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Assessment of Clinical Competence - The Long Case Revisited

Shahid Hassan

The goal of assessment in medical education remains the development of reliable measurement of student performance which, as well as having predictive value for subsequent clinical competence also have a formative, educational role. However, test that have both a formative and summative assessment are hard to design. It also raises a challenge for all those looking forward to an assessment program that meets the demand of evaluating the required clinical competence of future doctors. The clinical competency in a curriculum is defined as knowledge, skills and attitude, which cannot be assessed by a single test format. Traditionally the long and short cases are practiced to assess the clinical competence of postgraduate trainees in high-stake examination. The long case assessment is often criticized for its authenticity and reliability for being unobserved and inconsistent across raters as well as across cases respectively. Single long case assessment further raises the question of content-specificity and generalizability. Reliability in long case assessment is difficult to achieve due to the constraints of required number of cases and standardization of measurement. Length of time is the key to improving the reliability of this format and a minimum of ten rather than one observed long cases are required to achieve the test reliability in a high-stake examination.

Lack of sufficient testing time, unstructured random questions and inconsistent scoring are the cause of low reliability of long case assessment. Randomly asked oral questions (specially if the case is not physically examined by the assessor) may even argue the context-validity of long case assessment. Long cases are usually unobserved and often the assessors have to rely on candidate's reflection of long case workup. This makes the long case an assessment of "knows how" rather than "shows how" of Miller's pyramid of competence learning. This may also challenge the apparently good validity of a long case due to its context specificity. Observing the workup and decreasing the length of time of long cases assessment may allow more cases to be assessed to improve both, reliability and validity to some extent. Objective Structured Long Examination Record (OSLER) has been developed, which includes some direct observation of the candidate interaction with the patient.

Other options to test clinical competency in postgraduate medical education are OSCE (objective structured clinical examination) or WPBA (workplace based assessment), which may not be feasible due to logistics problems (in setting OSCE stations) and faculty development (in Mini-CEX and DOPS). These methods of assessments demand resources (OSCE) and drastic change in assessment culture (WPBA). Long case assessment in most of the postgraduate summative assessment allows only one case. The panel of examiners usually reviews the short listed cases to select the right cases for this encounter on the morning of examination. However every examiner involved may not necessarily examine all the cases. In practice long cases are not observed and students are supposed to reflect on their medical interviewing and physical examination skills by presenting the case before a panel of examiners for cross-examination after 20-30 minutes of patient's workup. These unobserved cases turn the long case assessment to oral assessment of "knows how" rather than the demonstration of "shows how" for an evaluator to assess the candidate's performance.

Observing the long case encounter between candidate and patient can improve the validity besides, providing an opportunity to examiners to evaluate the candidates for their over all competency of soft skills including communication skills, patient-doctor interpersonal skills, organizational efficiency and humanistic qualities. Humanism is the important aspect of postgraduate training, which needs to be observed to assess the meta-skills of a candidate's professionalism for which we often do not have other instrument in summative assessment program. The evidence to make decision on pass or fail should base on satisfactory or unsatisfactory performance of trainees both on quantitative scoring as well as on qualitative observation. A student's bad day in one assessment tool should not decide his fate.

An ideal instrument is not the one that stands out to decide on summative assessment result

alone, rather it should contribute to determine the overall performance of a candidate. The role of individual instrument should be seen in collaboration with other measurement tools for its share to assess the respective learning domains such as knowledge or clinical skills to decide on pass or fail in summative assessment. Triangulation can be called upon for a right qualitative judgment utilizing the complementing role of assessment tools, at least in the same component (short and long cases in the assessment of clinical competence). Triangulation refers to making a qualitative judgment based on best-practice evidences on assessment gathered over different time, under different circumstances, by different evaluators and using different methods. This adjustment will provide the benefit of doubt to candidates especially if the quantitative judgment score of an individual instrument is in question. This will inculcate the concept of quantitative assessment in postgraduate examination rather than utilizing individual instrument in isolation to decide on summative results.

In postgraduate examination, the clinical competence is tested directly through short and long case assessments with real patients. However, in short case assessments there are 3-4 cases for physical examination and provisional diagnosis, in which candidate's clinical skills are directly observed. More than one item tool (3-4 short cases), different examiners, different cases and clinical scenarios, direct observation and face-to-face questions improve content validity as well as context specificity. High correlation coefficient and Cronbach alpha determined for long and short cases also provides evidences to adopt the principles of internal triangulation in these assessment methods to rate the performance of examinees as an aggregate of 3-4 cases in short cases and 1-2 long cases assessment respectively. Long case assessment, which is a single case with varying level of complexity of patients from one candidate to another, unobserved workup and rating of performance achieved by consensus of a panel of examiners adopting holistic than an analytic rubric raises the question of context-specificity and low validity. However, internal triangulation with in the clinical examination is less often practiced and a long case assessment stands out in standard setting strategy to have its direct impact on summative assessment to decide overall pass or fail.

To improve the validity of long case assessment few options are worth considering however, the implementation of any of these options require a major decision to change the current practice of long case assessment as follows.

- 1) Increase the number of long cases to make it at least two long cases for assessments for each candidate even if this needs to reduce the allotted time or to readjust the long case assessment confined to specific clinical attributes in these encounters.
- 2) Start observing the candidates for their performance on long cases with 15-20% marks reserved for observation. It will be appropriate to observe the candidates for their clinical attributes of communication skills, professionalism, organizational efficiency and humanism (see table below).
- 3) Triangulate the long case assessment with short cases assessment to adopt compensatory approach for judgment of clinical competence to help improve the content-specificity of clinical skills in curriculum.
- 4) The rating of long case assessment should also be reviewed to make it more analytic then holistic in approach however, global rating by examiners should also be provided as suggested in proposed criteria of a rating form (see table below).
- 5) Scoring against a checklist is not as objective as originally supposed. Global rating has been established to be as reliable as checklist may also be used for standard setting method to decide on cut-off marks taken as the mean of all borderline examinees scores.

According to these criteria the minimum competence should be set either at 50% marks or at an average of all borderline scores of examinees on point table judged by all examiners involved in long case assessment (see table below). Attitude, professionalism and organizational efficiency are difficult to judge without observing the long case workup performed by a candidate. Assessment of attitude and humanism for patient care may also be judged during the discussion on management of the case or by creating scenario for example, advance tumor stage in relation to management and quality of life. Alternatively long case used for clinical attribute of counseling may also help to monitor candidate's empathy for patient. Demonstration of passion by candidate is the affective component where as value for patient empathy is the cognitive component of humanism that needs to be carefully observed by the examiners.

Candidate's commitment to excellence and humanistic behavior and professionalism can be determined through questions from medical ethics during the encounter. However, the assessment using a structured rating also highlights professionalism as value to medical ethics. Besides, commitment to excellence, demonstration of professional aspirations, and humanistic behavior during the interaction also speaks of candidate's professional approach. Internal assessor from the institution of candidate's belonging can best report on organizational efficiency of a candidate by commenting on his organizational behavior in routine clinic performance documented as formative assessment during the training. A reflection of organizational efficiency can also be elicited by candidate's existing knowledge and its application in a given situation of a case under examination. Similarly clinical, surgical and interpersonal skills can also be reported. However, all these attributes and communication skills can be judged better if long cases are observed during the patient workup. Unless the format of long and short cases assessment is improved by direct observation and the test length is extended to include many more cases, the unreliability of this format does not justify its use since an unreliable test cannot be valid.

No	Clinical Attributes of Long Case Assessment			Rating (>70-Excellent, 60-69 Good 50-59-Average <50-Unsatisfactory)		
1	Information gathering (reflective skills)			Total Marks - 25	Marks Claimed	
I	Presenting for cross questions on history			13		
II	Presenting for cross questions on physical examination			12		
2	Analytic Reasoning (diagnostic skills)			Total Marks - 15		
I	Differential diagnosis			7		
II	Imaging interpretation			5		
III	Provisional diagnosis			3		
3	Problem Solving (management skills)			Total Marks - 30		
I	Investigative skills (investigation/diagnosis)			8		
II	Therapeutic skills (curative/palliative)			10		
III	Procedural skills (operative procedure)			7		
I V	Complication of management			3		
V	Prognosis			2		
4	Interacting (communication skills)			Total Marks - 10		
I	Communication with patient			5		
II	Knowledge and confidence			5		
5	Attitude and Humanism			Total Marks - 20		
I	Professionalism (values to medical ethics)			5		
II	Humanities (values to patient care)			5		
III	Compassion (demonstration of patient care)			5		
I V	Organizational efficiency			5		
6	Total Marks vs. Marks Claimed			100		
7	Overall Performance	Excellent	Good	Average	Borderline	Poor

Table above shows the structured assessment of long case measurement using analytic rubric rather than holistic rubric to avoid subjective influence of any one assessor in panel of examiners.

Recurrence Patterns of Head and Neck Cancer at a Tertiary Care Center in Karachi, Pakistan

Anam Hameed, Zain A. Sobani, M. Ressim Nazir, Shehzad Ghaffar,

ABSTRACT: **BACKGROUND:** Pakistan in the high risk zone for Head and Neck cancers (HNC) with an age standardized incidence rate of 37.1/100,000 in males and 21.7/100,000 in females. These cases are managed by a multi-disciplinary team and subjected to a thorough follow-up schedule. This follow up may not be feasible for most patients and may even be doing more harm than good as the financial burden may eventually force patients to discontinue follow up. Keeping this in mind, we concluded that specific follow up programs need to be designed to cater to the Pakistani population. In order to aid the development of further guidelines in this regard, we conducted a retrospective audit of Head and Neck Cancer (HNC) patients to determine the trends of recurrent disease in our population. **SUBJECTS METHODS:** A retrospective review of patient charts was carried out in November 2010 for patients, diagnosed with HNC at our institution between Jan 2006 and June 2008. Total 288 patients identified were included in the study. The data was recorded in a predesigned questionnaire. All case notes, records and investigations were reviewed for possible associations. **RESULTS:** Of the total of 288 cases, 210(72.91%) were primary oral cavity tumors followed by 55(19.09%) laryngeal, 12(4.16%) hypopharyngeal, 6(2.08%) oropharyngeal, and 5(1.73%) unknown primaries. Recurrence occurred in 111(38.54%) of the cases. The median time period for recurrence was 236 (range: 45 - 2803) days, in 73(65.8%) recurrence was identified by the patient. **CONCLUSION:** Keeping these factors in mind, in our opinion high frequency follow up must be reserved for the first year during which patient education should encompass self-examination and the signs of recurrence. After this period of high frequency follow up the clinical schedule can be relaxed.

Key Words: Head and neck cancer, recurrence, Followup.

INTRODUCTION : According to the Karachi Cancer Registry, Head and Neck cancers account for nearly 21% of cancers in males and 11% in females of the city; with age standardized incidence rate of 37.1/100,000 and 21.7/100,000 respectively¹. These figures, putting the region in the high risk zone, may be attributable to cultural practices of using betel nut, paan, and tobacco related products. These cases are managed by a multi-disciplinary team in accordance with international guidelines and subjected to a thorough follow-up schedule. Haas et. al, justified this rigorous follow up schedule on the belief that this would in turn lead to the evaluation of treatment efficacy; early identification of recurrences; monitoring complications; and patient welfare and support². Different strategies for following patients with treated head and neck cancer have also been proposed involving regular radiographs and investigations³. This vigilant follow up schedule although prudent in effect of catching recurrences and residual disease, heavily taxes the limited pool of head and neck surgeons in the state, leading to a negative impact on quality of care and consultations. Further with a fee for service medical system dominating nearly 75% of the health care industry and over half of the population living on less than 2 US Dollars a day; this follow up may not be feasible for most patients. It may even be doing more harm than good as the financial burden may eventually force a large percentage of patients to discontinue follow up. Keeping this dilemma in mind we concluded that specific follow up programs need to be designed to cater to the Pakistani

population. In order to aid the development of further guidelines in this regard we conducted a retrospective audit of head and neck cancer patients at our center to determine the trends associated with recurrent disease in our population.

SUBJECT AND METHODS : A retrospective review of patient charts was carried out in November 2010 for head and neck cancer patients diagnosed and treated at our institution between January 2006 and June 2008. Total 288 patients identified in our International Statistical Classification were included in the study. The data was recorded in a predesigned questionnaire with special emphasis on recurrences and residual disease. All case notes, records and investigations were reviewed for possible associations. The data was analyzed using Statistical Package for Social Sciences version 17 (SPSS17.0). Mean and standard deviation for continuous variables was computed and a student t-test was used to confirm significance of the results. Proportion & percentages were computed for categorical variables and a chi square test of significance was applied. A p-value of <0.05 was taken to be statistically significant. **RESULTS :** Of the total of 288 cases, 210 (72.91%) were primary oral cavity tumors followed by 55 (19.09%) laryngeal, 12 (4.16%) hypopharyngeal, 6 (2.08%) oropharyngeal, and 5 (1.73%) unknown primaries. Pre-operative biopsy results of 215 patients were available out of which 128(59.53%) were moderately differentiated, 70 (32.55%) well differentiated and 17 (7.90%) were poorly differentiated tumors. Of the 288 patients 132

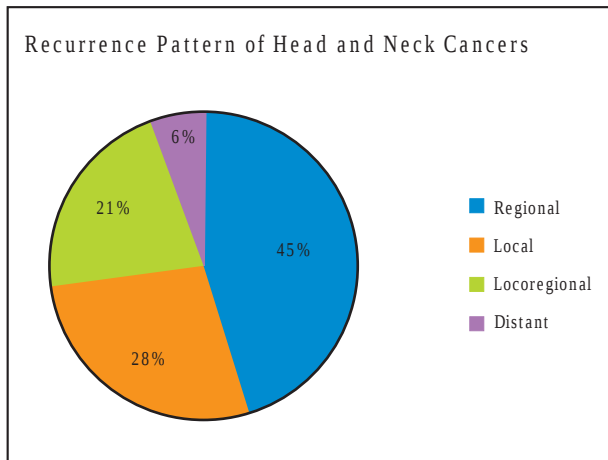


Figure1: Distribution of the 111 recurrences in our sample.

(45.83%) underwent surgery whereas 156 (54.16%) underwent both surgery and radiation as the primary treatment modality. Postoperative tumor grade was found to be well differentiated in 80 (29.73%), moderately differentiated in 168 (62.45%) and poorly differentiated in 21 (7.80%) cases. Recurrence occurred in 111 (38.54%) of the cases. Regional metastasis was seen as the most common pattern of recurrence occurring in 50 (45.04%) of the 111 cases. Local recurrence occurred in 31 (27.92%) with loco-regional and distant metastasis occurring in 23 (20.72%) and 7 (6.30%) cases respectively. Figure 1 shows the distribution of recurrences in our sample. The median time period for recurrence to occur was found to be 236 (range: 45 - 2803) days. Of interest to note was that in cases of recurrence, 73 (65.8%) were identified by the patient themselves. Of the 111 patients who developed recurrence, the recurrence was associated with bone involvement (15, p-value=0.124, CI=0.254-1.188), muscle involvement (15, p-value=0.477, CI=0.374-1.586), vessel involvement (7, p-value=0.61, CI=0.31-2.00), skin involvement (11, p-value=0.00, CI=0.007-0.406), extracapsular spread (5, p-value=0.995, CI=0.321-3.149), and perineural invasion (4, p-value=0.72, CI=0.40-6.60). However other than skin involvement there were no statistically significant associations noted with recurrence. The highest degree of recurrence was noted in oropharyngeal tumors where 66.67% (n=4/6, 1 local, 2 regional and 1 locoregional) recurrences were noted this was followed by 40.95 % (n=86/210, 24 local, 39 regional, 6 distant and 1 locoregional) in tumors of the oral cavity, 40% (n=2/5, 2 regional) in unknown primaries, 30.90% (n=17/55, 6 local, 5 regional, 1 distant and 5 locoregional) in laryngeal tumors and 16.67% (n=2/12, 2 regional) in hypopharyngeal tumors. Of the 132 patients who underwent surgery as the treatment modality 51 (38.63%) developed recurrence, similar rates were seen in those undergoing both surgery and radiation 60/156 (38.46%). Chi-square test applied showed no statistical significance between the primary treatment modality and recurrence (p-value=0.976, CI=0.626-1.622). Figure 2 shows the 5-year survival curve for this.

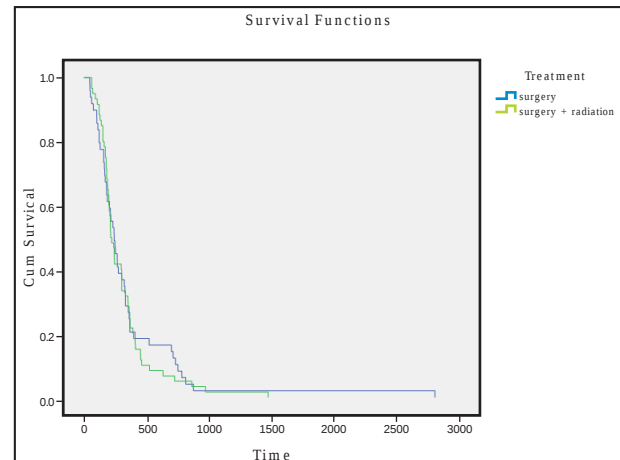


Figure 2: 5-year survival curve for patients undergoing surgery and those undergoing surgery with concomitant radiation.

DISCUSSION : According to the National Economic survey of Pakistan, 2005-2006 there is one registered medical practitioner for every 1,310 individuals⁴. Further the Pakistan Medical Association in its annual report for the same year reported that there is one registered medical practitioner for every 1,900 individuals and one specialist for every 14,500 individuals⁵, however head and neck surgeons are a rarity. A significant portion of these surgeons also work in private care settings, out of reach from a majority of the population, adding a significant load on those in public care settings. The public health care delivered through 4,554 dispensaries, 5290 basic health units, 907 maternal and child health centers, 552 rural health centers and 946 hospitals in the country⁴, is inadequately equipped to meet the needs of head and neck cancer patients. Despite these limitations most teams in Pakistan follow patients vigilantly with clinical follow ups every 4 weeks for the 1st year, and every 8 weeks in the 2nd year, when reported recurrence rates are high⁶. After which the frequency is reduced to every 16 weeks in the 3rd year and 6 monthly beyond that. We feel that this practice is heavily taxing the limited pool of head and neck surgeons in the state, leading to a negative impact on quality of care and consultations. While taxing the health care system; this follow up schedule may not be financially feasible for most patients using private health care services and may eventually force a large percentage of patients to discontinue follow up. Many studies have been conducted with regard to follow up of such patients; however their outcome is measured in terms of survival rates, rather than looking at the holistic picture of patient comfort, cost effectiveness and rationale. The general structure of follow-up reported in literature for head and neck cancer patients is high frequency visits in the first 2 years, when reported recurrence rates are high⁶, after which the number of visits are reduced with follow up finishing between a period of 3-5 years. However no specific guidelines exist and these arbitrary schedules usually reflect individual institutional or clinician preferences and there is little evidence to support any

system⁷. A recent survey on follow up patterns of head and neck surgeons in England showed that 33% followed patients for 3 years, 56% followed up patients for 5 years, 13% for 10 years and 22% for life. When questioned about the primary rationale behind these follow up patterns 32% quoted the detection of recurrence and secondary primaries; 23% claimed it as 'accepted practice' and British Association of Otolaryngology – Head and Neck Surgery guidelines; 12% preferred not to respond and 4% believed that a 5-year disease free survival was equated with cure⁸. When looking at our sample we noticed a recurrence rate of about 38%, indicating that a stringent follow up schedule may be required. However the median time period for recurrence in our sample was found to be 236 days indicating that a majority of recurrences could be detected within one year of follow up. Also of interest to note was that in these cases most of the time (65.8%) the recurrence was identified by the patient themselves and then subsequently brought to the attention of the surgeon. This finding suggests that self-examination techniques can be of some importance in this regard. By propagating self-examination practices in patients for detecting recurrences we may be able to safely increase the interval between follow up visits. Our data suggests that a major portion of recurrences were within the loco-regional limits hence especially with especial regard to oral cavity these areas can be easily examined by the patient himself allowing adequate spacing between clinical visits and examination. Recently some authors have suggested having regular nursing follow-ups intermixed with surgical follow-ups^{9,10}, this strategy may prove efficacious in the long however no concrete data is available to allow translation of these suggestions into everyday clinical practice. Another issue

with this suggestion is the limited number of qualified nurses in Pakistan, and the need for further training required to identify recurrences.

CONCLUSION: Keeping these factors in mind, in our opinion high frequency follow up must be reserved for the first year during which patient education should encompass the practice and propagation of self-examination and the signs of recurrence. After this period of high frequency follow up the clinical schedule can be relaxed with adequate spacing between visits on a case to case basis.

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The Evaluation of Hearing Loss in Children with Down Syndrome at University Kebangsaan Malaysia

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ABSTRACT: OBJECTIVES: To assess the type of hearing loss and its association with gender and birth weight in Down syndrome children. It was also aimed to study the association of otoacoustic emission (OAE) and brainstem evoked response (BSER) results in the diagnosis of hearing loss. **STUDY DESIGN:** A prospective study. **DURATION AND PLACE OF STUDY :** The study was conducted at Universiti Kebangsaan Malaysia Medical Center (UKMMC) between December 2008 till November 2009. **SUBJECTS AND METHODS:** Children with Down Syndrome (DS) aged between 2 months to 12 years old were evaluated. An interview, clinical examinations and hearing assessments such as audiogram, tympanometry and brainstem evoke response test (BSER) were used to evaluate these patients. This study was approved by the UKMMC Ethics and Research Committee. **RESULTS:** A total of 224 patients were enrolled for this study. This study showed that the commonest type of hearing loss were conductive in 160 patients (71.4%), sensorineural in 36 patients (16.1%) and mixed in 6 patients (2.7%). The other 22 patients (9.8%) had normal hearing. Most of them fall in the mild to moderate level of conductive hearing loss. Only 32 patients were prescribed with hearing and Among the 32 patients, 16 patients had Sensorineural, 14 patients had conductive hearing loss (CHL) and 2 patients had mixed hearing loss (MHL). There were significant association ($p < 0.05$) between 'refer' otoacoustic emission (OAE) test and abnormal BSER. There was no significant association ($p > 0.05$) between hearing loss between gender and birth weight. **CONCLUSION :** Conductive hearing loss is a common feature (71.4%) in DS children. 'Refer' OAE test results during newborn hearing screening proved to be a reliable indicator of significant hearing loss. **Key Words:** Down syndrome; hearing loss; otoacoustic emission; brain stem evoked response.

INTRODUCTION: The incidence of Down Syndrome (DS) is approximately 1 in 700 live births. The syndrome is a result of non-disjunction (95%) of chromosome 21 or translocation (5%) of the q22 segment to the other chromosome. The recurrence rate for non disjunction type of DS is 1%, and for translocation type is 2-10%¹. There are well-documented figures, ranging from 38 to 78% in the literature, primarily from Caucasian populations, concerning a high prevalence of hearing loss in individuals with DS¹. Anatomic anomalies of the eustachian tube, and the typically stenotic ear canals of children with DS, predispose them to congenital and acquired otologic problems. Ziesel and Roberts in 2003² suggested that children with DS, among various developmental disabilities, had the highest prevalence of otitis media with effusion indicated by tympanometry. Otitis media with effusion (OME) is common among children with DS. Mucoïd secretion accumulates in the middle ear and stops the ossicles from vibrating freely, therefore reducing hearing levels. OME can be treated in three ways: insertion of grommets, microsuction and tonsillectomy and/or adenoidectomy³. There is limited published data of Down Syndrome in developing countries. Therefore the objective of this study was to assess the type of

hearing loss and its association with gender and birth weight in children with Down syndrome in a tertiary hospital in Kuala Lumpur, Malaysia. The association of otoacoustic emission (OAE) and brainstem evoked response (BSER) results in the diagnosis of hearing loss was also studied.

SUBJECTS AND METHODS : This study was conducted at the Otorhinolaryngology clinic, Paediatric clinic and Child Development Center (CDC), UKMMC. All children with DS aged between 2 months till 12 years were identified for this study. The exclusion criteria were history of traumatic hearing loss, low birth weight (less than 1.5 kg), severe hyperbilirubinaemia requiring exchange transfusion ($> 340 \mu\text{mol}$), ototoxic drugs treatment, history of perinatal asphyxia and congenital intrauterine infections. All children with DS who fulfilled the study criteria then underwent a complete ear, nose and throat examination and hearing assessment. The hearing assessment was performed by using tympanometry studies and pure tone audiometry or brainstem evoked response, depending on the child's age and ability to follow instructions. A standard structured questionnaire was also used to document patients' demographic data and other related history such as co-existing medical

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illness, previous ear surgery, hearing aid usage and compliance. The tympanometry results were classified as type A, B, and C; Type A is normal, type B is related to the presence of middle ear fluid and type C is related to Eustachian tube dysfunction. Each of them underwent a hearing test either pure tone audiometry (PTA) or play audiometry or brainstem evoke response (BSER). BSER was used as the diagnostic hearing test for very young patients or those who were not able to obey instructions. The test is based upon utilizing auditory stimuli to evoke an electrical response generated from the cochlea to the upper brainstem. This test provides an effective measure of the integrity of the auditory pathways up to the upper brainstem level. The type of hearing loss was defined as conductive, sensorineural or mixed. The degree of hearing loss was defined as normal (< 25 dB), mild (26-40 dB), moderate (41-70 dB), severe (71-90 dB) and profound (>90 dB)⁴. The average hearing threshold was calculated by averaging the threshold at 500 Hz, 1 kHz and 2 kHz... All the collected data were analyzed with the SPSS 16.0 program; using the student t-test and ANOVA statistical analysis.

RESULTS: Two hundred and twenty six DS children were identified for this study. However two were excluded for history of severe head injury and severe hyperbilirubinaemia which required exchange transfusion. Out of the 224 children who fulfilled the study criteria, 132 (58.9%) were male and 92 (41.1%) female. The age and ethnic distribution of the subjects are shown in Figure 1 and 2 respectively.

HISTORY OF EAR SURGERY: Amongst the 224 patients only 62 (27.9%) had undergone myringotomy with/without ventilation tube surgery (Table 1).

TYPE OF HEARING LOSS: Amongst the 224 patients, there were 22 (9.8%) which had normal hearing level whilst 202 patients (90.2%) had some type of hearing loss. Majority of them had conductive hearing loss (160 patients, 71.4%) whilst sensorineural hearing loss in 36 patients (16.1%) and mixed hearing loss in 6 patients (2.7%) (Figure 3). The types of hearing tool used were BSER alone in 135 patients and BSER with audiometry in 96 patients.

TYPES OF TYMPANOGRAM: Out of the 224 patients, 156 patients (69.64%) had type B tympanogram, 44 patients (19.65%) had type C and 24 patients (10.71%) had a type A tympanogram (Table 2). Type B and type C tympanogram were categorized as abnormal which represent for middle ear effusion and eustachian tube dysfunction.

THE TYPE AND DEGREE OF HEARING LOSSES IN BOTH EARS: The level of hearing losses in both ears of patients are tabulated in table 3. The degree of hearing losses are categorized as normal, mild, moderate, severe and profound hearing loss. Table 3 showed that the level of hearing losses were almost equal in both ears. The commonest level of hearing losses were mild and moderate hearing loss. Only one patient had severe sensorineural hearing loss. None of the study population was diagnosed with profound hearing loss. Table 4 showed the mean hearing threshold

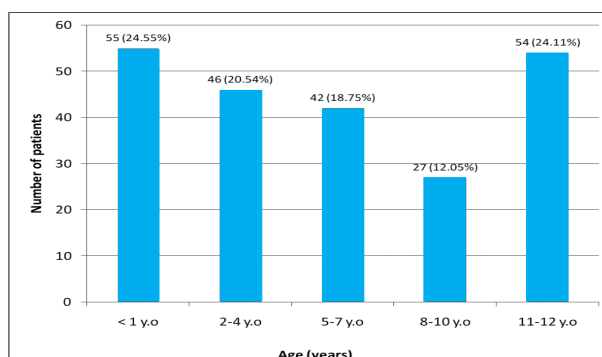


Figure 1: Age distribution of study population.

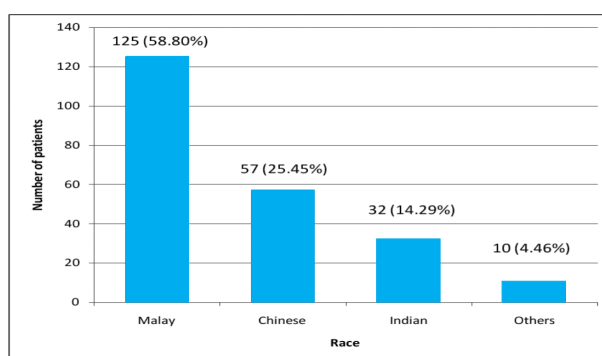


Figure 2: Ethnic distribution among the study population.

Any previous ear surgery (myringotomy and ventilation tube insertion)	Number of patients	Percentage (%)
Yes	62	27.68
No	162	72.32
Total	224	100.0

Table 1: Patients with history of ear surgery.

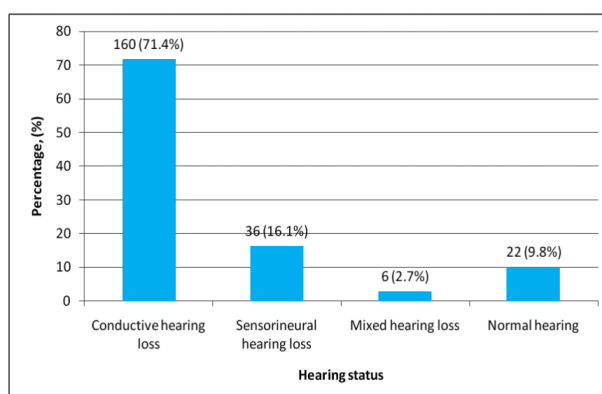


Figure 3: Hearing status of the study population.

Type of Tympanogram	Number of patients	Percentage (%)
Type A	24	10.71
Type B	156	69.64
Type C	44	19.65
Total	224	100.00

Table 2: Types of tympanogram among study population.

Ear	Hearing Level (dB)	Type of Hearing loss	Frequency	Percentage (%)
Right Ear	< 20	Normal	37	39.78
	21 – 40	Mild	42	45.16
	41 – 70	Moderate	13	13.98
	71 – 90	Severe	1	1.08
	> 90	Profound	0	0.00
	Total		93	100.00
Left Ear	< 20	Normal	31	33.33
	21 – 40	Mild	44	47.31
	41 – 70	Moderate	16	17.20
	71 – 90	Severe	2	2.15
	> 90	Profound	0	0.00
	Total		93	100.00

Table 3: Degree of hearing loss documented.

Hearing Test (dB)	Gender	N	Mean	Std. Deviation	t	p value
Right BSER threshold	Male	79	42.59	15.60	0.93	0.35
	Female	56	40.09	15.06		
Left BSER threshold	Male	79	44.25	15.03	1.24	0.22
	Female	56	41.07	14.07		
Right Air Conduction (audiogram)	Male	56	42.86	14.27	-0.60	0.55
	Female	40	44.50	11.59		
Right Bone Conduction (audiogram)	Male	53	29.91	13.78	0.10	0.92
	Female	40	29.63	13.42		
Left Air Conduction (audiogram)	Male	56	45.23	18.33	0.07	0.95
	Female	40	45.00	13.45		
Left Bone Conduction (audiogram)	Male	53	31.60	15.12	0.15	0.88
	Female	40	31.13	14.25		

Table 4: Association between gender and hearing threshold.

Hearing Assessment	F done	N	Mean	Std. deviation	t	P value
BSER	OAE					
Right	Pass	10	27.00	9.49	-3.18	0.00 **
	Fail	93	42.37	14.90		
Left	Pass	10	30.00	11.06	-2.88	0.00**
	Fail	93	43.55	14.40		

Table 5: Association between BSER and OAE screening results.

** significant value $p < 0.05$

Hearing Test (dB)	Birth Weight (kg)	N	Mean	Std. Deviation	Minimum	Maximum	F	p value
Right BSER threshold	1.5 - 2.0 kg (Low)	28	38.93	14.10	20	60	1.15	0.32
	2.1-3.5kg (Normal)	100	41.80	16.03	15	70		
	> 3.5kg (Above normal)	7	48.57	7.48	35	60		
	Total	135	41.56	15.37	15	70		
Left BSER threshold	1.5 - 2.0 kg (Low)	28	41.79	14.54	20	70	1.28	0.28
	2.1-3.5kg (Normal)	100	43.20	14.73	20	80		
	> 3.5kg (Above normal)	7	51.43	2.44	50	55		
	Total	135	43.33	14.39	20	80		
Right Air Conduction (audiogram)	1.5 - 2.0 kg (Low)	7	41.43	14.35	20	55	0.62	0.54
	2.1-3.5kg (Normal)	80	44.19	13.53	20	80		
	> 3.5kg (Above normal)	9	39.44	8.46	30	55		
	Total	96	43.54	13.18	20	80		
Right Bone Conduction (audiogram)	1.5 - 2.0 kg (Low)	6	33.33	13.29	20	50	0.22	0.80
	2.1-3.5kg (Normal)	78	29.49	13.85	10	80		
	> 3.5kg (Above normal)	9	30.00	11.99	20	50		
	Total	93	29.78	13.55	10	80		
Left Air Conduction (audiogram)	1.5 - 2.0 kg (Low)	7	43.57	17.96	20	60	0.07	0.93
	2.1-3.5kg (Normal)	80	45.69	16.45	20	80		
	> 3.5kg (Above normal)	9	44.44	8.82	30	55		
	Total	96	45.42	15.89	20	80		
Left Bone Conduction (audiogram)	1.5 - 2.0 kg (Low)	6	30.00	13.78	20	50	0.16	0.85
	2.1-3.5kg (Normal)	78	31.22	15.01	10	85		
	> 3.5kg (Above normal)	9	33.89	13.41	20	50		
	Total	93	31.40	14.68	10	85		

Table 6: Association between hearing threshold and birth weight.

and association between male and female. Those patients who were able to obey command were subjected to audiogram and those who were unable to follow command were subjected to BSER. T-test study showed that the association between hearing threshold and gender were not statistically significant ($p > 0.05$). The relationship of OAE screening results and BSER results among Down syndrome patients. All newborns delivered in our center were subjected to routine newborn hearing screening using OAE before discharge. Those with refer OAE results will undergo a repeat OAE at 8 weeks of life. If they do not pass the second OAE test, BSER testing is performed on the same day. However not all newborns with refer OAE results will have an abnormal BSER result. T-test showed that there was a significant relationship ($p < 0.05$) between the two hearing assessment tools (Table 5). This clearly showed that OAE is a good and reliable hearing screening tool for neonatal hearing. It is easy to conduct, fast, reliable and it gives an overview of the overall cochlear function. It correlates well with the BSER findings; though BSER is still required to confirm the degree of hearing loss.

BIRTH WEIGHT AND HEARING THRESHOLD: Birth weights of the study population were categorized into low birth weight (1.5 – 2.0 kg), normal (2.1 – 3.5 kg) and above normal (> 3.5 kg) (Table 6). ANOVA test was used to study the association between birth weight with BSER and audiogram results. There were no statistically significant association ($p > 0.05$) between birth weight and hearing threshold.

DISCUSSION: Speech and hearing impairment, upper airway obstruction and ENT infections are frequently observed in DS children. Most of these ENT abnormalities are linked to functional and anatomical abnormalities in the ear, nose, and throat and immune system⁵. Among the 224 children with DS, 132 (58.93%) were male and 92 (41.07%) were female. The population of the study group was representative of the Malaysian community in which 125 children with DS were Malays

(55.8%), 57 (25.45%) were Chinese, 32 (14.29%) were Indians and other races were 10 (4.46%). Among the study population, the most frequent type of hearing impairment was conductive in nature. In the study population, 160 children (71.4%) presented with conductive hearing loss, 36 children (16.1%) presented with sensorineural hearing loss, 6 children (2.7%) presented with mixed hearing loss and 22 children (9.8%) had normal hearing level (Figure 3). These findings were similar in the studies (1,4,6). The possible explanation of these observations are anatomical abnormalities such as chronic nasal obstruction, adenotonsillar hypertrophy, collapse of Eustachian tube and recurrent otitis media as discussed earlier. Another possible explanation of higher incidence of OME are patulous Eustachian tube, weakness of the pharyngeal musculature or poor immunological function among the DS populations. The immune system in DS children develops more slowly, predisposing them to a higher incidence of upper respiratory tract infections and thus middle ear effusion⁴. The Eustachian tubes are often less effective in allowing drainage from the middle ear, as they tend to be narrower in children with DS. Tympanometry were performed in all of the study population. The purpose of this test was to examine the middle ear compliance. The proportion of abnormal tympanometry in children with DS previously reported was 60-70%⁷ which is similar to our study results, 156/224 patients (69.64%) had type B tympanogram, 44 patients (19.65%) had type C and 24 patients (10.71%) had a type A Majority of them documented mild hearing loss (86 ears), followed by moderate (29 ears) and severe hearing loss (3 ears). The type hearing losses are similar in both ears of each patient but the hearing thresholds might differ. There were no statistically significant ($p>0.05$) differences between hearing threshold and gender. This study also showed that there were no statistically significant relationship ($p>0.05$) between the birth weight of the study population and hearing threshold. Therefore birth weight in the region of 1.5 kg till 3.5 kg does not seem to affect the hearing threshold in DS children. Both results are similar to the study results of McPherson et al, 2007¹ which confirmed that there was no association between gender and birth weight to hearing impairment in DS children. Neonatal hearing programme has becoming increasingly popular in detecting early hearing impairment. This is very important to ensure that hearing intervention and rehabilitation can be started as early as possible. Otoacoustic emission test (OAE) is a useful screening tool. Transient evoke otoacoustic emission (TEOAE) is used widely in infant screening. It is an objective measure that allows the outer hair cell function of the cochlear to be assessed. It is relatively simple, fast, non-invasive and reliable overview of cochlear function⁸. The presence of TEOAE indicates a healthy cochlea, normal middle ear function, and a free sound pathway to the auditory meatus, though the presence of the emissions does not provide information on the magnitude and type of hearing impairment⁹. The result of OAE was interpreted as pass (normal hearing) and

fail (abnormal hearing). In our study, 103 out of 224 children with DS underwent an OAE and BSER assessment. There was a statistically significant (t -test, $p<0.05$) association between a refer OAE result with abnormal BSER results. This concluded that OAE is a reliable screening tool for hearing loss which can then be confirmed by BSER. As hearing loss is likely to an impact upon language development in children with DS, amplification is considered even for mild conductive hearing loss that is likely to be present for more than a few months. The hearing loss is almost always accompanied by recruitment, which can cause sound intolerance. The hearing aid prescription will be such as to avoid tolerance problems in noisy places such as special schools and day centers¹⁰. In this study, there were only 32 patients (14%) out of 224 patients were prescribed with HA. Among the 32 patients, 16 patients had SNHL, 14 patients had conductive hearing loss (CHL) and 2 patients had mixed hearing loss (MHL). All had hearing levels between mild to moderate hearing loss. Compliance of the HA usage were majority around 3 to 5 hours per day in 21 patients (9.38%). (This results were not shown in the results section, therefore need to be included) Based on the history and clinical examination, some of these patients had refused, not prescribed or not being counseled on the importance of hearing amplification. It is concluded that in this study, there is poor prescription practice of HA counseling in the DS population. In previous studies, mild hearing losses even at 15 dB loss had been shown to affect the child's progress in school¹¹. According to Shott SR4, 40% of children with DS have stenotic ear canals and 80% of them have OME. Fitting of hearing aid in the stenotic ear canals is a challenge and even when it is properly fitted; it can be a challenge to achieve compliance amongst them. Most of the SNHL and MHL group are from those age between 11 to 12 year old (48 out of 54 patients). Hearing thresholds in most of them were within 40 to 60 dBHL. The etiology of SNHL in DS children is unclear. Even if the cochlear abnormalities seen are correlated to the severity of the deafness, thresholds should not exceed 40 to 50 dBHL¹². A severe (71 to 90 dBHL) or profound hearing loss (>90 dBHL) should warrant a search for another etiology of hearing loss such as a mutation of the GJB2 gene or connexin 26. 5 In the adult population with DS, mild SNHL is a common feature, owing mostly to early presbycusis¹³. The treatment of SNHL in children with DS is similar as in normal children with hearing loss. They need to use the hearing aid for trial of 3 months. If they could not benefit from HA then the patient will assess for cochlear implant candidacy. However, practitioners must bear in mind that mental handicap and specific language troubles may interfere with the treatment and may require a particular approach by the speech therapist. Good rehabilitation, including a combined approach utilizing the teaching of sign language, may help to improve the language development of these children.

CONCLUSIONS : Conductive hearing loss is a common feature (71.4%) in DS children. The presentation of

hearing loss in DS in our population is similar to previous studies. There was significant association between OAE screening and BSER result. We still have to improve on our HA prescription and compliance.

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Treating Acute Follicular Tonsillitis In Adults. Do Antibiotics Help ?

*Amer Sabih Hydri , **Jehangir Ahmed Afridi, ***Zubair Ahmed

ABSTRACT: OBJECTIVES: To compare any difference in the time required for recovery in cases of acute follicular tonsillitis, when antibiotics are prescribed and otherwise. **DESIGN:** A comparative (analytical) study. **PLACE & DURATION:** Department of ENT/Head & neck surgery, Combined Military Hospital Peshawar, from 1st Jan 2008 to 30th Jun 2008. **SUBJECTS AND METHODS:** 60 diagnosed cases of acute follicular tonsillitis of either gender, aged 18 to 33 years were divided randomly into two groups (A and B). Group-A was treated with Injection Benzyl penicillin I/M , Paracetamol, oral fluids and Infusion 5% Dextrose water (Protocol –A). Injection Benzyl penicillin was withheld from Group-B patients, while rest of the treatment remained the same. (Protocol –B). Number of days required for complete recovery was recorded and the two groups compared. **RESULTS:** There was no significant difference in complete recovery in terms of days among the two groups. $p < 0.0001$. **CONCLUSION:** Rate of antibiotic prescription for acute follicular tonsillitis in our primary care clinics, is alarmingly high. To change this unscientific trend, implementation of evidence based practice and education of both the patients & health care personnel is imperative.

Key Words: Tonsillitis, Antibiotics, Cost effectiveness, Analgesics.

INTRODUCTION : Acute infection of the tonsils is a very common condition encountered in medical practice. It occurs in all age groups but is more frequent during childhood because of poor immunity against common pathogens in the environment. The disease is rare in infancy because of less exposure to outside environment and after the age of 50 because of degenerative changes and regression of lymphoid tissue. Clinically, acute tonsillitis may present in one of the three forms. 1. Acute follicular tonsillitis (Inflammatory exudations from the crypts mark the reddened surface with whitish or yellowish spots. 2. Acute parenchymatous tonsillitis, when the whole tonsil is congested, red and swollen. 3. Acute membranous tonsillitis, in this case exudation from the adjoining crypts coalesce to form a false membrane over the surface of the tonsil which can be easily picked up from the surface¹. Both general practitioners and ENT specialists handle a substantial number of such cases in their routine clinical practice. Majority of these infections are viral in nature², while only 15-20% is bacterial^{3,4}. Viruses like influenza, parainfluenza, adenovirus, enterovirus, rhinovirus and Epstein-Barr virus have been implicated⁵. The commonest bacterium implicated in acute tonsillitis is group A beta-hemolytic streptococcus (GABHS). This organism has been isolated from only 30% cases of acute tonsillitis. Streptococci other than GABHS, staphylococcus aureus, haemophilus influenza have also been found to be the culprits of acute tonsillitis⁶. Post Bacterial and viral tonsillitis tend to resolve quickly without treatment in most cases^{7,8}. Antibiotics have a limited role in the treatment of these self-limiting infections³. Oral fluids,

analgesics and bed rest are often all that may be required. Paracetamol in full doses is often adequate⁹. Despite this, a large number of patients with such infections were prescribed antibiotics^{4,10}, probably because of the common belief among patients as well as some clinicians that antibiotics hasten the process of recovery. This lack of a standard protocol in the management of acute follicular tonsillitis prompted this study so as to compare any difference in the time required for recovery when antibiotics are prescribed and otherwise. **SUBJECTS AND METHODS :** This comparative (analytical) study was carried out at the department of ENT, Combined Military Hospital Peshawar, from 1st Jan 2008 to 30th June 2008. After obtaining approval from the Hospital Ethical Committee, a total of 60 diagnosed patients of acute follicular tonsillitis were recruited for the study.

INCLUSION CRITERIA :

1. All cases of Acute Follicular Tonsillitis with fever $>100^{\circ}\text{F}$.
2. Age groups between 18—35 years.
3. Both sexes.
4. Palpable and Tender lymph node.

EXCLUSION CRITERIA:

1. Patients of Acute Follicular Tonsillitis presenting with complications (Quinsy, Para pharyngeal abscess)
2. Patients already taking antibiotics
3. Immuno-compromized patients.

Patients were divided randomly into two groups (A and B). Group-A was treated with Injection Benzyl penicillin I/M according to body weight in divided doses six hourly, Paracetamol 500mg, 2 tablets 6 hourly, oral fluids and Infusion 5% Dextrose water I/V 12 hourly.(Protocol –A).

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Group-B was treated with Paracetamol 500mg, 2 tablets 6 hourly, oral fluids and Infusion 5% Dextrose water I/V 12 hourly. (Protocol-B). Only two patients were excluded from the study, which got no response in protocol-B after 72 hours. All patients were examined on the first visit in ENT OPD. After diagnosis of acute follicular tonsillitis, they were admitted to the ENT ward. Throat swab was submitted for culture & sensitivity and blood was sent to laboratory for total leucocyte count (TLC) and differential leucocyte count (DLC). Each patient was examined daily. Temperature, pain, congestion and odynophagia (on a scale of 1-10) were recorded 6 hourly. Number of days required for complete recovery was recorded. Complete recovery was labeled once it was established that the patient had no fever, follicles, tonsillar congestion and that they were free of sore throat and odynophagia. The data was analyzed using SPSS-11 software. T-test was applied for determining statistical significance of the results. A value of $p = 0.05$ was considered as significant.

RESULTS : The patients' ages in group A ranged from 18 to 31 years (mean age 26 years); while in group B it was 18 to 33 years (mean age 27 years). Male: female was 1.2:1. The breakdown of culture sensitivity reports of throat swabs of both groups are given in (Table 1). There was no significant difference in complete recovery in terms of days among the two groups. Number of days for complete recovery in case of Group-A was 5.80 days while it was 5.83 for Group-B which shows little or no benefit of antibiotics in hastening the recovery in acute follicular tonsillitis. $P < 0.0001$. Complete recovery was observed in 40% patients (12/30) within 05 days in both groups and in 100% patients (30/30) in both groups within 7 days (Table 2). Tables 3-6 illustrate the daily average temperature charting, presence of pain, visualization of tonsillar pus follicles and Odynophagia. The breakdown of complete recovery in both groups is illustrated in (Fig1).

DISCUSSION : A review of Pub med and Cochrane databases revealed no study with a design similar to ours. Discussion will therefore be confined to those studies in which antibiotics alone were prescribed. The reasons why antibiotics are prescribed for a disease which has a predominantly viral etiology and is self limiting in nature, are multifactorial. Many social and cultural factors are involved¹¹. First and foremost is the belief amongst primary care physicians that antibiotics shorten the duration of disease. There is little scientific

Throat swab C/S	Group A	Group B
Normal flora	26	21
No organism	4	9

Table 1: Results of Culture sensitivity of throat swabs.

Days	4 th day	5 th day	6 th day	7 th day
Group A	6.66%	33.33%	33.33%	26.66%
Group B	6.66%	33.33%	30%	30%

Table 2: Percentage of complete recovery per day.

Temperature	Day-1	Day-2	Day-3	Day-4	Day-5	Day-6	Day-7
>100oF							
Group A	30	30	24	20	18	8	Afebrile(30)
Group B	30	30	26	22	18	10	Afebrile(30)

Table 3: Daily average temperature charting. Group A= 30. Group B =30.

Pain	Day-1	Day-2	Day-3	Day-4	Day-5	Day-6	Day-7
Group A	30	30	22	18	18	8	No pain(30)
Group B	30	30	20	19	18	10	No pain(30)

Table 4: Daily charting of presence of pain. Group A= 30. Group B =30.

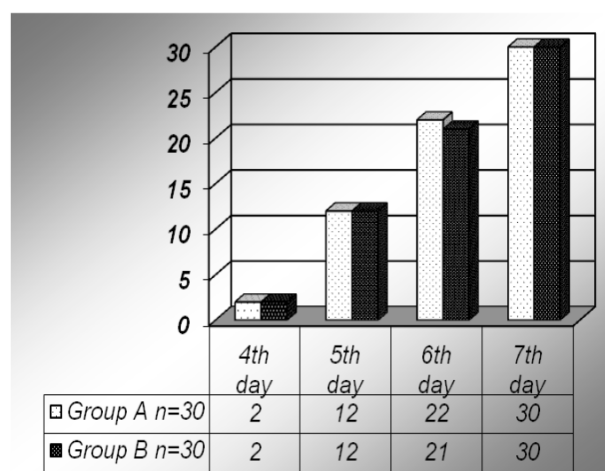


Figure1: Complete recovery in both groups versus days of treatment.

Follicles	Day-1	Day-2	Day-3	Day-4	Day-5	Day-6	Day-7
Group A	Present(30)	Present(30)	Present(18)	Present(18)	Present(18)	Present(8)	No Follicles (30)
Group B	Present(30)	Present(30)	Present(20)	Present(20)	Present(18)	Present(10)	No Follicles (30)

Table 5: Daily charting of presence of tonsillar pus follicles. Group A= 30. Group B=30.

Odynophagia (scale 1-10)	Day-1	Day-2	Day-3	Day-4	Day-5	Day-6	Day-7
Group A	9(30)	9(30)	8(22) 2(8)	7(18) 2(12)	5(18) 1(12)	4(8) 0(22)	0 (30)
Group B	9(30)	9(30)	8(20) 2(10)	7(19) 1(11)	6(18) 0(12)	4(16) 0(14)	0 (30)

Table 6: Daily charting of Odynophagia on pain scale (1-10). Group A= 30. Group B =30.

justification for this notion; many researchers have demonstrated that antibiotics provide only a marginal advantage in the treatment of such cases¹². Over-prescription of antibiotics for the treatment of acute follicular tonsillitis is very common^{10,13}. This predicament is not limited to Pakistan and has been frequently reported from various parts of the world. Even in United States majority of antibiotics are prescribed for cases of acute follicular tonsillitis¹⁴. There are similar reports from UK¹⁵, Netherlands¹⁶ and New Zealand¹⁰. In Cochrane data-base analysis of more than 11000 patients, it was found that antibiotics shorten the duration of symptoms, but by a mean of only one day, about halfway through the illness (the time of maximal effect) and by about sixteen hours over all¹². This is commensurate with our findings. Antibiotic prescription is also related to patient's satisfaction and at times the clinician may prescribe antibiotics for maintaining good relations with the patient. The injudicious use of antibiotics has several disadvantages; they disturb normal flora and lead to emergence of resistant strains. Antibiotic resistance amongst common respiratory infection producing bacteria such as *Streptococcus pneumoniae*, *Haemophilus influenza* and *Moraxella catarrhalis* has become a major global public health problem^{17,18}. This is particularly true for *Streptococcus Pneumoniae* the resistance to which has reached epidemic proportions¹⁹. One study carried at Aga Khan University Pakistan has shown high levels of resistance to Ampicillin, Co-trimoxazole, Chloramphenicol and Erythromycin²⁰. Resistance is not the only problem; every antibiotic has its own side effects²¹. In the current economic scenario wastage of money on antibiotics for a self-limiting illness can hardly be justified. A study carried out in Pakistan in 1996 showed that elimination of inappropriate antibiotic therapy in cases of ARI alone, has the potential to save Rs.39.8 million (US\$1.2 million) from Pakistan's public health budget each year²². Considering all these disadvantages, there is a need for an effective campaign to apprise both patients and health care professionals about the ill effects and disadvantages of antibiotics¹². The patients should be apprised of the fact that antibiotic provide only a marginal benefit, which is outweighed by their disadvantages. The least, one can do is to prescribe a short course of antibiotics, rather than traditional 10-days therapy; it has been reported that short course of antibiotics is as effective as a long course^{18,23}. A British study divided children with tonsillitis into 3 groups. One group was given 10 days of antibiotic, the 2nd group was given none and the 3rd group was given a prescription and told to use it only if symptoms did not settle by the 3rd day. There was no difference in outcome between the 3 groups and in the 3rd group only 69% used the prescription²⁴. Data from Pakistan is scanty; one small study carried out at Attock showed 62% rate of prescription of antibiotics. The same researchers have found that General practitioners in private sector prescribe more antibiotics as compared to the public sector²⁵. Although there is a multitude of newer antibiotics to choose from, yet in our study Benzyl penicillin was

selected as the primary antibiotic for several reasons i.e. it acts effectively against all Gram-positive pathogens, most Gram-negative cocci and some spirochetes and actinomycetes. This antibiotic shows excellent tissue penetration in the body²⁶ and is inexpensive when compared with other antibiotics. Following the flooding of market with newer generation antibiotics, it is being sparingly prescribed for several years, with the hypothetical conclusion that its resistance must have plummeted.

CONCLUSION: Rate of antibiotic prescription for acute follicular tonsillitis in our primary care clinics, is alarmingly high. There is a dire need to change this unscientific trend. Among the many disadvantages of injudicious prescription of antibiotics, emergence of resistant strains is most critical. Implementation of evidence based practice and education of both the patients & health care personnel is of the essence.

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Pattern of Pure Tone Audiograms in Presbycusis

Babar Hussain Khan, Shiraz Aslam, Pervaiz Palous

ABSTRACT: AIM: To investigate the degree and configurations of hearing loss on pure tone audiometry in presbycusis. **STUDY DESIGN:** Prospective. **PLACE AND DURATION:** Shalamar hospital, Lahore. September 2010 to May 2011. **SUBJECTS AND METHODS:** One hundred and twenty nine (N=129) consecutive subjects, sixty years of age or above, presenting with hearing impairment underwent pure tone audiometry. Demographic characteristics of the patients were noted. The subjects with external and middle ear disease, with history of noise/ ototoxic trauma were excluded from the study. The results were reported in terms of degree and pure tone configuration of hearing loss (HL). **RESULTS:** All subjects showed symmetrical sensorineural hearing loss on pure tone audiometry. The levels of hearing deficit varied between mild and profound and the frequency of mild, moderate, severe, and profound hearing impairment were found to be 26.3%, 43.4%, 18.6%, 11.6% respectively. Males and females were affected equally. The pure tone average hearing loss showed more loss on high frequencies. The average air-bone gap was 5 dB. Out of 129 cases, 62 % had downsloping (56.4% were gentle sloping and 43.5% showed abrupt slope), 26.3% had flat pattern and 2.3% showed u shaped configuration. **CONCLUSION:** We found greater number of a gentlehigh-frequency sloping audiogram followed by flat configuration and the degree of loss varied from mild to profound, with a prevalence of moderate degree. No significant differences were observed in the audiometric profile in men and women.

Key Words: Presbycusis, pure tone audiometry, deafness, hearing loss, sensorineural.

INTRODUCTION: Diminished organ function due to degenerative processes is more commonly seen now a days because the population is becoming progressively older¹. This is due to health awareness programmes on one hand and the advanced health facilities on the other. Hearing loss associated with increasing age is known as presbycusis. The term presbycusis comes from the Greek “presbys” meaning “old” and “(a)kousis” meaning “hearing,” and is referred to as symmetrical HL associated with the degenerative processes of ageing. Toynbee in 1849 was perhaps the first to write about age-related HL². Zwaardemaker in 1891 is credited with the first accurate description of presbycusis³. Since the 1930s, age-related changes have been observed at nearly every location in the ageing auditory system, from the external ear with collapsing canals to neural degeneration extending from the auditory nerve⁴. The pattern of HL in elderly patients reveals definitive variations in the degree and form of hearing as well as in time of onset and rate of progression⁵. The durability of auditory mechanism is determined mainly by genetic factors and by the physical stress to which it is subjected during daily life^{6,7,8}. Hearing impairment can result in anxiety or stress in everyday life^{9,10}. In many patients in which there is not much tonal loss on pure tone audiogram, their main problem is speech perception and discrimination¹¹. Rehabilitation of such patients is possible but is underused¹². According to the AAO-HNS definitions of hearing the average HL at 0.5, 1, 2, and 3 kHz must exceed 25 dB to be considered a hearing handicap¹¹. The incidence of hearing loss increases with age¹³. The predictable deterioration in hearing ability that occurs with age varies in severity from mild to substantial and if not rehabilitated isolation, depression,

and, cognitive decline¹⁴. The audiological testing plays an important role in advising the most appropriate aid. Our search failed to find any study conducted in Pakistan on audiogram pattern amongst the elderly subjects. We conducted this study to assess the pure tone thresholds and audiogram configuration in ageing patients. **SUBJECTS AND METHODS:** This study was carried out in the Audiology unit of the Shalamar Hospital, Lahore from September 2010 to May 2011. All new subjects (N=129) sixty years of age or above, presenting with hearing impairment underwent pure tone audiometry were included. Demographic characteristics of the patients were noted. Their mean age was 68.33 years (SD=7.558, range 60-95). There were 72 males and 57 females (M: F 1.2:1). Audiometric assessments were done using the equipment- MAICO MA 41 66961. The project was approved by the Hospital Ethics Committee and written consent was obtained from all the subjects. Complete history was taken to rule out any other cause of HL. The patients with external and middle ear disease and with history of noise and ototoxic trauma were excluded from the study. According to the classification, the frequencies of 0.25, 0.5, 1 and 2 KHz were considered low frequencies; and 4, and 8 KHz were considered high frequencies, and the type of hearing loss was noted and the degree of hearing loss were analyzed from their mean values. Audiometric testing was performed at 250, 500, 1000, 2000, 4000, 8000 Hz. Hearing levels were measured in decibels. The degree of HL was reported according to international standards for hearing:

Normal hearing = 0-25 dB.

Mild HL = 26-40 dB

Moderate HL = 41-55 dB

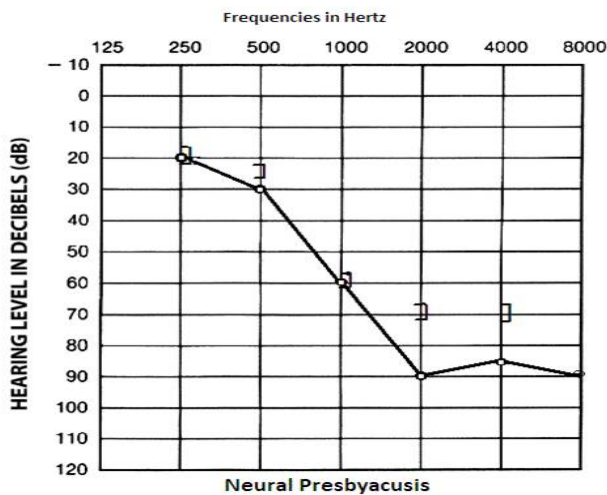


Figure 1: Descending pattern. (See text)

Moderately -severe HL = 56-70 dB

Severe HL = 71-90 dB

Profound HL =>90 dB.

Descriptive statistics were calculated for degree and configuration of HL.

RESULTS: Pure tone audiograms of 129 subjects were analyzed. Positive correlations were found between age and hearing impairment. All patients showed symmetrical sensorineural hearing loss on pure tone audiometry. The levels of hearing deficit varied between mild and profound and the frequency of mild, moderate, severe, and profound hearing impairment were found to be 26.3%, 43.4%, 18.6%, 11.6% respectively. The pure tone average hearing loss (PTA, average of 0.5, 1 and 2 kHz) ranged from 15 to 70 dBHL with a median of 40 and when high frequencies included, ranged from 15 to 100 with a median of 55 dBHL, thus indicating more loss on the high frequencies. The average air-bone gap was 5 dB. No significant differences were found between males and females. Out of 129 cases, 62 % had down

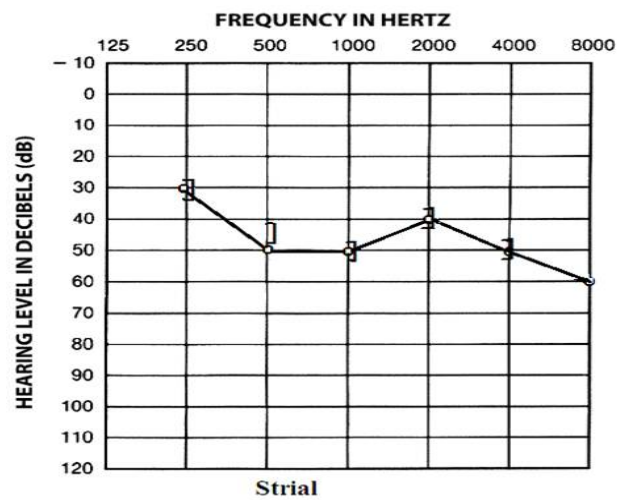


Figure 2: Flat pattern.

sloping (56.4% were gentle sloping and 43.5% showed steep slope), 26.3% had flat pattern of audiogram. 2.3% showed u shaped (cookie bite) configuration. **DISCUSSION:** Age related HL or presbycusis is one of the common presentations of elderly patients. When assessing a patient with hearing impairment, the most simple and most widely available technical investigation is pure-tone audiometry. Standard audiometry is performed by a method of limits in which brief pure tones are presented through headphones at a variety of frequencies and sound pressure levels and the subject indicates when the tones are audible. Intensities are presented in an ascending or descending sequence at each frequency of interest until the threshold has been determined. Routinely thresholds are determined at octave interval from 125 to 8000 Hz. Bone conduction (BC) is carried out by a small bone vibrator placed against the mastoid process. Proper testing requires careful masking of the non-test ear for a bone conduction transducer placed on any part of the skull, because there

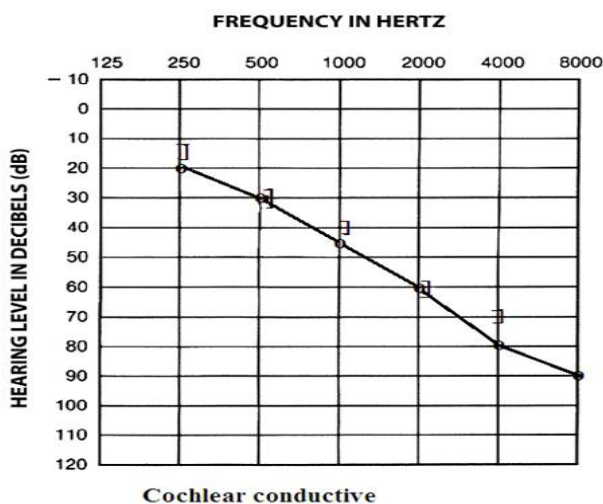


Figure 3: Gradual descending pattern.

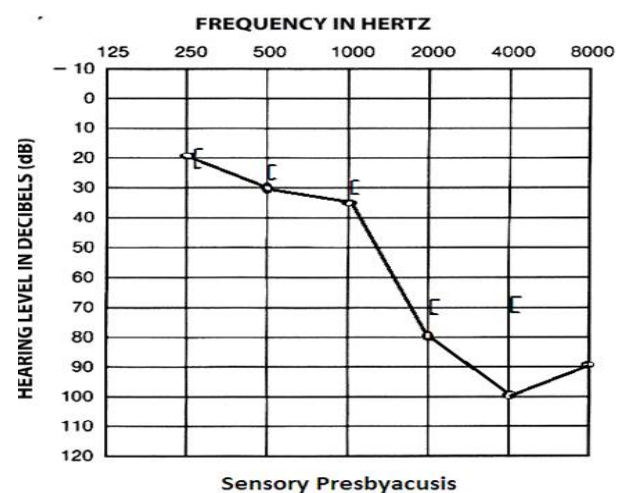


Figure 4: Abrupt descending pattern.

is less than 5 dB attenuation between the two ears. It is equally important in air conduction (AC) testing when the interaural threshold difference in AC is 40 dB or more. Although it is a subjective measure, the test is very reliable if the subject is compliant. An emphasis has been laid on the reliability and age gender specific values when interpreting the pure tone thresholds¹⁵. Presbycusis is not a single pathophysiological entity¹⁶. Moreover, ageing of the auditory structures does not affect all persons of the same age in the same manner, but varies from individual to individual¹⁷. The issue of presbycusis has been debated for more comprehensive definition¹⁸. Presbycusis is characterized by four distinct degenerative conditions and their corresponding distinct audiometric patterns in their purest manifestation. Sensory presbycusis refers to epithelial atrophy with loss of sensory hair cells and supporting cells in the organ of Corti. Auditory thresholds correspond with the degree of hair cell damage in the cochlea and is characterized by abrupt descending PTA. (Fig.1) Neural presbycusis refers to atrophy of nerve cells in the cochlea and central neural pathways. Audiometrically, neural presbycusis is manifested as disproportionate tonal thresholds with speech discrimination (speech discrimination is poorer than auditory thresholds on PTA). On pure tone audiometry, it is characterized by downward sloping audiogram with variable slope. (Fig.2) Metabolic (strial) presbycusis results from atrophy of the stria vascularis. Flat audiometric profiles have been reported to be associated with the stria vascularis atrophy. (Fig.3) Mechanical (cochlear conductive) presbycusis based upon both clinical and pathological criteria. The audiogram must show a gradual descending pure tone thresholds over a range of at least five octaves, a difference of at least 50 dB between the best and the poorest thresholds and no more than 25 dB difference in any octave range. (Fig.4) This results from thickening and secondary stiffening of the basilar membrane of the cochlea and lead to alteration in the cochlear motion mechanics¹⁹. Another variant is mixed presbycusis and is associated with significant pathological changes in more than one auditory structures. Various possible combinations are described by Shucknecht¹⁶. Sensory with strial presbycusis will cause an abrupt high frequency loss superimposed on a flat threshold loss. A sensory with cochlear conductive presbycusis would present an audiogram having an abrupt loss for the high frequencies superimposed on a descending threshold loss. Strial and cochlear conductive will show a gradual descending slope superimposed on a flat threshold loss. In cases in which cochlear pathology does not reach any significant level in any of the structure and when pure tone threshold does not meet the criteria for typical sloping pattern are classified as in indeterminate presbycusis. In one study, conducted by Blanchet, Pommie and colleagues, distribution of pure-tone hearing thresholds of a Caucasian population living in the south of France aged 70 years and older was documented. They concluded that hearing thresholds, especially in high frequencies, increased with age more and this was more pronounced in women than in men. They however

included the parameters of ototoxic and noise exposure in their study²⁰. In our study, high frequency loss was common to both men and women. The distribution of sensorineural hearing was studied by Lutman and Coles, however found Inter-aural threshold differences greater than attributable to measurement error in older subjects²¹. A study conducted by Roth, Hanebuth and colleagues, revealed roughly 30% of men and 20% of women in Europe to have a HL of 30 dB HL or more by age 70 years, and 55% of men and 45% of women by age 80 years²². Ogunleye and Labaran, however, found that presbycusis affect both males and females subjects almost equally²³. We found no significant difference in the distribution of SNHL in men and women. In one study by Bunnag and Prasansuk et al, hearing screening performed using pure tone audiometry in elderly people showed abnormal hearing level in considerable number of subjects. A significant number of subjects had bilateral moderate to severe degree of hearing impairment. They however, found no difference in the hearing thresholds between males and females or between right and left ears²⁴. There is no known therapy for presbycusis and this is an important problem in society. Early detection of hearing impairment in elderly persons can benefit them by amplification from properly fitted hearing aid and hence helps definitely improve their quality of life and may prevent various psychiatric and functional impairments common in such subjects. **CONCLUSION:** We found greater number of high-frequency gentle sloping followed by flat configurations. The degree of loss varied from mild to profound, with a prevalence of moderate degree. No significant differences were observed in the audiometric profile in men and women. We anticipate that this pilot study will help to provide basic data for the study of this very common but neglected clinical entity.

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Microlaryngoscopic Procedure of Laryngeal lesions- A Clinical study of 100 cases

*M A Matin , **M Rowshan Ali, ***M Nurul Islam,

ABSTRACT: **OBJECTIVE:** To evaluate the role of microlaryngoscopy in the management of benign laryngeal lesions and T₁ glottic carcinoma. To analyze the age and sex distribution, symptomatology, site of involvement, occupational factors and prognosis of various benign laryngeal lesions and T₁ glottic carcinoma. **STUDY DESIGN:** A 10 year prospective study was conducted from July 1999 to June 2010. **SETTING:** The study was conducted at Maleka Nursing Home, Bogra, Dhaka Medical College Hospital and Rajshahi Medical College Hospital. **SUBJECTS AND METHOD:** A total of 100 patients (78 males & 22 females) with benign laryngeal lesions and T₁ glottic carcinoma were included based on symptomatology of persistent hoarseness or hoarseness and stridor and positive finding of indirect laryngoscopy or flexible nasolaryngoscopy / Telelaryngoscopy. The patients with T₂-T₄ glottic carcinoma with or without neck nodes were excluded from this study. Microlaryngoscopy was performed in all cases using operative microscope (Atmos, Germany) with 400 mm lens, laryngeal suspension, rigid black anterior commissure laryngoscope and curved towards left, towards right microlaryngeal forceps and scissors except one case of laryngeal web where Diode laser was used. Documentation was done in every case either using camera attachment and TV monitor or taking photograph of pre and post operative microlaryngoscopic view of laryngeal pathology with digital camera. Histopathology was done in all cases of laryngeal pathology excluding laryngeal web and partial cordectomy patient. **RESULTS:** A male preponderance with a male:female ratio of 3.5:1 was observed. Patients age ranged from 5-75 years (mean age 43.5). Majority of patients were in the age group of 41-50 years. All (100%) presented with persistent hoarseness of voice and stridor was the presenting complaint in 8(8%) cases. Vocal cord polyps (38%) were observed to be the commonest type of benign lesions while invasive squamous cell carcinoma (24%) was the most common neoplastic lesion. Glottal lesions were observed in 90 cases (90%) of which 72 cases involved in right vocal cord. Teacher was found to be the commonest occupation in 30 patients (30%). All T₁ glottic carcinoma got post operative radiotherapy. There was no recurrence in cases of polyps, nodules and haemangiomas with 2 recurrences in T₁ glottic carcinoma and multiple papilloma. Significant improvement of voice was noticed in 94 patients (94%). **CONCLUSION:** Microlaryngeal surgery and voice rest offer a cost effective, useful and safe method for the management of benign laryngeal lesions with significant voice improvement and minimal recurrence. **Key Words:** Benign laryngeal tumours, vocal cord polyps, T₁ glottic carcinoma, Microlaryngoscopy surgery.

INTRODUCTION: Microlaryngoscopy is the most modern technique of examination of the larynx both for diagnostic and therapeutic purposes. With the help of operating microscope with 400 mm lens and laryngeal suspension, the surgeon gets better magnified view of the larynx with two hands free to operate on larynx. Advances in all aspects of otorhinolaryngology since the early 1960's until now a days that it has been difficult for the participating physician to keep himself informed. Microsurgical techniques applied in otology were rapidly adopted to diagnose and treat disease of the larynx with greater excellence and opened a new exciting era in laryngology. Use of operating microscope, advances in anaesthesia, development of precise surgical instruments, application of carbon dioxide laser together with the initiative and ingenuity of laryngeal surgeons have all led to many new techniques in microlaryngeal surgery, laser treatment and more recently phonosurgery¹. Most recently Robot assisted microlaryngeal surgery has been introduced with great success². Although CO₂ laser has great advantage in vascular laryngeal lesions and multiple papilloma larynx controversy exists regarding voice recovery after the use of laser versus microforceps

techniques in the removal of benign vocal fold lesions³. The use of Microdebrider for the resection of subglottic cyst also showed some benefits over CO₂ laser⁴. Instead of using conventional vertically opening microinstruments, microsurgical pressing excision technique (MPET) utilized two pairs of custom made horizontally left opening or right opening, curved microscissors/curved cupped microforceps to remove right or left vocal fold lesions accordingly using one instrument at a time, the lesion can be successfully removed with the microscissors and micro forceps in a press-evert cut manner⁵. We use this technique of microlaryngeal surgery in our study. Laryngeal pathologies may present as hoarseness, dyspnoea, stridor, hemoptysis, referred pain and dysphagia¹. The aim of this study was to evaluate the role of microlaryngoscopy in the management of various laryngeal pathologies and to enlist the various laryngeal lesions causing hoarseness and other presentation.

SUBJECTS AND METHODS: This study was conducted at Maleka Nursing Home, Bogra, Dhaka Medical College Hospital and Rajshahi Medical College Hospital from July 1999 to June 2010. The study was

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carried out in 100 patients, 92 patients from Maleka Nursing Home, 7 patients from 1st National Phonosurgery workshop at Dhaka Medical College Hospital and one patient from Rajshahi Medical College Hospital who presented with complaints related to laryngeal frame work such as persistent hoarseness, dyspnoea, chronic dry cough and choking. A detailed history was taken and thorough clinical examination was performed with special emphasis on indirect laryngoscopy, Flexible nasolaryngoscopy/telelaryngoscopy and neck examination. Necessary laboratory and radiological investigations were performed. After provisional diagnosis, all patients underwent microlaryngoscopy under general anaesthesia using microlaryngeal instruments in 99 patients and Diode laser in one patient and the tissues removed were sent for histopathology. The findings were recorded on preformed Proforma's.

RESULTS: Majority of the patients were male (78 as compared to 22 females) with male; female ratio 3.5:1 (Table 1). The age ranged from 5 years to 75 years. (Table 2). The mean age was 43.5 years and most common age group was between 41-50 years (38%). All patients presented with persistent hoarseness for more than 6 weeks (100%) while 8 patients (8%) presented with stridor. (Table 3). Table 4 shows site of lesion of which 90% of patients presented with glottic lesion followed by supraglottic lesion in 8% of cases. Table 5 shows patients occupation where 30% of patients were from teacher group. The patients habit was studied in Table-6 which showed those who are habituated with betel leaf and betel nut ranking the highest (40%). The indirect laryngoscopic examination/FOL/telelaryngoscopic findings of different patients is shown in Table-7. and Histopathological reports in Table-8. Indirect laryngoscopic findings of 3 vocal cord polyps showed ulcerated vocal cord polyps under operating microscopic view seems to be carcinoma and histology confirmed squamous cell carcinoma. Vocal cord polyps were observed to be the commonest type of benign lesions in 38 patients (38%) while invasive squamous cell carcinoma (24%) was the most common neoplastic lesion. Laryngeal Tuberculosis was found in 1 patients (1%) A rare case of haemangiopericytoma was found in a 45 year old male patient presented with huge subglottic laryngeal polypoid lesion who needed tracheostomy. Microlaryngoscopies were performed in all cases under general anaesthesia. Vocal cords nodules, polyps, papillomas, haemangiomas were removed with microsurgical instruments with microlaryngoscopy followed by speech therapy. Partial cordectomy and arytenoidectomy was done in one patient of bilateral vocal cord paralysis following thyroid surgery. (Table-9) Diode Laser was used in 1 patient with laryngeal web. Microlaryngoscopy helped in precise excision avoiding damage to the underlying and surrounding structures. Similarly T1 glottic tumor were fully visualized and specimen was easily taken from the lesion for histopathological diagnosis. 2 patients with fusiform congested vocal cords on microlaryngoscopy were labeled Reinke's edema and treated endoscopically followed by speech therapy. Out of 4 patients of multiple papilloma larynx one patient presented with stridor needed

Sex of Patient	No of Patient	Percentage (%)	
Male	78	78	M:F=3.5:1
Female	22	22	

Table 1: Sex distribution of patients n=100.

Age group	No of Patient	Percentage (%)
5-10	4	4
11-20	10	10
21-30	5	5
31-40	18	18
41-50	38	38
51-60	13	13
61-75	12	12

Table 2: Age distribution of patients n=100

Symptoms	No of Patient	Percentage (%)
Hoarseness of voice	100	100
Pain in throat	12	12
Cough	9	9
Stridor	8	8

Table 3: Presenting Complaints/symptoms n=100

Site	No of Patient	Percentage (%)
Glottis	90	90
Supraglottis	8	8
Subglottis	2	2

Table 4: Site of Lesion n=100

Occupation	No of Patient	Percentage (%)
Teacher	30	30
Shop keeper	19	19
House wife	14	14
Student	8	8
Politician	7	7
Others	22	22

Table 5: Patient's occupation n=100

Habit	No of Patients	Percentage (%)
Betel leaf & betel nut	40	40
Smoker	22	22
Cigarette, betel leaf & nut	9	9
None	25	25

Table 6: Patient's habit n=100

Finding	No of Patients	Percentage (%)
Polypoid lesion/polyps	41	41
Ulcerated VC lesion	25	25
Nodular lesion/nodule		
Bilateral	7	7
Single	5	5
Vascular polyp/haemangioma	7	7
Pedunculated lesion/cyst	4	4
Multiple papilloma larynx	4	4
Reinke's oedema	3	3
Leukoplakia	2	2
Laryngeal web	1	1
Bilateral VC palsy	1	1

Table 7: IL/FOL/Telelaryngoscopic finding n=100

Report	No of Patient	Percentage (%)
Vocal cord polyp	38	38
Invasive squamous cell carcinoma	24	24
Vocal cord Nodules	16	
Haemangiomas	6	6
Multiple papilloma	4	4
Squamous papilloma	3	3
Dysplasia	2	2
Reinke's oedema	3	3
Laryngeal tuberculosis	1	1
Haemangiopericytoma	1	1

Table 8: Histopathology Report n=100

Procedure	No of patient	(%)
Microlaryngeal excision of lesions by forceps and scissor	98	98
Partial cordectomy and arytenoidectomy		
By scissor	1	1
Excision of laryngeal web by Diot laser	1	1

Table 9: Types of Microlaryngeal procedure n=100

Complications	No of patients	Percentage (%)
Chipped upper incisor teeth (old pt)	3	3
Severe laryngeal spasm needing tracheostomy	2	2
Vocal cord atrophy	1	1

Table 10: Complications of Procedure n=100

tracheostomy. Recurrence was observed in one patient of multiple papilloma larynx and one case of T₁ glottic carcinoma. Damage to upper incisor teeth occurred during procedure in 3 old patients, 2 patients got severe laryngeal spasm following the procedure who needed tracheostomy (Table 10). Normal voice or significant improvement of voice was observed in 94 patients. (94%)

DISCUSSION: The history of peroral endoscopy extends into 19th century¹. Manuel Gracia, a Spanish singing teacher living in London, was the first to report the visualization of larynx with mirrors and reflected sun light. His discovery, reported in 1855, was followed by the independent development in 1856 of direct laryngoscopy by Truk and Czermak in Vienna. Gustave Killian, in Freiburg, demonstrated the endoscopic feasibility of foreign bodies removed from trachea-bronchial tree in 1897. Cheivellier Jackson in Philadelphia introduced the distally lighted laryngoscopes, bronchoscopes as well as telescopes with incandescent bulbs at the turn of the century. His contribution to the whole understanding of laryngo-broncho-esophagoscopy was enormous, and he developed the art of foreign body removal from the air and food passages to the extent that there has not been any subsequent fundamental improvement^{6,7}. A thorough and detailed laryngeal examination is the key in evaluation when patients present with voice changes such as hoarseness, vocal fatigue etc. advances in technology and improved understanding of vocal fold physiology and sound production have resulted in a dramatic improvement in the ability to visualize the interior of the larynx^{8,9,10}. There is no single method of laryngeal examination that is optimal for patients with symptoms related to larynx, when it is important to recognize the advantages and limitation of a variety of techniques for laryngeal examination. Indirect laryngoscopy has been used by otolaryngologist for years

because it is an out patient department examination and allows gross examination of the larynx and pharynx. However this method of examination is limited in comparison to newer methods like flexible and rigid endoscopy. A time limitation caused by large base of tongue, soft palate, over hanging epiglottis and exaggerated gag response limits this examination from being performed in 5-10% of patients⁹. Flexible endoscopy has advantages to visualize the nasopharyngeal velum, pharynx and larynx in patients with exaggerated gag reflex and in children. Moreover stroboscopic light source can be attached with it¹⁰. Rigid endoscopy offers an extremely clear view of the larynx and provides magnified view of the vocal folds when used with high quality operating microscope using 400mm focal length lens. Subtle lesions or vocal folds atrophy are identified easily using this method. It facilitates detailed examination for staging of malignant lesions and taking biopsy. Micro laryngoscopy provides surgical approach for the excision of benign lesions such as papillomatosis, polyps, and nodules while early carcinoma (carcinoma in situ and T₁) can also be excised en block^{11,12}. Laser can be used for cordectomy / arytenoidectomy or laryngeal papillomatosis. In our study, the causes of hoarseness in majority of cases were vocal cord polyps (38%) among the benign lesions which is similar to the lowenthal study¹. Vocal cord T₁ carcinoma is the second most cause (24%). In our study most of the lesions were glottal (90%) which is also similar to the study by Shapshay et al who recorded 86% of glottal lesions among 307 cases¹³. Most patients were male and the cause was voice abuse as most of them belonged to teaching profession (30%). Most polyps and T₁ glottic carcinoma were present in the right vocal cord (72%) and nodules were present at the anterior one-third of the vocal cord. One-third were bilateral where as vocal cord polyps were present near the anterior commissure and were difficult to see on indirect laryngoscopy without flexible laryngoscopy. The addition of microscope not only helped in detail delineation of the nodules but also excision without damaging the underlying muscles. Similarly the polyp was grasped with forceps and based excised with micro scissors under magnification. In 94 patients voice returned to normal post-operatively with voice rest/speech therapy without any fibrosis on the vocal cord. Microlaryngoscopy not only helped in the diagnosis but also in surgical management of these patients¹⁴. Diode laser was used with microlaryngoscopy in 1 patient with laryngeal web. The main presentation was hoarseness (100%) and respiratory distress (8%). Similar presentation has been reported by Derky CS et al¹⁵. In our study 25 patients (24 male and 1 female) presented with ulcerated vocal cord lesions seems to be carcinoma (22 T₁ a and 3 T₁ b) of which 24 patients confirmed by histology. Microlaryngoscopy is not only helpful in taking biopsy but also in determining the extent of the lesion properly which is necessary for staging and subsequent treatment of the disease. All 24 patients subsequently got post operative radiotherapy and showed normal voice and no recurrence in subsequent long term follow up except one case who developed severe laryngeal oedema following radiotherapy and eventually needed tracheostomy. Three patients in this study was found to have Reinke's edema. All these patients were

female. Reinke's edema has been found to be more common in females because hormonal receptors have been found to exist in the nucleus and cytoplasm of cells in the vocal folds, as reported by Newman SR et al in his study¹⁶. Microlaryngoscopy and mucosal stripping was done followed by speech therapy. Laryngeal tuberculosis was reported in one patient who got his voice back after anti TB drugs. An extremely rare case of haemangiopericytoma of larynx was reported in a 45 year old male patient at Rajshahi Medical College Hospital presented with subglottic lesion and stridor who needed tracheostomy preoperatively. Microlaryngeal surgery is a common and safe otolaryngological surgery. Its common complications include pain and numbness of the tongue, bruising of the lip, chipped teeth and rarely subcutaneous emphysema of the neck¹⁷. Only 6 patients developed post-operative complications which includes 3 old patient had damage to upper incisor teeth, 2 patients developed severe laryngeal spasm needing tracheostomy and one patient developed vocal cord atrophy with dysphonia. Thus the complications of the procedure were very minimal.

CONCLUSION: Laryngeal lesions have different presentation, affecting all age groups and both sexes. Early diagnosis and, in time management can help us to avoid the late untoward complications. The different methods of laryngeal examination, like laryngoscopy (indirect, flexible and rigid) and microlaryngoscopy have established diagnostic and therapeutic application, especially patients who are difficult to be examined in out patient department. Microlaryngoscopy helped us in the diagnosis of early vocal cord nodules, Reinke's edema and Carcinoma in situ and T₁ glottic carcinoma which can be easily missed on indirect laryngoscopy and direct laryngoscopy. Similarly for therapeutic purposes microlaryngoscopy results are better than direct laryngoscopy due to less damage to the underlying structures and thus less post-operative scarring with excellent functional outcome. So the standard treatment of choice in all types of benign tumours of the larynx should consist of a triad of approach by microlaryngeal surgery (with or without laser), voice rest and vocal rehabilitation.

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Microorganism and Anti-Microbial Resistance of Bacterial Agents in Chronic Suppurative Otitis Media Patients at Abbasi Shaheed Hospital

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*Faheem A Khan, *S M Qaiser Sajjad

ABSTRACT: OBJECTIVES: To evaluate the microbiologic profile and their sensitivity spectrum and resistance pattern against the various antibiotics in chronic suppurative otitis media. **STUDY DESIGN:** A retrospective study. **DURATION AND PLACE OF STUDY:** The study was conducted at the department of ENT and head and neck surgery, Abbasi Shaheed hospital, Karachi from April 2009 to June 2010. **SUBJECTS AND METHOD:** A total of 146 clinically diagnosed cases of chronic suppurative otitis media (CSOM) were included in the study. Their informed and written consent was taken prior to their inclusion. Cases operated previously for the management of CSOM were excluded. The pus was collected on a sterile cotton swab and sent to laboratory for bacterial culture and sensitivity. Prior to taking the swabs the patients were kept away from the use of antibiotics (both topical and oral) for 3-5 days. The results (antibiograms) were analyzed for the most common isolates and their sensitivity spectrum and resistance pattern was recorded. **RESULTS:** The most common isolated organism was *Pseudomonas Aeruginosa* whereas *Proteus* species was least reported. However organisms were resistant to most of the commonly available drugs, except quinolone and aminoglycoside group. **Key Words:** Chronic Suppurative Otitis Media, Microbes, Anti-microbial Profile, Otorrhea.

INTRODUCTION: Chronic suppurative otitis media (CSOM) is a disease which is characterized by persistent discharge through a perforated ear drum lasting for 03 months or more, however there is no widely agreed definition of this disease¹. The incidence apparently depends upon race and socioeconomic factors. Poor living conditions, overcrowding, poor hygiene, malnutrition, improper treatment by primary physician or treatment by the quacks are the basis for a wide spread prevalence in our country². CSOM is divided in to following types according to Browning. Mucosal (active, inactive), Squamosal (active, inactive) and Healed³. Recent evidences indicate that the risk of complications is present with both the squamosal and mucosal types⁴. Prevalence surveys shows that the global burden of illness from CSOM involves 65-350 million individuals with draining ears, 60% of which suffers from hearing damage. In 1993 World Development Report estimated that about⁵, 12 million disability-adjusted-life-years (DALYs) were lost from otitis media, 91% of which comes from the developing world.⁵ Later it scaled down to 20163 million DALYs in 1996; 94% of which still comes from the developing world⁶. Chronic discharging ear is a major health problem in Pakistan⁷. It is one of the most common presenting complain of most of the patients with CSOM in outpatient ENT clinics⁸. The microflora or bacteriologic spectrum differs in both acute and chronic otitis media and because of unjustified use of different antibiotics, emerging clinical resistance is getting more and more prevalent among the cases of CSOM; making the treatment prolong and cost exuberant⁹. Microbiology cultures yield many, frequently multiple

organisms and these vary depending on the climate, patient population and whether antibiotics have or have not recently been used. The studies therefore report different isolates in different proportions of which *Pseudomonas aeruginosa* and *Staphylococcus aureus* are the most commonly reported pathogens, while most of the other organisms are being gram-negative coliforms¹⁰.

SUBJECTS AND METHODS: Out of 198 cases of CSOM patients, 146 were selected having their consent. The study was conducted from April 2009 to June 2010 at outpatient clinics of ENT, Abbasi Shaheed hospital. The discharge was either frankly purulent, muco-purulent, serous (wet) type or blood stained on occasions. The samples were collected after discarding pus from external auditory canal on a sterile cotton swab and was sent for culture and sensitivity to the hospital's laboratory or outside to a private laboratory too, depending upon the circumstances and availability of resources. The results were recorded and analyzed using SPSS system for the most common isolates and their sensitivity spectrum and resistance pattern. **RESULTS:** A total of 146 cases were randomly selected (n=146) among which the males were 121 (83%) and females were 25 (17%). Out of 146 patients, 49 (33.56%) had bilateral and 97 (66.43%) had unilateral ear discharge. The total number of discharging ears were 195 out of which 38% were frankly purulent; 35% muco-purulent; 21% wet ear and 06% blood stained (fig. 1). The most common organism cultured were: *Pseudomonas aeruginosa*, 75 ears (38.46%); *Streptococcal Pneumoniae* and *Escherichia Coli*, 26 ears each (13.33% each); *Staphylococcal* species -

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coagulase positive, 13 ears (6.66%); *Klebsiella* species, 12 ears (6.15%); *Proteus* species, 18 ears (9%) and 25 ears (12.8%) were negative for any organism (table 1). The antibiograms obtained were different in the sense that the drugs tested in majority of the reports were not uniformly the same. The most common organisms and their sensitivity and resistance to group of drugs are as shown in table 2 & 3. Individual pathogens and their resistance and sensitivity for different drugs observed is shown in table-4.

DISCUSSION: The pathogenesis of CSOM is multifactorial, environmental versus genetically determined factors as well as anatomical and functional characteristics of eustachian tube are involved. In CSOM the bacteria can reach the middle ear either from the nasopharynx through the Eustachian tube or from the external auditory canal through the non-intact ear drum^{1,12,13}. In the studies of Argeudas et. al and Kenna MA et. al, the aerobic organisms frequently cultured were *Pseudomonas Aeruginosa* (18-67% of cases)] *Staphylococcus Aureus* (14-33% of cases) followed by *Proteus* species, *Klebsiella* species and *Escherichia coli*^{14,15}. This is in slight similarity with our study, where we found *Pseudomonas aeruginosa* to be the commonest but the order that follows is different from the above (table1). A local study revealed *Pseudomonas aeruginosa* to be the most common organism followed by *Staphylococcus aureus*, *Proteus* species, *Escherichia Coli* and *Klebsiella* species⁹. Here again the order that follows after the *Pseudomonas* is different from our study (table 1). A study from India documented; *Pseudomonas pyocyaneus* followed by *Klebsiella* species, *Staphylococcus aureus*, *Proteus* species, *Escherichia coli*, *Staphylococcus albus* and hemolytic *Streptococci* as frequently involved microbes¹⁶. Another study from Singapore showed the most common isolated organisms to be *Pseudomonas aeruginosa* (33.3%), *Staphylococcal aureus* (33.3%) followed by coagulase negative *staphylococcus* (21.1%)⁸. The slight differences observed in the isolates and species may be because of geographical and/or ethnic variations. The current study includes the drug sensitivity and resistance patterns and it was observed that some drugs/drug groups were not effective for almost all of the organisms cultured as evident from the table 4. A local study has found imipenem to be the most effective drug for *Pseudomonas aeruginosa* followed by ciprofloxacin, ofloxacin and cephaolsporins⁹. Other studies also have the similar conclusions^{17,18}. In other study conducted at Dera Ismail Khan showed the similar results with predominance of *Pseudomonas aeruginosa* in CSOM followed by *Staphylococcus aureus* and they found 100% sensitivity of *Pseudomonas* to tazocin/piperacillin and 88% to levofloxacin¹⁹. An other international study found *Staphylococcus aureus* to be the commonest isolate (32.2%) followed by *Pseudomonas aeruginosa* (26.9%) and *Klebsiella* (10.4%)²⁰. It seems that empiric therapy with topical ciprofloxacin and ofloxacin have an effective, safe and relatively inexpensive treatment for otorrhea in reducing the duration of illness and avoiding the complications of CSOM. The same study found that imipenem, ciprofloxacin, ofloxacin, amikacin and co-amoxiclave are effective against *Staphylo*

*aureus*⁹. Based on the results the authors recommend that fosfomycin to be used as first line drug (oral preparation) for CSOM with an addition of either gentamycin, ciprofloxacin or ofloxacin (topical preparation) while the injectables preparations

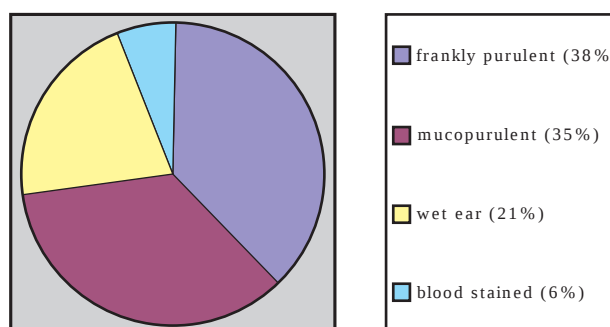


Figure 1: Percentages of different ear discharge.

ORGANISMS CULTURED (TOTAL DISCHARGING EARS=195)	
PSEUDOMONAS AERUGINOSA	75 EARS (38.46%)
STREPTOCOCCAL PNEUMONIAE	26 EARS (13.33%)
ESCHERICHIA COLI	26 EARS (13.33%)
STAPHYLOCOCCAL coagulase positive SP.	13 EARS (6.66%)
KLEBSIELLA SP.	12 EARS (6.15%)
PROTEUS SP.	18 EARS (9%)
NEGATIVE FOR ANY ORGANISM	25 EARS (12.8%)
TOTAL DISCHARGING EARS	195 EARS

Table 1: Cases and % of organism cultured.

MOST COMMON DRUGS FOR WHICH RESISTANCE OBSERVED FOR CULTURED ORGANISMS (TOTAL POSITIVELY CULTURED EARS=170)	
CEPHALOSPORIN GROUP (most of them except Cefoperazone/Sulbactam)	71 EARS (41.76%)
MACROLIDE GROUP (Erythromycin/Azithromycin/Clarithromycin)	31 EARS (18.23%)
PENICILLIN GROUP (except Co-amoxiclave, Tazocin)	26 EARS (15.29%)
CHLORAMPHENICOL	22 EARS (12.94%)
TETRACYCLINE GROUP (Doxycycline)	20 EARS (11.76%)

Table 2: Drug resistance observed in antibiograms.

MOST COMMON DRUGS FOR WHICH SENSITIVITY OBSERVED FOR ORGANISMS CULTURED (TOTAL POSITIVELY CULTURED EARS=170)	
Most of QUINOLONES	49 EARS (28.82%)
CARBAPENEMS (Imipenem, Meropenem)	38 EARS (22.35%)
VANCOMYCIN	31 EARS (18.23%)
CEPHALOSPORIN GROUP (Cefoperazone/Sulbactam)	29 EARS (17.05%)
AMINOGLYCOSIDE GROUP (Amikacin, Tobramycin)	13 EARS (07.64%)
FOSFOMYCIN	10 EARS (05.8%)

Table 3: Drugs sensitivity observed in antibiograms.

INDIVIDUAL PATHOGENS' SENSITIVITY AND RESISTANCE TO DIFFERENT DRUGS

ORGANISM	SENSITIVITY	RESISTANCE
PSEUDOMONAS AERUGINOSA	Ceftazidime, Cefoperazone/Sulbactam, Cefepime, Amikacin, Fosfomycin, Quinolone group, Carbapenems	Chloramphenicol, Cotrimoxazole, Gentamycin, Tobramycin, most of Cephalosporins
E COLI	Cefoperazone/Sulbactam, Amikacin, Gentamycin, Tazocin, Quinolones, Carbapenems	Tetracyclines, Macrolides, Cefixime, Cefuroxime, Cefepime
STREPTOCOCCAL PNEUMONIAE	Penicillin, Tazocin, Quinolones, Ceftriaxone, Cefoperazone/Sulbactam, Fosfomycin, Azithromycin, Clarithromycin	Most of Aminoglycosides, Cephradine, Cefuroxime, Cefixime, Tetracyclines
STAPHYLOCOCCAL AUREUS	Co-amoxiclavate, Fosfomycin, Vancomycin, Quinolones & Aminoglycosides,	Macrolides, Cefuroxime, Ceftazidime
KLEBSIELLASPP.	Most of Quinolones, Fosfomycin, Cefoperazone/Sulbactam	Most of Cephalosporins, Macrolides, Tetracyclines
PROTEUS SPP.	Carbapenems, Quinolones, Cefoperazone/Sulbactam, Tobramycin, Gentamycin, Amikacin	Most of Macrolides, Tetracyclines & Cephalosporins

Table 4: Individual pathogens' sensitivity and resistance spectrum to various drugs/drug groups.

(carbapenems, vancomycin, cefoperazone/sulbactam, co-amoxiclavate and quinolones) may be reserved for the severe infections.

CONCLUSION: The authors conclude that although the pattern of isolated organisms were not different from that published in literature, however, unjustified use of anti-microbial agents without culture and sensitivity is responsible for the emerging resistance of the involved pathogens. It is thereby recommended that the correct management is with an early culture and sensitivity that would control this rapid trend of emerging resistant organisms.

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Endolymphatic Sac Tumor: Case Report and Review

Dayang Suhana, Abang Madzhi , Asma Abdullah

ABSTRACT: **OBJECTIVE:** To report a case of endolymphatic sac tumor which has local aggressive pattern. **Methods Design:** A Case Report. **Setting:** Tertiary Referral Centre. **Patients:** One. **Result:** The patient presented with a left otorrhoea and left facial nerve palsy with worsening past one year in 2008. Physical examination showed left facial nerve palsy grade V and reddish middle ear mass seen. Computed tomography (CT) scan and Magnetic Resonance Imaging (MRI) showed a cerebellopontine angle tumor. Tumor excision via intracranial approach performed and histopathology report consistent with endolymphatic sac tumor (ELST). During surveillance follow-up a year later, this patient developed tumor recurrence and translabyrinthine excision was performed. He has been completed radiotherapy 30 fraction with 60 Gry. Post surgery he is well and still under yearly follow up. **Key Words:** Endolymphatic sac tumour, vestibular aqueduct, pathology.

INTRODUCTION: Endolymphatic sac tumor is a locally aggressive tumor which results in late clinical manifestations with expansive mass invading the temporal bone and posterior fossa. Surgery and post-operative radiotherapy are the main treatments modality. Follow up of patients have to focus on both local recurrence and metastases

CASE REPORT: A 40 year old man presented with left facial nerve palsy with left otorrhoea for one year and gradually worsening in symptoms. He presented with reduced hearing over left ear with presence of tinnitus for few months with no history of vertigo. Physical examination showed left facial nerve palsy grade V and left reddish middle ear mass seen. Nasoendoscopy showed normal findings of nasopharynx. Pure tone audiometry showed left moderate to severe mixed hearing loss with right normal hearing. The post contrasted computed tomography scan (CT scan) showed a mass at left Cerebello-Pontine (CP) angle tumor with heterogeneous enhancement of the solid component and enhancement of the wall of the cystic component. (Figure 1) There were calcifications within the solid component. The petrous temporal bone was irregular with lytic lesion. Magnetic Resonance Imaging (MRI) showed left CP angle tumor measuring 3x2cm and extends into the left middle cranial fossa 2x2x1cm, enhancement of adjacent durra. (Figure 2) Excision of tumor done via craniotomy was performed successfully. Post operative period was uneventful and he was discharged well. Histopathological examination showed endolymphatic sac papillary tumor. During follow-up surveillance at one year later, MRI showed distorted left temporal bone signal density with presence of residual tumor at the CP angle component measures 2x0.9x1.5cm and extends into the left middle cranial fossa measures 1.4x1.8x1.6cm. He underwent tumor excision via translabyrinthine approach and intraoperative findings showed a mass at the left CP angle eroding the posterior wall of the middle ear and sigmoid sinus. Histopathology report showed remnant of endolymphatic sac tumor. He completed radiotherapy 30 fraction with 60 Gry with no complications.

DISCUSSION: Initially ELST described as a low grade papillary adenocarcinoma, the histological appearance and apparent lack of metastatic potential of these tumours has convinced some to reclassify them as benign papillary adenomatous tumours. However to date, it is classify as a locally aggressive tumour with malignant features and possibility of drop metastases. The high overall survival following surgical resection, despite locally aggressive behaviour, is likely due to the underlying benign histology of the tumour. The first report of drop metastasis to the spine is by Bambakidis in 2005¹. The second report of such occurrence reported by Bambakidis is by Tay KY which shows the need for close follow up and assessment in patients diagnosed with ELST². Endolymphatic sac tumor (ELST) is a locally aggressive tumor which shows destruction to adjacent area. The immunochemical analysis of these tumors usually reveals cytokeratin, vimentin, epithelial membrane antigen and less frequently S-100 protein and neuron specific enolase. In sporadic cases genetic analysis for Von Hippel-Lindau disease should be considered. Local excision is curative for end lymphatic sac papillary tumors. The currently favored method of treatment consists of excision and long term follow up. The treatment of choice is a radical resection, although complete resection is impossible in most of the cases³. The role of adjuvant radiotherapy as treatment is controversial⁴. Endolymphatic sac tumors could be controlled by surgery, radiotherapy or conservative management and strongly influenced by tumor stage and co-morbidity⁵. It is important to make a distinction between ELST and the more benign middle-ear adenomas, since this leads to a different treatment and prognosis. ELST frequently invades the surrounding structures and extends intracranially. The long history of chronic otorrhoea in this patient with the presence of reduced hearing and tinnitus warrants an earlier investigation, namely CT scan or MRI for further evaluation to rule out other causes of chronic discharging ear namely chronic suppurative otitis media with cholesteatoma. The nature of local aggressiveness of this

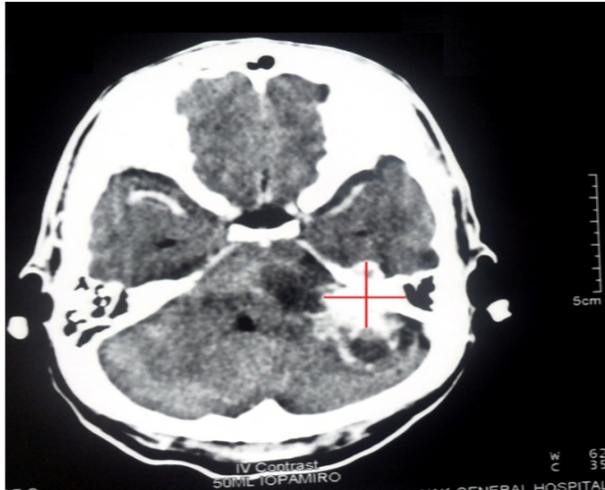


Figure 1: Axial cut of post contrasted computed tomography scan (CT scan) shows a mass at left Cerebello-Pontine (CP) angle with heterogeneous enhancement of the solid component and enhancement of the wall of the cystic component.

tumour was presented in this patient whereby it eroded the posterior wall of the external ear canal. The diagnosis dilemma was at the time of presentation there is presence of reddish mass in the middle ear which could also be glomus jugulare having in mind of the CP angle tumour could be acoustic neuroma which has different entity and management. With regards to this patient the remnant of tumour was excised via translabyrinth approach compromising the hearing as to ensure complete tumour resection. He was given radiotherapy post operation in order to prevent metastases. Despite given post operative radiotherapy patient still has to be on surveillance follow up and spinal imaging should be considered in patients complaints of back pain, cauda equina and radicular symptoms². In patients undergoing gamma knife surgery for recurrence tumour still shows neurologically stable although not disease free still warrants a close surveillance of symptoms⁶. To date role of radiotherapy is still controversial, 50% efficacy has been reported for the treatment of ELST with only radiotherapy, rate of cure of 90% has been reported for complete ELST excision without radiation⁷. With the possibility of residual tumour it is important to look at the origin of this tumour for complete resection to avoid recurrence and metastases. The precise location of the origin of tumour is at the vestibular aqueduct of the endolymphatic sac. In a reported case series by Russell RL et al in 2009 it correlates the HPE and the CT scan and MRI findings for and made a conclusion that the tumour is confined in the intraosseous portion (vestibular aqueduct) of endolymphatic sac and the radiological investigations showed the epicentre is at the same area⁸. Special attention should be consider in excision of tumour in this area as it will prevent the recurrence of disease. In patients with excellent preoperative hearing and a small ELST, such a hearing conservation approach may be warranted. However, the completeness of tumor resection should not be compromised for the sake of hearing conservation. In some tumours, total resection cannot be achieved without risk of catastrophic loss of

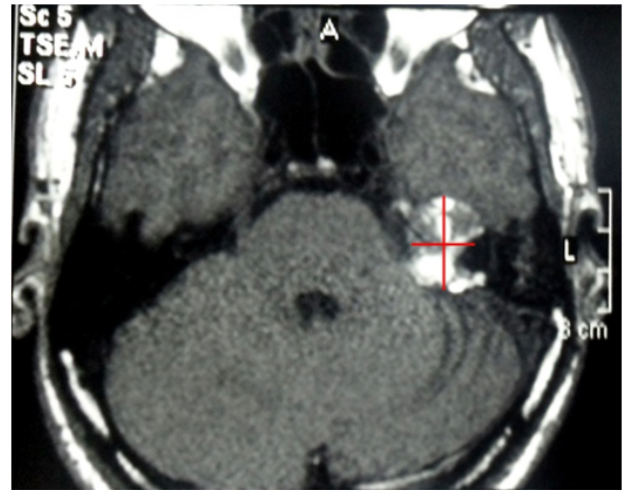


Figure 2: Magnetic Resonance Imaging (MRI) of left CP angle shows tumor measuring 3x2cm and extends into the left middle cranial fossa 2x2x1cm, enhancement of adjacent dura.

function or death, and in these patients subtotal resection may be warranted. Overall survival characteristics for all reported cases of ELSTs are: 74% of patients have no evidence of disease, 20% patients alive with disease and 4% died of disease. Stereotactic radiotherapy has shown no increased benefit above standard fractionated radiotherapy in survival or recurrence rates, and subtotal resection followed by stereotactic radiotherapy has uniformly resulted in tumor regrowth^{9,10}.

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Chondroma of the Nasal Septum-A Case Report and Review of Literature

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ABSTRACT: A chondroma is a benign cartilaginous neoplasm or tumor, tissue composed of cells that grow in an abnormal way. They are rare in the head and neck region. The sites of predilection in the head and neck region include ethmoid sinus (50%), maxilla (18%), nasal septum (17%), hard palate and nasopharynx including sphenoid sinus (6% each), and alar cartilage (3%). These tumors probably arise from remnants of the embryonal cartilaginous skeleton that escape resorption during endochondral ossification. Since its first literary description in 1842, only about 140 cases have been reported. We present the case of a 45-years old female who reported nasal obstruction and intermittent nasal bleeding for 6 months. Nasoendoscopic examination revealed a firm mass arising from the posterior part of nasal septum on both sides. The tumor was removed by wide excision with endoscopic guidance. Histopathological examination showed hyaline cartilage cells arranged in lobules. No nuclear atypia or hyperchromasia was found. Post operative follow up has been done and till now no recurrence of growth seen. In conclusion despite their rarity, chondromas should be taken into consideration in the differential diagnosis of nasal tumors, especially those arising from the nasal septum and its close relation to chondrogenic sarcoma.

Key Words: Chondroma, Nasal septum, Benign neoplasm.

INTRODUCTION: A chondroma is a benign cartilaginous neoplasm or tumor, tissue composed of cells that grow in an abnormal way. Normal tissue is growth-limited, i.e., cell reproduction is equal to cell death. Cartilaginous tumors make up the second largest group of bone neoplasms. They are rare in the head and neck region. Approximately 60% of tumors occur in patients less than 50 years old¹. No sex predilection exists. They are usually well circumscribed and appear fairly homogenous on CT. They tend to be expansile lesions that remodel bone¹. They do not provoke sclerotic bone at their margins. Calcification of the chondroid matrix occurs rarely¹. The diagnosis of a nasal chondroma is based on the combination of clinical, radiologic, and pathologic findings. Since its first description in the literature in 1842, only about 140 cases have been reported. The symptoms of nasal septum chondroma are nasal obstruction, headache

and epistaxis. The treatment of choice is wide surgical excision. Despite their rarity, chondromas should be taken into consideration in the differential diagnosis of nasal tumors, especially those arising from the nasal septum¹. Considering its rarity and presence of malignancy it has been presented as a case report.

CASE REPORT: A 45 years old woman presented with gradual onset of bilateral nasal obstruction over a period of 6 months more on left side which was persistent and partial, associated with occasional little nasal bleeding and headache. Clinical examination plus nasoendoscopy revealed a non-tender smooth surfaced mass seemed to be lobulated on the left and without lobulation on the right. Intact mucosa covered the growth on both sides. It originated in the nasal cavity posteriorly from nasal septum on both sides 1 cm above the floor of the nose. The growth was firm, painless and did not bleed on touch. The size of the



Figure 1: Chondroma arising from Rt. side of nasal septum .



Figure 2: Chondroma arising from Lt. side of nasal septum.

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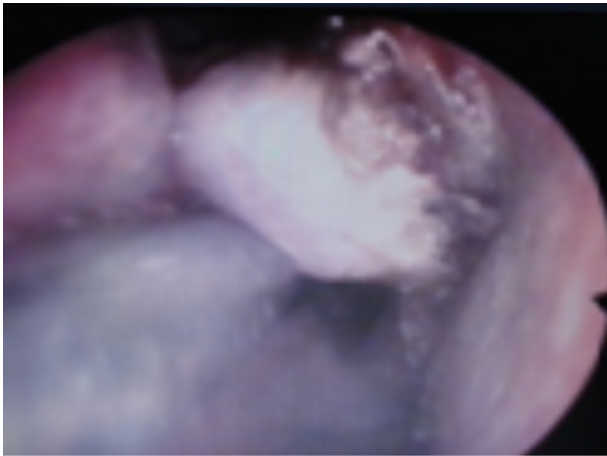


Figure 3: Removal of chondroma from Rt. side of nasal septum.

tumor was approximately 1×1×1 cm on the right side and 1×1.2×1.2 cm on the left. CT scanning revealed a mass arising from the posterior part of the nasal septum on both sides. No intratumoral calcification, local tissue destruction, or cervical lymphadenopathy was seen. Wide excision of the mass was performed with endoscopic guidance under general anesthesia and removed in pieces by forceps. During operation part of nasal septum was removed as growth was present on both sides of it. The histopathological examination showed benign lesion made of lobules of mature cartilage, fibrous tissue and blood vessels. The patient was followed up for more than 5 months and no recurrence was seen. The size of the perforation was more than 1 cm covered with healthy mucosa all around. Nothing has been done to the perforation. **DISCUSSION:** Chondrogenic tumors of the head and neck region are rare and most often malignant. The sites of predilection in the head and neck region include ethmoid sinus (50%), maxilla (18%), nasal septum (17%), hard palate and nasopharynx (including sphenoid sinus) (6% each), and alar cartilage (3%)². These tumors probably arise from remnants of the

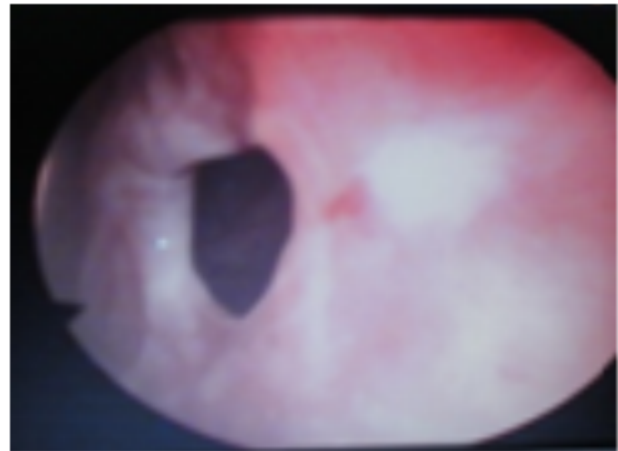


Figure 4: Nasal septum after two and half months (Rt. side) of operation showing the site of operation on the nasal septum with a perforation.

embryonic cartilaginous skeleton that escape resorption during endochondral ossification³. In the facial skeleton, chondroma generally occurs during adolescence and early adulthood⁴. To the best of our knowledge, chondroma arising from the nasal bone, very few cases has been previously reported in the English-language literature. The way in which cartilaginous tumors arise at some sites in the head and neck is puzzling. These tumors may arise from the nasal septum because of their intrinsic cartilaginous nature⁵. Cartilaginous tumors may also arise from bones that ossify in cartilage (e.g., sphenoid and nasal bones); these bones can harbor cartilaginous rests long after ossification is complete. Chondromas and chondrosarcomas can also develop in tissues that do not normally contain cartilage at any stage of development⁶. Aberrant embryonic cell rests have been suggested to explain the origin of cartilaginous tumors at these sites⁷. Multidirectional differentiation of the mesenchymal cells has also been implicated in the origin of cartilaginous tumors at these sites⁶. Macroscopically, benign chondromas are smooth, firm, and lobulated tumors with a gritty "ripe pear feel"⁸.



Figure 5: Coronal CT of Nose showing chondroma arising from both sides of nasal septum

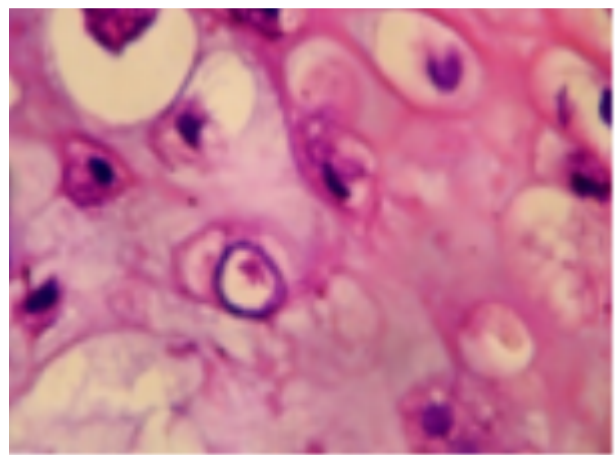


Figure 6: Chondroma-Microscopic view –High magnification (X640) No nuclear pleomorphism seen

On microscopy, cartilage cells are consistently small and contain pale, vacuolated cytoplasm and small, round, dark-stained nuclei. Making a histologic distinction between a benign chondroma and a malignant chondrosarcoma may be difficult. In fact, many authors believe that a benign chondroma is actually a low-grade chondrosarcoma. In brief, a chondroma duplicates normal cartilage despite increased cellularity, but a chondrosarcoma exhibits pronounced irregularity in the number and size of cells and in the degree of hyperchromatism. Although the final diagnosis is established by the histopathology report, a clinical differentiation between a benign and malignant lesion must be made so that the physician can plan the surgical management of the lesion. Some clinical features should raise a suspicion of malignancy, including older age at presentation, a rapid extension of growth, an invasion of surrounding structures, and a site of origin in the facial skeleton⁹. The differential diagnosis of nasal cavity mass lesions is extensive and includes many inflammatory and neoplastic entities. Rhinolith, fungal infections, rhinosporidiosis, tuberculosis, Wegener's granulomatosis, and lethal midline granuloma or nasal polyp present as nasal cavity soft-tissue mass lesions with variable bone destruction¹. The diagnosis of nasal chondroma must be considered in the differential diagnoses of midline nasal cavity masses. Recognition of this entity aids in appropriate treatment. Surgery is the mainstay of treatment for both benign and malignant tumors. A wide excision should be performed when a presumptive diagnosis of a cartilaginous tumor of the facial skeleton is made because these tumors behave aggressively in the facial skeleton¹⁰. Radiotherapy is of little value for

histopathologically benign tumors, Long-term follow-up of a benign chondroma is necessary because of the possibility that malignant transformation will occur¹¹. **CONCLUSION:** Chondroma should be taken into consideration during the differential diagnosis of the nasal septal tumors.

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Huge Capillary Hemangioma of the Pinna

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ABSTRACT: Capillary hemangioma is a benign vascular tumor. It usually presents as a bright red to blue, rapidly growing nodule and may occur anywhere on the skin or mucosa. Involvement of the pinna is very rare. In this report, we describe one such unusual case. A 28-year-old female patient presented to our institution with huge hemangioma of the left pinna. Temporary ligation of the external carotid artery was done followed by complete auricular amputation.

Key Words: Capillary hemangioma, pinna, auricular amputation.

INTRODUCTION: Capillary hemangiomas are benign vascular tumors composed of capillary-sized blood vessels. They develop at a number of sites but involvement of pinna has been rarely reported. Giblin et al retrospectively reviewed 408 cases of capillary hemangioma treated at a single institution. In this series the head and neck presented the most common location (36%), followed by the upper limb (33%), the trunk (15%), and the lower limb (8%). 59 percent of the head and neck lesions were located on the lips, the cheeks, and in other intraoral locations. Only 4 patients presented with a capillary hemangioma of the ear, although the authors did not give any detailed information as to which part of the ear was affected¹. Courteny et al reported a case of capillary hemangioma in a 27-year-old female patient. It was found arising from external auditory meatus². Schild et al reported a case of pedunculated capillary hemangioma of the external ear. It was an exophytic mass about 27 x 20 x 20 mm in size attached to the left pinna by a broad-to-slender stalk. They performed complete excision of the tumor³.

CASE REPORT: A 28-year-old female patient presented to our institution with swelling of the left pinna for 2 years. Patient noted a cutaneous blush on her left pinna, 2 years ago, with slight size discrepancy between the ears. Patient recalled gradual expansion of the lesion. Trauma, on the pinna, 1 year back, was a trigger factor, and caused, the affected ear to grow noticeably larger. Physical examination revealed huge macrotia, capillary staining and cutaneous thickening of whole of the left pinna. The external auditory canal was partially occluded, but tympanic membrane was without any pathological finding. The remainder of the physical examination was uneventful. Doppler ultrasonography of the lesion showed a vascular tumor limited to the pinna without extension in the surrounding area. A provisional diagnosis of hemangioma was made. The patient was given a general anesthesia and complete auricular amputation was done after temporary ligation of the external carotid artery, on the left side (Fig 1). Initially lobule was not included in excision. But bleeding could be stopped only after complete amputation. Primary closure was accomplished by linear approximation. Histopathological examination revealed a well-vascularized tumor with capillary sized vascular channels. There were no signs of malignancy and the surgical margins were free of disease. The findings were consistent with a capillary hemangioma. The postoperative course was uneventful. Repeat doppler ultrasonography of the periauricular region done 1 year later, revealed no recurrence. The patient wore her hair in a long style to cover the site.

DISCUSSION: Hemangiomas are characterized by

increased number of normal or abnormal vessels filled with blood. They are difficult to distinguish with certainty from malformations or hamartomas. These lesions are subdivided into several categories, capillary hemangioma is the most common type⁴. Virtually all capillary hemangiomas are composed of nodules of capillary size vessels, each of which is subserved by a feeder vessel. This lobular or grouped arrangement of vessels is a helpful feature for distinguishing benign and malignant vascular malformation. Adult form of capillary hemangioma consists of small vessels lined by flattened mature endothelium⁵. Concerning the sex ratio, the international literature offers conflicting views, although mucosal lesions are up to twice as common in women as in men³.

The etiology of capillary hemangioma is unknown. Proposed agents include trauma, infection, hormonal factors, and preceding dermatoses³. The capillary hemangiomas in women may fluctuate in size with pregnancy and menarche; this suggests that the endothelial cells of these tumors may be responsive to circulating hormones⁵. Our case was a 28-year-old female, trauma was another factor which was associated with increase in the size of tumor.

Capillary hemangioma usually presents as a bright red to blue, rapidly growing nodule on a level with the surface of the skin or mucosa³. Very rarely, as in the case presented, huge hemangioma is formed on the pinna. A lesion with thrill or bruit or with an obviously warmer

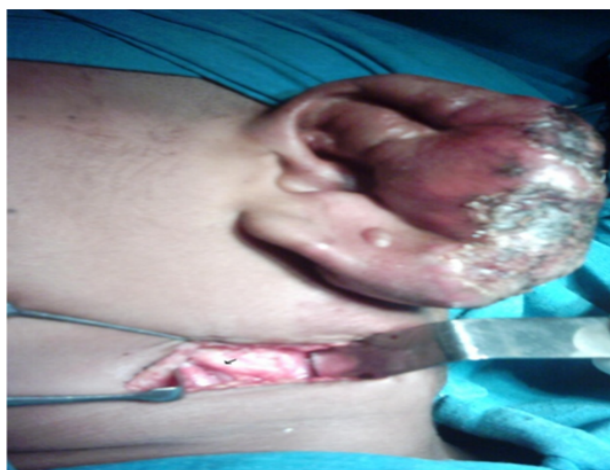


Figure 1: Huge Capillary hemangioma of the left auricle. Left external carotid artery (arrow) exposed for temporary ligation.

surface is most likely a special vascular malformation, called arterio-venous hemangioma (arterio-venous malformation)⁶. It is important to distinguish between hemangiomas and other vascular malformations as they are treated differently and have different outcomes. Hemangiomas have a variable ultrasound appearance depending on the number of cystic vascular spaces present. Small lesions are usually echogenic but often the larger lesions are hypoechoic, compressible with increased color Doppler flow. Grey-scale imaging can aid the diagnosis of a venous malformation. The majority of venous malformations are heterogeneous and hypoechoic relative to the subcutaneous tissue and phleboliths are seen in 16 percent⁷. Angiography, retrograde venography, MRI, and magnetic resonance angiography allow more definite identification of the nature of a vascular mass of the pinna. However definite diagnosis can only be obtained by excision of the tumor with histologic examination⁶. Shave and cautery, curettage and laser ablation or photocoagulation appear less efficient in clearing these notoriously recurring lesions. Complete surgical resection with histopathologically clear margins represents the therapy of choice¹. Chances of recurrence are higher if there is incomplete histological excision. After auricular amputation, reconstruction can be done by costochondral cartilage and a contralateral free temporoparietal fascial flap. Prosthetic ears and women wearing their hair in a long style, as was ours, are options available for patients denying reconstructive surgery⁶.

The case presented is noteworthy for the unusual size of the capillary hemangioma of the pinna. This work received the approval of the departmental board of postgraduate studies.

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Huge Pleomorphic Adenoma of Sub Mandibular Gland

Irfan Ul Shamas

ABSTRACT: Pleomorphic adenoma is the most common salivary gland tumor and submandibular pleomorphic adenoma accounts for only 8 % of them. The annual incidence is approximately 2-3.5 cases per 100,000 population. Pleomorphic adenoma occurs in individuals of all ages. However, it is most common in the third to sixth decades; the average age at presentation is between 43 and 46 years. Pleomorphic adenoma is seen more often in females than in males (2:1 ratio). Large masses appear heterogeneous on imaging secondary to hemorrhage, necrosis and cystic changes. Lobulated contour of the tumor favors the diagnosis of pleomorphic adenoma and they appear as multiple adjacent masses rather than single on CT scan. Treatment is essentially surgical with post operative radiotherapy is advisable in larger masses to prevent recurrence.

Key Words: Pleomorphic adenoma, huge submandibular gland, mixed salivary tumour.

INTRODUCTION : Pleomorphic adenoma is the most frequent benign tumour of the salivary glands. It is a slow growing tumour and is also called mixed tumour because histologically they are solid, tubuloglandular structure alternating with myxoid and chondroid zones. The name pleomorphic adenoma was suggested by Willis.

CASE HISTORY : A 50 yr old male presented with history of swelling over front of the neck from last 15 yrs gradually increasing to present size (15cm by 10 cm approximately). (Fig.1) On examination the large lobulated swelling was seen over front of neck, predominantly on right side and extending into the right submandibular region up to the angle of the mandible. On palpation it was firm to hard in consistency. The patient was referred to radiology department, CSS Hospital, Meerut for ultrasound examination of neck. On ultrasound examination there was a large heterogeneous predominantly echogenic mass seen overlying right side of neck extending up to angle of mandible. Multiple echogenic nodules and anechoic areas were seen within it. Right submandibular gland was not seen separately from the mass. Both parotid glands and

left submandibular gland were normal. No lymphadenopathy detected in the neck. Both sided carotid arteries and jugular veins were normal, no evidence of thrombosis seen within them. On ultrasound possibility of a large mass arising from the left submandibular gland was kept and CT scan neck was advised but patient refused citing financial problems. FNAC of the mass suggested the diagnosis of pleomorphic adenoma. The patient was operated at ENT department GMC Srinagar and a large encapsulated mass well separated from the surrounding tissue was removed. (Fig.2) Post operative histopathological examination of specimen confirmed the diagnosis of pleomorphic adenoma arising from the submandibular. **DISCUSSION:** Pleomorphic adenoma (benign mixed tumor) is the most common salivary gland tumor and represents 70-80 % of all benign tumors of the major salivary glands^{1,2,3}. Of all the pleomorphic adenomas over 85% occur in the parotid gland, 8% occur in the submandibular gland, and 6.5% occur in the minor salivary glands and 0.5 % in the sublingual glands^{1,3}. The submandibular gland is involved in only 5% to 10% of the salivary gland tumors, and



Figure 1a: Patient 15 years back.



Figure 1b: Patient now.



Figure 2: Operative specimen

pleomorphic adenoma (PA) is the most common tumor affecting it⁴. Sarcomatous transformation is seen in only 2-5% of cases and is usually associated with tumors that have been present for 10-15 years⁵. Tumors arising in the minor salivary gland account for 22% of all salivary gland neoplasm. Majority of them are malignant with only 18% being benign. Of the benign tumors pleomorphic adenoma is the commonest⁵. The most common site of a pleomorphic adenoma of the minor salivary gland is the palate followed by lip, buccal mucosa, floor of mouth, tongue, tonsil, pharynx, retromolar area and nasal cavity⁵. Pleomorphic adenomas are usually seen in middle aged women and present as a painless slowly growing mass. The lesions are usually solitary, ovoid, well demarcated masses². The larger tumors may have pedunculated outgrowths from the main lesion that grossly simulate multiple masses¹. On ultrasound they are seen as well defined rounded hypoechoic lesions with lobulated or bosselated contour and may have posterior acoustic enhancement. They may appear heterogeneous secondary to hemorrhage, calcification, and necrosis as seen our case. CT scan is an important diagnostic tool in these tumors because it helps in determining the extent of disease, local spread and also helps to some extent in determining the type of tumor¹. Presence of intact fat plane helps in distinguishing benign tumors from malignant¹. Most small tumors are smoothly marginated, spherical having higher attenuation value than surrounding normal gland however low attenuation area mimicking cyst may be seen. The larger masses most often have a heterogeneous appearance with sites of low attenuation representing areas of necrosis, old hemorrhage and cystic changes as seen our case¹. Localized areas of increased attenuation most often represent sites of recent hemorrhage. Dystrophic calcifications or ossification can occasionally be seen scattered throughout the tumor¹. Our case showed a single calcific focus. The larger tumors tend to develop a lobulated contour that, when present, is highly suggestive of the diagnosis as seen in our case¹. Such a lobulated mass on CT appears as multiple adjacent

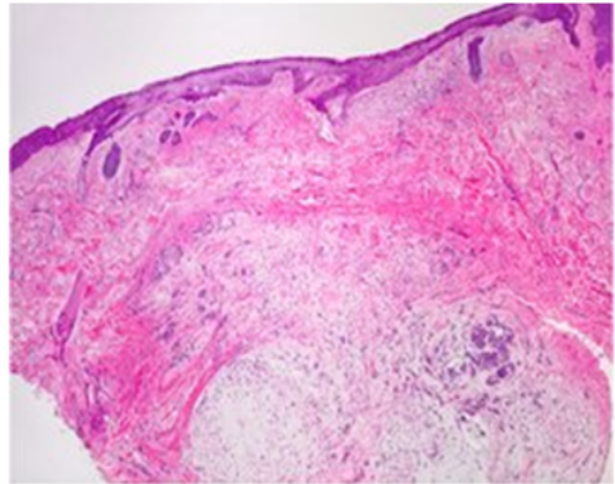


Figure 3: Histopathology suggesting pleomorphic adenoma.

masses rather than a solitary lesion¹. CT shows well defined enhancing soft tissue mass. Contrast enhanced MR imaging delineates tumor margins better, necrotic and cystic areas can be differentiated from enhancing mass, also skull base invasion and vessel involvement can be better depicted. High grade tumor have intermediate to low signal intensity on all pulse sequences while low grade tumors are dark on T1W and bright on T2W images. The treatment of pleomorphic adenoma is essentially surgical. Though these benign tumors are apparently well encapsulated, resection of the tumor with an adequate margin of grossly normal surrounding tissue is necessary to prevent local recurrence as these tumors are known to have microscopic pseudopod like extension into the surrounding tissue due to "dehiscences" in the false capsule. Postoperative radiotherapy to the parapharyngeal space could possibly reduce the recurrence rate in such tumors⁶. The dose of radiotherapy recommended in such cases is 50 Gy in 15-16 divided doses⁶. It is unusual that despite of such a large mass of long duration which seemed to be originate from left submandibular gland on imaging, turned out to be benign pleomorphic adenoma of submandibular gland. The patient was from a far flung area with no access to medical facilities that is why presented at such an advanced stage.

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Use of CROS Hearing Aid in Conjunction to CIC Hearing Aid: A Case Study

Indranil Chatterjee, Pragati Shatapathy, Suman Kumar, Ashok Kumar Sinha

ABSTRACT: Patient aged 34 years male presented with complaint of hearing loss in the both ears. The onset of hearing loss was due to middle ear infection, underwent middle ear reconstruction surgery and was fitted with Complete In the Canal (CIC) hearing aid in the better ear. Pure tone audiometry, immittance audiometry and the speech discrimination scores revealed that the patient has moderate sensorineural hearing loss in his left ear and the severe sensorineural hearing loss in his right ear. Patient was advised and fitted with CIC hearing aids in the left ear. The puretone aided response with CIC hearing aid was close to normal levels of hearing. The speech discrimination scores were also 70% when the signal was delivered from the better ear that is left side which were lowered when the same intensity stimuli was presented through the poorer side to 30%. Clinician must continue to provide better option of amplification even the best amplification device has been provided to the cases. The amplification protocol must not end at one style of the hearing aids but it must continue considering the benefit of the amplification devices.

Key Words: Amplification, Complete In the Canal, Speech discrimination score.

INTRODUCTION: The binaural redundancy component of binaural advantage diminishes as the average hearing thresholds of the two ears become more dissimilar¹. Speech intelligibility was found to be maximized by a bilateral fitting of amplification devices². Persons, who are fitted with hearing aid in one ear with the other ear unaidable, are not uncommon and often report dissatisfaction from a hearing aid because they continue to have difficulty hearing persons who address them from the side of the “unaidable” ear. The application of an auxiliary microphone added to a standard ear level hearing aid for persons who have a significant bilateral hearing loss, but with one unaidable ear and termed it as BICROS hearing aid³. However, CROS hearing aids are not available even for trial purpose in most of the clinics as well as with hearing aids dealers/manufactures. Thus cases with asymmetrical/unilateral hearing loss go without amplification, adding a great deal for more handicapping than any available measures can show. Not many clinician has the scope to offer CROS hearing aid trial before prescribing CROS hearing aid or its variant⁴. Sinha (2005) reported that patient using CROS hearing aids speech discrimination improved on average when the signal was delivered from the poorer ear to 86.4 % with the CROS hearing aid from 48% for the unaided conditions. When the signal was presented from the 0 degree azimuth, the speech discrimination improved to 95 % (aided) from 72 % (unaided). The improvement in the speech discrimination can be interpreted as elimination of head shadow effect as sufficient energy is reaching the cochlea for the purpose of speech

system and due to this gain is in the speech discrimination. As speech discrimination improves with the application of CROS hearing aids and the ability to locate the source of the sound also improves one may conclude that young children with unilateral hearing loss or asymmetrical hearing loss can significantly benefit from the CROS hearing aid. Completely in the canal (CIC) hearing aids are the most cosmetically appealing, miniaturized contemporary hearing aid styles. Researchers were shown that CIC produce advantage in hearing regarding reduced occlusion effect, increased hearing aid headroom, feedback reduction, improved listening in noise and security of fit, as well as normal telephone use⁵. Fitting of CIC hearing aid in the ear with moderate to moderately severe hearing loss can significantly improve the aided hearing thresholds, but may not improve directionality, speech discrimination when the sound is incident from the poorer ear. Patient having asymmetrical hearing loss with one ear unaidable and the other ear aidable, if fitted with CIC hearing aid there will be significant improvement in the hearing of the person. But the patient may continue to have poor localization, reduced speech discrimination in presence of ambient noise or when sound arrives from the poorer ear. As after amplification in one ear, the benefit converts the loss as unilateral hearing loss and thus a good candidate for the use of CROS hearing aids. There seems to be no study regarding hearing aid fitting criteria in a case with asymmetric hearing loss, using hearing aid in better ear and the benefits of the amplification resulting in candidacy for yet another style of hearing aid.

and was fitted with CIC hearing aid in the better ear. Detail case history was taken. After the ENT evaluation, pure tone audiometry as per the standard procedure was conducted along with speech audiometry. Patient's aided puretone threshold, speech discrimination scores when fitted with CIC hearing aid in the better ear were obtained. Similar results were recorded with additional fitting of the CROS hearing aids. Patient was fitted with the CIC hearing aid in the better ear and the measurers such as aided pure tone threshold, speech discrimination scores, and localization responses were measured. These scores were compared with the scores obtained with fitting of the CROS hearing aids in addition to the CIC hearing aid. Both Tympanic membranes were found to be intact. Pure tone audiometry and the speech discrimination score for the case is shown in Table 1 and 2 respectively. Immittance audiometry revealed 'A' type and 'As' type of tympanogram in right and left ear respectively. Acoustic reflex were found to be absent. Free field pure tone aided response of the subject with CIC hearing aid in the left ear (A1), CIC hearing with CROS hearing aid with parallel tube (A2) and with tube bent towards the external auditory canal (A3) are depicted in the Table 3. Response of the case with and without CROS hearing aid to pure tone stimuli are shown in Table 4. A4 was the response with CROS hearing aid switched off and the tone was presented through the right speaker. A5 was the similar nature response except that the tone was presented through the left speaker. Speech discrimination score was 30% and 70% when the CROS was switched off and the speech stimuli was presented through right and left speaker respectively. Aided response with Modified BICROS arrangement. Response of the puretones and were obtained when the CROS hearing was fitted along with the CIC hearing aid so as to work as modified BICROS hearing aid are shown in the Table 5. Speech discrimination score when CIC was in left ear, CROS was switched on and speech stimuli presented through right ear were 70% which further enhanced up to 90% when the speech stimuli was presented through the left speaker. DISCUSSION: Generally we prescribe the hearing aid in the better ear (when the loss is asymmetrical) on the basis of pure tone thresholds. The unilateral fitting improves the performance of hearing but the directionality aspect is left unattended. The present study shows although the subject was fitted with a CIC hearing aid and had significant improved hearing but still lack the localization of the sound, reduced speech discrimination in the presence of the ambient noise. Patient also reported having balance problem which he can even feel while walking in his gait. Pure tone audiometry, immittance audiometry and the speech discrimination scores revealed that the patient has moderate sensorineural hearing loss in his

EAR	250Hz	500Hz	1000Hz	2000Hz	4000Hz	8000Hz	PTA
Right(AC)	60dB HL	70dB HL	90dB HL (Masked)	90dB HL (Masked)	90dB HL (Masked)	110dB HL	85.3dB HL
Left(AC)	50dB HL	50dB HL	60dB HL	50dB HL	30dB HL	60dB HL	53.3dB HL
Right BC	40dB HL	50dB HL	70dB HL	75dB HL	80dB HL		
Left BC	(Masked)	(Masked)	(NR)	(NR)	(NR)		
	30dB HL	40dB HL	50dB HL	50dB HL	25dB HL		

Table 1: Result of pure tone audiometry.

EAR	SRT	SDS
Right	85 dB HL	0%
Left	60 dB HL	100 %

Table 2: Result of Speech Audiometry.

Frequency (Hz)	Free – Field (dB SPL)	A1 (dB SPL)	A2 (dB SPL)	A3 (dB SPL)
250	50	50	45	40
500	65	65	60	55
1000	50	25	25	25
2000	60	40	35	30
4000	50	35	35	30
8000	75	65	65	65

Table 3: Free field aided response of the subject with CIC hearing aid in the left ear (A1), CIC hearing with CROS hearing aid with parallel tube (A2) and with tube bent towards the external auditory canal (A3)

Frequency (Hz)	A4 (tone through right speaker when CROS is switched off)	A5 (tone through left speaker when CROS is switched off)
250	45 dB SPL	30 dB SPL
500	45 dB SPL	30 dB SPL
1000	60 dB SPL	30 dB SPL
2000	50 dB SPL	35 dB SPL
4000	60 dB SPL	30 dB SPL
8000	70 dB SPL	50 dB SPL

Table 4: Response of the case with and without CROS hearing aid to pure tone stimuli Speech discrimination score was 30% and 70% when the CROS was switched off and the speech stimuli was presented through right and left speaker respectively.

Frequency (Hz)	A6 (tone through right speaker when CROS was switched on)	A7 (tone through left speaker when CROS was switched on)
250	40 dB SPL	35 dB SPL
500	55 dB SPL	40 dB SPL
1000	35 dB SPL	30 dB SPL
2000	40 dB SPL	35 dB SPL
4000	45 dB SPL	45 dB SPL
8000	65 dB SPL	55 dB SPL

Table 5: Aided Pure Tone response with Modified BICROS Speech discrimination score when CIC was in left ear, CROS was switched on and speech stimuli presented through right ear were 70% which further enhanced up to 90% when the speech stimuli was presented through the left speaker.

which were lowered when the same intensity stimuli was presented through the poorer side to 30%. Thus, in spite of using the beat amplification device the patient's capacity of better commutation skill is not optimized. As the CIC in left ear almost brings the hearing level in the left to near normal, with the amplification on patient can be considered as case with unilateral hearing loss, with left ear near normal hearing (after using CIC hearing aid) and the other ear was unaidable (Speech discrimination score 0%). As per Hardford and Barry, and Sinha, patient fulfils the candidacy

left ear and the CROS hearing aid were fitted together there was significant improvement in the puretone aided and speech discrimination response from the better as well as the poorer side. This arrangement is similar to the BICROS model with the difference that the microphone are not connected in the same circuit, termed here as Modified BICROS (MBICROS). With MBICROS the aided puretone average improved to 35dBHL and 43 dBHL when the stimuli were delivered from the better and poorer ear respectively. Similarly the Speech Discrimination Score improved to 70% when the stimuli were delivered from the poorer side and 90% for the stimuli delivered from the better ear with the MBICROS on. Localization ability improved significantly which is expected in the cases using the CROS hearing aids. It was interestingly reported by the case that his sense of imbalance as well as the balance in the gait also improved. Perhaps one can interpret this as the biannual stimulation is reaching the ear although in the same ear but some fusion may be possible at the higher centers. Clinician must continue to provide better option of amplification even the best amplification device has been provided to the cases. The amplification protocol must not end at one style of the hearing aid but it must continue considering the benefit of the amplification devices.

CONCLUSION: Generally audiologists' prescribe the hearing aid in the better ear (when the loss is asymmetrical) on the basis of pure tone thresholds and speech discrimination scores. The monaural fitting improves the performance of hearing abilities but the directionality aspect is left unattended. The present study shows although

discrimination in the presence of the ambient noise and poor response to sound stimuli when incident from the poor ear side. Patient also reported having balance problem which he can even feel while walking. Providing CIC in the better ear brought the hearing levels near to normal, and the other ear remains unaidable (Speech Discrimination Scores 0%). Thus the candidacy for the CROS hearing aid was met. Case was fitted with CROS hearing aid along with CIC in the left ear. This arrangement termed as MBICROS was found to improve the localization and speech discriminations scores when sound incident from the poorer ear side of the case. Clinician must continue to provide better option of amplification even the best amplification device has been provided to the cases. The amplification protocol must not end at one style of the hearing aid but it must continue considering the benefit of the amplification devices.

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