective surgery these cases were included as normal cases where concomitant pathology was absent. Post-operative synechiae formation was dropped from 9.7% to 3.6%, with overall improvement of results (Table 3).

Gender	Frequency No. of Patients	Percent	Valid Percent	Cumulative Percent
Male	39	47.6%	47.6%	47.6%
Female	43	52.4%	52.4%	100.0%

Table 1 : Gender distribution (n=82).

Nasal Pathology	Frequency No. of Patient	Percent %	Relief of Symptoms	Adhesions
CB	8	9.8%	5	3
DNS	15	18.3%	10	5
Polyp	2	2.4%	2	0
Absent	57	69.5%	54	3

Table 2 : Results showing different Nasal Pathologies (n=82) .

	Group A (Patients with Normal nasal patency) n=57	Group B (Patients with Reduced nasal patency) n=25	Grand Total n=82
Relief of epiphora	54 (65.8%)	17 (20.7%)	71 (86.5%)
Adhesions	3 (3.6%)	8 (9.7%)	11 (13.4%)

Table 3: Results showing relief of epiphora and adhesions in groups A and B.

DISCUSSION: The most common cause of a surgical failure in endoscopic DCR is obstruction of the neo-ostium by granulation tissue or synechiae that forms post-operatively[10]. To avoid or prevent obstruction of the neo-ostium, many modified techniques have been attempted. These include complete separation of the sac from the nasolacrimal duct to divert lacrimal flow to the neo-ostium[12], use of steroids or mitomycin-C[13,14], and use of mucosal flaps after wide resection of bone surrounding the sac[15-17]. We used silicone stents in all our cases to maintain the opening of the neo-ostium and to prevent synechiae of the canaliculus. There are debates over the use of silicone tubing in endoscopic DCR. Some researchers have reported 81-87% success rates without using silicone tubes after

endoscopic DCR, and so, either do not recommend using silicone tubing or advise removing it early because of granulation formation stimulated by the tubing itself[19]. Anatomical variants of the sinonasal cavities are very common and about 15 major variants have been described[20]. These anatomical variations cause narrowing or obstruction of the osteo-meatal channels. Any surgical intervention in narrow nasal cavities may result in mucosal damages of adjacent structures leading to synechiae formation[21]. Nasal septum deviation is the most common disorder that presents in up to 62% of the population[20,21]. The incidence of concha bullosa, which is a pneumatized cavity within middle turbinate of the nose, has varied from 14 to 53% in different studies[20,21,22]. Nasal septum deviation has been observed in neonates. In a randomized group of newborns, it was found that 21.8% had nasal septal deviation[23]. The commonest cause of nasal septal deviation in neonates was birth trauma[23,24]. In one study, it has been observed that incidence of nasal septum deviation increases with age. Nasal fracture is the most common facial fracture, and the prevalence of nasal septal deformity and its relationship with the different types of sinonasal pathologies and increased rate of complications have been assessed in different studies[22,23]. In a study by Nussbaumer et al., 55 out of 256 patients (21.5%) required additional endonasal procedures to improve access to the lacrimal area[24]. In a recent study by Cheng et al., out of 28 dacryocystorhinostomies (DCR), septoplasties were also performed in 25 patients, with overall improvement of results to 96.4%[25]. They concluded that septoplasty was an effective and safe procedure during endonasal DCR, allowing better exposure of the surgical field in patients with significant DNS.

In present study, associated nasal anomalies have resulted 26.6% increased incidence of nasal synechiae formation i.e. 32% (8/25), in group 'B', who had also reduced nasal patency. The other group of patients, whose nasal cavities were normal, demonstrated lower 5.2% (3/57) incidence of nasal synechiae formation. This is in accordance with other studies published so far[11]. This study also demonstrated that septal deviation was the most common anomaly followed by concha bullosa, which is also concordant to other published data in literature. In our study, the main complication was post-operative synechiae formation, which occurred in 11/82 (13.4%) cases. Other rare complications of endoscopic DCR include, bleeding from the nasal cavity, orbital injury, CSF leakage through a fractured ethmoid, and corneal abrasion or canaliculi erosion due to the overly-tight silicone tube placement[6,19,26]. Recurrent infections can occur if the lower portion of the bone surrounding the sac is removed inadequately[17]. In recent years, Lasers were also used to improve surgical success rate and minimize nasal adhesion or synechiae formation[27]. But there is no convincing evidence to prove that use of lasers is of any added advantage in improving the success rate.

CONCLUSION: Nasal anatomical or pathological variations are very common which result in reduced nasal patency. Among different nasal conditions, septal deviation is the most common followed by concha bullosa. These anomalies increase the chances of post-operative synechiae formation. It can be minimized if these nasal conditions are corrected. Endoscopic DCR has equally good results in the management of nasolacrimal duct obstruction. It does not produce external surgical scar. It preserves medial fibers of orbicularis occuli muscle and lacrimal pump action. The surgery is performed more quickly as a day care procedure. Concomitant nasal problems like septal deviation, enlarged turbinates or nasal polyposis can also be corrected at the same time, thereby improving success rate. Besides, endoscopic approach can deal with nasal conditions e.g. nasal septal deviation, concha bullosa and nasal polypi etc. Thereby increasing the success rate and also reducing rate of post operative complications.

REFERENCES:

1. Karkos PD, Leong SC, Sastry A, Assimakopoulos AD, Swift AC. Evidence-based applications of mitomycin C in the nose. Am J Otolaryngol. 2011; 32(5): 422-5.
2. Leong SC, Macewen CJ, White PS. A systematic review of outcomes after dacryocystorhinostomy in adults. Am J Rhinol Allergy. 2010 Jan-Feb; 24(1): 81-90.
3. Sharma BR. Non endoscopic endonasal dacryocystorhinostomy versus external dacryocystorhinostomy. Kathmandu Univ Med J (KUMJ). 2008 Oct-Dec; 6(24): 437-42.
4. Agarwal S. Endoscopic dacryocystorhinostomy for acquired nasolacrimal duct obstruction. J Laryngol Otol. 2009 Nov; 123(11): 1226-8.
5. Onerci M. Dacryocystorhinostomy. Diagnosis and treatment of nasolacrimal canal obstructions. Rhinology 2002; 40: 49-65.
6. Jones LT. The cure of epiphora due to canalicular disorders, trauma and surgical failures on the lacrimal passages. Trans Am Acad Ophthalmol Otolaryngol 1962; 66: 506.
7. McDonough M, Meiring JH. Endoscopic transnasal dacryocystorhinostomy. J Laryngol Otol 1989; 103: 585-7.
8. Ishio K, Sugasawa M, Tayama N, Kaga K. Clinical usefulness of endoscopic intranasal dacryocystorhinostomy. Acta Otolaryngol Suppl. 2007 Dec; (559): 95-102.
9. Zaidi FH, Symanski S, Olver JM. A clinical trial of endoscopic vs external dacryocystorhinostomy for partial nasolacrimal duct obstruction. Eye (Lond). 2011 Sep; 25(9): 1219-24.
10. Rahman A, Channa S, Niazi JH, Memon MS. Dacryocystorhinostomy without intubation with intraoperative mitomycin-C. J Coll Physicians Surg Pak. 2006 Jul; 16(7): 476-8.
11. Rathore PK, Kumari Sodhi P, Pandey RM. Topical mitomycin C as a postoperative adjunct to endonasal dacryocystorhinostomy in patients with anatomical endonasal variants. Orbit. 2009; 28(5): 297-302.
12. Penttilä E, Smirnov G, Seppä J, Kaarniranta K, Tuomilehto H. Mitomycin C in revision endoscopic dacryocystorhinostomy: a prospective randomized study. Am J Rhinol Allergy. 2011 Nov-Dec; 25(6): 425-8.
13. Prasannaraj T, Kumar BY, Narasimhan I, Shivaprakash KV. Significance of adjunctive mitomycin C in endoscopic dacryocystorhinostomy. Am J Otolaryngol. 2012 Jan-Feb; 33(1): 47-50.
14. Jin HR, Yeon JY, Choi MY. Endoscopic dacryocystorhinostomy: creation of a large marsupialized lacrimal sac. J Korean Med Sci. 2006 Aug; 21(4): 719-23.
15. Araujo Filho BC, Voegels RL, Butugan O, Pinheiro Neto CD, Lessa MM. Endoscopic dacryocystorhinostomy. Braz J Otorhinolaryngol. 2005 Nov-Dec; 71(6): 721-5.

16. Apuhan T, Yildirim YS, Eroglu F, Sipahier A. Effect of mitomycin C on endoscopic dacryocystorhinostomy. J Craniofac Surg. 2011 Nov; 22(6): 2057-9.
17. Korkut AY, Teker AM, Ozsutcu M, Askiner O, Gedikli O. A comparison of endonasal with external dacryocystorhinostomy in revision cases. Eur Arch Otorhinolaryngol. 2011; 268(3): 377-81.
18. Yigit O, Samancioglu M, Taskin U, Ceylan S, Eltutar K, Yener M. External and endoscopic dacryocystorhinostomy in chronic dacryocystitis: comparison of results. Eur Arch Otorhinolaryngol. 2007 Aug; 264(8): 879-85.
19. Korkut AY, Teker AM, Yazici MZ, Kahya V, Gedikli O, Kayhan FT. Surgical outcomes of primary and revision endoscopic dacryocystorhinostomy. J Craniofac Surg. 2010 Nov; 21(6): 1706-8.
20. Orlandi RR. A systematic analysis of septal deviation associated with rhinosinusitis. Laryngoscope. 2010; 120(8): 1687-95.
21. Lehmann P, Bouaziz R, Page C, Warin M, Saliou G, Deschepper B, Strunski V, Deramond H. Sinonasal cavities: CT imaging features of anatomical variants and surgical risk. J Radiol. 2009; 90: 21-9.
22. Cho JH, Park MS, Chung YS, Hong SC, Kwon KH, Kim JK. Do anatomic variations of the middle turbinate have an effect on nasal septal deviation or paranasal sinusitis? Ann Otol Rhinol Laryngol. 2011; 120(9): 569-74.
23. Reitzen SD, Chung W, Shah AR. Nasal septal deviation in the pediatric and adult populations. Ear Nose Throat J. 2011 Mar; 90(3): 112-5.
24. Nussbaumer M, Schreiber S, Yung MW. Concomitant nasal procedures in endoscopic dacryocystorhinostomy. J Laryngol Otol. 2004 Apr; 118(4): 267-9.
25. Cheng AC, Wong AC, Sze AM, Yuen HK. Limited nasal septoplasty by ophthalmologists during endonasal dacryocystorhinostomy: is it safe? Ophthal Plast Reconstr Surg. 2009 Jul-Aug; 25(4): 293-5.
26. Henson RD, Cruz HL, Henson RG Jr, Ali MJ, Kakizaki H. Postoperative application of mitomycin-C in endocanalicular laser dacryocystorhinostomy. Ophthal Plast Reconstr Surg. 2012 May; 28(3): 192-5.
27. Henson RD, Henson RG Jr, Cruz HL Jr, Camara JG. Use of the diode laser with intraoperative mitomycin C in endocanalicular laser dacryocystorhinostomy. Ophthal Plast Reconstr Surg. 2007 Mar-Apr; 23(2): 134-7.

Pakistan Journal of Otolaryngology 2013; 29 : 47-48

Original Article

Mass Parapharyngeal Space – An Experience at CMH, Rawalpindi

*Zeeshan Ayub, **Atif Najam, ***Urwa Sarwar, ****Bashir Ahmed, *****Zubair Khan, **Muhammad Farooq

ABSTRACT: OBJECTIVE: To review surgical approaches to parapharyngeal space and post operative histology of parapharyngeal masses. STUDY DESIGN: Descriptive study. PLACE AND DURATION: Department of ENT, Head & Neck surgery Combined Military Hospital Rawalpindi from January 2006-January 2008. PATIENTS & METHODS: Patients of any age and sex with radiologically confirmed parapharyngeal masses. RESULTS: There were a total of 14 cases included in this study; ten were managed by cervical, two by transparotid and two by mandibular swing. The commonest tumor was pleomorphic adenoma (57%), followed by schwannom a (14%), lymphoma (14%), craniopharyngioma (7%), and metastatic deposit (7%). CONCLUSION: Treatment of parapharyngeal masses is a challenge for the surgeon. We mostly employed the cervical approach because it needs relatively less dissection but it depends upon the size and site of tumor. Pleomorphic adenoma of the parotid gland remains the commonest tumor in complex anatomical space. Diagnosis is based on radiological evidence and cytological.
Key Words: Parapharyngeal masses, Cervical route, Pleomorphic adenoma.

INTRODUCTION: Masses of the parapharyngeal space present a treatment challenge. Of the facial spaces of neck, the parapharyngeal space plays an important role in diagnosis and treatment of neck masses because of its central location and extension of tumour to and from this space[1,2]. Parapharyngea lmasses can be divided into three broad categories: congenital, infectious or inflammatory, and neoplastic etiologies. Most of the parapharyngeal masses are benign and include tumours of salivary gland other tumours less commonly neurogenic tumors and metastatic lesions are encountered[3]. Historically, the transoral approach has been used to excise smaller parapharyngeal lesions, but this approach is no longer used due to the inadequate exposure which led to a high rate of vascular injury, tumor spillage and local recurrence. Selection of approach dealing with parapharyngeal tumours is based on the need for exposure, the size of the lesion, and the nature of the lesion i.e. encapsulated vs infiltrating, or benign vs malignant[3].

PATIENTS AND METHODS : This research project was carried out as a descriptive study in department of ENT & Head and Neck surgery, Combined Military Hospital Rawalpindi from January 2006 to January 2008. There were a total of seventeen radiologically confirmed cases of mass parapharyngeal space that presented to ENT OPD from January 2006 to January 2008. After relevant investigations it was decided that fourteen patients were to undergo surgical excision. Two patients were unfit for general anaesthesia and one refused surgery. Cervical approach was planned in ten, transparotid in two and mandibular split in two of the patients. Resected specimen sent for histopathological examination. The patients age, gender, surgical approach and post operative histopathology report was recorded.

RESULTS: There were 9 males (64%) and 5 (26%) females in this study (Figure 1). Their ages varied from 31 to 57 years. Mean of the age was 41 years. Cervical approach was employed in 10 cases, transparotid in 2 cases and mandibular swing in 2 cases (Table 2). Histopathology reported as; pleomorphic adenoma in 8 cases (57%), followed by schwanoma in 2 patients (14%), lymphoma in two cases (14%), craniopharyngioma in 1 patient (7%), and metastatic deposit from nasopharynx in 1 patient (7%) (Table 1).

DISCUSSION: We employed the cervical approach in most of our cases. This is due to our experience with this approach and relatively less dissection as compared with other approaches. The approach entails the removal of the submandibular gland and thereafter it is relatively a blind dissection. Exposure can be increased by dividing the stylomandibular ligament. The most commonly encountered pathology was pleomorphic adenoma, which can arise from minor salivary glands in the parapharyngeal space or more commonly from congenital salivary rests. There were two cases of lymphoma and schwannoma. Histopathology of one patient revealed metastatic deposit of carcinoma nasopharynx, previously examination of the nasopharynx in the same patient did not reveal any abnormality. One patient had craniopharyngioma. Bass[5] and Som[6] divided approaches to parapharyngeal space into four groups, (i) cervical or submandibular approach, (ii) transparotid-cervical with or without angle

Combined Military Hospital *Peshawar, **Malir Cantt, ***Dept of Histopathology Army Medical College Rawalpindi, ****Combined Military Hospital Rawalpindi, *****PNS Shifa Karachi.

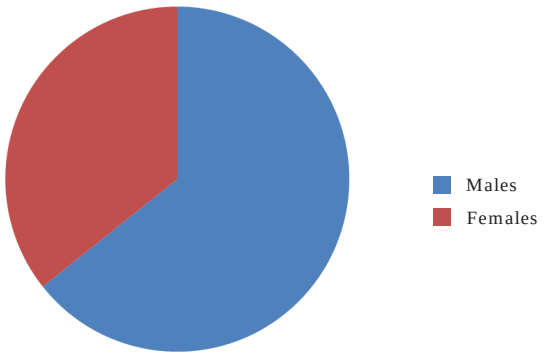


Figure 1: Gender distribution of Parapharyngeal masses.

S. No.	Para Pharyngeal Masses	Occurrence
1	Pleomorphic adenoma	8 (57%)
2	Schwannoma	2 (14%)
3	Lymphoma	2 (14%)
4	Craniopharyngioma	1 (7%)
5	Metastatic deposits	1 (7%)

Table 1: Frequency of para-pharyngeal masses.

S. No.	Methods	No of cases
1	Cervical	10
2	Trans-parotid	2
3	Mandibular Swing	2

Table 2: Methods employed.

mandibulotomy, (iii) cervical-transpharyngeal with midline mandibulotomy, and (iv) transmastoid-transcervical approach for jugular foramen lesions. The cervical or submandibular approach gives access to the parapharyngeal space through the submandibular space, and lesions arising from the minor salivary glands can also be removed using this approach. The transparotid-cervical approach provides exposure for facial nerve dissection and is used for tumours arising from the parotid. The cervical-transpharyngeal approach, also known as the "mandibular swing" utilizes midline mandibulotomy at the symphysis. Tracheotomy is mandatory in this procedure. With the hemimandible reflected laterally, wide exposure is afforded[7, 8, 9]. In a retrospective study by Seth et al of 166 cases, histopathology showed that 21 (12.7%) were malignant, 145 (87.3%) were benign, 76 (45.8%) were vascular, and 69 (41.6%) involved the skull base. Transcervical techniques were used in all cases[10]. In an 18 years review of thirty one operated cases Kenney et al found that the commonest aetiology was a deep lobe of parotid tumour (44%), followed by neurilemmomas (18%), there was only one paraganglioma. The most common route employed was transcervical route[11]. In a review of 23 cases by Allison et al the most common histological type (56.52%) was pleomorphic adenoma and the tumours were managed by transoral removal if small, or a combined transcervical approach if large[12].

CONCLUSION: Treatment of parapharyngeal masses is a challenge for the surgeon. Pleomorphic adenoma of the parotid gland remains the commonest tumor in complex anatomical space. Diagnosis is based on radiological evidence and cytological.

REFERENCES:

1. Cowan DL, Hibbert J. Acute and chronic infection of the pharynx and tonsil. In: Kerr AG, HibbertJ,editors. Scott Browns Otolaryngology. 6th ed. Butter worth-Heinemann 1977. 5/4/1 – 5/4/23.
2. Barry MT, Vijay MR, Flavius G. Imaging of the parapharyngeal space: anatomy and pathology. Crit Rev Diagnos Imag 1991;31: 315-56.
3. Michael M, Herman J. Temporal bone neoplasm and lateral cranial base surgery. In Cummings CW, Harker LA, editors: Otolaryngology- Head and Neck Surgery, St Louis, 2005, Mosby.
4. Jackson CG, Harris PF, Glasscock ME 3d, Fritsch M, Dimitrov E, Johnson GD , et al. Diagnosis and management of paragangliomas of the skull base. Am J Surg 1990;159: 389-93.
5. Bass RM. Approaches to the diagnosis and treatment of tumors of the parapharyngeal space. Head Neck Surg 1982;4: 281-9.
6. Som PM, Biller HF, Lawson W. Tumors of the parapharyngeal space: preoperative evaluation, diagnosis, and surgical approaches. Ann Otol Rhinol Laryngol Suppl 1981;90: 3-15.
7. Ammirati M, Ma J, Cheatham ML, Mei ZT, Bloch J, Becker DP. The mandibular swing-transcervical approach to the skull base: anatomical study. Technical note. J Neurosurg 1993;78: 673-81.
8. Biedlingmaier JF, Ord R. Modified double mandibular osteotomy for tumors of the parapharyngeal space. J Oral MaxillofacSurg 1994;52: 348-52.
9. Dubner S, Spiro RH. Median mandibulotomy: a critical assessment. Head Neck 1991;13: 289-393.
10. Seth M. Cohen, MD, MPH *, Brian B. Burkey, MD, James L. Netterville, MD Surgical management of parapharyngeal space masses Volume 27, Issue 8 , Pages 669 - 675Published Online: 6 May 2005.
11. Kenny PP, Christopher H. K, How MT. Parapharyngeal space tumours: an 18 year review The Journal of Laryngology & Otology 2002, 116: 170-5.
12. Allison RS, Van der Waal I, Snow GB. Parapharyngealtumours: a review of 23 cases. Clin Otolaryngol 1989;14: 199-203.

Pakistan Journal of Otolaryngology 2013; 29 : 49-53

Original Article

Antimicrobial Susceptibility Pattern of Bacterial and Fungal Isolates from Patients with Chronic Suppurative Otitis Media in Perspective of Emerging Resistance

Ghulam Fatima, Maria Shoaib, Mohammad Zeeshan Raza, Syed Bilal,

ABSTRACT: PURPOSE OF STUDY : To determine the antibiotic sensitivity pattern in patients with chronic suppurative otitis media (CSOM) to provide a guideline for making a protocol for empirical antibiotic therapy where culture facilities are not available. STUDY DESIGN: Descriptive hospital based study. PLACE AND DURATION: The study was conducted from January 2011 to December 2011 at the Central Lab, Civil Hospital Karachi. SUBJECTS & METHODS: A total of 251 patients with unilateral or bilateral active chronic suppurative otitis media attending the outpatient clinic and admitted in the ENT Wards were included in the study. Pus samples (Ear swabs) were collected from the discharging ear(s) and sent to Central Lab, Civil Hospital Karachi. Aerobic cultures were done. Antibiotic sensitivity testing was done with standard antibiotic discs using Kirby-Bauer disk diffusion method as per National Committee for Clinical Laboratory Standards recommendations. RESULTS: From the clinical specimens of 251 patients enrolled in the study, the pathogens were isolated in 206 (82.07%) patients, while in 45 (17.9%) patients' pathogenic micro-organisms were not isolated. There were 201, (98%) bacterial isolates and 5 (2%) fungi. Pseudomonas aeruginosa in 141 (68.44%) was the most common isolate, followed by Staphylococcus aureus in 53 (25.72%). Antibiotic sensitivities of Pseudomonas Aeruginosa showed that 100% isolates were sensitive to meropenem, where as 97% isolates were sensitive to sparfloxacin and 95% to sulbactam / cefoperazone, piperacillin / tazobactam and imipenem. Only 68% of Pseudomonas aeruginosa isolates were sensitive to aztreonam and 65% to chloramphenicol. For Staphylococcus aureus, 94.3% isolates were sensitive to Fusidic acid, 92% to Linezolid and 90% to Vancomycin. Over all 66% isolates were sensitive to Amoxicillin and 60% to Ciprofloxacin, Ofloxacin and Kanamycin. CONCLUSION: Pseudomonas aeruginosa was the most common isolate followed by Staphylococcus aureus. Clustering of cases was seen during the summer season. More than 80% of Pseudomonas aeruginosa isolates were sensitive to carbapenems and bêta-lactamase inhibitors while Fusidic acid, Vancomycin and Linezolid were found to be most sensitive for strains of Staphylococcus aureus. It is therefore concluded that the topical preparation of these antibiotics should be incorporated in the course of therapy to cover up the most frequent aerobic isolates implicated in CSOM.

Key Words: Chronic suppurative otitis media, Bacteria, Fungi, Risk factors, Culture and sensitivity.

INRODUCTION: Chronic suppurative otitis media (CSOM) is one of the most common problem related to ear in developing and developed countries, if left untreated causing more severe loss of hearing. It is characterized by persistent otorrhea for more than 6-12 weeks, through perforated tympanic membrane, usually resulting from previous acute infection[1]. The infection is due to the bacteria coming from nasopharynx via eustachian tube, and cause inflammation in mucoperiosteum of middle ear cleft, resulting in ear discharge[2]. CSOM is a global problem and affects all ages but especially prevalent in children younger than 7 years due to horizontal, wider and short eustachian tube[3]. The commonly occurring symptoms are ear discharge, deafness, itching, pain and sometimes fever. If it is left untreated complications like loss of hearing, post aural swelling and post aural sinus may occur[4]. The most probable risk factors included are untreated sore throat, low socio-economic status, age, poor hygiene, upper respiratory tract infection , immunocompromised, environmental factors, nutritional factors and facial anomalies etc[5, 6]. CSOM is mostly caused by bacteria, but fungi and virus can also be a cause CSOM[7]. Commonly found pathogens in CSOM are Pseudomonas aeruginosa, Staphylococcus aureus, Proteus mirabilis, Klebsiella pneumoniae, Escherichia coli, Aspergillus spp and Candida spp[8]. This middle ear infection can cause complications like facial nerve paralysis, meningitis and intracranial and extra cranial abscesses[9].

The basic aim of this study was to evaluate the bacteriological and mycological causes of CSOM and their antibiotic sensitivity pattern to commonly used antibiotics at CHK, finding the risk factors involved and to provide a guideline for making a protocol for

*Senior Pathologist, Department of Microbiology, Central Lab, Civil Hospital Karachi, Pakistan.
**Medical Student, Dow Medical College, Dow University of Health Sciences, Karachi, Pakistan.

empirical antibiotic therapy where culture facilities are not available. This will contribute to rational usage of antibiotics, success of treatment, prevention of the complications and antibiotic resistance of the pathogenic micro-organisms.

SUBJECTS AND METHODS: Collection of specimens: Two hundred and fifty one patients of chronic suppurative otitis media both unilateral and bilateral who presented to Ear, Nose and Throat (ENT) Department of Civil Hospital, Karachi from January 2011 to December 2011 were prospectively studied. All patients had perforated tympanic membranes with active purulent discharge for more than six weeks.Detailed clinical history regarding age, sex, duration of discharge and antibiotic treatment were taken. Disposable sterile cotton swabs and ear specula were used to collect pus swabs to harvest the middle ear micro flora through the tympanic membrane perforation. All care was taken to avoid surface contamination and the swabs were transported to Microbiology Department of Central Lab, CHK for further processing.

Inclusion criteria: Only those patients who had not received antibiotic therapy (topical or systemic) for previous 72 hours were included in the study. Exclusion criteria: Patients with ear discharge due to cholesteotoma and on treatment with systemic antibiotics were excluded from the study. Culture and antibiotic sensitivity: The pus swabs were cultured on Blood agar, MacConkey's agar and Chocolate agar and incubated at 37°C aerobically for 24-48 hours. Direct smear of pus was made and stained with Gram stain and looked for pus cells, epithelial cells and bacteria. All organisms isolated were identified according to standard microbiological methods. Antimicrobial susceptibility tests was performed using modified Kirby- Bauer disc diffusion method using national committee for clinical laboratory standards (NCCLS) for breakpoints of interpretation of results. The standard antimicrobial discs used for Staphylococcus aureus were Oxacillin (OX) 1 µg, Cotrimoxazole (COT) 1.25/23.75 µg , Gentamicin (CN) 10 µg, Chloramphenicol (C) 30µg, Ciprofloxacin (CIP) 5µg and Vancomycin (V) 30µg . The standard antimicrobial discs used for Pseudomonas aeruginosa were Gentamicin (CN) 10 µg, Amikacin (AK) 30µg, Ciprofloxacin (CIP) 5µg, Ceftazidime (CAZ) 30 µg and Piperacillin/Tazobactam 10/1 (TZP) 110 µg. The susceptible zone diameters were interpreted according to NCCLS criteria.

RESULTS: The overall age range of patients was 6-85 years with mean age of 36 years. There was almost equal distribution between sexes, males n=116 (46.21%) and females n=135 (53.78%).The microbiological profile of aerobic bacterial isolates is depicted in table 1 and figure 1. Pseudomonas aeruginosa n=141 (68.44%) was the most common isolate, followed by Staphylococcus aureus n=53 (25.72%). The month wise distribution of cases of CSOM is shown in figure 2. Clustering of cases was seen during the summer season with a peak obtained in the month of May. Fungal organisms were found to be more prevalent in the winter season. The antibiotic sensitivity pattern of the two commonest isolates Pseudomonas aeruginosa and Staphylococcus aureus from patients of CSOM is shown in (figures 3 & 4) respectively. The antibiotic sensitivity pattern for Pseudomonas aeruginosa was found to be as follows: Imipenem 95%, Amikacin 91%, Gentamycin 79.43%, Tobramycin 81%, Ceftazidime 82%, Aztreonam 69%, Chloramphenicol 66%, Polymyxin-B 76%, Neomycin 79%, Sparfloxacin 97%, Cefoperazone/Sulbactam 95%, Piperacillin/Tazobactam 95%, Levofloxacin 79%, Meropenem 100%, and Ciprofloxacin 80%. The antibiotic sensitivity pattern for Staphylococcus aureus was found to be as follows: Amoxicillin 66%, Amoxicillin+Clavulanic acid 88%, Doxycycline 77%, Ciprofloxacin 60%, Ofloxacin 60%, Fusidic acid 94%, Clindamycin 85%, Linezolid 92%, Vancomycin 90%, Kanamycin 60%. Among the minority of micro-organisms causing CSOM; Pneumococci and Enterococci were found to be sensitive to all conventional antibiotics while Klebsiella spp was found to be resistant to Cefuroxime and Proteus mirabilis was resistant to Chloramphenicol and Neomycin. E.coli was markedly resistant to all generations of cephalosporins and quinolones in the strains isolated.

Name Of Organism	No. of Isolates (N)	Percentage Yield (%)
Pseudomonas aeruginosa	141	68.44
Staphylococcus aureus	53	25.72
Eschericia Coli	2	0.97
Pneumococci	1	0.5
Enterococci	1	0.5
Proteus mirabilis	2	0.97
Klebsiella spp.	1	0.5
Aspergillus spp.	1	0.5
Candida spp	4	1.9

Table 1: Microbiological profile of patients with chronic suppurative otitis media (n=206).

DISCUSSION: Chronic suppurative otitis media and various complications associated with the disease such as irreversible local destruction of middle ear structures, facial palsy, serious intracranial and extra cranial complications are amongst the most common conditions seen by ENT Specialists, Pediatricians and General Practitioners. It is a persistent disease and often causes irreversible damage to the middle ear cavity; recurrent otitis media may cause damage to ossicles, facial nerve and cochlea resulting in permanent hearing loss[10, 11]. This study was carried out for the identification of micro organisms of CSOM in our set up and to stress the importance of culture and sensitivity in the management of CSOM. The abuse of antibiotic in everyday practice is a routine, thus resulting in emergence of resistant organisms. In pathogenesis the commensals help the accompanying pathogenic bacteria by increasing beta lactamase and these enzymes also inhibit the activity of certain antibiotics[12]. The most common isolated organism according to our results is Pseudomonas aeruginosa followed by Staphylococcus aureus, however Escherichia coli, Proteus mirabilis, Klebsiella were

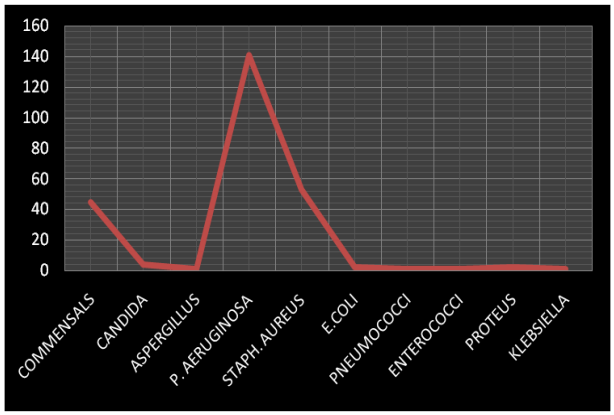


Figure 1: Frequency of etiologies of CSOM.

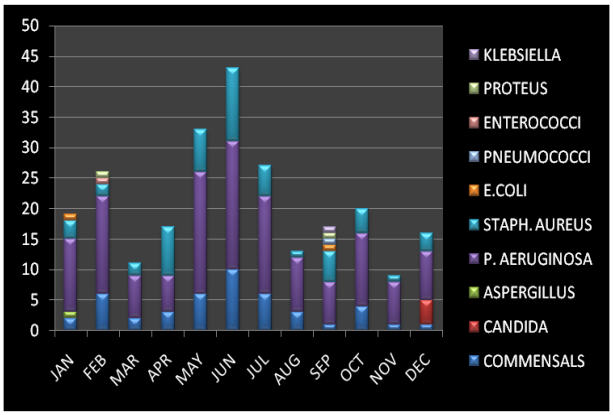
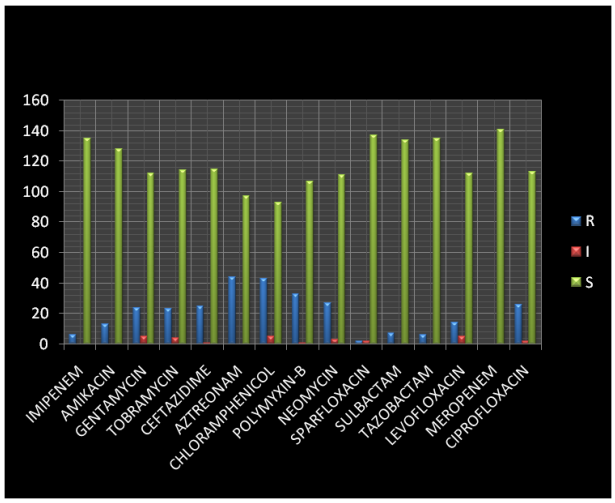


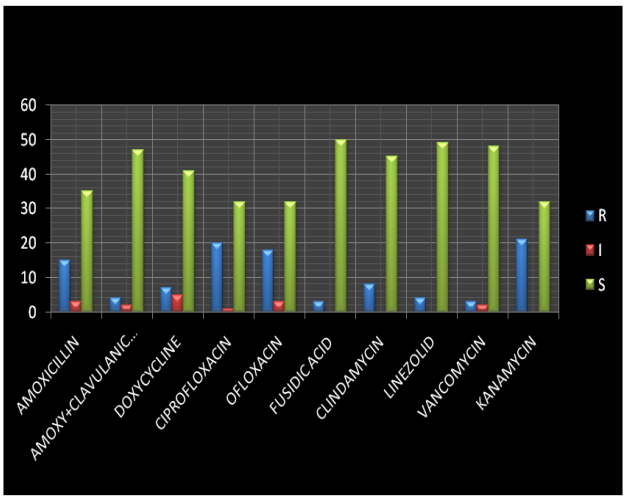
Figure 2: Monthly distribution of cases of CSOM by etiology of micro-organisms.

also found, this result is similar to some studies conducted in various cities of Pakistan[13-16]. A study from USA also found the highest incidence of Pseudomonas aeruginosa followed by Staphylococcus aureus and Klebsiella. Other studies also described Pseudomonas aeruginosa followed by Staphylococcus aureus and Proteus mirabilis as the common organisms in their study[17,18]. Pseudomonas aeruginosa has been the most prevailing bacterial isolate so it was checked frequently for its antibiotic susceptibility pattern to aminoglycosides (Amikacin, Gentamycin) which are bactericidal antibiotics interfering with protein synthesis of the bacteria and is used largely for gram negatives species. We found it highly effective also as reported by previous researches from India[23], Nigeria, Nepal[21] and also from Pakistan[10, 15, 16]. Flouroquinolones (Ciprofloxacin, Sparfloxacin, Levofloxacin) which acts on DNA replication and transcription inhibition, were also very effective up to 80 % in our community[14, 16]. Cephalosporins have an extended antibiotic spectrum. In Pakistan it is shown that 3rd generation cephalosporins are very effective against the bacterial isolates in CSOM and some suggest Ceftriaxone as the drug of choice along with other antibiotic combinations[24]. Our results show 87% susceptibility to Ceftazidime which is comparable to other researches[13]. Imipenem and Meropenem of Carbopenem group is also very effective against the bacteria and show almost complete susceptibility[16]. The monobactam Aztreonam also shows a good susceptibility profile to Pseudomonas aeuriginosa[16] The second predominant organism in our study was Staphylococcus aureus which is similar to findings of various previously conducted studies in the world[25-27]. In our series the antibiotic sensitivity pattern for Staphylococcus aureus was found to be as follows: Amoxicillin 66%, Amoxicillin+Clavulanic acid 88%, Doxycycline 77%, Ciprofloxacin 60%, Ofloxacin 60%, Fusidic acid 94%, Clindamycin 85%, Linezolid 92%, Vancomycin 90%, Kanamycin 60%. It correspond to a previous studies where more suspectibitilty pattern of Staphylococcus aureus to Ampicillin, Amoxicillin+Clavulanic acid, macrolides, aminoglycosides, cephalosporins and flouroquinolones



Susceptibility Pattern:R=resistant, I=intermediate, S=sensitive)

Figure 3: Antibiogram of Pseudomonas aeruginosa (n=141).



Susceptibility Pattern:R=resistant, I=intermediate, S=sensitive)

Figure 4: Antibiogram of Staphylococcus aureus (n=53).

with 36%, 55%, 18%, 55%, 76% and 83% respectively[28]. We also noted that Ciprofloxacin, Augmentin (amoxicillin+clavulinic acid), Gentamycin were broad spectrum antibiotic sensitive to almost all gram negative and gram positive isolates in CSOM. To evaluate the associated factors with CSOM, age is considered as a major risk factor because of shorter and more horizontal Eustachian tube of children less than five years allow commensal organism from the nasopharynx to sterile middle ear cavity resulting in congestion of the tube. It has also been observed that children are more exposed to upper respiratory tract infection due to their immature immune system that minimally protect them against the opportunistic organisms[29], The overall age range observed in our study is 6-85 years, and a mean age of 36 years, this may be because our records are hospital admission based, though it corresponds to a few researches conducted before[2, 30]. We found almost equal sex distribution of the disease similar to other studies[31]. Some researchers however argued that males have higher incidence of disease which could be due to their active and adventurous nature which predispose them to traumatic conditions[32]. With respect to seasonal variation the clustering of cases was seen during the summer season with a peak obtained in the month of May. Fungal organisms were found to be more prevalent in the winter season. Since cold weather predispose to upper respiratory tract infections hence most of the chronic suppurative otitis media cases would be seen post dry season and more frequently in rainy season[29]. For better management of otitis media, clinical classification of infection as well as drug susceptibility testing of the organisms recovered from chronic cases are essential for making the right decision of antimicrobial drugs that will effectively eradicate the pathogens. The high rate of multiple drug resistance as well as high level of resistance to individual antibiotics is a cause of concern. In addition, educating parents and guardians regarding possible risk factors of the disease may be a preventive strategy that might reduce disease occurrences. CONCLUSION: Pseudomonas aeruginosa was the most common isolate followed by Staphylococcus aureus. Clustering of cases was seen during the summer season. More than 80% of Pseudomonas aeruginosa were sensitive to carbapenems and bête-lactamase inhibitors while Fusidic acid, Vancomycin and Linezolid were found to be most sensitive for strains of Staphylococcus aureus. It is therefore concluded that the topical preparation of these antibiotics should be incorporated in the course of therapy to cover up the most frequent aerobic isolates implicated in CSOM. Culture and sensitivity remains time tested investigation of choice for better medical treatment , it has advantages like preventing resistance, minimizing complications and total cost of treatment. Knowledge of risk factors, seasonal variation also help to get best possible results of medical management of CSOM.

REFERENCES:

1. Krišto B, Buljan M. Microbiology of the chronic suppurative otitis media. Medicinski Glasnik. 2011;8:2.
2. Srivastava A, Singh R, Varshney S, Gupta P, Bist S, Bhagat S, et al. Microbiological Evaluation of an Active Tubotympanic Type of Chronic Suppurative Otitis Media. Nepalese Journal of ENT Head and Neck Surgery. 2011;12:14-6.
3. Haraldsson G, Holbrook WP, Könönen E. Clonal similarity of salivary and nasopharyngeal Fusobacterium nucleatum in infants with acute otitis media experience. Journal of medical microbiology. 2004;532:161-5.
4. Oguntibeju O. Bacterial isolates from patients with ear infection. Indian Journal of Medical Microbiology. 2003;214:294.
5. Haider A. Chronic Suppurative Otitis Media (CSOM): Bacteriological Study. ORION. 2002;13.
6. Anwar-us-Salam ASH, Abdulla E. Suppurative otitis in Karachi: An audit of 510 cases. Pak J Otolaryngol. 1997;13:66-9.
7. Gül H, Kurnaz A, Turhan V, Oncül O, Pahsa A. Microorganisms isolated from middle ear cultures and their antibacterial susceptibility in patients with chronic suppurative otitis media]. Kulak burun bogaz ihtisas dergisi: KBB= Journal of ear, nose, and throat. 2006;16;4:164.
8. Ibekwe A, Okafor J. Pathogenic organisms in chronic suppurative otitis media in Enugu, Nigeria. Tropical and geographical medicine. 1983;35;4:389.
9. Bluestone CD, Klein JO. Chronic suppurative otitis media. Pediatrics in Review. 1999;20;8:277-9.
10. Iqbal K, Khan MI, Satti L. Microbiology of chronic suppurative otitis media: Experience at Dera Ismail Khan. Gomal Journal of Medical Sciences. 2012;9:2.
11. Bluestone CD, editor. Acute and chronic mastoiditis and chronic suppurative otitis media. 1998: Elsevier.
12. Karma P, Jokipii L, Ojala K, Jokipii A. Bacteriology of the chronically discharging middle ear. Acta Oto-Laryngologica. 1978;86:110-4.
13. Mansoor T, Musani MA, Khalid G, Kamal M. Pseudomonas aeruginosa in chronic suppurative otitis media: sensitivity spectrum against various antibiotics in Karachi. J Ayub Med Coll Abbottabad. 2009;21;2:120-3.
14. Aslam MA, Ahmed Z, Azim R. Microbiology and drug sensitivity patterns of chronic suppurative otitis media. Journal of the College of Physicians and Surgeons--Pakistan: JCPSP. 2004;14;8:459.
16. Iqbal S, Udaipurwala I, Hasan A, Shafiq M, Mughal S. Chronic suppurative otitis media: disease pattern and drug sensitivity. J Surg Pak. 2006;11;1:17-9.
17. Gul A, Ali L, Rahim E, Ahmed S. Chronic suppurative otitis media; frequency of Pseudomonas aeruginosa in patients and its sensitivity to various antibiotics. Professional Med J. 2007;14:411-5.
18. Javed M, Kharal S, Rafit KAK. Selection of an antibiotic in chronic suppurative otitis media. Pak J Otolaryngol. 1999;15:7-9.
19. Yang Y, Gong S, Liu Y. The clinical investigation of bacteriology of chronic suppurative otitis media]. Lin chuang er bi yan hou ke za zhi=Journal of clinical otorhinolaryngology. 2001;15;12:550.
20. Wariso B, Ibe S. Bacteriology of chronic discharging ears in Port Harcourt, Nigeria. West African journal of medicine. 2007;25;3:219-22.
21. Loy A, Tan A, Lu P. Microbiology of chronic suppurative otitis media in Singapore. Singapore medical journal. 2002;43;6:296-9.
22. Sharma S, Rehan HS, Goyal A, Jha AK, Upadhyaya S, Mishra S. Bacteriological profile in chronic suppurative otitis media in Eastern Nepal. Tropical doctor. 2004;34;2:102-4.
23. Yeo SG, Park DC, Hong SM, Cha CI, Kim MG. Bacteriology of chronic suppurative otitis media-a multicenter study. Acta Oto-Laryngologica. 2007;127;10:1062-7.
24. Deb T, Ray D. A Study of the Bacteriological Profile of Chronic Suppurative Otitis Media in Agartala. Indian Journal of

Otolaryngology and Head & Neck Surgery. 2011:1-4.
25. Hafidh MA, Keogh I, Walsh RMC, Walsh M, Rawluk D. Otogenic intracranial complications. A 7-year retrospective review. American journal of otolaryngology. 2006;27;6:390-5.
26. Shyamala R, Reddy PS. The study of bacteriological agents of chronic suppurative otitis media-Aerobic culture and evaluation.
27. Moshi N, Minja B, Ole-Lengine L, Mwakagile D. Bacteriology of chronic otitis media in Dar es Salaam, Tanzania. East African Medical Journal. 2000;77;1:20-2.
28. Brook I, Finegold SM. Bacteriology of chronic otitis media. JAMA: the journal of the American Medical Association. 1979;241;5:487-8.
29. Maji P, Chatterjee T, Chatterjee S, Chakrabarty J, Mukhopadhyay B. The investigation of bacteriology of chronic suppurative otitis media in patients attending a tertiary care hospital with special emphasis on seasonal variation. Indian Journal of Otolaryngology and Head & Neck Surgery. 2007;59;2:128-31.
30. Gordon MA, Grunstein E, Burton WB. The effect of the season on otitis media with effusion resolution rates in the New York Metropolitan area. International journal of pediatric otorhinolaryngology. 2004;68;2:191-5.
31. Tahir M, Jawaid A, Abdullah A, Najam MA. Bacterial Culture and Sensitivity in Active Chronic Otitis Media: 500 Cases in Combined Military Hospital Rawalpindi. Pakistan Journal of Otolaryngology. 2012;28:56-8.
32. Amusa Y, Ijadunola I, Onayade O. Epidemiology of otitis media in a local tropical African population. West African journal of medicine. 2006;24;3:227-30.
33. Akinpelu O, Amusa Y. Otological diseases in Nigerian children. The Internet J Otorhinolaryngol. 2007;7:1.

Pakistan Journal of Otolaryngology 2013; 29 : 49-51 Original Article

Endoscopic Dacryocystorhinostomy: Experience at Sheikh Zayed Hospital, Lahore

Raheel Ahmad, Atif Rafique, Sarfraz Latif

ABSTRACT: INTRODUCTION: External dacryocystorhinostomy (DCR) has been the gold standard for treatment of blocked nasolacrimal duct. We evaluated results of Endoscopic Endonasal DCR in our institution. OBJECTIVE: The aim of the present study is to report the experience of the Otorhinolaryngology department of Sheikh Zayed Hospital Lahore in the management of the obstruction of the nasolacrimal system by endoscopic endonasal dacryocystorhinostomy (DCR). MATERIAL AND METHODS : Retrospective descriptive study conducted in the department of ENT, Sheikh Zayed Hospital, Lahore from January 2008 to January 2011. All patients who were referred to ENT department for blocked nasolacrimal duct were assessed for inclusion in this study. Patients who suffered with history of sinonasal disease or previous surgery for obstruction of nasolacrimal system on same eye were excluded. RESULTS : Total of 67 patients were included, 48 were males and 19 were females, mean age was 59 years (range 32-79). All underwent endoscopic dacryocystorhinostomy. We encountered only minor complications, 4 patients developed hemorrhage, 1 preseptal cellulitis and 1nasal adhesions. After a median follow-up of 6 months, 61 patients were completely symptom free, 4 were partially asymptomatic and treated conservatively and 2 did not show any improvement and required revision surgery. CONCLUSION: Endoscopic endonasal dacryocystorhinostomy (DCR) is now safer and better technique than conventional external Dacryocystorhinostomy (DCR).

Key Words: Nasolacrimal duct obstruction (NLDO), Dacryocystorhinostomy (DCR).

INTRODUCTION : The usual causes of stenosis of the nasolacrimal drainage system are inflammation, trauma and congenital malformations[1]. Surgery remains the only effective treatment, when other measures, such as unblocking through probes or a local massage over the lacrimal sac area have failed[2]. Dacryocystorhinostomy (DCR) consists of creating a lacrimal drainage pathway to the nasal cavity to restore permanent drainage of the previously obstructed excreting system, through an opening normally made at the level of the lacrimal bone[3]. Classically; it has been performed by ophthalmologists using an external approach. However, the introduction of direct and angled endoscopes for paranasal sinus surgery and the refinement of endoscopic surgical procedures allow a complete intranasal exposure and surgical management of the lacrimal sac[4]. Endoscopic DCR is a new and effective indication for endoscopic nasal surgery, because of benefits which include: endonasal approach is more natural and avoids the sequelae of an external approach, having less surgical trauma, fewer postoperative complications and better anatomical accessibility and in most cases, a reduced surgical time and hospital stay[5]. The disadvantages of this technique are related to the use of specific instruments and to the technical difficulties of the endonasal route[6]. Endoscopic sinonasal surgery required specific training in the new anatomic region and a significant learning curve was observed in surgeons. Although at first the presence of an ophthalmologist may be necessary to help in channeling lacrimal canaliculi, any otolaryngologist can perform the complete technique[7]. This retrospective descriptive study was done to assess the expertise, surgical outcome and complications of endoscopic DCR at ENT department Sheikh Zayed Hospital Lahore.

MATERIAL AND METHOD: This study was carried at ENT department Sheikh Zayed Hospital Lahore. 71 patients who were referred from ophthalmology department with nasolacrimal duct obstruction (NLDO) were analyzed. Three patients having nasal pathology such as polyps, DNS, chronic sinusitis and previous DCR surgery on same eye were excluded from the study. In 1 patient endoscopic DCR was converted to external DCR, this left 67 patients in our study. All patients were subjected to endoscopic DCR and silicon tube was placed as a stent in all cases. Patients were discharged on day 1. Patients were seen at week 1, 3 and 6 at clinic to perform suction cleaning until complete internal healing. The silicone tube was removed 12 weeks postoperatively. Patients were regularly followed up to 6 months. The operation was classified as successful both by the objective demonstration of a patent nasolacrimal system through irrigation and relief of epiphora.The study was approved by the ethical committee of Sheikh Zayed hospital Lahore. Endoscopic endonasal DCR was performed under general anesthesia. After vasoconstriction of the nasal cavity, the head of the middle turbinate and the mucosa surrounding the lacrimal sac were infiltrated with a (lignocaine and lidocaine combination) local anesthetic. A surgical incision is made at the lateral nasal wall, antero superior to the insertion of the middle turbinate. The

Department of ENT, Sheikh Zayed Hospital, Lahore.

posterior mucosal flap is elevated off the maxillary bone and incision made until the sac is exposed. Metallic lacrimal probes are passed medially through both canaliculi so as to tent the sac lumen. A silicone bicanalicular tube is then positioned and tied. All patients were given postoperative chloramphenicol and prednisone drops to the affected eye four times a day for a month as well as oral cephalosporin. Medication variation was only considered if the patient had a known allergy. Patients are encouraged to wash using nasal rinse or sprays to prevent crust formation.

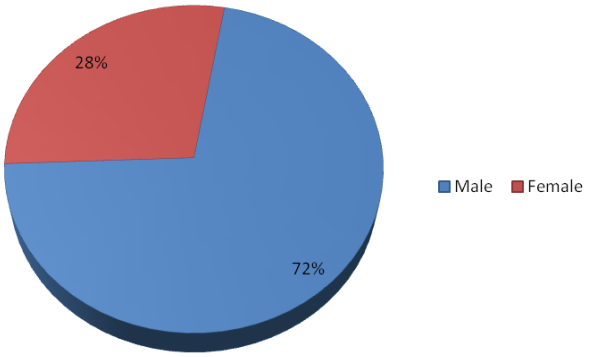


Figure 1: Gender distribution (n=67).

S/N	Complications	No. of Patients	Percentage (%)
1	Hemorrhage	4	6
2	Pre-septal cellulitis	1	1.5
3	Adhesions	1	1.5

Table 1: Post-operative complications noted after endo DCR proceduy (n=67).

RESULTS: Out of total 67 patients in our study, 48(72%) were males and 19(28%) were females as demonstrated in figure 1. The mean age was 59 years (range 32-79). All patients underwent endoscopic DCR. Mean follow up period was 6 months. Out of 67 patients, 61 patients (91%) demonstrated primary surgical success, defined as decreased or absent epiphora and an adequately patent neo-ostium. In 4 patients (5.9%) complete patency of nasolacrimal duct was not achieved and managed conservatively, where as 2 patients (3%) did not show any improvement and they underwent external DCR and were symptom free. These results are elaborated in figure 2. Table no 1 show the complications of endonasal DCR. Post-operative hemorrhage was successfully managed with nasal packing's in all cases. Pre-septal cellulitis was managed with intravenous steroids. Post-operative synachae was managed with adhenolysis and splint placement.

DISCUSSION: External DCR surgery was regarded as the gold standard in treatment for nasolacrimal duct obstruction few years back. Direct visualization of the anatomy compared with a nasoendoscope is the main success factor for this approach. However, cutaneous scar and the potential for injury to medial

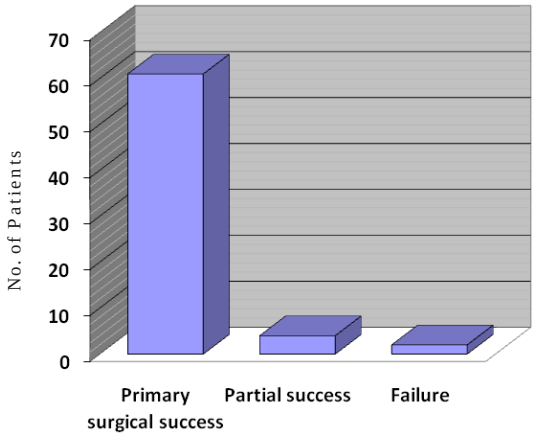


Figure 2: Surgical outcomes (n=67).

canthal structures, cerebrospinal fluid rhinorrhea and functional interference with the physiological action of the lacrimal pump are major drawbacks[8]. Although the endonasal approach was for the first time introduced by Caldwell in 1893, its use stayed limited due to difficulties in visualizing the endonasal structures during the operation[9]. The advancement of the operating microscope and later a rigid endoscope into the surgery stemmed interest for the endonasal approach[10]. The most important surgical difficulties with this technique are hemorrhage and nasal anatomical anomalies, which if present can be corrected in the same operation with the endoscopic technique. Among the most frequent difficulties are nasal polyposis, middle turbinate hypertrophy and septal deviation. Although a slight deviation of the septum is present in almost 25% of the population, the need for septoplasty prior to DCR varies from 0.3% to 30% in recent medical literature. The endoscopic approach allows diagnosis and management of associated conditions[11,12]. Hence, patients with a concomitant nasal and paranasal disorder that may contribute to the nasolacrimal obstruction can be diagnosed and treated simultaneously if the endoscopic endonasal procedure is performed. In our series we excluded the patients with sinonasal pathology from our study so cannot comment on this aspect. The endoscopic approach has a reduced risk of interfering with the medial canthal tendon and physiology of the lacrimal pump mechanism. There is the advantage of no external scar, providing a desired cosmetic effect for patients. More importantly endoscopic endonasal DCR surgery has been shown to have earlier postoperative recovery time[13]. Our patients were discharged on same day with prompt recovery and early return to work. Complications of endoscopic endonasal DCR are low but can include re-stenosis of the opening, bleeding from the nasal cavity, orbital injury and corneal abrasion, or canaliculi erosion[14]. Serious complications including orbital and subcutaneous emphysema, retrobulbar hemorrhage, medial rectus paresis, and orbital fat herniation are rare in the medical literature for both forms of DCR surgery[15].In our study only

4(6%) patients developed hemorrhage, 1(1.5%) developed preseptal cellulitis and adhesions. None of the patients developed serious complications such as retrobulbar paralysis showing endoscopic DCR to be quite safe procedure. Of the 226 patients who underwent endoscopic endonasal DCR in the Sonkhya retrospective case series, only two patients had complications of orbital fat prolapse and lamina papyracea damage. Both had no sequelae from this complication[16]. We found no serious complications in our study, with only four patients with postoperative hemorrhage requiring conservative treatment. In a case series of 115 patients, the success rates of external and endoscopic hammer-chisel DCR were found to be 89.8% and 88.2%, respectively. A lower complication rate was observed in the endoscopic group, with minimal morbidity and shorter operative time compared with the external approach[17]. In our study primary surgical success was 91% which is comparable with this study. It is difficult to compare success rate for primary surgery between external DCR and the endoscopic endonasal procedures as there are few comparative studies[18]. Few studies have standard outcome measures, with some studies defining success as patency to irrigation with others concentrating on symptom resolution[19]. Guidelines published by the Royal College of Ophthalmologist suggest that lack of tearing 3 months after surgery is a good indicator of successful surgery. We have used these guidelines for patients with at least 6 months' follow-up time postoperatively. Our study included both objective patency results and subjective patient symptom measurements. Evidence for endoscopic dacryocystorhinostomy appears to be comparable to the "gold standard" external approach, with success rates ranging from 78% to 97%. Endoscopic DCR are more expensive to run initially, with high equipment costs compared with general ophthalmology used in external DCR[2]. However, with shorter surgical times and use of local anesthetic in a day-surgery setting, these costs can be absorbed over time[20,21]. The procedure is technically involved and can initially be difficult to learn. Experience with persons highly skilled with endonasal surgery and endoscopic techniques is imperative, and this can incur higher training costs only in the short-term. A learning curve of the endoscopic procedure was demonstrated in several studies. Onerci stratified according to experience of the surgeon and found high success rates of up to 94% with experienced surgeons, compared with inexperienced surgeons with success rates of only 58%[9].

CONCLUSION: In conclusion, endoscopic DCR is a better alternative to external procedures in the management of nasolacrimal canal obstruction; it is a less invasive procedure, an efficacious method with a high success rate, fewer complications and good outcome.

REFERENCES:

1. Choi CJ,Jin HR,Moon YE et al.The surgical outcome of endoscopic dacrocystorhinostomy according to the obstruction levels of lacrimal drainage system.Clin Exp Otorhinolaryngol 2009;2:141-4.
2. Karim R,Ghabial R,Lynch TF et al.A comparison of external and endoscopic endonasal dacrocystorhinostomy for acquired nasolacrimal duct obstruction.Clin Ophthalmol 2011;5:979-89.
3. Saeed BM. Endoscopic DCR with stents:clinical guidelines and procedure.Eur Arch Otorhinolaryngol 2012;269:545-9.
4. Gu Z,Cao Z.Silicon intubation and endoscopic dacrocystorhinostomy:a meta-analysis.J Otolaryngol Head Neck Surg 2010;39:710-3.
5. Kupper DS, Demarco RC, Resende R, Anselmo-Lima WT, Valera FP, Moribe I. Endoscopic nasal dacryocystorhinostomy: results and advantages over the external approach. Rev Bras Otorhinolaryngol. 2005; 71:356-60.
6. Zenk J,Karatzanis AD,Psychogios G et al.Long-term results of endonasal dacrocystorhinostomy.Eur Arch Otorhinolaryngol 2009;266:1733-8.
7. Korkut AY,Teker AM.A comparison of endonasal with external dacrocystorhinostomy in revision cases.Eur Arch Otorhinolaryngol 2011;268:377-81.
8. Abdullah RA. A comparative study between Intubated and Non-Intubated DCR`s in NLD obstruction.Pak J Ophthalmol Apr 2004;20(2):61-4.
9. Watkins LM, Janfaza P, Rubin PD.The Evolution of Endonasal Dacryocystorhinostomy. Surv Ophthalmol. 2003; 48:73-84.
10. Onerci M. Dacryocystorhinostomy. Diagnosis and treatment of nasolacrimal canal obstructions. Rhinology. 2002; 40:49–65.
11. Dietrich C,Mewes T,Kuhnenund M,Hashemi B,Mann WJ,Amedee RG.Long term follow up of patients with microscopic endonasal dacrocystorhinostomy.Am J Rhinol 2003;17:57-61.
12. Ben Simon GJ, Joseph J, Lee S, Schwarcz RM, McCann JD, Goldberg RA. External versus endoscopic dacryocystorhinostomy for acquired nasolacrimal duct obstruction in a tertiary referral center. Ophthalmology. 2005; 112:1463-68.
13. Taban M, Jarullazada I, Mancini R, Hwang C, Goldberg RA .Facial asymmetry and nasal septal deviation in acquired nasolacrimal duct obstruction. Orbit. 2011 Oct;30(5):226-9.
14. Azizur Rahman,Shahnawaz Channa,Jawaid Hassan Niazi, Muhammad Saleh Memon.Dacrocystorhinostomy without intubation with intraoperative Mitomycin-
15. Mir Zaman,Tariq Farooq Babar,Ayesha Abdullah.Prospective randomized comparison of Dacrocystorhinostomy (DCR) with and without intubation.Pak J Med Res.2005;44(2):75-8.
16. Ghulam Sabir.Modified external dacrocystorhinostomy with silicon tube intubation .J Rawal Med Coll.2010;14(1):26-7.
17. Sonkhya N, Mishra P. Endoscopic transnasal dacryocystorhinostomy with nasal mucosal and posterior lacrimal sac flap. J Laryngol Otol. 2009; 123:320–6.
18. Smith W, Merkonidis C, Draper M, Yung M. Endoscopic dacryocystorhinostomy in warfarinized patients. Am J Otolaryngol Head Neck Med Surg. 2006;27:327-9.
19. Geoffrey E. Rose. The Apparent Paradox of "Success" in Lacrimal Drainage Surgery OCULOPLASTICS AND ORBIT.Essentials in Ophthalmology 2006, Part 3, 51-59, DOI: 10.1007/3-540-29969-6_4
20. Yung MW, Hardman-Lea S. Analysis of the results of surgical endoscopic dacryocystorhinostomy: effect of the level of obstruction. Br J Ophthalmol 2002;86:792– 4.
21. Raj Kumar Advani, Fiaz Mohammad Halepota,Syed Imtiaz Ali Shah,Wasif M Kadri.Comparative results of Dacrocystorhinostomy with and without silicon intubation .Pak J Ophthalmol 2004;20(1):29-34.
22. Malhotra R, Wright M, Olver JM. A consideration of the time taken to do dacryocystorhinostomy (DCR) surgery. Eye 2003; 17:691-6.

Pakistan Journal of Otolaryngology 2013; 29 : 49-52 Original Article

Bacterial and Fungal Profile and Antimicrobial Susceptibility Pattern from Patients of Chronic Suppurative Otitis Media in Civil Hospital Karachi (C.H.K.)

*Ghulam Fatima, **Mohammad Zeeshan Raza, **Syed Bilal, **Maria Shoaib

ABSTRACT: AIMS AND OBJECTIVES: To study The Bacteriological And Mycological Profile Of Chronic Suppurative Otitis Media (CSOM) And Their Antibiotic Sensitivity Pattern To Commonly Used Antibiotics In View Of Emerging Resistance At Civil Hospital Karachi (C.H.K.) To evaluate the risk factors involved i.e. seasonal variation, age, and sex, low resistance of patients like immuno compromised , diabetic and upper respiratory tract infection. PURPOSE OF STUDY : To determine the antibiotic sensitivity pattern in patients with chronic suppurative otitis media (CSOM) to provide a guideline for making a protocol for empirical antibiotic therapy where culture facilities are not available. METHODOLOGY: Study Design: Descriptive Hospital Based study.Study Place and Duration: The study was conducted from January 2011 to December 2011 at the department of ENT and Central Lab, Civil Hospital Karachi. Study Subjects: A total of 251 patients with unilateral or bilateral active chronic suppurative otitis media attending the outpatient clinic and admitted in the ENT Wards were included in the study. Pus samples (Ear swabs) were collected from the discharging ear(s) and sent to Central Lab, Civil Hospital Karachi. STUDY METHOD: Aerobic cultures were done. Antibiotic sensitivity testing was done with standard antibiotic discs using Kirby-Bauer disk diffusion method as per National Committee for Clinical Laboratory Standards recommendations. RESULTS: From the clinical specimens of 251 patients enrolled in the study, the pathogens were isolated in 206(82.07%) patients, while 45 (17.9%) patients' pathogenic microorganisms were not isolated. There were 201, (98%) bacterial isolates and 5, (2%) fungi. Pseudomonas Aeruginosa 141 (68.44%) was the most common isolate, followed by Staphylococcus Aureus 53 (25.72%). Antibiotic sensitivities of Pseudomonas Aeruginosa showed that 100% isolates were sensitive to meropenem, where as 97% isolates were sensitive to sparfloxacin and 95% to sulbactam / cefoperazone, piperacillin / tazobactam and imipenem. Only 68% of Pseudomonas Aeruginosa isolates were sensitive to aztreonam and 65% to chloramphenicol. For Staphylococcus Aureus, 94.3% isolates were sensitive to fusidic acid, 92% to linezolid and 90% to vancomycin. Only 66% isolates were sensitive to amoxicillin and 60% to ciprofloxacin, ofloxacin and kanamycin. CONCLUSION: Pseudomonas Aeruginosa was the most common isolate followed by Staphylococcus Aureus. Clustering of cases was seen during the summer season. More than 80% of Pseudomonas Aeruginosa isolates were sensitive to carbapenems and bête-lactamase inhibitors while fusidic acid, vancomycin and linezolid were found to be most sensitive for strains of Staphylococcus Aureus. It is therefore concluded that the topical preparation of these antibiotics should be incorporated in the course of therapy to cover up the most frequent aerobic isolates implicated in CSOM.

Key Words: CSOM, bacteria, fungi, risk factors, culture and sensitivity.

INRODUCTION: Chronic suppurative otitis media (CSOM) is one of the most common problem related to ear in developing and developed countries, if left untreated causing more severe loss of hearing, characterized by persistent otorrhea more than 6-12 weeks, through perforated tympanic membrane, usually resulting from previous acute infection[1]. The infection is due to the bacteria coming from nasopharynx via Eustachian tube, and cause inflammation in mucoperiosteum of middle ear cleft, resulting in ear discharge[2]. CSOM is a global problem and affects all ages but especially prevalent in children younger than 7 years due to horizontal, wider and short Eustachian tube[3]. The commonly occurring symptoms are ear discharge, deafness, itching, pain and sometimes fever. If it is left untreated complications like loss of hearing, post aural swelling and post aural sinus may occur[4]. The most probable risk factors included are untreated sore throat, low socioeconomic status, age, poor hygiene, upper respiratory tract infection, immunocomprimised, environmental factors and nutritional factors, Facial anomalies etc[5, 6]. CSOM is mostly caused by bacteria, but fungi and virus can also be a cause CSOM[7]. Commonly found pathogens in CSOM are Pseudomonas Aeruginosa, Staphylococcus Aureus, Proteus mirabilis, Klebsiella pneumoniae, Escherichia coli, Aspergillus spp and Candida spp[8]. This middle ear infection can cause complications like f facial nerve paralysis, meningititis and intracranial and extra cranial abcesses [9]. The basic aim of this study was to evaluate the bacteriological and mycological causes of CSOM and their antibiotic sensitivity pattern to commonly used antibiotics at CHK, finding the risk

*Senir Pathologist, Department of Microbiology, Central Lab, Civil Hospital Karachi, Pakistan,
**Medical Student Fourth year, Dow Medical College, Dow University of Health Sciences, Karachi, Pakistan.

factors involved and to provide a guideline for making a protocol for empirical antibiotic therapy where culture facilities are not available. This will contribute to rational usage of antibiotics, success of treatment, avoidance of the disease complications and to prevent resistance of the pathogenic micro flora.

SUBJECT AND METHODS: Two hundred and fifty one patients of chronic suppurative otitis media both unilateral and bilateral who presented to ear, nose and throat (ENT) department from January 2011 to December 2011 were prospectively studied. All patients had perforated tympanic membranes with active purulent discharge for more than six weeks. Detailed clinical history regarding age, sex, duration of discharge and antibiotic treatment were taken. INCLUSION CRITERIA: Only those patients who had not received antibiotic therapy (topical or systemic) for previous 72 hours were included in the study. EXCLUSION CRITERIA: Patients with ear discharge due to cholesteotoma and on treatment with systemic antibiotics were excluded from the study. Disposable sterile cotton swabs and ear specula were used to collect pus swabs to harvest the middle ear micro flora through the tympanic membrane perforation. All care was taken to avoid surface contamination and the swabs were transported to microbiology section of central lab, CHK for further processing. The pus swabs were cultured on Blood agar, MacConkey's agar and Chocolate agar and incubated at 37ºc aerobically for 24-48 hours. Direct smear of pus was made and stained with Gram stain and looked for pus cells, epithelial cells and bacteria. All organisms isolated were identified according to standard microbiological methods. Antimicrobial susceptibility tests was performed using modified Kirby- Bauer disc diffusion method and using national committee for clinical laboratory standards (NCCLS) for breakpoints for interpretation of results. The standard antimicrobial discs used for Staphylococcus Aureus were oxacillin (OX) 1 µg, cotrimoxazole (COT) 1. 25/23. 75 µg, gentamicin (GEN) 10 µg, chloramphenicol (CAP) 30µg, ciprofloxacin (CIP) 5µg and vancomycin (VAN) 30µg . The standard antimicrobial discs used for Pseudomonas Aeruginosa were gentamicin (GEN) 10 µg, amikacin (AMK) 30µg, ciprofloxacin (CIP) 5µg, ceftazidime (CAZ) 30 µg and piperacillin/tazobactam 10/1 (TZP) 110 µg. The susceptible zone diameters were interpreted according to NCCLS criteria.

RESULTS: The overall age range of patients was 0-85 years with mean age of 36 years. There was almost equal distribution between sexes, males n=116 (46. 21%) and females n=135 (53. 78%). The microbiological profile of aerobic bacterial isolates is depicted in table 1 and figure 1. Pseudomonas Aeruginosa n=141 (68. 44%) was the most common isolate, followed by Staphylococcus Aureus n=53 (25. 72%). The month wise distribution of cases of CSOM is shown in figure 2. Clustering of cases was seen during the summer season with a peek obtained in the month of May. Fungal organisms were found to be more prevalent in the winter season. The antibiotic sensitivity pattern of the two commonest isolates Pseudomonas Aeruginosa and Staphylococcus Aureus from patients of CSOM is shown in (fig. 3 & 4) respectively. The antibiotic sensitivity pattern for Pseudomonas Aeruginosa was found to be as follows: imipenem 95%, amikacin 91%, gentamycin 79. 43%, tobramycin 81%, ceftazidime 82%, aztreonam 69%, chloramphenicol 66%, polymyxin-B 76%, neomycin 79%, sparfloxacin 97%, cefoperazone/sulbactam 95%, piperacillin /tazobactam 95%, levofloxacin 79%, meropenem 100%, and ciprofloxacin 80%. The antibiotic sensitivity pattern for Staphylococcus Aureus was found to be as follows: amoxicillin 66%, amoxicillin+clavulanic acid 88%, doxycycline 77%, ciprofloxacin 60%, ofloxacin 60%, fusidic acid 94%, clindamycin 85%, linezolid 92%, vancomycin 90%, kanamycin 60%. Among the minority of micro-organisms causing CSOM; Pneumococci and Enterococci were found to be sensitive to all conventional antibiotics while Klebsiella spp was found to be resistant to cefuroxime and Proteus mirabilis was resistant to chloramphenicol and neomycin. E. coli was markedly resistant to all generatons of cephalosporins and quinolones in the strains isolated.

DISCUSSION: Chronic suppurative otitis media and various complications associated with the disease such as irreversible local destruction of middle ear structures, facial palsy, serious intracranial and extra cranial complications are amongst the most common conditions seen by ENT Specialists, Pediatricians and General Practitioners. It is a persistent disease and often causes irreversible damage to the middle ear cavity; recurrent otitis media may cause damage to ossicles, facial nerve and cochlea resulting in permanent hearing loss[10, 11]. This study is carried out for the identification of micro organisms of CSOM in our set up and to stress the importance of culture and sensitivity in the management of CSOM. The abuse of antibiotic in everyday practice is a routine, thus resulting in emergence of resistant organisms. In indirect pathogenesis the commensals help the accompanying pathogenic bacteria by increasing beta lactamase[12] these enzymes also inhibit the activity of certain antibiotics. The most common isolated organism according to our results is Pseudomonas Aeruginosa followed by Staphylococcus Aureus, however Escherichia coli, Proteus mirabilis, klebsiella were also found, this result is similar to some studies conducted in various cities of Pakistan[13-16]. Brookes from USA also found the highest incidence of Pseudomonas Aeruginosa followed by Staphylococcus Aureus and klebsiella. Javed et al[17] and yang et al[18] also described Pseudomonas Aeruginosa followed by Staphylococcus Aureus and proteus mirabilis as the common organisms in their study. Pseudomonas Aeruginosa has been the most prevailing bacterial isolate[19-22] was checked for its antibiotic susceptibility pattern to aminoglycosides (eg :amikacin, gentamycin) which are bactericidal antibiotics interfering with protein synthesis of the bacteria and is used largely for gram negatives species we found it highly effective as also according to previous researches conducted in

Type of Organism	No. of Isolates (N)	Percentage Yield (%)
Pseudomonas Aeruginosa	141	68.44
Staphylococcus Aureus	53	25.72
Eschericia Coli	2	0.97
Pneumococci	1	0.5
Enterococci	1	0.5
Proteus mirabilis	2	0.97
Klebsiella spp.	1	0.5
Aspergillus spp.	1	0.5
Candida spp	4	1.9

Table 1: Microbiological profile of patients with chronic suppurative otitis media (n=206)

India[23], Nigeria and Nepal[21] and also Pakistan[10, 15, 16]. flouroquinolones (e. g. ; ciprofloxacin, sparfloxacin, levofloxacin) DNA replication and transcription inhibiting antibiotics were also very effective up to 80 % in our community[14, 16]. Cephalosporins have an extended antibiotic spectrum, in Pakistan it is showed that 3rd generation cephalosporins are very effective against the bacterial isolates in CSOM and some suggest ceftriaxone as the drug of choice along with other antibiotic combinations[24]. Our results show 87% susceptibility to ceftazidime which is comparable to other researches[13]. Imipenem and meropenem of carbopenem group is also very effective against the bacteria and show almost complete susceptibility[16]. The monobactam aztreonam also shows a good susceptibility profile to Pseudomonas aeuriginosa[16] The second predominant organism in our study Staphylococcus Aureus which is similar to findings of various previously conducted researches in the world[25-27]. In our case the antibiotic sensitivity pattern for Staphylococcus Aureus was found to be as follows: amoxicillin 66%, amoxicillin+clavulanic acid 88%, doxycycline 77%, ciprofloxacin 60%, ofloxacin 60%, fusidic acid 94%, clindamycin 85%, linezolid 92%, vancomycin 90%, kanamycin 60%. Maji et al corresponded to more suspectibitilty pattern of Staphylococcus Aureus to ampicillin, amoxicillin +clavulanic acid, macrolides, aminoglycosides, cephalosporins and flouroquinolones with 36%, 55%, 18%, 55%, 76%and 83% respectively[28]. We also noted that ciprofloxacin, amoxicillin+clavulinic acid, augmentin, gentamycin were broad spectrum antibiotic sensitive to almost gram negative and gram positive isolates in CSOM. To evaluate the associated factors with CSOM, age is considered as a major risk factor because of shorter and more horizontal Eustachian tube of children less than five years allow commensal organism from the nasopharynx to sterile middle ear cavity resulting in congestion of the tube. It has also been observed that children are more exposed to upper respiratory tract infection due to their immature immune system that minimally protect them against the opportunistic organisms (gordan et al. 2004)[29], The overall age range observed in our study is 0-85 years, and a mean age of 36 years, this may be because our records are hospital admission based, though it corresponds to a few researches conducted before[2, 30]. We found almost equal sex distribution of the disease similar to Amusa et al (2005) (31), no particular sex

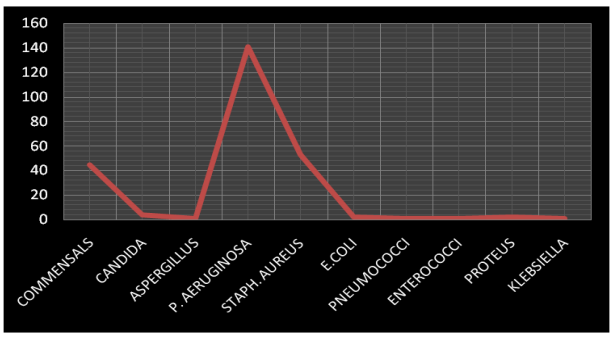


Figure 1: Frequency of etiologies of CSOM.

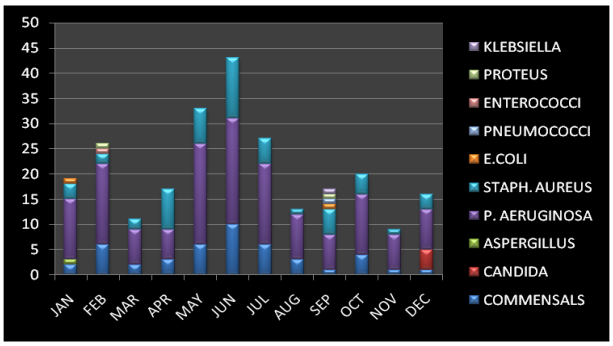
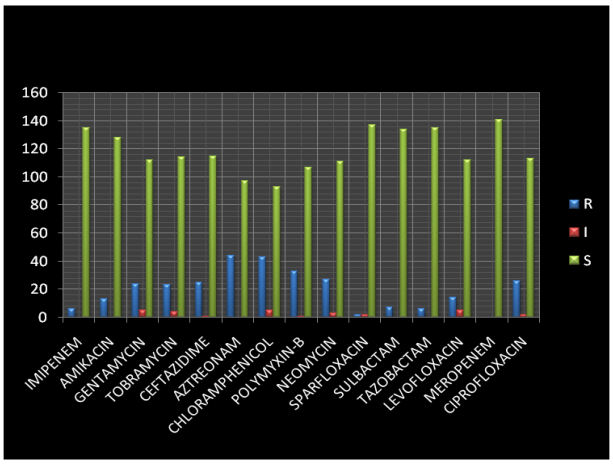


Figure 2: Monthly distribution of cases of CSOM by etiology of micro-organisms



*(Susceptibility Pattern: R=resistant, I=intermediate, S=sensitive)

Figure 3: Antibiogram of Pseudomonas Aeruginosa (n=141).

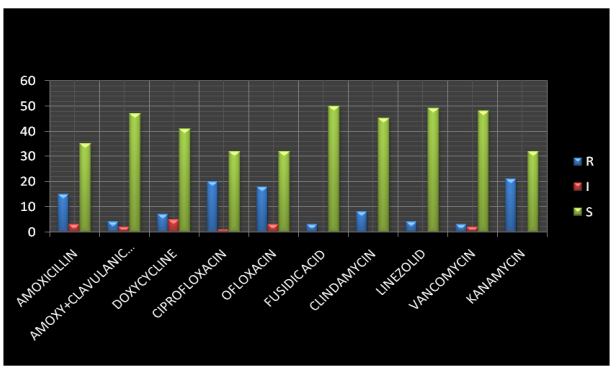


Figure 4: Antibiogram of Staphylococcus Aureus (n=53).

predisposition attributed that to equal admission of female and male patients, however Akinpelu (2007)[32] argued that males have higher incidence of disease which could be due to their active and adventurous nature which predispose them to traumatic conditions. With respect to seasonal variation the clustering of cases was seen during the summer season with a peak obtained in the month of May. Fungal organisms were found to be more prevalent in the winter season. Since cold weather predispose to upper respiratory tract infections hence most of the chronic suppurative otitis media cases would be seen post dry season and more frequently in rainy season[29]. For better management of otitis media, clinical classification of infection as well as drug susceptibility testing of the organisms recovered from chronic cases are essential for making the right decision of antimicrobial drugs that will effectively eradicate the pathogens. The high rate of multiple drug resistance as well as high level of resistance to individual antibiotics is a cause of concern. In addition, educating parents and guardians (of the otitis prone children) on the possible risk factors of the disease may be a preventive strategy that might reduce disease occurrences.

CONCLUSION: Pseudomonas Aeruginosa was the most common isolate followed by Staphylococcus Aureus. Clustering of cases was seen during the summer season. More than 80% of Pseudomonas Aeruginosa were sensitive to carbapenems and bête-lactamase inhibitors while fusidic acid, vancomycin and linezolid were found to be most sensitive for strains of Staphylococcus Aureus. It is therefore concluded that the topical preparation of these antibiotics should be incorporated in the course of therapy to cover up the most frequent aerobic isolates implicated in CSOM. Culture and sensitivity remains time tested investigation of choice for better medical treatment, it has advantages like preventing resistance, minimizing complications and total cost of treatment. Knowledge of risk factors, seasonal variation also help to get best possible results of medical management of CSOM.

REFERENCES:

1. Krišto B, Buljan M. Microbiology of the chronic suppurative otitis media. Medicinski Glasnik. 2011;8(2).
2. Srivastava A, Singh R, Varshney S, Gupta P, Bist S, Bhagat S, et al. Microbiological Evaluation of an Active Tubotympanic Type of Chronic Suppurative Otitis Media. Nepalese Journal of ENT Head and Neck Surgery. 2011;1(2):14-6.
3. Haraldsson G, Holbrook WP, Könönen E. Clonal similarity of salivary and nasopharyngeal Fusobacterium nucleatum in infants with acute otitis media experience. Journal of medical microbiology. 2004;53(2):161-5.
4. Oguntibeju O. Bacterial isolates from patients with ear infection. Indian Journal of Medical Microbiology. 2003;21(4):294.
5. Haider A. Chronic Suppurative Otitis Media (CSOM): Bacteriological Study. ORION. 2002;13.
6. Anwar-us-Salam ASH, Abdulla E. Suppurative otitis in Karachi: An audit of 510 cases. Pak J Otolaryngol. 1997;13:66-9.
7. Gül H, Kurnaz A, Turhan V, Oncül O, Pahsa A. Microorganisms isolated from middle ear cultures and their antibacterial susceptibility in patients with chronic suppurative otitis media]. Kulak burun bogaz ihtisas dergisi: KBB= Journal of ear, nose, and throat. 2006;16(4):164.
8. Ibekwe A, Okafor J. Pathogenic organisms in chronic suppurative otitis media in Enugu, Nigeria. Tropical and geographical medicine. 1983;35(4):389.
9. Bluestone CD, Klein JO. Chronic suppurative otitis media. Pediatrics in Review. 1999;20(8):277-9.
10. Iqbal K, Khan MI, Satti L. Microbiology of chronic suppurative otitis media: Experience at Dera Ismail Khan. Gomal Journal of Medical Sciences. 2012;9(2).
11. Bluestone CD, editor. Acute and chronic mastoiditis and chronic suppurative otitis media. 1998: Elsevier.
12. Karma P, Jokipii L, Ojala K, Jokipii A. Bacteriology of the chronically discharging middle ear. Acta Oto-Laryngologica. 1978;86(1-6):110-4.
13. Mansoor T, Musani MA, Khalid G, Kamal M. Pseudomonas aeruginosa in chronic suppurative otitis media: sensitivity spectrum against various antibiotics in Karachi. J Ayub Med Coll Abbottabad. 2009;21(2):120-3.
14. Aslam MA, Ahmed Z, Azim R. Microbiology and drug sensitivity patterns of chronic suppurative otitis media. Journal of the College of Physicians and Surgeons--Pakistan: JCPSP. 2004;14(8):459.
15. Iqbal S, Udaipurwala I, Hasan A, Shafiq M, Mughal S. Chronic suppurative otitis media: disease pattern and drug sensitivity. J Surg Pak. 2006;11(1):17-9.
16. Gul A, Ali L, Rahim E, Ahmed S. Chronic suppurative otitis media; frequency of Pseudomonas aeruginosa in patients and its sensitivity to various antibiotics. Professional Med J. 2007;14:411-5.
17. Javed M, Kharal S, Rafit KAK. Selection of an antibiotic in chronic suppurative otitis media. Pak J Otolaryngol. 1999;15:7-9.
18. Yang Y, Gong S, Liu Y. The clinical investigation of bacteriology of chronic suppurative otitis media]. Lin chuang er bi yan hou ke za zhi= Journal of clinical otorhinolaryngology. 2001;15(12):550.
19. Wariso B, Ibe S. Bacteriology of chronic discharging ears in Port Harcourt, Nigeria. West African journal of medicine. 2007;25(3):219-22.
20. Loy A, Tan A, Lu P. Microbiology of chronic suppurative otitis media in Singapore. Singapore medical journal. 2002;43(6):296-9.
21. Sharma S, Rehan HS, Goyal A, Jha AK, Upadhyaya S, Mishra S. Bacteriological profile in chronic suppurative otitis media in Eastern Nepal. Tropical doctor. 2004;34(2):102-4.
22. Yeo SG, Park DC, Hong SM, Cha CI, Kim MG. Bacteriology of chronic suppurative otitis media-a multicenter study. Acta Oto-Laryngologica. 2007;127(10):1062-7.
23. Deb T, Ray D. A Study of the Bacteriological Profile of Chronic Suppurative Otitis Media in Agartala. Indian Journal of Otolaryngology and Head & Neck Surgery. 2011:1-4.
24. Hafidh MA, Keogh I, Walsh RMC, Walsh M, Rawluk D. Otogenic intracranial complications. A 7-year retrospective review. American journal of otolaryngology. 2006;27(6):390-5.
25. Shyamala R, Reddy PS. The study of bacteriological agents of chronic suppurative otitis media-Aerobic culture and evaluation.
26. Moshi N, Minja B, Ole-Lengine L, Mwakagile D. Bacteriology of chronic otitis media in Dar es Salaam, Tanzania. East African Medical Journal. 2000;77(1):20-2.
27. Brook I, Finegold SM. Bacteriology of chronic otitis media. JAMA: the journal of the American Medical Association. 1979;241(5):487-8.
28. Maji P, Chatterjee T, Chatterjee S, Chakrabarty J, Mukhopadhyay B. The investigation of bacteriology of chronic suppurative otitis media in patients attending a tertiary care hospital with special emphasis on seasonal variation. Indian Journal of Otolaryngology and Head & Neck Surgery. 2007;59(2):128-31.
29. Gordon MA, Grunstein E, Burton WB. The effect of the season on otitis media with effusion resolution rates in the New York Metropolitan area. International journal of pediatric otorhinolaryngology. 2004;68(2):191-5.
30. Tahir M, Jawaid A, Abdullah A, Najam MA. Bacterial Culture and Sensitivity in Active Chronic Otitis Media: 500 Cases in Combined Military Hospital Rawalpindi. Pakistan Journal of Otolaryngology. 2012;28:56-8.
31. Amusa Y, Ijadunola I, Onayade O. Epidemiology of otitis media in a local tropical African population. West African journal of medicine. 2006;24(3):227-30.
32. Akinpelu O, Amusa Y. Otological diseases in Nigerian children. The Internet J Otorhinolaryngol. 2007;7:1.

Pakistan Journal of Otolaryngology 2013; 29 : 54-58

Review Article

Recent Advances in the Diagnosis of Oral Pre-malignant and Malignant Lesions - A Review

*Iqbal A. Muhammad Khyani, **Masood A. Qureishi, ***Talat Mirza,
***M. Rafiq Khanani, *M. Umar Farooq,

ABSTRACT: Oral cancer is a fatal disease and is the eight most frequently occurring cancer worldwide. It is the most common cancer and constitute a major health problem in developing countries representing the leading cause of death. Oral cancer most commonly occurs in middle aged and older individuals, although a disturbing and alarming number of this malignancy is also being documented in younger adults in recent years.More than 95% of oral tumour, are squamous cell carcinoma which arises from oral mucosal lining. A significant number of it developed from pre-malignant or potentially malignant lesions such as leukoplakia, erythroplakia, lichen planus and oral submucosal fibrosis. Early detection and prompt treatment offer best hope for the patient. This improve survival and diminishes the morbidity. Clinical examination and histopathology of the suspected lesion remains the gold standard for diagnosis and identification of malignant oral lesion. Biopsy being an invasive technique has its surgical and technical limitation for professionals and psychological implications for most patients. These issues can be addressed by detecting the biomarker with non invasive techniques .Accurately identified biomarker may provide new avenues and constitute major target for early cancer detection and risk assessment. Different methods have been used to obtain DNA & RNA for biomarker identification. Oral rinse, swab, brush biopsies and recently saliva have been employed for this purpose. In this review article, we describe the various conventional and novel methods of diagnosis of oral pre-malignant lesions and oral cancer. We discussed the advances in diagnosis on molecular levels by identifying the biomarker through non-invasive methods which are expected to affect choice of treatment and patient's outcomes.
Key Words: Pre-malignant lesions, Oral cancer, Molecular diagnosis, Salivary diagnosis, Biomarkers.

INTRODUCTION AND BACKGROUND: Oral cancer is the eight most frequently occurring cancer wordwide[1], with approximately 400,000 new cases diagnosed each year[2]. It is the most common cancer and constitutes a major health problem in developing countries, representing the leading cause of death. Although constituting 2-4% of the malignancy in the west[3], this carcinoma accounts for almost 40% of all cancers in the Indian subcontinent[4,5] Carcinoma of oral cavity is the second most frequent malignant tumor for both the gender in Pakistan[6]. The incidence is reported highest worldwide[7]. It constitutes 20-35% of all cancers seen in various public hospitals in Karachi and slightly less in other regions of Pakistan and increasing cases are being consistently reported in younger age groups. Never the less it is a major killer in our population[6]. It most commonly occurs in middle aged and older individuals, although a disturbing and alarming number of this malignancy is also being documented in younger adults in recent years[8]. This paper reviews the conventional and recent advances in techniques for early detection of pre-malignant lesions and oral cancer which may predict morbidity and mortatility.

PATHOLOGY & PATHOGENESIS: Over 95%of oral tumours are squamous cell carcinoma (SCC) which arises from the oral mucosal lining. A significant proportion of oral squamous cell carcinoma (OSCC) developed from pre-malignant lesions such as leukoplakia, erythroplakia, oral submucous fibrosis and lichen plannus[3]. Multiplicative effects of nutritional deficiency, dietary habits[9], bad oral hygiene, mal-directed sharp, gagged teeth and infection with human papilloma virus (HPV)[10,11,12] has been implicated for contributing in oral carcinogenesis but their exact role has not been fully established. In Pakistan, the major risk factors for oral cancer are areca nut (betel nut, chalia, Supari), betel quid (Paan), tobacco chewing, naswar, paan masala (Ghutka, Mawa) and poor nutrition. Alcohol consumption is not a prevalent habit in Karachi, therefore, not a major risk factor.

The natural history of oral cancer seems to gradually evolve from normal epithelium through precursor lesion to full blown metastatic phenotype[13]. There exists a complex web of inter- relationship among habits, diet, nutrition, chemical carcinogens, viruses, immune status and genetics in carcinogenesis. Link between human papilloma virus and squamous cell carcinoma of the head and neck was suggested more than 20 years ago[14]. HPV-16 was the most detectable virus in salivary samples, serum and biopsy

*Department of ENT, Head & Neck Surgery, Dow University of Health Sciences & Civil Hospital, Karachi.
**Department of Physiology, ***Department of Pathology, Dow International Medical College, DUHS, Karachi

cell blocks of the patients with pre-neoplastic lesions & OSCC. The oncological potential of high risk HPV is attributed to its ability to insert specific DNA fragments (early gene E6 and E7) into the host cellular genome[15,16]. Investigators showed a strong association between high risk HPV infection and OSCC in Mexican, Sweden, Japanese, and Chinese populations[17-18]. The role of high-risk oncogenic HPV in pre-malignant and malignant oral lesions has been an issue of extreme controversy with conflicting data reported by numerous studies. Its prevalence reported in OSCC vary from <5% to 100%[19,20]. This wide range may be due to a variety of reasons such as the choice of primers used in the PCR, inherent differences in the populations being studied, and the methods used for HPV detection. PCR techniques are very sensitive and in the absence of a quantitative method such as Real-Time PCR, in-significant virus (with no role in carcinogenesis) can be identified. In terms of sensitivity and specificity, in situ detection techniques of HPV in paraffin-embedded tissue sections of OSCC (using in situ PCR and in situ hybridization PCR) are more powerful in detecting HPV than the liquid-phase PCR methods[21]. In contrast, Enzyme Linked Immune Assay (ELISA) lacks acceptable sensitivity in detecting clinically meaningful HPV infections[14]. Certain proinflammatory, proangiogenic cytokines such as tumour necrosis factor alpha (TNF$\propto$) interleukin (IL6 & IL8) are raised in OSCC and has improtamt role in carcinogenesis. There are evidences that these cytokines are produced in a dysregulated fashion in oropharyngeal SCC and that they have roles in cell growth, invasion, interruption of tumour suppression, immune status and even survival[22,23,24].

PRESENTATION: Pre-cancerous lesions and early oral cancers are often subtle and asymptomatic and many patients do not present for diagnosis and treatment until they have stage III or IV disease. Therefore it is important for a clinician to maintain a high index of suspicion, especially when risk factors are present. Invasive OSCC is often preceded by the presence of clinically identifiable pre-malignant changes of oral mucosa as white or red patches. As the neoplastic process progress, patient may notice a non-healing ulcer or mass. Later stage symptoms includes: Pain, bleeding, loosening of teeth, burning mouth, restricted opening of mouth, intolerance to spicy food, difficulty in wearing dentures, referred earache, dysphagia dysarthria, odynophagia and development of neck mass.

Detailed history is of paramount importance. Duration of symptoms and complete history of possible risk factors like smoking (type, frequency and duration), alcohol consumption (type, amount, frequency and duration), smokeless tobacco (paan, betal quid, betal nut, areca nut, ghutka, mawa, naswar etc) use along with frequency, duration and habit of placement in oral cavity, presence of dental pain and caries all should be recorded. Family history, socio economical status and dietary habits should be recorded which may be an aid to reach diagnosis and further management.

IMPORTANCE OF EARLY DIAGNOSIS: Despite ready accessibility of the oral cavity to direct examination, these malignancies still are often not detected until a late stage and the survival rate for oral cancers has remained essentially unchanged over the past three decades. In spite of advances in accessibility, methods of diagnosis and treatment (Surgery, radiation and chemotherapy) the five years survival rate for OSCC has not improved significantly over the past several decades and it remained at about 50-55 percent[25].

Early detection can improve patient survival and diminishes the morbidity of treatment required for advance disease. Early diagnosis depends upon an astute clinician or patient who may identify a suspicious lesion or symptom while it is still at an early stage[26]. Early diagnosis is perhaps the greatest factor contributing to outcome for treatment of this disease. Prompt detection is also vital for effective surveillance after treatment.

DIAGNOSTIC METHODOLOGY: *a) Vital Staining:* When on physical examination, a suspicion area of neoplastic activity is seen especially in high risk patient, one can use the vital staining of the suspected area with Toluidine blue to strengthen the doubt. Toluidine blue is a water soluble dye that stains the malignant cell giving them dark blue colour while normal mucosal cells remains unchanged. Two mechanism of Toluidine blue staining are proposed; 1. It is believed that the nuclei of malignant cells take up the dye manifesting increased DNA synthesis. 2. Second hypothesis is that dye penetrates the crevices as a result of randomly arranged tumour cells. Toluidine blue rinses stain malignant cells that appear dark blue. It can increase the sensitivity of detecting malignant transformation from 26.6% by visual inspection alone to 96.7% with staining. *b) Photo spectrometry:* Different photo spectral techniques have shows promise for early detection of OSCC. Its use is still in the early stages of clinical testing. Unlike visual inspection method, this spectral analysis is claiming to detect pre-malignant conditions well before any visually detectable morphological change forming frank clinical lesion. The basic idea of spectral technique is that electromagnetic radiations are used to illuminate the area of oral tissue and a photo detection system records the wave length spectrum of the radiation reflecting the area of illumination during and immediately after illumination period. *c) Biopsy for Histopathology:* When, on inspection, a suspicious lesion is identified, a conventional biopsy remains the best and most accurate means of assessing it. Biopsies of normal and malignant tissue, scrapings by brush biopsies containing exfoliative buccal cells have been explored for many years[27,28]. Histological examination of the tissue remains the gold standard for diagnosis and identification of malignant oral lesions. Biopsy is an invasive technique with surgical implications, technique limitations for professionals and

psychological implications for most patients. It also presents limitation when there is trismus due to submucosal fibrosis and when the lesion is large, whereby, it is important to select the most appropriate site of biopsy. Furthermore, even though the biopsy study is fundamental, it is a diagnostic method with limited sensitivity where one of the most important factors is the subjective interpretation of the examining pathologist. These issues underlie the importance of discovering and developing new diagnostic methods, improving the existing ones and discovering new therapeutic targets for oral neoplastic diseases[29].

d) Molecular Diagnosis (Biomarkers): In recent decade have seen a dramatic switch from histopathology to molecular methods of disease diagnosis and exfoliative cytology has gained importance as a rapid and simple method for obtaining. DNA samples. Accurately identified biomarker may provide new avenue and constitute major target for early cancer detection and risk assessment. Identification of high risk oral pre-malignant lesion and intervention at pre-malignant stages could constitute one of the keys for reducing the mortality, morbidity and cost of treatment associated with OSCC. Absence of definite early warning signs in most head and neck cancer suggests that sensitive and specific biomarkers are likely to be important in screening high-risk patients. The rationale for molecular targeted prevention of oral cancer is strong. Biomarkers of genomic instability can accurately measure the cancer risk of oral pre-malignant lesion or intra-epithelial neoplasm[30]. Screening and early detection of pre-neoplasm in population at risk have been proposed to decrease morbidity and mortality associated with oral cancer[31].

e) Methods of Molecular Diagnosis: Different physical systems of obtaining the oral mucosal cells has been employed for cytological examination for example scraping the surface of mucosa (oral brush biopsy), rinsing the oral cavity with normal saline solution, swabbing the target areas and taking the sample of saliva from the patient. Brush biopsy is a simple, minimally invasive, relatively risk free and in-expensive method of screening for cancer and serves as an aid to the clinical examination. Despite the improvement in the scraping methods used for collecting oral cytological material, this methodology still presents problem in diagnosing oral cancer. There are controversies related to the real value of this technique in the early detection of OSCC. The problems of exfoliative cytology by this method are mainly due to existence of false negative obtained as a result of a non-representative samples, subjectivity of the cytological evaluation, patients discomfort and reluctance and in-accessibility and / or limited approach due to trismus especially in case of submucosal fibrosis. Liquid based cytology was developed in 1990. It offers significant advantages over conventional exfoliative cytology, as it reduces the problems related to sampling error, poor transfer and fixation of cellular samples.

LIMITATIONS OF SCREENING BY BIOMARKERS: There exits some limitations to our ability to detect cancer in its earliest stages with biomarker, as none of the markers has been shown to universally identify OSCC in its early stage. Furthermore, most of these markers have been identified either in cancer cell lines or in biopsy specimens from late invasive and metastatic cancers. Moreover, the invasive nature of a punch or brush biopsy and blood collection, that is discomforting and distressing for the patient, makes it unsuitable for cancer screening in high risk population. This suggests an imperative need for developing new diagnostic tool that would improve early detection. The goal of a cancer-screening program is to detect tumour at a stage early enough that treatment is likely to be successful. Screening tools are needed that exhibit the combined features of high sensitivity and specificity. Moreover, the screening tool must be sufficiently easy, non-invasive and cost- effective to allow widespread applicability. Identification of molecular markers in bodily fluid that would predict the development of cancer in its earliest stage or in pre-cancerous stage would constitute such a tool.

SALIVA AS A TOOL FOR MOLECULAR DIAGNOSIS: It has been shown that identical mutation present in the primary tumour can be identified in the body fluids of affected patients. Significant development of biotechnology and improvement in our basic understanding of the cancer initiation and progression now enable us to identify tumour signatures, such as oncogenes and tumour suppressor gene alteration in bodily fluid that drain from organs affected by the tumour[32]. Recently saliva has been used as prospective source in molecular diagnostics by analyzing genomics, proteomics and salivary transcriptomes. Oral fluid (Saliva) meets the demand for non-invasive, easily accessible biofluid of human body that nurtures a wide spectrum of biological analytes, informative for clinical diagnostic application. It provides highly efficient diagnostic medium. Oral fluid is a perfect medium to be explored for health and disease surveillance[33]. Compelling reasons exist to use saliva as a diagnostic fluid. It meets the demands for inexpensive, non-invasive and easy-to-use diagnostic method. As a clinical tool, saliva has many advantages over serum including ease of collection, storing and shipping and it can be obtained at low cost, in sufficient quantities for analysis. For patients, the non-invasive collection techniques dramatically reduce the anxiety and discomfort thus simplifies procurement of repeated samples for monitoring overtime (Longitudinal studies). For professionals, saliva collection is safer than blood, it is easy to handle as it does not clot and thus lessening the manipulation with less chance of exposure of health care workers[34]. Saliva has been demonstrated to be a promising body fluid for early detection of diseases and salivary diagnostics has been exhibited tremendance potential in clinical application as a credible diagnostic tool. Saliva is often regarded as mirror of the body, is a perfect surrogate medium to be applied for clinical diagnostics[35,36]. A great need exists for this convenient

1. Detail History
2. Physical Examination
Inspection
Mirror Examination
Palpation
3. Vital Staining. Toluidine Blue
4. Photospectrometry
5. Cytology & Histopathology
6. Biomarkers
7. Imaging
Plain radiology
Orthopentogram (OPG)
Computerized tomography (CT Scan)
Magnetic resonance imaging (MRI)
Positron emission tomography (PET Scan)
Radionuclear Scan
Ultrasound Scan (U.S)

Table 1: Diagnostic strategies in oral Pre-malignant lesions

and accurate point-of-care diagnostic tool that can be used in a non- invasive manner. This is of particular relevance in the developing countries like Pakistan, where many health risks and illnesses remains poorly defined and patient receive inappropriate treatment. In addition reliable indigenous epidemiological data is grossly deficient in developing countries about the burden of the disease to guide population wide health decisions. Human DNA biomarkers has been identified in saliva and were used for the detection of oral cancer[37,38,39,40]. In this one of the most important applications of the salivary diagnostic approach is to detect the cancer conversion risk of oral pre-malignant lesion[41,42]. The overall malignant transformation rates range from 11-70%[43].

IMAGING OF ORAL CANCER: Once the diagnosis is confirmed by histopathology ,different imaging techniques are used to evaluate the primary tumour and regional metastasis in cervical lymph nodes and to search for distant metastasis. Plain radiology, Orthopentogram (OPG), Computerized tomographic Scan (C.T Scan), Magnetic resonance imaging (MRI), Positron emission tomograply (PET Scan), Radio-nuclear Scan and ultrasound scan are utilized at the merit of the situation. Different diagnostic strategies in oral pre-malignant and malignant lesion are summarized in table-1.

PRESENT STATUS: In Pakistan, Saliva has never been explored as a diagnostic medium to detect biomarkers for OSCC. As genetic alteration can be successfully identified in bodily fluid draining the organ affected by the tumour. With this in mind, we will attempt to investigate whether the ability to analyze saliva for potential biomarkers would be feasible to diagnose pre-neoplastic lesions and OSCC in our etiologically distinct population. Specifically we will examined high risk HPV-16 in saliva of patients with clinically confirmed pre- neoplastic lesion, histologically proven OSCC and compared it with identical normal controls by PCR method. Similarly cytokines IL-6 and IL-8 levels in saliva of the patients with strong clinical diagnosis of pre malignant lesions histologically proven OSCC and in age, gender and risk factor matched controls by ELISA technique. In this study, we will analyze the application of saliva as a diagnostic fluid for the possibility of early detection of OSCC. The proof-of-principle disease would be oral squamous cell carcinoma. The rationale being that oral cancer cells are immersed in the salivary milieu and genetic heterogeneity can be detected in the saliva from patient with OSCC.

REFERENCES:

1. Jemal A, Seigal R, ward E. Cancer statistics 2006. CA. cancer J clin; 56:106-30.
2. Pisani P, Parkin DM, Ferlay J. Estimate of worldwide mortality from eighteen major cancers in 1985; implications for prevention and projection of future burden. Int J cancer 1993; 55:891-3.
3. Mehrotra R, Gupta A, Singh M, Ibrahim R. Application of cytology and molecular events in diagnosing pre-malignant or malignant oral lesion. Mol cancer 2006; 5:11-5.
4. Mehrotra R, Singh M, Kumar D, Pandey AN, Gupta R.K, Sinha U.S. Age specific incidence rate and pathological spectrum of oral cancer in Allahabad. Int J Med Sci. 2003; 57:400-04.
5. Ahluwalia K. P. Assessing the oral cancer risk of south Asian Immigrants in New York City. Cancer, 2005; 104:12:2959-61.
6. Bhurgri Y, Rahim A, Bhutto K, Bhurgri A, Pinjani P, Usman A, Hassan S. Incidence of carcinoma of the oral cavity in Karachi Cancer Registry J Pak Med Assoc. 1998;48:11:321-5.
7. Bhurgri Y, Cancer in the oral cavity-trends in Karachi South (1995-2002). Asian Pac J Cancer Prev, 2005; 6:1:22-6.
8. Llemellyn C. D, Johnson NW, Warna Kulasuriya K.A. Risk factors for squamous cell carcinoma of the oral cavity in younger people-a comprehensive literature review Oral Oncol 2001;37:401-18.
9. Winn OM. Diet and nutrition in the etiology of oral cancer. Am J Clin Nutr. 1995; 61; 4375-458.
10. Sugarman BP, Shillitoe EJ. The high risk Human papilloma viruses and oral cancer. Evidence for and against a causal relationship. Oral Dis 1997; 3:130-47.
11. Gillson ML, Shah KV. Human papilloma virus associated head and neck squamous cell carcinoma mounting evidence for an etiologic role of human papilloma virus in a subset of head and neck cancer. Curr Opin Oncol 2001; 13:183-8.
12. Mark J, Lie AK, Glattre E. Human papilloma virus infection as risk factor for squamous cell carcinoma of the head and neck N. Engl J Med 2001;344:1125-31.
13. Santonlis PK, Kastramkis NG, Touruas AD. Advance in biology of oral cancers. Oral Oncol 2007; 43; 6:523-34.
14. Hobbs CG, Sterne JA, Bailey M, Heyderman RS, Birchall MA, Thomas SJ. Human papillomavirus and head and neck cancer: a systematic review and meta-analysis. Clin Otolaryngol. 2006;31:259-66
15. Campari G., Giovannelli. L. Controversies surranding human papilloma virus infection, Head & Neck v/s oral cancer, implication for proplylaxis and treatment. J of Head & Neck oncology 2009;18;1-8.
16. Jamee M. S, Boorghani M, Ghaffari SR, Moghadam F.A. Keyhani. A. Human popilloma virus in saliva of patients with oral squmous cell carcinoma. Med Oral Patol CirBucal 2009;1;14(10);525-8.
17. Anaya-Saavedra G, Ramirez-Amador V, Irigoyen-Camacho ME, Garcia-Cuellar CM, Guido-Jamenez M, Mendez-Martinez R, High association of human papillomavirus infection with oral cancer: a case-control study. Arch Med Res. 2008;39:189-97.
18. Hansson BG, Rosenquit K, Antonsson A, Wennerberg J, Schildt EB, Bladstom A. Strong association between infection with human papillomovirus and oral and oropharyngeal squamous cell carcinoma: a population-based case-control study in southern Sweden. Acta Otolaryngol. 2005;125:1337-44.
19. Boy S, Van Rensburg EJ, Engelbrecht S, Deryer L, Van Heerden M, Van Heerden W.HPV detection in primary intra-oral squamous cell carcinomas-commenensal, aetiological agent or contamination?. J Oral Pathol Med. 2006;35:86-90.
20. Mirza T, Sattar R.A. Farrukh M.S, Muhammad I.A. Ikram S, Mirza. M. Molecullar detection of highrisk human popilloma viruses in oral squamous cell carcinoma and precancer. Pak J Otolaryngol

2008;2;6-8.
21. Koyama K, Uobe K, Tanaka A. Highly sensitive detection of HPV-DNA in paraffin sections of human oral carcinomas. J Oral Pathol Med. 2007;36:18-24.
22. Rhodus NL, HoV, Miller CS, Myers S, Indrey F. NF-Kappob dependent cytokines levels in Saliva of patients with oral pre-neoplastic lesion and oral sq; cell carcinoma. Cancer Derecl prev. 2005;29(1);42-5.
23. Rhodus NL, cheng R, Myers S, Miller L, HoV, Ondrey F. The feasibility of monitoring NF-Kappa B assocated cytokines TNF-1, alpha, IL 6 and IL8 in whole Saliva for malignant trous formation of oral lichen Plase Mol. Carcinog 2005;44(2);77-82.
24. Jamee M.S, Eslami M, Moghadam F.A, Sarafnejad A/F. Salivary concentration of TNF, IL-6 and IL-8 in oral squanous cell carcinoma. Med Oral Patol Cir Bucal 2008;1;13(5);292-5.
25. Silverman Sll Jr. Demographics and occurrence of oral and pharyngeal cancers. The outcomes, the trends – the challenge. J Am Dent Assoc 2001;132:7;-115
26. Neville BW, Day TA. Oral cancer and pre-cancer CA. Cancer J Clin 2002; 52:195-215.
27. Zhang L, Williams M, Poh CF et al. Toluidine blue staining identifies high risk primary oral pre-malignant lesions with poor outcomes. Cancer Res 2005; 65:8017-2.
28. Kujan O, Ghenny A.M, Duxbury J, Thakker N, Sloan P. Evaluation of screening strategies for improving oral cancer mortality: a chochrane systemic review. J Dent Educ 2005; 69:255-65.
29. Epstein JB, Zhang L, Rosin M. Advances in the diagnosis of oral pre-malignant and malignant lesions. J Can Dent 2002; 68:617-21.
30. Novel SJ. Management of oral cancers. A paradigm predictive oncology. Clin Med Res 2004; 2:233-42.
31. Mirza T, Muhammad IA, Mirza T et al. Histological spectrum of oral leukoplakia ; a clinicopathological perspective. Pak J Otolaryngol Head Neck Surg 2007; 23:37-9.
32. Wong DT Salivary diagnostics powered by nanotechnologies, proteomics and genomics. J. Am Dent Assoc 2006; 137:313-21.
33. Li Y, Zhou X, St John MAR, Wong D.T. RNA profiling of cell free saliva using micro array technology. J Dent Res 2004; 83:199-203.
34. Li Y, St. John MAR, Zhou X .et al. Salivary transcriptome diagnostics for oral cancer detection Clin Cancer Res 2004;10:8442-50.
35. Lee Y.H, Wong D.T. Saliva; an emerging biofluid for early detection of diseases. Am J Dent 2009; 22(4);241-8.
36. Zhang L, Xiao H, Wong D.T. Salivary biomarkers for clinical application. Mol Diagn Ther, 2009; 13(4);245-59.
37. El- Naggar AK, Mao L, Staerkel G et al. Genetic heterogeneity in saliva from patient with oral squamous carcinoma: Implications in molecular diagnosis and screening. J Mol Diagn 2001; 3:164-70.
38. Li PH, Chong YC, Huang MF, Tai KW, Chau MY. Mutation of P53 gene codon 63 in saliva as a molecular marker for oral squamous cell carcinoma. Oral Oncol 2000; 36:272-6.
39. Epstein J.B, Zhang L, Rosin M. Advances in the Diagnosis of Oral Premalignant and Malignant lesions. J Can Dent Assoc; 2002; 68(10):17-21.
40. Kao. S.Y, Chu Y.W, Chen Y.W, Chang K.W, Liu T.Y. Detection and screening of Oral Cancer and Pre-cancerous Lesions. J. Chin Med Assoc; 2010; 72(5); 227-33.
41. Scully. C, Bagan J.V, Hopper. C. Epstein J.B. Oral Cancer; Current and future diagnostic techniques. Am J Dent: 2012:21; 199-209.
42. Shpitzer. T, Hamzany. Y, Bahar. G, Feinmesser, Savulescu. D, Borovoi. I, Gavish. M, Nagler R. M; Salivary analysis of oral cancer biomarkers; British J of cancer; 2011 ;101;1194-98.
43. St. John MAR, Li Y, Zhou X et al. Interleukin – 6 and interleukin – 8 as potential biomarkers for oral cavity and oropharyngeal squamous cell carcinoma. Arch Otolaryngol Head Neck Surg 2004; 130:929-35.

Pakistan Journal of Otolaryngology 2013; 29 : 59-61

Case Series

Postoperative Mastoid Fistulas Managed by Fistulous Tract Excision and Cavity Obliteration by Epicranial Aponeurosis & Temporalis Fibromuscular Flaps

*Sudhir M. Naik, **Sarika S. Naik

ABSTRACT: OBJECTIVE: Discharge free mastoid cavity with good healing is the aim of all canal wall down (CWD) procedures. Post aural fistulas after CWD mastoidectomies can be successfully treated by fistula tract excision and obliterating the mastoid cavity. SETTING: Department of ENT, Head & Neck Surgery, KVG Medical College, Hospital, Sullia, Karnataka, India. CASE REPORTS: 3 cases of post CWD mastoid fistulas which were discharging were taken for fistula excision and cavity obliteration under general anaesthesia. RESULTS: All 3 cavities and fistulas were obliterated by scalp epicranial aponeurosis and temporalis fibromuscular flaps. In one case these flaps were augmented by fascia lata. CONCLUSION: Post aural mastoid fistula resulting from complications of CWD mastoidectomies can be treated successfully by fistula excision and cavity obliteration by combined epicranial aponeurosis and muscle pedicled flaps.

Key Words: Mastoid fistula, Cavity obliteration, Temporalis fibro muscular flap, Canal wall down technique, Epicranial aponeurosis flap.

INTRODUCTION: Post aural mastoid fistula can occur as a complication of unsafe type of CSOM or a canal wall down tympano-mastoidectomy[1,2]. Simple skin to skin closure of the scarred fistula often is not successful as it may end up in a larger fistula due to its necrotic edges[1]. The long term results depend on the technique of obliteration of the mastoid cavity[2]. Well healed and discharge free mastoid cavity is the end result of all canal wall down mastoidectomies[3]. The surgical techniques which are meticulously needed to ensure complete mastoid cavity healing include complete disease clearance, adequate lowering of the facial ridge, good meatoplasty and closure of the perforation of the tympanic membrane[3]. The incidence of discharging mastoid cavity after a canal wall down (CWD) procedure is between 10-66%[4,5]. This technique of open cavity mastoidectomy carries the potential of unhealed cavity resulting in chronically discharging ear[4,5]. So various methods practiced to enhance healing after CWD procedure include partial or complete obliteration of the mastoid cavity[6]. The surface of the mastoid cavity derives its vascularity and nutrition from the bare bone surface and the obliteration of the cavity using vascular tissue flaps aids in this process[6]. At the end of the CWD procedure the cavity is polished with diamond bur which smoothens the cavity but devascularises it compromising its epithelial regeneration[7]. Size of the discharging surface decreases drastically after cavity obliteration and the epithelial regeneration of the remaining surface are fastened if vascular pedicled graft is used[7]. Recurrent cholesteatomas are identified with difficulty in an obliterated cavity and preferred only after complete disease clearance[7]. The main idea is to decrease the size of the mastoid cavity which leads to better healing of the cavity due to good vascularity[3]. The rate of healing of the cavity becomes faster after obliteration[3]. The main disadvantage of cavity obliteration is failure of early detection of cholesteatoma recurrence and a remote risk of intracranial complications[3]. Pure tone audiometric analysis documented no increase in hearing in cavity obliterated patients compared to non obliterated patients[3].

CASE REPORTS: *Case1:* The patient was a 49 year old male and had CWD mastoidectomy done 21 years earlier and had a left sided postaural mastoid fistula. The meatoplasty opening was closed and endoscopic examination of the mastoid cavity through the fistula showed recurrent flakes of cholesteatoma. *Case 2:* The patient was a 37 year old male and had CWD mastoidectomy done 6 years back and had a right sided postaural mastoid fistula. The meatoplasty

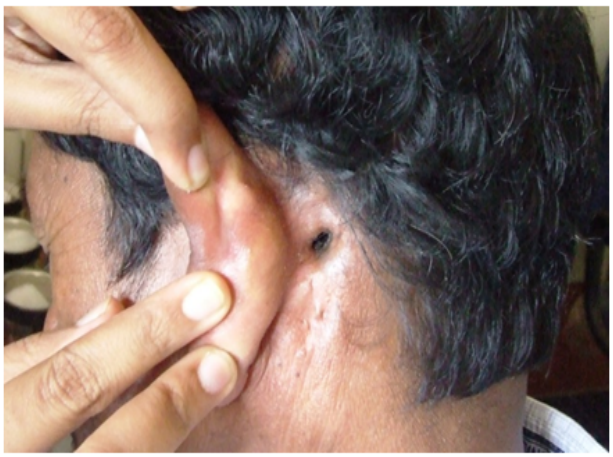


Figure 1: Post aural mastoid fistula left sided.

*KVG Medical College, Sullia , Karnataka, Narayana **Hrudayalaya, Bangalore, Karnataka.

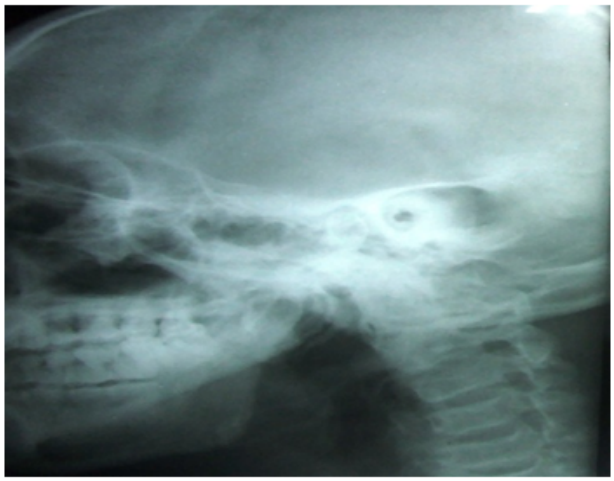


Figure 2: X –ray of post operated CWD cavity.

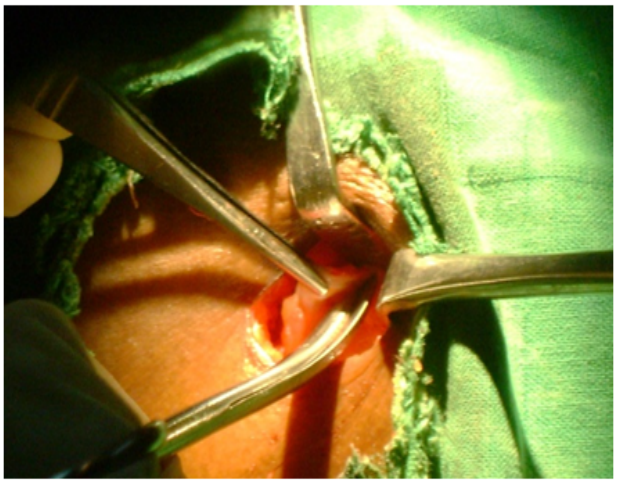


Figure 3: Fascia lata being harvested to augment the flaps.

opening was narrowed and recurrence of cholesteatoma seen.

Case 3: The patient was a 42 year old male and had CWD mastoidectomy done 12 years earlier and had a left sided postaural mastoid fistula. Here the meatoplasty was completely closed with the fistula discharging.

RESULTS: All the 3 patients were given antibiotics and discharged on the third day. Meatoplasty and the obliterated cavity were observed on follow up. The fistula healed very well after scar excision. The discharging cavity reduced in size and recurrence of cholesteatoma was not seen on 12 months of follow up.

DISCUSSION: The main objectives of mastoid surgeries are complete disease clearance and reconstruction of the hearing mechanism and to prevent recurrence[8,9]. Mastoidectomy procedures are divided into two types depending on whether the posterior canal wall is kept intact or removed[10]. In canal wall down mastoidectomy (CWD) posterior canal wall is removed and in intact canal wall (ICW) mastoidectomy posterior canal wall is kept intact[10]. Recurrence of cholesteatoma is usually due to incomplete disease removal during surgery from the middle ear[11]. Factors well known in causing recurrence in canal wall down procedures include inadequate meatoplasty, a high facial ridge, inadequate diseased air cells clearance and failure to exenterate hidden cholesteatoma fragments completely[12]. The suppuration in the remaining tissues and obstructive mechanical factors enhances the accumulation of the debris in the cavity causing discharge[13]. Thus, incomplete disease clearance during mastoidectomy has been recognized as a common cause of failure in patients, with or without cholesteatoma[13,14]. The incidences of recurrent cholesteatoma are seen in 21-25% of cases post operatively[11]. Recurrent cholesteatomas are more aggressive in pediatric population than in adults[10,15]. To avoid cavity problems even in unsafe CSOM with small cholesteatomas ICW mastoidectomy is preferred after complete disease clearance[9]. The incidences of recurrent cholesteatomas are higher in ICW procedures compared to CWD procedures done for unsafe CSOM[9]. Normal canal wall, middle ear anatomy and functions are maintained in ICW procedures but still the remnant squamous epithelium left over during surgery due to poor visibility or technique may lead to recurrence[16,17]. The creation of an open cavity with CWD procedure which includes wide meatoplasty reducing future risk of post surgical cholesteatomas causing complications as it can be inspected easily[11]. Relapses in the mastoid cavity can be prevented but residual cholesteatoma in the middle ear should be re-explored to prevent complications[11]. The CWD technique is more difficult to perform earlier during the disease process[15]. The disadvantages associated with CWD mastoidectomy include life long mastoid care and the possible recurrence of discharge[15]. Because post surgical cholesteatomas originate from the epitympanum, they usually are found in the attic or pars flaccida[14]. Recurrent cholesteatomas should be evaluated by a careful medical history, otomicroscopy and CT Scan of both the mastoids[14]. CT appreciates the bony changes and the soft tissue densities within the mastoid and the middle ear[14]. On diagnosing the recurrent cholesteatoma treatment goal should be to remove the matrix completely and repair any relevant structures to prevent damage to the ossicles and tympanic membrane and to prevent further recurrence[14]. The surgical technique of CWD mastoidectomy depends on the extent of the cholesteatoma of the ear, the amount of pre-operative destruction and the extent of mastoid pneumatization[14]. The problems of the discharging mastoid cavity can be reduced by obliterating the cavity and also closing the fistula from above and re-enforcing it from below[18]. Several methods of cavity obliteration are proposed[18]. Many methods used include free and pedicled skin grafts[18], temporalis muscle flaps, bone chips, bone pate, cartilage grafts, non absorbable synthetic substances, ceramic powder and autologous cultured epithelial cells[3]. Skin grafts used split thickness and pedicled

grafts failed in most of the cases as they necrosed and sloughed off resulting in persistently discharging cavity[4]. Bone grafts were proved unsuccessful because complete absorption of the grafts and problems at the donor site[4]. These two grafts failed because the lack of adequate vascularity within the cavity prevents the integration of the grafts[4].

Dermo-adipose tissues used to fill the cavity failed to heal the cavity as they became incompatible on crushing and harvesting a huge amount was a problem[4,18]. The musculo-periosteal flap and pedicled temporalis muscle flaps gave good results in the initial months but later shrinked in size due to disuse atrophy resulting in partial formation of the mastoid cavity[18,19]. The flaps of the superficial and deep fascia of the scalp which includes epicranial aponeurosis and loose areolar tissue are also used to obliterate the CWD cavity because of the rich vascularity of the scalp[20]. The subaponeurotic layer can be used alone or along with the pedicled temporalis muscle flaps depending on the desired thickness of the flap[20]. The scalp flaps are supplied by superficial temporal and posterior auricular arteries[20]. The use of epicranial aponeurosis can be folded upon itself or with muscle flaps gives very good results on obliteration of CWD mastoid cavity[20].

The post-auricular scar for cavity obliteration is more posterior compared to the initial mastoidectomy scar but is hidden among the hair and chances of alopecia is remote as dissection is done meticulously while harvesting the flaps[1]. We used epicranial aponeurosis with pedicled temporalis muscle flap in the 3 cases of post CWD mastoid fistula[3]. The steps include postaural incision, excision of the fistulous tract, complete saucerization of the cavity and reducing the facial ridge. Later a wide meatoplasty with conchal cartilage excision is done[3]. Now the aponeurosis flaps are harvested and rotated along with temporalis muscle pedicled flap[3]. In one case the flaps were augmented with fascia lata. The muscle and fascial grafts shrink and forms a fibrous coating which supports the growth of epithelium from the edges[3]. The patients were discharged on 3rd day with antibiotics prescribed for three weeks. The patients were followed up for 6-12 months and all the three showed good fistula healing with drastically reduced cavity discharge on meatoplasty examination.

CONCLUSION: Post aural mastoid fistula resulting as complications of CWD mastoidectomies can be treated successfully by combined aponeurosis flaps and muscle pedicled flaps. These flaps are safe, well vascularized, malleable and easily adaptable to the bone cavity. The complications and morbidity are minimal on follow up. Long term results are good with good fistula healing and reduced cavity problems.

REFERENCES:

1. Luetje CM: Postauricular mastoid cutaneous fistula: a method of closure. Otolaryngol Head Neck Surg. 1980;88(1):90-2.
2. D Franco, T Franco, LFG Fernandes, CSC Da-Silva. Galeal flaps for mastoid fistula: Journal of Otolaryngology Rev.Bras. Otorinolaringol. 67:6 São Paulo:2001.
3. Wadhwa V, Anand TS, Kumar S. Periosteo-temporofacial flap for cavity obliteration:Ind J of Otolaryngol Head and Neck Surg 55;3, 2003.
4. Beales PH, Hymes W. Rapid healing after mastoid surgery by use of post-auricular flap. Jour of Laryngol and Otlogy, 1958, 72: 888-901.
5. Mills IP, Phil M. Surgical management of discharging mastoid cavity. Journal of Laryngology and Otology,1998: 102 :1-6.
6. Mosher HP. A method of filling the excavated mastoid with a flap from the back of the auricle. Laryngoscope, 1911, 21:1158-63.
7. Gibb AG, Tan KK, Sim RST. The Singapore swing.Jou of Laryngology and Otology.1997,111: 527-30.
8. Shinkawa A, Sakai M, Tamura Y, Takahashi H, Ishida K. Canal-down tympanoplasty: One-stage tympanoplasty with mastoid obliteration, for non-cholesteatomatous chronic otitis media associated with osteitis. Tokai J Exp Clin Med 1998;23:19-23.
9. Nadol JB, Boston MA. Causes of failure of mastoidectomy for chronic otitis media. Laryngoscope :1985;95:410-3.
10. Kinney SE. Five years experience using the intact canal wall tympanoplasty with mastoidectomy for cholesteatoma: Preliminary report. Laryngoscope 1982;92:1395- 1400.
11. Sanna M, Zini C, Scandellari R, Jemmi G. Residual and recurrent cholesteatoma in closed tympanoplasty. Am J Otol 1984;5:277-82.
12. Cheesman AD. Changes in otological teaching following analysis of failures in surgical technique. Clin Otolaryngol : 1978;3:233-7.
13. Nadol JB, Boston MA. Causes of failure of mastoidectomy for chronic otitis media. Laryngoscope :1985;95:410-3.
14. Pillsbury HC, Carrasco VN. Revision mastoidectomy. Arch Otolaryngol Head Neck Surg. 1990;116:1019-22.
15. Sheehy JL. Cholesteatoma surgery: Canal wall down procedures. Ann Otol Rhinol Laryngol 1988;97:30-5.
16. Palva T. Surgical treatment of chronic middle ear disease III :Revisions after tympanomastoid surgery. Acta Otolaryngol :1988;105:82-9.
17. Hough J. The canal wall up or down debate. The case for the canal wall down mastoidectomy. J Laryngol Otol 1983;97:Suppl 8:92-4.
18. Thorburn IB: A clinical review of tympanoplastic surgery. Jour of Laryngology and Otology, 74: 453-74.
19. Frerisch DW, Williams GV: One – stage endaural musculo tympanoplasty. Archives of Otolaryngology,1962:76: 35-43.
20. Gierek T Klimczak-Golab L. Use of temporal fascia pedicle flap for the reconstruction of the posterior wall in the external auditory meatus and mastoid cavity obliteration of the process in the surgical treatment of cholesteatoma in COM. Otolary Pol, 1998;52 (6): 645-8.

Pakistan Journal of Otolaryngology 2013; 29 : 62-66

Case Series

Cochlear Implantation Program Among Nigerians (Black Africans)

Y.B. Amusa, A.O. Adeniji, J.A.E. Eziyi, T.O. Olarinoye, A.O. Adeyemo, Grace Ogunniyi

ABSTRACT: OBJECTIVE: We report the first ever Cochlear Implantation (CI) program among the Nigerians (black Africans), using the short electrode implant and the minimal access surgery technique, the peculiar challenges encountered as a developing country are also discussed. PLACE AND DURATION OF STUDY: Department of Otorhinolaryngology, College of Health Seiences, Obafemi Awolowo University, Ile-Ife, Nigeria, during Jun 2008 and May 2011. PATIENTS & METHODS: We retrospectively reviewed the case notes of the eight patients who had CI followed by speech rehabilitation between 2008 and 2011 in our centre. We obtained information on demography, socioeconomic status, source of funding for the implant, clinical presentation, aetiology, high resolution petromastoid computerized tomography (HRCT), surgery, outcome of surgery, and rehabilitation. RESULTS: Eight patients were implanted in this study, onset and etiology of the deafness varied. All had a successful implantation with no major postoperative complication noted and they developed environmental sound awareness and speech discrimination with a variable degree of expressive language where applicable. Outcome in the postmeningitic deafness was also impressive despite minimal cochlear fibrosis. CONCLUSION: Our CI was effective for aural rehabilitation of profound sensorineural hearing loss caused by all the etiological agents in this review. We had various challenges ranging from logistics, facilities, manpower, others related to our poor resource setting. As cochlear implant technology evolves and surgical techniques continue to improve, our center will continue its efforts to provide effective hearing.

Key Words: : Cochlear implant, Short electrode, Black Africans, Challenges.

INTRODUCTION: Practicing otologists among the black Africans have over the years been helpless in achieving meaningful rehabilitation of the profoundly deaf who form a major part of their clinic as many of such patients over the years return home with their parents or guardians without any definite hope of restoration of their hearing or meaningful rehabilitation within reach. Such was the common experience at the dedicated deaf clinic of our center prior to the year 2008 as most sessions with patients and parents end up with them crying out of disappointment. Worldwide, the journey out of frustration for the profoundly deaf started as early as 1957, when Djourno and Eryies observed that activation of the auditory nerve with an electrified device provides auditory stimulation in a patient[1]. Doyle and Doyle's early experiments of 1963, on the scala tympani preceded the first House/3M single channel implant of 1972[2]. Blair Simmons in 1964 at California succeeded in the surgical placement of a 6-electrode array in the modiolus of a human volunteer[3]. In 1984, the US food and drug administration (FDA) approved the use of the House-3M single-channel implant, then the multichannel Nucleus 22-channel implant for adults and then children in 1985 and 1990 respectively. A multichannel cochlear implant consists of two parts, a receiver stimulator implanted in the temporal bone consisting of a receiver coil with an electrode array inserted into the cochlea, and an external device. The three main components of the external device are the microphone, speech processor and a transmitter coil conveying signals from the processor across the skin to the electrode array (Figure 1). The microphone picks up sounds and transfers them to the speech processor. These sound signals are analyzed and converted to a form suitable for transmission by the processor. In most devices these transformed signals reach the electrodes by radio-frequency transmission from the transmitter coil resting on the head to the implanted receiver coil. Profound deafness in the majority of cases results from damage to the sensory cells in the 'Organ of Corti' in the inner ear, due to various causes. CI helps this group of patients since it bypasses the damaged part of the auditory pathway and stimulates the surviving spiral ganglion cells directly with electrical signals. The aim of this was to simulate the activity of normal cochlea, by stimulating the tonotopically arranged surviving neural elements resulting in a significant improvement in the speech perception capability. The various efforts made to improve on the multichannel implant have led to the development of this full spectrum implant used in this series. The cochlear implant is the only medical intervention that can restore hearing to a totally deaf person, as of April 2009, approximately 188,000 people worldwide had received cochlear implants[4]. In the United States, about 40,000 adults and over 30,000 children are recipients[5]. Whereas, in the sub-Saharan Africa there is no documentation of any cochlear implantation completely programmed locally until this report. Many reasons can be adduced for this, ranging from manpower, the technical skills, as well as the cost. The cost of implant device alone, excluding surgery and rehabilitation, is priced between US $15,000 and US $35,000 depending on the implant type and the

Otorhinolaryngology Department, College of Health Sciences, Obafemi Awolowo University, Ile-Ife, Nigeria.

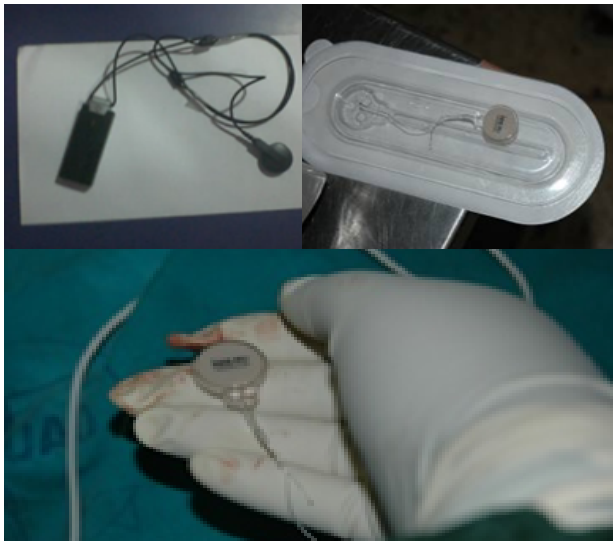


Figure 1: Cochlear implant.

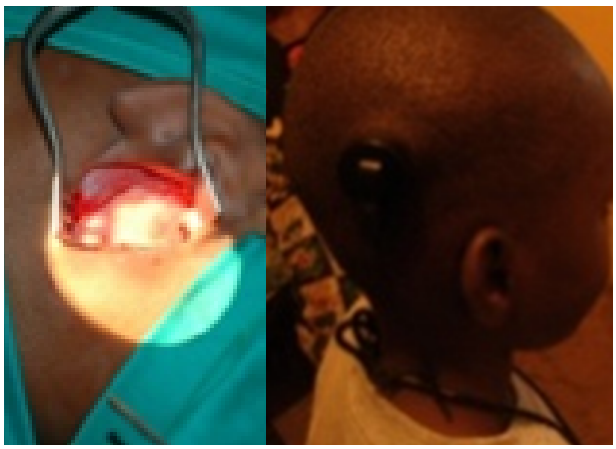


Figure 2: During and after surgery.

specific market. Arguably due to this high cost, majority of the beneficiaries are in the advanced countries of the world. Presently cochlear implant program is already in Egypt, Republic of South Africa and recently Nigeria which we now report. According to the World Health Organization (WHO), more than 80% of the world's 120million people who have disabling hearing difficulties live in developing countries. With a personal average annual income of well below US $2,000, the present cochlear implant is virtually unavailable for deaf people in developing nations especially the black Africans. This article documents the Nigerian experience (the black Africans) with the cochlear implantation program as a resource challenge country without any previous national policy for this program.

PATIENTS AND METHODS: We retrospectively reviewed the case file of the 8 patients who had cochlear implantation done followed by rehabilitation in our centre. The study period was between June 2008 and May 2011.We obtained information on the patients' bio data, clinical presentation, diagnosis, Pure Tone Audiometry, Tympanometry, Otoacoustic emission (OAE), Auditory Brainstem Evoked Response (ABR), high resolution petromastoid computerized tomography (HRCT) to establish the patency of the cochlea[6], implant type, surgical procedure, outcome of surgery, complications and speech rehabilitation from the patients' case files. The outcome after speech rehabilitation was divided into six depending on whether the patients did not respond to sound, responded to sound at low frequencies only, responded to sound at high frequencies only, responded to sound across all frequencies, developed reasonable speech, did not develop speech. Data regarding the age and aetiology of deafness of the study group are as shown in Table 1.

THE DEVICE: The cochlear implants are surgically implantable electronic devices for stimulating the spiral ganglion via the cochlea in hearing impaired patients. They are manufactured by a few companies worldwide and are in Australia, Austria, France, South Korea, Spain and United States of America. The cost-effectiveness of the device and the surgery remains the major factor considered in determining who among the many potential candidates get implanted. The CI type ienjoysound(ies)-250 manufactured by Material Solutions Technology Co., Ltd. of South Korea was implanted in all the patients. It is simple, cost-effective; it has a short electrode and provides a full spectrum of hearing as well as the preservation of residual hearing of the patient. The relatively simple technique of implantation makes it easier for relatively younger otologists with less experience in inner ear surgeries. Presence of after sale service also made it more reassuring to us. The products are approved by CE, KFDA and ISO.

THE TEAM: Our CI team comprised of the ENT surgeon, Audiologist/ Speech therapist, Psychologist, Social workers, Radiologist, Pediatricians, Teachers for the deaf, Psychiatrists, Neurologist, Anesthetist, and Implant nurses. Our team had to bear several burdens but majorly resting upon the surgeon and the speech therapist. Absence of the diagnostic facilities necessary for the preoperative assessment of the implant patient was an initial task for the patients and the team. Fund was as always a major problem we had to contend with. The team was headed by the Head of Ear, Nose and Throat Surgery; an Otologist, supported by other ENT surgeons and resident doctors. All surgeons had earlier repeated refresher courses in temporal bone dissection anchored by local and international faculties, so as to get more acquainted with middle and inner ear anatomy, and surgical techniques. Our audiologist who performed the speech therapy had special overseas training course for rehabilitation of the cochlear implant patients. Other members of the team were encouraged to participate fully, especially the social worker for follow up of the patients. We had a robust technical support by the manufacturer especially at the initial period.

INTERVENTION:

(A) PRE-OPERATIVE EVALUATIONS. This included the Pure tone audiometry, Free field audiometry, Otoacoustic emission (OAE), Auditory brain stem response (ABR) testing were ordered as required. Complete medical history and physical examination

Figure 3: Age at implantation (Yrs).

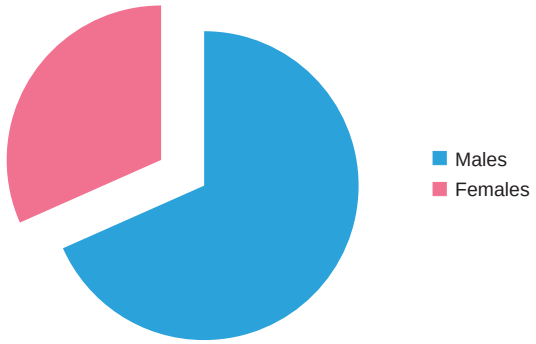


Figure 4: Sex distribution.

were performed to ensure that the patient was fit for anaesthesia and to rule out other congenital anomalies. A full head and neck examination was also carried out to rule out the presence of an active middle ear disease. Examination of all other systems especially the eye was done in the congenital deafness and the cerebral palsy. Computerized tomography scan was done to image the structure of the cochlea and identify any abnormalities or malformation. It had been said that severe abnormalities may present surgical challenges but do not necessarily preclude patients from CI surgery. One case of cochlear fibrosis was found in the patient with meningitis. Psychological evaluation was also carried out to assess the child's cognition function to rule out factors other than hearing impairment which may be inhibiting child's auditory development such as learning disorder. Neurological evaluation was also done by the other members of the team. The patients and relations were adequately counseled on expectation and a specially prepared and administered informed consent document was obtained before surgery.

(B) SURGERY: The hypotensive general anaesthesia was employed in all the cases as widely used[7]. The conventional cochlear implantation procedure involves either a cortical mastoidectomy and facial recess approach[8], or a cortical mastoidectomy and hypo-tympanotomy approach[9] to access the promontory, this however usually necessitates raising of a large scalp flap, also the facial nerve is at risk of damage. One of the unique features of this implant is that the surgical procedure for the implantation was by the simplified and less invasive minimal access technique in which neither of the usual approaches were used but, via a minimal postauricular incision, with raising a tympanomeatal flap followed by mobilizing the fibrous annulus of the tympanic membrane out of the tympanic sulcus. From here the promontory is identified and using the skeeter drill, the cochleostomy perfomed and from here only about 6mm of the tip of the electrode of the cochlear implant is inserted (short electrode insertion). Both the technique of the surgery and the technology of the implant are simpler, and poses no danger to the facial nerve and preserves residual hearing of the patient because only a short portion of one electrode is implanted into the base of the cochlea using the iES 250 device.

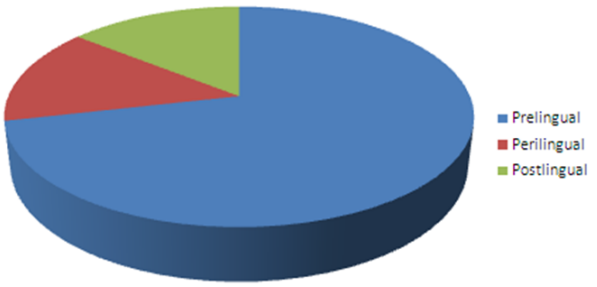


Figure 5: Onset of deafness.

RESULTS : Eight patients had cochlear implantation followed by rehabilitation over the study period. Age range at implantation was between 14 months and 19 years (see Fig. 3). mean age was 8 years. There were 5 males and 3 females; sex ratio was 5:3 (Fig. 4). The male preponderance in this study is consistent with previous similar studies in West Africa[10]. Onset of deafness: Pre, Peri and Post lingual is depicted in Fig. 5.

AETIOLOGY: The predominant causes of deafness preventable causes as 7 out of the 8 patients who had the implantation had acquired deafness. Workers in this environment had earlier found acquired deafness to be the most predominant[11]. Measles was the cause in 12.5% of our patients and this is comparable with a figure of 19.3% in the causes of childhood deafness in Nigeria[12] and more recently 13.9%[13]. Meningitis is still a major cause of preventable deafness as it is said that 15% of patients who survive acute bacterial meningitis develop neurological sequelae, and permanent sensorineural hearing loss account for approximately 75% of these cases[11,14].

POST IMPLANT RESPONSE: Implantation of the device is usually followed by its switch on and mapping after a period of 6weeks, however 'switch on' was done within 24 hrs- 5days post-operatively in all our patients and it was successful in all the patients, this is because of the simple nature of the procedure with minimal raising of flap and therefore less oedema over the internal device. The 'switch on' was followed by a final 'hook on' and mapping This is then followed by the auditory verbal training which is given by the speech therapist intensively. At the initial switch on and the final hook on and mapping, response was 100% as all the patients responded to sound. The

S/N	Age (yrs)	Aetiology	No. of Patients
1	9	Congenital	1
2	4	Post Measles	1
3	12	Post Traumatic	1
4	19	Post Meningitis	1
5	3	Post febrile illness	2
6	1.2	Post Cerebral palsy	1
7	8	Uncertain	1

Table 1: Showing the age at implantation and aetiology of deafness of the patients implanted.

Outcome Measure	No of Patients
No response to sound	None (0%)
Responded to sound at low frequencies only	None (0%)
Responded to sound at high frequencies only	None (0%)
Responded to sound across all frequencies	8 (100%)
Developed reasonable speech	5(62.5%)
Has not develop speech	1 (12.5%)

Table 2: Table showing response of patients.

auditory verbal training was generally done intensively, and patients had to stay in or close to the hospital for the first 6 weeks, following this the patients were given appointments monthly, then 3 monthly, then twice in a year depending on how well they were responding. Our rehabilitation was however individualized to cater for the needs of each of the patients, the patient from the neighboring African country was discharged a week after the switch on and mapping. The care givers were also educated on the rehabilitation.

POST REHABILITATION: The outcome after speech rehabilitation was divided into six depending on whether the patients had responded to sound and at which frequencies, as well as speech development. One of the patients was however not available for assessment at the time of putting up the paper, this patient was the one who was brought in from the neighboring African country. There was a good response to sound across all frequencies in most patients, there was however poor perception in the high frequency range for the post menigitic deafness in the initial period (this is explainable by the affectation of the basal turn of the cochlea by the fibrosis), this however gradually improved over time. Audiological evaluation was also challenging occasionally in the post cerebral palsy and the same patient had a poor speech development despite evidence that he perceived sound (Table 2). Overall, all the patients responded to sound, while those above 4 years were already making simple sentences within 12 months of commencement of the therapy. The star patient was the 19year old with post meningitic deafness, he attended the national conference of the Otolaryngologists (ORLSON) of our country about 8months after the implant surgery and there he was able to jot down notes!

COMPLICATIONS: There was no major complication in our report. The report by MRC institute of Hearing Research on the evaluation of the national cochlear implant program confirmed that the occurrence of major complications was acceptably low[15]. In our series, two patients had psychological breakdown, in one of these patients who had post meningitic deafness, his understanding of speech did not occur as fast as he expected and he wanted to sit for the post university examination interview, he was however promptly attended to by the other members of the team, in the second patient it appeared to be constitutional. Two of the patients were not complying with rehabilitation appointments; this still occurred despite using acceptable standards for our candidacy. External auditory canal flap necrosis occurred in one of the patients necessitating a supervised sterile clinic aural toileting leading to re-epithelialisation within a few weeks. Functioning of the implant (battery) was poor in one of the paediatric patient, and this was probably due to erratic power supply for charging the implant battery or the use of direct current (generator) to charge the implant battery, or both and this had been replaced the company. There was no case needing re-implantation. The simple nature of the procedure; avoiding mastoidectomy, good candidate selection, preoperative preparation coupled with meticulous surgery may be responsible for the good outcome and absence of major complications. However, it is also true that the relatively small number of our series may also contribute. Post implant CT scan was also done in two of the patients and the implant was found to be in place.

CANDIDACY: Our criteria used for selecting patients are similar to those obtained worldwide with slight modification and emphasis on funds and good social support, and this included that : None of our patients was less than 12 months, confirmed diagnosis of profound sensory neural hearing loss, with an intact eight nerve function demonstrable by ABR, with a patent cochlea. There was however partial cochlear ossification in one of the patients demonstrated on the HRCT scan, in this patient, the etiology was the meningitis, the procedure was however successful but he had deficiency in hearing at high frequency. There should also be no contraindication to elective surgery and general anaesthesia.

CHALLENGES ENCOUNTERED: During the process of commencement of the OAUTHC CI programs some of the challenges encountered included:

Logistics: Absence of facility the ABR, OEA was a major challenge for which we had to make arrangement for our patient to go to Lagos (about 250kilometers away) for the tests. Vaccination: Meningococal vaccine which was given to all the patients in which it was required had to be source from the Northern part of Nigeria a distance of more than 400kilometers as it was not readily available.

COST OF IMPLANTS: This was by far one of the most important challenges we faced. The number of patients attending the dedicated deaf clinic of our center was well over four hundred and only a few of these prospective candidates could afford the cost of the implant.

REHABILITATION: Facilities for Rehabilitation was not fully available as our audiology room also doubled as the speech therapy clinic. We did not have a dedicated speech therapist for the auditory verbal training but through our motivation and overseas training our audiologist was able to perform the

auditory verbal training for our patients. *FUNDING:* This was a big problem throughout the program. Skepticisms from the people: This was expressed initially by some of the patient's relatives and even some members of the medical community since this is a very new introduction in Nigeria medical practice.

CONCLUSION: The CI program of our center among the black Africans is very successful despite many odds against it. The simple nature of the implantation technique, the advanced nature of the technology coupled with the relatively cheaper cost makes it the implant of choice in any part of the world. The main report by the MRC institute of hearing research on the evaluation of the national cochlear implant program in UK confirms with relevant data the benefits of cochlear implants for the rehabilitation of deaf patients[15]. At this phase of CI program in Nigeria which serves the entire black Africans it is highly beneficial to the patients and is therefore a welcome development, but is faced with myriads of challenges ranging from social, financial, manpower, to policy issues and others related to a poor resource setting. We recommend institutionalization of Nigerian Cochlear Implant Group (NCIG) which has already been kick started by the OAUTHC CIG, establishment of Ear health commission under the Federal and State governments and that, funding for cochlear implantation and rehabilitation must be provided by this body following a positive assessment by the specialist cochlear implant centre. There is need for equipping the several otolaryngology centers with up to date audiological facilities to aid in hospital diagnosis and help in community hearing screening. The availability of these facilities will help to improve our management outcome further. In addition, we recommend this implant type with its surgical technique for patients in whom it is indicated due to its numerous advantages. It is also hoped that international non-governmental organizations will come to the aid of the deaf in the black African countries.

ACKNOWLEDGEMENT: The authors thank Dr Miklu Senapati for his efforts and support in practically establishing the Nigerian Cochlear Implant Group. We thank all the ENT specialists in Nigeria for their support and positive criticisms of our program. Many thanks also to the entire members of the Cochlear Implant team for their invaluable help in this program.

REFERENCES:

1. Djourno A, Eryies C. Prosthese auditive par excitation electrique a distance du nerf sensoriel a l'aide d'un bobinage inclus a demeure. [Auditory prosthesis by means of a distant electrical stimulation of a sensory nerve with the use of an indwelling coil]. Presse Med. 1957; 65: 1417.
2. Doyle J, Doyle D. Electrical stimulation of the nerve deafness. Bulletin of the Los Angeles Neurological Society. 1963;28:148-50.
3. Simmons FB. Electrical stimulation of the auditory nerve in man. Arch. Otolaryngol. 1966; 84: 2-54.
4. Jennifer Davis (2009-10-29). "Peoria's first cochlear implant surgery has grandfather rediscovering life". Peoria's Journal Star. http://www.pjstar.com/features/x876590686/Peoria-s-first-cochlear-implant-surgery has-grandfather-rediscovering-life.
5. Mary Brophy Marcus (2009-08-17). "Eyeing smaller, faster, smarter ear implants". USA Today. http://www.usatoday.com/news/health/2009-08-16-cochlear-implant_N.htm.
6. Phelps PD, Anis JAD, Robinson P J. Imaging for cochlear implants. Br J Radiol 1990; 63: 512-6.
7. G John, JG Toner. Cochlear Implantations in Northern Ireland: An overview of the first five years. The Ulster Medical Journal. 1999; 68: 12-6.
8. House WF. The cochlear implant. In Braekmann D. E (ed): Neurological surgery of the ear and Skull Base. New York: Rave Press, 1982.
9. Michelson RP, Schindler RA: Multichannel cochlear implant: Prelimnary result in man. Laryngoscope1981;91:38-42.
10. Ologe and Akande. Pattern of disabilities in a residential school for the handicapped in Ilorin, Nigeria. Nigerian Postgraduate Medical Journal 2003;10(4):208-10.
11. McPherson B, Holborow CA. A study of deafness in West Africa: the Gambian Hearing Health Project. International Journal of Paediatric Otorhinolaryngology 1985;10:115-35.
12. Holborow C, Martinson FD, Anger NA study of deafness in West Africa. International Journal of Pediatric Otorhinolaryngology. 1982;4: 107-32.
13. AD Dunmade, S Segun-Busari, TG Olajide, FE Ologe. Profound Bilateral Sensorineural Hearing Loss in Nigerian Children: Any Shift in Etiology? J. Deaf Stud. Deaf Educ. 2007;12 (1): 112-8.
14. Brobby G.W Causes of congenital and acquired total Sensorineural Hearing Loss in Ghanaian children. Tropical Doctor 1988;18: 30-2.
15. Summerfield AQ, Marshall DH. Cochlear implantation in the UK 1990-1994. Report by the MRC institute of hearing research on the evaluation of the national cochlear implant program. 1995;63:89, 171-85.

Pakistan Journal of Otolaryngology 2013; 29 : 67-68

Case Report

Aberrant Cervical Thymic Cyst - Case Report

*Mohamed A.B. Al-Ahmari, *Ali S. Al-Mastour, **Wagih M. Ghnnam

ABSTRACT: The objective of this study is to highlight the embryological development of cervical remnants and to report a case of thymo-cervical duct cyst. Cervical ectopic thymic tissue is rarely reported. However, it should be included in the differential diagnosis of neck masses especially in children and young adults.
Key Words: Ectopic, Thymic cysts , Neck masses.

INTRODUCTION: Aberrant cervical thymus and cysts are uncommon entities to be considered in the differential diagnosis of neck masses in children and young adults, so a preoperative diagnosis has rarely been made[1,2]. The thymus develops from the third pharyngeal pouch and descends from the neck into the anterio-superior mediastinum. Rarely a rudimentary thymus may develop from the ventral wing of the fourth pharyngeal pouch forming an accessory thymus in relation to the superior parathyroid. Thymus begins involution at puberty. The functions of thymus are mainly for differentiation of lymphoid tissue into T-cells and production of thymosin hormones.Thus it is possible to have thymic remnants in the neck, which most often present as a cervical mass or thymic cysts during childhood and young adulthood[3]. If the mass is located in the lower aspect of the neck the following possibilities must be considered: hypoplasia of the thymus, thymoma, and thymic lymphosarcoma[4]. We report a case of an 18-year old man with a soft, asymptomatic cervical mass of the anterior triangle.

CASE REPORT: An 18-year-old Saudi male was referred to our clinic from surgical clinic with a painless mid cervical cystic lesion of about 4-weeks duration. Prior to referral he was treated for two weeks with antibiotics without appreciable decrease in size. The mass was located above the hyoid bone, about 2cm by 1 cm in size, mildly tender and subcutaneous. There was no regional lymphadenopathy. The initial, tentative, clinical diagnosis was thyroglossal duct cyst or dermoid cyst. Fine needle aspiration was done in the clinic but the histopathological report was inconclusive. Ultrasound of the anterior upper triangle of the neck confirmed cystic lesion of about 1cm by1cm in size (fig 1). The patient underwent complete excision of the mass. During the excision it was discovered that the cyst has two fibrous cords attached to it superiorly and inferiorly (fig 2). The superior cord extended anteriorly and terminates at the symphysis menti of the mandible while the inferior one extended downward and terminates at the thyroid lobe. Histopathological report confirmed a thymic remnant cyst. The postoperative period was uneventful and so far there has been no recurrence.

DISCUSSION: Ectopic cervical thymic cysts are rarely reported in the medical literature[5]. The lesion generally occurs in the line of descent of the thymus from the angle of the mandible to the superior mediastinum[6]. Like the case reported above, the preoperative diagnosis of ectopic thymic mass is seldom considered and these masses are often misdiagnosed as dermoid cyst, thyroglossal duct cyst or lymph nodes[5]. This lesion can occur as thymopharyngeal duct cyst[6]. Kushida et al had reported a case of ectopic harmatomatous thymoma (EHT) in a 19-year old Japanese male[7]. Shah et al also reported a case of acute emergency upper airway obstruction from retro-pharyngeal aberrant mass in a 6-week old infant[8]. At the present time there is no preoperative radiologic test that can identify a neck mass as a cervical thymic cyst[8]. Han BK et al had been able to confirm by ultrasound 5 cases of aberrant thymic tissue and cysts by paying special attention to the echo pattern of the tissue[1,9]. In our own case we were able to confirm diagnosis after surgical excision and histopathological report.

CONCLUSION: Cervical thymic remnants and cysts must always be considered in the differential diagnosis of pediatric and young adults neck masses. Complete surgical excision is the appropriate therapy in majority

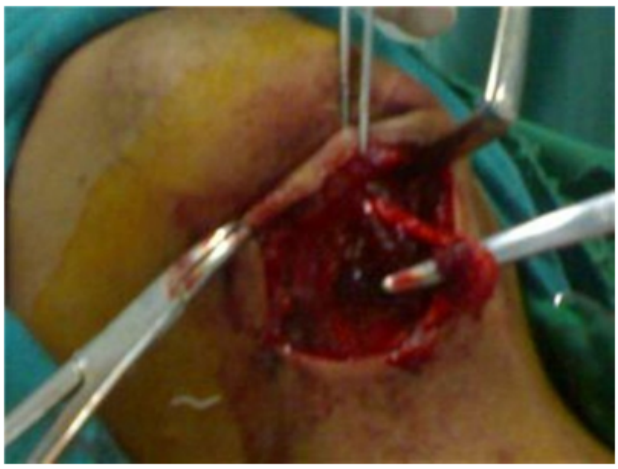


Figure 1: Dissection of the cyst.

*Department of ENT, Head & Neck Surgery, Khamis Civil Hospital, Khamis Mushayt, Saudi Arabia.
**General Surgery department, Mansoura Faculty of Medicine, Mansoura University, Egypt.

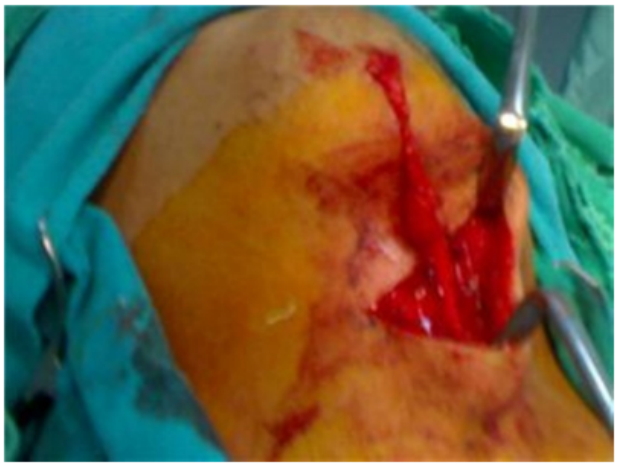


Figure 2: After excision of the upper part.

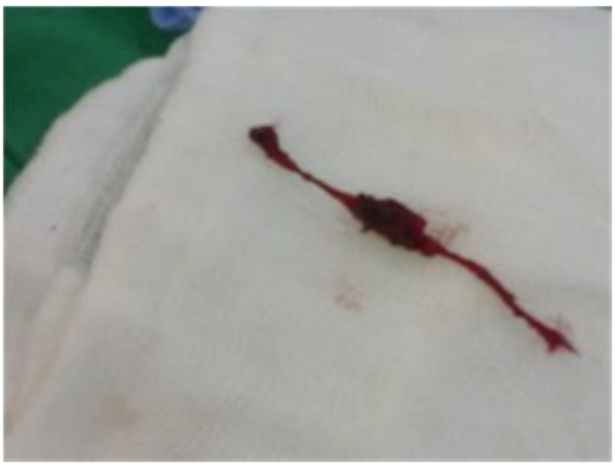


Figure 3: The whole cyst after total excision.

of cases with minimal morbidity when careful attention is paid to vital structures.

REFERENCES:

1. Han BK, Yoon HK, Suh YL. Thymic Ultrasound. Diagnosis of aberrant cervical thymus. Pedia Radiol 2001; 31(7): 480-7.
2. Petropoulus I, Konstantinidis I, Noussios G, Karagianidis K, Kontzogolou G. Thymic cysts in the differential diagnosis of paediatric cervical masses. B-ENT 2006; 2(1): 35-7.
3. Kaufman MR, Smith S, Rothschild MA, Som P. Thymopharyngeal duct cyst: an unusual variant of cervical thymic anomalies. Arch Otolaryngolog Head and Neck Surg. 2001; 127(11): 1357-60.
4. Johnson CM, Cantrell RW. Congenital neck masses. In Gates G.A(ed): Current therapy in Otolaryngology. Philladelphia,WB Saunders Company 1983; 1386-1401.
5. Park JJ, Kim JW, Kim JP, Ahn SK, Jeong JH, Jeon SY. Two cases of ectopic cervical thymus case reports and review of the literature. Auris Nasus Larynx 2006; 33(1):101-5.
6. Kacker A, April M, Markentel CB, Breuer F. Ectopic thymus presenting as a solid submandibular neck mass in an infant: case report and review of literature. 1999; 49(3): 241-5
7. Kushida Y, Haba R, Kobayashi S, Ishikawa M, Doi T, Kadota K. Ectopic harmatomatous thymoma: a case report with immunohistochemical study and a review of the literature. J Cutan Pathol. 2006; 33(5): 369-72.
8. Shah SS, Lai SY, Raucheli E, Kazahaya K, Manboubi S. Retropharyngeal aberrant thymus. 2001; 108(5): E94.
9. Caluwe D, Ahmed M, Puri P. Cervical thymic cysts. Pediatr Surg Int. 2002;18(5):477-9.

Pakistan Journal of Otolaryngology 2013; 29 : 69-71

Case Report

Transoral Surgical Resection of Bilateral Styloid Processes Elongation (Eagle's Syndrome)

*Rohaida Ibrahim, **Khairudin Abdullah, *Shahid Hassan, *Baharudin Abdullah

ABSTRACT: Eagle's syndrome represents a symptomatic styloid process elongation or calcification of stylohyoid or stylomandibular ligament. The symptoms include throat pain radiating to ipsilateral ear or foreign body sensation in the pharynx causing odynophagia and dysphagia. It is commonly unilateral and bilateral cases are rare. We report a case of bilateral elongation of styloid processes treated surgically by transoral approach.

Key Words: Eagle's syndrome, Elongated styloid process, Neck pain.

INTRODUCTION: Elongation of styloid process is defined by Dr W.W. Eagle as styloid process more than 2.5 cm in length. Incidence of styloid process elongation is around 4-7% and only 4% of the patients with elongated styloid process have symptoms[1,2]. Therefore, the actual incidence of Eagle's syndrome accounted as 0.16%. Peak age of incidence is 30 to 40 years[2,3,4]. The diversion of elongated styloid process in relation to its surrounding structures account for a wide range of symptoms of Eagle's syndrome.

CASE SUMMARY: A 59 year old Malay lady presented to ORL clinic with history of persistent throat pain for 5 months duration. She also complained of foreign body sensation and odynophagia. She had reflux symptoms and halithosis as well. There was no history of recurrent fever. Clinical examination of her throat showed bilateral enlarged tonsils grade 2. No inflammation and no exudates on the tonsils were noted. However there was a pale looking mass over superior pole of the left tonsil measured about one by one cm. The same looking mass also present on the right tonsil but smaller. The masses were hard on palpation and tender. She was diagnosed as having bilateral tonsilolith and underwent bilateral tonsillectomy. Intraoperatively, after both of the tonsils were removed, there was a bony hard bulge noted over the left tonsillar fossa by the operative surgeon. She was reviewed 2 weeks post operatively and had some improvement in her symptoms. Histopathology of the removed tonsils reported as chronic inflammation of the tonsils tissue, but no tonsilolith was found. After 3 months she still complaint of persistent throat pain which was even more severe, sharp in nature and exacerbated by swallowing, chewing and jaw movement. However, she did not have any more halithosis and foreign body sensation. Review of her oropharynx showed both of her tonsillar fossa have healed well and there was a prominent bulge on the left tonsillar fossa. Digital palpation over the tonsillar fossa revealed that the bulge was bony hard and exacerbated the left neck pain. No other neck mass was noted. A 3D CT of styloid process was done and

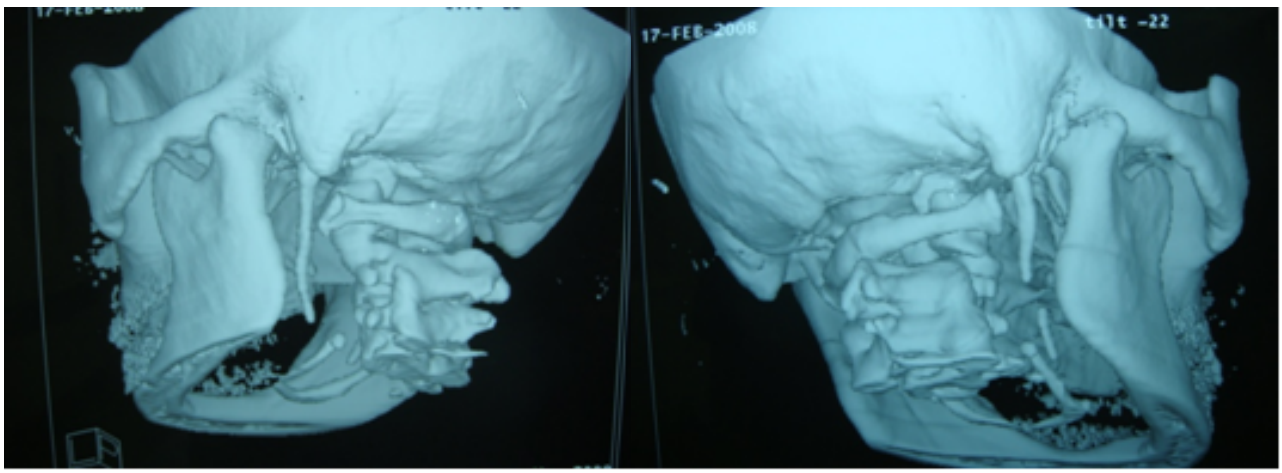


Figure 1: Image of 3D reconstruction of styloid processes showing both styloid processes of the patient to be elongated and pointing medially, 1(a) left styloid process (5cm long) and 1(b) Right styloid process (3 cm long).

Departments of Otorhinolaryngology-Head & Neck Surgery, *School of Medical Sciences, Universiti Sains Malaysia, Kota Bharu, Kelantan, Malaysia. **Hospital Sultanah Nur Zahirah, Jalan Sultan Mahmud, Kuala Terengganu, Malaysia.

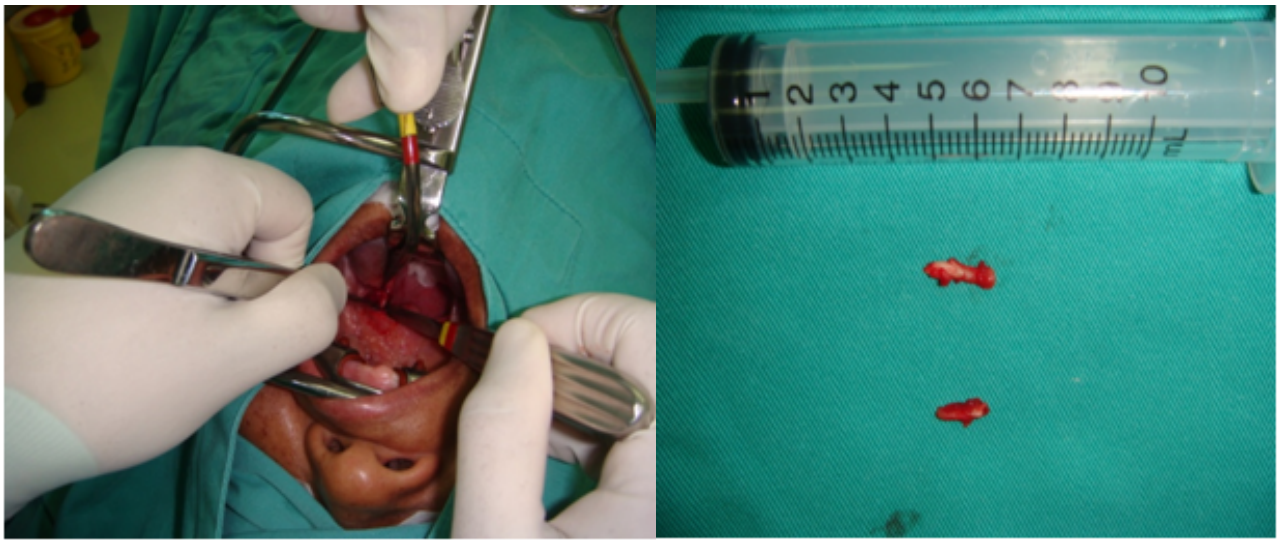


Figure 2: Shortening of both styloid processes of the patient performed via transoral approach , 2(a) skeletonizing of left styloid process, 2(b) part of left styloid process (upper bony specimen) and right styloid process (lower bony specimen) that had been resected.

showed bilateral styloid processes elongation (Figure 1). She then underwent bilateral styloid processes shortening via transoral approach in which 2.5 cm of left styloid and 1.5cm of right styloid were resected (Figure 2). She was reviewed 1 month later and her symptoms resolved.

DISCUSSION: Styloid process arises from temporal bone just anteromedial to stylomastoid foramen. Stylohyoid complex consist of styloid process, stylohyoid ligament and lesser horn of hyoid bone derived from 2nd branchial arch of Reichert cartilage. Three muscles i.e. styloglossus, stylohyoid, stylopharyngeus and two ligaments i.e stylohoid and stylomandibular ligament attached to the styloid process. Styloid process has closed relation to important neurovascular structure in the neck i.e V, VII, IX, X, XI, XII cranial nerves and internal jugular vein. The tip of styloid usually lies between internal and external carotid arteries. The variation of diversion of elongated styloid process may be the cause for wide variety of symptoms in Eagle syndrome's patients[2,4,5]. It can be either medial or lateral angulation and anterior or posterior angulation of styloid diversion. Haluk et al concluded the length and anterior angulation of the styloid process are responsible for the symptoms rather than medial angulation[6]. The most common presenting symptoms are persistent throat pain, foreign body sensation, dysphagia, odynophagia, chronic neck pain, headache and referred otalgia[2-7]. The exact mechanism leading to pain in Eagle's syndrome is still uncleared but several postulations have been given. These include compression of glossopharyngeal nerve, degenerative and inflammatory insertion tendinitis, irritation of pharyngeal mucosa and V,VII, IX and X cranial nerves by fibrosis of post tonsillectomy scar, as well as sympathetic nerve irritation due to impingement on carotid vessels[1,5,7]. The etiology of elongation of styloid process also remains unknown[8]. Excessive ossification of the stylohyoid complex may be the cause of lengthening of the styloid process[6,8,9,10]. Other theories that have been proposed include congenital elongation of styloid process and growth of osseous tissue at the insertion of stylohyoid ligament[9,10]. History and physical examinations are crucial in the diagnosis of Eagle's syndrome. However as the presentations actually can be misleading, the aid of imaging is very useful to confirm the diagnosis. Digital palpation over tonsillar fossa is important as a hard bony prominence can be felt indicates elongated styloid process provided that tonsils tissue are not enlarged or absent as in post-tonsillectomy patient and gagging sensation can be tolerated well[3-5,11]. As in our reported case, since the patient had enlarged tonsils, the elongated styloid process had pushed the tonsils tissue over the superior pole giving the appearance of tonsilolith like mass. In fact, it was not a true tonsilolith. This additional finding proved the heterogeneity of presentation in Eagle's syndrome[4]. When there is pale whitish mass appeared over the tonsil, clinicians should bear in mind the possibility of an underlying elongated styloid process. Elongated styloid process can be visualized on anteroposterior modified Towne's view X-ray[3-7]. Any medial and lateral deviation also can be evaluated. Lateral skull X-ray and orthopantomogram also can visualize the elongated styloid process[2,5,10,11,12]. In any centre where 3D CT is available, it is very useful to subject patients for it as this can provide accurate measurement in the length and deviation of styloid process or any other related anatomical variants before surgical intervention take place[6,10-12]. Angiography may be also useful in any case suspected for carotid artery impingement in Eagle's syndrome but seldomly done as it is an invasive procedure[4]. It is generally accepted that surgical resection of elongated styloid process is the primary treatment for Eagle's syndrome[5,7-13]. Even though medical treatment using analgesic or local steroid injection is an option, the condition is not yet proven to be well treated or

resolved[2]. There are 2 surgical approaches that has been implemented i.e transoral and external transcervical approach[7-13]. Transoral approach is well described by W.W Eagle where as external approach by Loeser and Cardwell[5]. We choose to do transoral approach for our patient since it is technically easier as patient already underwent tonsillectomy and provided no external scar. The procedure was performed under general anaesthesia. Boyle's Davis mouth gag was inserted for better view of surgical field. The protruberance of elongated styloid process identified by digital palpation and then, the overlying mucosa was incised. Dissection over superior constrictor muscle performed to expose the tip of styloid process and skeletonization done until its origin. The ligaments and muscle tendons attached to it were separated and the free styloid process resected using bone nibbler as near as possible to its base. The muscles and mucosa over the surgical bed were closed in layers. Surgical failure rate is around 20% by means of partial relief of symptoms or recurrence of symptoms and can be due to entrapment within fibrous tissue of adjoining nerve, or inadequate shortening leading to constant irritation[5].

CONCLUSION: Eagle's syndrome is a rare condition. Patient may present with vague symptoms such as chronic neck pain, odynophagia, dysphagia, foreign body sensation or headache. Clinicians should have a high suspicion index and in addition, any bony hard mass over tonsillar region elicited by digital palpation should be investigated for a possible elongated styloid process. Styloidectomy is the treatment for the relieve of symptoms in this condition.

REFERENCES:

1. Vijay Chourdia. Elongated Styloid process (Eagle's Syndrome) & severe headache. Ind J Otolaryngol Head Neck Surg 2002; 54(3):238-41.
2. Kishore Chandra Prasad, M. Panduranga Kamath, K. Jagan Mohan Reddy, Krishnam Raju, Saurabh Agarwal. Elongated Styloid Process (Eagle's syndrome): A Clinical study. J Oral Maxillofac Surg 2002; 60: 175-7.
3. Esen Beder, Ozan Bagis Ozgursoy, Selmin Karatayli Ozgursoy. Current diagnosis and Transoral Surgical treatment of Eagle's syndrome. J Oral Maxillofac Surg 2005; 63: 1742-5.
4. Abie H. Mendelsohn, Gerald S. Berke, Dinesh K. Cchetri. Heterogeneity in the Clinical Presentation of Eagle's Snydrome. Am Otolaryngol- Head Neck Surg 2006; 134: 389-93.
5. Lal M.Gosh, Siba P. Dubey. The syndrome of elongated styloid process. Auris Nasus Larynx 26 (1999) 169-75.
6. Haluk Yavuz, Fatma Caylakli, tulin Yildirim, Levent N. Ozluoglu. Angulation of the styloid process in Eagle's Syndrome. Eur Arch Otorhinolarongol 2008; 265: 1393-6.
7. Leslie H. Diamond, David A. Cottrell, Michael J. Hunter, Maria Papageorge. Eagle's syndrome: A report of 4 patients treated using a Modified Extraoral Approach. J Oral Maxillofac Surg 2001; 59: 1420-6.
8. Arkuszewski P, Przygonski A, Tyndorf M. Eagle's syndrome- report of rare case of bilateral elongation of styloid processes. Otolarnygol Pol. 2009;63(2):162-4.
9. Kiran V.Padeyappanavar, P.S Bhusareddy, A.S. Nagaleekar. Case report on Elongated Styloid process. Al Ameen J Med Sci 2010; 3(1): 99-101.
10. Ryan D. Murtagh, Jamie T. Caracciolo and Gaspar Fernandez. CT findings associated with Eagle's syndrome. Am J Neuroradiol. 2001; 22(7):1401-2.
11. Subramaniam S, Majid MD. Eagle's syndrome. Med J Malaysia 2003;58(1):139-41.
12. Rafael E. Alcalde, Yoshiya Ueyama, Akiyoshi Nishiyama, Teruhisa Mizuguchi, Tomohiri Matsumura, Kanji Kishi. Diagnostic Imaging of Eagle's syndrome: Report of three cases. Oral Radiol. 1994; 10(2):143-8.
13. Umberto Buono, Giuseppe Michele Mangone, Ambra Michelotti, Francesco Longo, Luigi Califano. Surgical approach to the Stylohyoid process in Eagle's syndrome. J Oral Maxillofac Surg 2005; 63: 714-6.

PAKISTAN JOURNAL OF
OTOLARYNGOLOGY, HEAD & NECK SURGERY

INDEXED AND ABSTRACTED BY PAKISTAN SCIENCES ABSTRACTS, EXCERPTA MEDICA (AMSTERDAM), IMEMR (INDEX MEDICUS FOR WHO EASTERN MEDITERRANEAN REGION) AND EMBASE, RECOGNISED BY PMDC & HIGHER EDUCATION COMMISSION, PAKISTAN.
ISSN # : 0257-4985

Pakistan Journal of Otolaryngology is published in April, August and December

Address:-
M. Umar Farooq
Chief Editor, PJO, Dept. of E.N.T. Head & Neck Surgery, Dow University of Health Sciences, Karachi-Pakistan.
Phone: (92-21) 99215717, 99216063, 32745824, 32715464 Fax: (92-21) 99215462 Cell : 0333-3225262
E-mail: pjorl.entsociety@gmail.com, umar.farooq@duhs.edu.pk