

OTOLARYNGOLOGY

HEAD & NECK SURGERY

APRIL 2014

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Contemporary imaging for the Otologist

Saba Sohail

Temporal bone is a small bony case housing a multitude of structures ranging from nerves to fluid filled canals to finely chiseled bony ossicles and delicate yet sturdy membranes necessary for hearing and balance. Its particular structural make up renders it a complex anatomical region where anatomical topography makes it imperative to select the right kind of imaging modality in context of a particular pathology.

Although the imaging armamentarium ranges from plain X-rays to computed tomography (CT) and MR scanning, the use of plain X-rays has nearly fallen into the oblivion, secondary to intrinsically restricted bony and soft tissue details on plain X-rays. Perhaps the only valid use of plain X-ray in otology today is post-operative confirmation of the placement of the electrode array of a cochlear implant through either the Stenver's or the Per-orbital projection¹. This leaves mainly CT scanning and MRI to be employed for imaging temporal bone and its pathologies. MR imaging is most useful in evaluating soft tissue relationship such as the membranous labyrinth and nervous structures within the temporal bone.

However, bony anatomy is best visualized on CT scanning. It offers high contrast images with good resolution, so that detailed scans of fractures and their complications can be obtained which makes CT scanning a baseline investigation in the evaluation of petrous bone trauma. This should be combined with cranial CT as many of these patients have associated intracranial injuries as well². However magnetic resonance imaging (MRI) is better for the detection of presence of vestibular hemorrhage, the extent of brainstem injury, and nerve compression². CT scan is also very well suited to confirm and accurately locate a foreign body within the external auditory canal, as well as any inflammatory reaction on adjacent soft tissues and bone.

Thin section high-resolution CT scanning in the axial and coronal planes is the imaging of choice in the diagnosis of temporal-bone cholesteatomas. It may be difficult to differentiate a cholesteatoma from inflammatory tissue or collection in chronic otitis media since the above examination is essentially done without intravenous contrast administration. Hence a small possibility of false result may be there. Diffusion-weighted MRI is important in this regard. Cholesteatoma, by virtue of its high keratin content, produces low density on CT scan and high signal intensity compared with brain tissue on DWI and hence obviates the need for contrast administration³. Another technique termed TFE-DSDE further improves the accuracy in diagnosing acquired middle ear cholesteatomas compared with the routine echoplanar DWI⁴. This latter technique is not practiced in Pakistan as yet, however DWI is widely available. Since DWI costs more than the routine MRI of IAM so it has to be specifically mentioned with the indication. Use of intravenous contrast agent in MRI is particularly useful in detecting the enhancement patterns of neoplasms, infections and inflammatory processes and differentiating it from simple fluid collections. Hence these are very useful in cases of recurrent or residual cholestaetoma before a re-look surgery is embarked upon. It is also helpful in detecting intracranial extension or vascular complications in these cases.

Regarding tumors of the region, the coronal CT scan of the internal acoustic meatus done for the screening of acoustic neuroma is no longer practiced¹. It has been supplimented by MRI due to the latter's superior resolution capability. The present technical advancement in MRI can detect tumors as small as 2 mm in size. The best utility is the pre-operative assessment of the possibility of surgical success indicated by size less than 2 cm, tumor limited to the postero-superior quadrant

of the IAM and not extending to the IAC fundus⁵. Although contrast administration is preferred, it increases the cost of MRI. Instead of that, screening protocols for tumors related to temporal bone have been developed that use T weighted FSE technique focused on brain stem and internal auditory meatus. This is a limited but cost effective technique employed for screening purposes and detailed scans may follow in case an abnormality is detected.

MRI is also useful in evaluating facial nerve in cases of palsy. In Bell's palsy, facial nerve simply enhances uniformly without any focal enlargement or nodularity. The latter is indicative of a tumoral or granulomatous palsy and requires further detailed workup. Most pronounced thickening, enhancement and nodularity suggest Ramsay Hunt syndrome.

For the evaluation of sensori-neural hearing deficit, bony abnormality such as otosclerosis, Paget's disease, fibrous dysplasia is best evaluated with CT scan. Bone density measurements using high-resolution CT have been reported to be useful to diagnose fenestral otosclerosis⁶. However evaluation of a dilated endolymphatic duct, large vestibular aqueduct, and labyrinth dysplasias require a dedicated MRI.

In short, technical advances have opened wide vistas of pre-operative imaging and diagnoses in contemporary otology practice. What is needed is a judicious use of appropriate imaging for the right indication, not just its availability and expertise of the reporting radiologists.

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Morphological Evaluation of Thyroid Nodules on Ultrasound

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***Munir Ahmed Baloch, **Murtaza Ahsan Ansari, *Qamar S. Khan

ABSTRACT: **OBJECTIVE:** To evaluate different morphological appearances of thyroid nodules by using high frequency 7.5 MHz ultrasound along with Doppler ultrasound to provide criteria to characterize the nodule as benign or malignant. **STUDY DESIGN:** Non-interventional, descriptive study. **SETTING:** Department of ENT and Radiology, Dow University of Health Sciences and Civil Hospital, Karachi. **DURATION:** January 2011 to June 2012. **PATIENTS AND METHODS:** All adult patients who underwent ultrasound imaging either with palpable or non palpable thyroid nodules, were included in the study. Cases of any gender, aged between 20 – 65 years, having symptoms of goiter with or without palpable lump or nodule, pain or abnormal thyroid profile were included in the study. Biopsy proven and treated cases for thyroid diseases were excluded from the study. Main outcome measures were, presence of the abnormal clinical, laboratory and ultrasonic findings. Sonographic findings that are suggestive of potential malignancy are, size, shape (taller than wider), hypoechogenicity, microcalcification, irregular or lobulated margins, presence of septae, and solid nodule. If any one of the above criteria was present it was considered as positive case for malignancy. In all such cases cytology and post operative histopathology were advised. Statistical analysis was done for descriptive purpose. Overall sensitivity, specificity, positive and negative predictive values of thyroid nodules, frequency and percentage analysis were carried out. **RESULTS:** Total of 85 patients were included in the study out of which, 56 (65%) were female and 29 (34.2%) were male. Palpable lump was observed in 70 (82%) patients, while other 08 (9.4%) had non palpable symptomatic lumps. In 07 (8.2%) patients, thyroid nodules were discovered incidentally on ultrasound neck for non thyroid ultrasonic examinations. Typical single solid nodules were observed in 35 (41%) patients, and 20 (23%) patients were with typical single cystic nodules. Multiple benign solid nodules were noted in 28 (21.1%) patients and in 02(2.35%) cases diffuse goiter was observed. Potential malignant features of shape and marginal irregularity, microcalcification, heterogeneity and type I and II abnormal flow were observed in 10 (11.7%) patients, while 20 (23%) patients had typical sonological features of malignancy, i.e., taller than wider, irregular, heterogeneity, mural solid nodules with abnormal vascularity of type III and IV. All thyroid nodules (n=85) were further assessed by cytology or post-operative histopathology. Out of 30 potentially malignant cases, 24 were true positive for malignant cells, and 06 were false positive. Out of 55 potentially non-malignant cases, 52 cases were true negative, and 03 cases were false negative. Overall Ultrasound sensitivity of morphological characteristics is estimated to be 88.8% (24/30) and specificity to be 89.6% (52/55). Negative predictive value is calculated as 94.3% (52/55) and positive predictive value of 80.6% (24/30). **CONCLUSION:** This study reflects that high frequency ultrasound is the alternative non-invasive modality to recognize benign and malignant features of thyroid nodules by their size, shape, margins, calcifications, solid mural nodules, septae and abnormal vascularity. Morphological characterization of thyroid nodule on ultrasound substantially reduce the number of unnecessary biopsies. **Key Words:** Goiter, Doppler ultrasound, Histopathology, Neck lump, Thyroid nodule, Sonography.

INTRODUCTION: A thyroid nodule is an abnormal growth or lump in the thyroid gland. These growths can be benign or malignant. Fluid filled cyst or solid masses presenting as single nodule or multiple nodules. High frequency ultrasound scanning is the imaging modality of choice for thyroid masses. It is possible to detect thyroid nodules, especially those which are not palpable or difficult to diagnose clinically and are discovered incidentally on neck ultrasound. Thyroid ultrasonography may be used to differentiate benign from malignant nodule on the basis of certain characteristics features on ultrasonography^{1,2}. Thyroid diseases are quite common, especially in those areas where iodine deficiency

is present. The reported frequency of malignancy in thyroid nodules is 5%. It is important to diagnose it early, as thyroid cancers progress slowly. With early diagnosis and treatment, prognosis is much better with high survival rate^{3,4}. With advancement and modification of ultrasound technology, rate of detection of thyroid nodules is increased^{5,6}. Different studies were carried out since late 90's to assess the relationship of different features of thyroid nodules and potential malignancy^{7,8}. American and European Thyroid Society of Radiologists have suggested different guidelines to mark benign or malignant thyroid nodules. These guidelines for thyroid nodule are still confusing^{3,9}. Few authors believe in

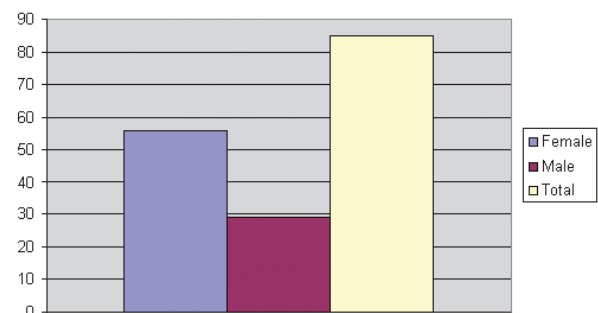
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specific morphological pattern rather than individual or single feature to differentiate benign or malignant thyroid nodules^{10,11}. Ultrasound features indicative of malignancy are the presence of predominantly solid mass, hypoechogenicity, micro calcifications, abnormal vascularity, irregular margins and internal septations¹²⁻⁴. Some investigators prefer combination of features rather than single feature¹¹⁻². Although combination of features and overlaps of findings between benign and malignant are also found in some studies^{6,15}. Sensitivity and specificity of ultrasound findings of thyroid nodule are also variable. In present study, we determined different morphological features of thyroid nodules on high frequency ultrasound by shape, size, margins, and numbers of nodules, presence of septae, hypoechogenicity, calcifications and abnormal vascularity. By combination of these ultrasonic features we can differentiate benign from malignant thyroid masses and recommend FNAC or biopsy in potentially malignant nodules only. This can reduce the number of unnecessary biopsies.

PATIENTS AND METHODS: This non-interventional, descriptive study was carried out at departments of ENT and Radiology of Dow University of Health Sciences and Civil Hospital Karachi between January 2011 to June 2012. All adult patients of any gender between the age of 20-65 years with the complains of neck lump and / or Thyroid related swelling with or without palpable nodules with abnormal thyroid profile referred from department of ENT or General Surgery to radiology for ultrasound neck, were included in the study. Biopsy proven thyroid lesion and treated cases for thyroid diseases were excluded from the study. Ultrasound of thyroid was carried out by high frequency 7.5 - 12 MHz Zario Toshiba machine with linear array transducer and Doppler study was performed with gray scale B mode. Ultrasound examination of neck was carried out after taking detailed clinical history, informed consent and giving brief description of the examination. It was carried out by experienced sonologist adopting departmental scanning protocol. Transverse and longitudinal real time imaging of thyroid gland were performed. Ultrasound appearances of thyroid nodule was observed for size, shape, margins, hypoechogenicity, numbers, internal architecture i-e septae, solid nodule, calcification. Assessment of vascularity of each thyroid nodule was carried out by color Doppler ultrasound. These were ranked from 0-4 as follows; Type- 0-no visible flow Type-I as peripheral flow only, Type-II as predominantly peripheral with some central flow, Type-III as extensive internal flow with peripheral flow, Type-IV as central flow only. On the basis of above findings thyroid nodules were potentially classified as positive or negative. If one or more features were suggestive of malignancy, the nodules were classified as positive. If a nodule had no suspicious features, it was classified as negative (benign). Statistical analysis was performed for mean age, sex preponderance of nodule, frequency of different appearances of thyroid nodules, its vascularity, ultrasonic features of potentially malignant thyroid nodules, FNAC or post-operative biopsy. Positive predictive and negative predictive values of thyroid nodules, frequency and percentage analysis

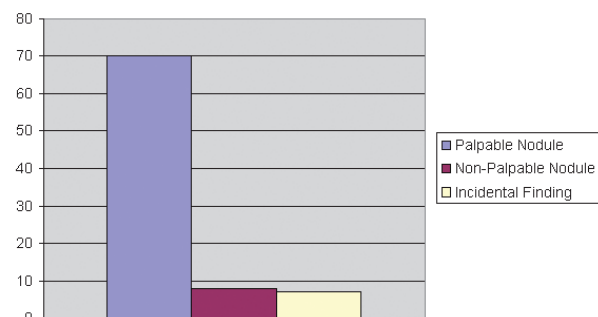
of benign & malignant findings were carried out. Sensitivity, specificity, Positive and Negative predictive values, and accuracy were calculated.

RESULTS: Total of 85 patients were included in this study, 56 (65.8%) were females and 29 (34.2%) were males (Table & Figure-1). Palpable lump was observed in 70 (82.4%) patients, while other 08 (9.4%) had non-palpable symptomatic lumps. In 07 (8.2%) patients, thyroid nodules were discovered incidentally on ultrasound neck for non-thyroid ultrasonic examinations (Table & Figure-2). Typical single solid nodules were observed in 35 (41%) patients, and 20 (23%) patients were with typical single cystic nodules. Multiple benign solid nodules were noted in 28 (21.1%) patients. Potential malignant features of shape and marginal irregularity, microcalcification, hetrogenicity and type I and II abnormal flow were observed in 10 (11.7%) patients, while 20 (23%) patients had typical sonological features of malignancy, i.e., taller than wider, irregular, heterogeneity, mural solid nodules with abnormal vascularity of type III and IV. (Table-3). All thyroid nodules (n=85) were further assessed by cytology or post-operative histopathology. Out of 30 cases 24 were true positive for malignant cells, and 06 were false positive (Table-4). Out of 55 cases, 52 cases were true negative, and 03 cases were false negative. Overall Ultrasound



Female	Male	Total
56	29	85

Table & Figure-1: Gender distribution.



Palpable Nodule	Non-palpable Nodule	Incidental Finding	Total
70	08	07	85

Table & Figure-2 : Clinical findings of thyroid lumps.

Ultrasound Features		Frequency n=85	%
Shape	Taller than wider	25	29
	Wider than taller	40	47
	Round / oval	20	23
Margins	Circumscribed	37	36
	Microlobulated	26	30
	Irregular	22	25
Echogenicity	Cystic	20	23
	Solid	28	33
	Complex	37	43
Heterogeneity	Present	25	30
	Absent	60	70
No. of mass	Single	37	43.5
	Multiple	48	56.5
Calcification	Coarse	30	35
	Micro	20	23
	Absent	35	42
Vascularity	Central	18	21
	Peripheral	45	53
	Absent	22	26

Table-3 : Morphological features of thyroid lumps on ultrasonography.

Type of Nodule	Ultrasound Doppler	FNAC/Histopathology
Malignant	30	24
Benign	55	61
Total	85	85

Table-4 : Comparison of Ultrasound findings and histopathological findings (n=85).

sensitivity for morphological characteristics is estimated to be 88.8% and specificity to be 89.6%. Negative predictive value is calculated as 94.3% (52/55) and positive predictive value of 80.6 % (24/30) with accuracy of ultrasound to be 89.4% (76/85).

DISCUSSION: Thyroid nodules are quite common in Pakistan, either as palpable or non-palpable nodules. They may be discovered incidentally on high frequency ultrasound for other lesions of neck. Palpable nodules occur in 4-7% of population¹⁶. The prevalence of incidental discovery on sonography is 13-67%¹⁷. Most of the thyroid nodules are asymptomatic and the patient only complains of the presence of lump. It may be incidental finding of nodules on cross sectional imaging performed for other reasons⁸. Normally, the healthy thyroid gland shows homogeneous echogenicity when compared with the surrounding muscle. Most thyroid nodules show hypoechogenicity when compared with the thyroid parenchyma. But this comparison does not provide much useful information. Hypoechogenicity is marked when compared with strep muscle for consideration of malignancy, as strep muscles are uniformly present in all patients. Therefore, it is used as the comparative standard for the determination of the echogenicity of solid nodules^{1,12}. Micro-calcifications suggesting malignancy were defined as tiny, punctate hyperechoic foci which are 10- 100 µm sized, round- laminar crystalline calcified deposits, with or without acoustic shadows¹⁸.

In this study we evaluated different morphological features of thyroid lump by non-invasive, easily available and cost effective modality. This avoid unnecessary advanced imaging modalities and interventional

procedure like FNAC and biopsy. In present study different morphological ultrasonic criteria were assessed, which include shape (taller than wider), margins (regular, irregular), hypoechogenicity, heterogeneity, number (single, multiple), calcification (micro, macro or curvilinear) and vascularity (central, peripheral or both) on the scale of 0-4 as suggested in literature¹⁹. There is no single definitive criteria in the literature to label the lesion as malignant or benign. In a well defined, homogenous lesion with absent central vascularity, can be confidently reported as true benign nature of the disease and so avoiding FNAC or post operative biopsy.

On the other hand, tissue growing against the soft tissue planes and taller than wider lesion signify aggressiveness of the disease¹⁸. Cystic with mural nodule, type III or IV vascularity and micro calcification are highly suspicious of malignancy and require biopsy to confirm the nature of the disease and to plan further management. Indeterminate or equivocal lesions with heterogeneity and complex cystic masses with mixed pattern of vascularity, microcalcification and more hypoechoic nodules also need further evaluation by FNAC and post-operative histopathology. With availability of color Doppler ultrasound to assess the vascularity of thyroid nodule it has become established imaging tool to assess the malignancy on basis of vascularity and its grading. Many authors believe that vascularity has good sensitivity and specificity index, when reporting as potential malignancy². Sensitivity and specificity of vascularity of our study is comparable to other published studies^{19,20}. In our study overall sensitivity, specificity, positive and negative predictive values of the ultrasound criteria of thyroid nodules are calculated by standard formulae in conjunction with histopathology report. The overall ultrasound sensitivity of morphological characteristics is 88.8% (24/27) and specificity of 89.6% (52/58). Negative predictive value is 94.3% (52/55), while positive predictive value is 77.6% (24/30) with accuracy of 76/85 (89.4%). These figures are also comparable with reported study by M. Yunus et.al.²¹, where ultrasound sensitivity was calculated to be 92%, specificity of 73%, positive predictive value 65.7% and negative predictive value was 95.3%. This study described the frequencies of different ultrasound features, sensitivity, specificity, positive and negative predictive value and accuracy of ultrasound features in different thyroid nodules. These informations are utilized in the management plan that avoids unnecessary FNAC/ biopsies.

CONCLUSION: Ultrasound is sensitive, non-ionizing, easily available, simple and safe method to detect intrathyroid nodules. On the basis of different ultrasound features a thyroid nodule may be characterized as benign or malignant nodule. Although no single criteria is reliable but combined ultrasonic features help in predicting benign and malignant thyroid lesions. It saves economic burden and avoid unnecessary biopsies

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Prevalence of Throat Symptoms in Asthmatic Patients in Nigeria

Paul R.O.C. Adobamen, *Eruke E Egbagbe

ABSTRACT: OBJECTIVE: This study was carried out to determine the prevalence of throat related symptoms in asthma with a view to follow a more holistic approach to the management of asthma patients. **METHODS:** This prospective study was conducted in the Chest Clinic and the Ear, Nose, Throat, Head and Neck Surgery Clinic of the University of Benin Teaching Hospital, Benin City, between 1st March, 2008 to 28th February, 2011. Asthmatic patients were enrolled into the study after taking informed consent. **RESULTS:** 41 Asthmatic patients participated in the study. There were 15 males and 26 females. Ages ranged from 17 years to 83 years, with an average age of 48.7 years. The common throat symptoms were cough (26.36%), itching of the throat (17.54%), hoarseness (15.79%). In 46.34% of asthmatics, no abnormality was detected in the throat. **CONCLUSION:** Common throat symptoms in asthmatics were cough, throat itching and hoarseness. A more detailed study of this topic is highly recommended

Keywords: Prevalence, Throat symptoms, Asthmatic patients, Nigeria.

INTRODUCTION : Asthma is defined as a chronic airway disease characterized by hyper-responsiveness of the airway due to recurrent inflammation following exposure to environmental allergens and manifesting as cough, wheezing, breathlessness and chest tightness which may be reversible with or without the use of bronchodilators¹. Acute asthma has also been defined as acute episodes of progressively worsening shortness of breath, cough, wheezing or chest tightness. Severity is defined according to the global initiative for asthma (GINA) guidelines². Asthma is further confirmed by a change in the Peak Expiratory Flow Ratio (PEFR) of at least 20% (measured with the mini- Wright's peak flow meter after the administration of a bronchodilator)³. Asthma is a common disease in children and adults worldwide⁴⁻⁶. However the prevalence of asthma varies from country to country and even within the same country. There are also differences in prevalence between urban and rural settings⁷⁻⁸. Generally, prevalence of asthma range from 0 to 10% in children and in up to 15% adults in Africa^{5,7}. It is possible that common immunologic reactions to antigenic stimuli as seen in asthma, leading to angio-oedema that causes clinical features of throat resulting from hypersensitivity or exaggerated response of the immune system seen in some asthmatic patients. Angio-oedema is an acute allergic, histamine-mediated reaction, which can occur in many parts of the body and it can be potentially fatal if it occurs in the larynx⁹.

Although it is well documented that asthma has a close link to chronic bronchitis¹⁰, the prevalence of clinical features of the throat in asthmatic patients has not been properly documented in our center. This study was therefore carried out to outline the prevalence of throat features in asthma with a view

to establishing a link or correlation between asthma and throat problems. This will form a baseline for a more holistic approach in the management of asthmatic patients

SUBJECTS AND METHODS : This is a prospective study that was carried out at the Chest Clinic and the Ear, Nose, Throat, Head and Neck (ENT, H & N) Surgery Clinic of the University of Benin Teaching Hospital (UBTH), Benin City, between 1st March, 2008 and 28th February, 2011. Approval for this study was granted by the ethical review committee of UBTH, Benin City.

All patients with a diagnosis of asthma that were seen in the Chest Clinic of UBTH, were evaluated to be enrolled for the study. The patients were diagnosed as having asthma with characteristics history, physical examination and reversibility testing³. All the asthmatic patients were stable and were on salbutamol inhaler/tablet and salmeterol/fluticasone propionate

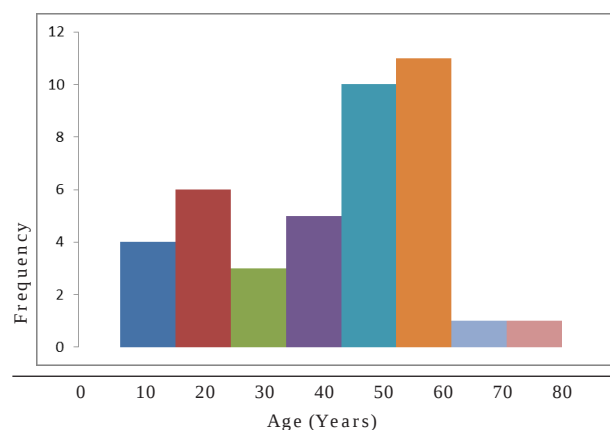


Figure 1: Age distribution.

Throat Symptoms	Cough	Hoarseness	Odynophagia	Itching of Throat Palate	Snoring	Pain in throat	Dysphagia	No Complaint	Total
Freq	15	9	1	10	3	1	1	17	57
%	26.36	15.79	1.75	17.54	5.26	1.75	1.75	29.82	100

Table 1: Throat symptoms in asthmatic patient.

Symptoms	PND	Hyperaemia of ppw	Granular ppw	Hyper trophic papillae post 1/3rd tongue	Laryneal polyp	Oral Candidiasis	Dysphagia	Enlarged tonsils	NAD	Total
Freq	15	3	3	1	1	1	1	1	19	44
%	34.09	6.82	6.82	2.27	2.27	2.27	1.75	2.27	43.18	100

Table 2: Signs of throat problem in asthmatics.

accuhaler. All the patients enrolled for the study were requested to attend the ENT H & N Surgery Clinic where clinical features of throat problem were taken and elicited respectively. The enquiries were made for the symptoms of dysphagia, odynophagia, regurgitation, breathlessness/dyspnoea, hoarseness, snoring, cough, itching of the roof of the mouth/throat and growth in the mouth /throat. A complete throat examination was also carried out by the first author. The clinical features were then documented in an adopted format/questionnaire for the study. Asthmatic patients found to have symptom of ENT were treated for the ENT problem. The data were analyzed manually, presenting the results in tabular formats and histogram.

RESULTS : A total of 41 consecutive asthmatic patients were enrolled for the study. There were 15 males and 26 females, with male to female ratio of 1: 1.7. Ages ranged from 17 years to 83 years, with an average age of 48.7 years. Figure 1 showed the age distribution of patients in the study. Table 1 showed the throat symptoms in asthmatic patients. Table 2 showed the throat signs in asthmatic patients. It is significant to note that two asthmatic patients were diagnosed as having pharyngitis and laryngeal polyp respectively.

DISCUSSION : Only 41 patients gave consent to participate in this study, despite the fact that 160 asthmatic patients were seen in the Chest Clinic during this period. This is an attestation that people in this locality are reluctant or not so keen to participate in research with no financial or material benefit. The higher number of females in this study, may be due to the higher prevalence of female asthmatics in this age bracket. As seen in the age distribution of patients, there was a preponderance of the working class and the middle age group. The young and active asthmatics may be too busy to attend a second clinic in a week for 'research purpose', especially when stable. Similarly parents in this locality are less likely to bring their asthmatic children for a 'mere research visit' when there is no financial or material benefits attached. As regards to throat symptoms in asthmatics, cough (26.36%), itching of throat (17.54%) and hoarseness (15.79%) were the main symptoms in asthmatic patients. One may postulate that these symptoms might be a reflection

of the allergic tendency of the asthmatic patients as the cough in most cases were non-productive and intermittent. Similarly the hoarseness appears to be related mostly to the period of acute asthmatic attack. Itching of the throat also points to allergic origin. Allergy has been closely associated with chronic laryngitis and asthma¹⁰. Allergy has also been implicated as a cause of vocal cord oedema¹¹. These findings explain the predominance of cough, hoarseness and itching in asthmatic patients.

Although allergic disorder may be different in terms of the stimulating antigens¹², the asthmatic patient has the predisposition to develop exaggerated immunoglobulin E (IgE) antibody responses against common inhaled aeroallergens, in different parts of the body inclusive of the entire respiratory system¹³. Allergic tendency in asthma leading to angio-edema⁹, can also explain the hoarseness in asthmatics in this study.

The prevalence of post- nasal drip in some of the patients (34.09%) is due to chronic rhinosinusitis, which is a known common co-morbidity with asthma¹⁴. The muco-purulent discharge dripped from the nasopharynx, down the posterior pharyngeal wall and presented as a throat sign in the asthmatic patients. Laryngeal polyp is more likely to be due to inflammatory changes¹⁵, although allergy can precipitate in the inflammation. It is therefore necessary to look for the presence of these signs in asthmatics and to investigate and treat them when they are present. It is also noteworthy that in 19 out of 41 patients (46.34%) no abnormality was detected in the throat.

All the patients in this study had throat examinations only once and they were not followed over a period of time for the symptoms they presented with or for other symptoms. These are limitations of this study. It is advised that a more detailed study in which the asthmatic patients can be monitored over a period of time may be conducted.

CONCLUSION : Asthmatic patients occasionally present with cough (26.36%), itching of throat/palate (17.54%), hoarseness (15.79%), which appear to be due to their allergic tendencies. 46.34% of asthmatic patients had no throat sign on examination. More detailed and follow-up study of throat symptoms in asthma is recommended.

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Role of Video Documentation in Otolaryngology Practice

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ABSTRACT: OBJECTIVE : To analyse the effect of video documentation in ENT outdoor practice with regards to patient satisfaction. **STUDY DESIGN:** Retrospective Observational study. **SETTING:** ENT outpatient department of CMH Quetta from December 2011 to March 2012, and ENT department of CMH Multan from April 2012 to June 2012. **MATERIALS AND METHODS:** A standard micro-CCTV camera with optical coupler attached to rigid or fiberoptic endoscope and connected to USB TV device was used to record image of any pathology found on patient's ENT examination. Patients were shown recordings of their ENT pathology and were explained suggested treatment. After surgery, fresh recordings were taken. A set of questions was asked from the patients and results were deducted after assessment of the patient's response card. **RESULTS:** In the opinion of 67.5 % of patients, their understanding of the disease was complete after seeing the video. Interestingly out of those who consented for surgery, 42.5 % opined that they would have not consented for surgery so quickly if they had not been shown video evidence of their disease. 91.7 % said that serial videos made them more reassured about progress and current status of their disease. P value with Pearson Chi-Square test (used as test of significance) was less than .05, significantly in favour of greater reassurance level about progress of the disease after seeing video rather than without seeing video. **CONCLUSION:** Video documentation definitely increases patient's confidence, his understanding of disease, saves time and subsequent visits. It greatly adds to the patient's reassurance before and after surgery. .

Key Words: Video endoscopy, Video documentation, Photo documentation, Patient's satisfaction.

INTRODUCTION: The present era of rapid technological advancement has made its inroad into all walks of life and medical profession is no exception. Patients have become more aware of their disease and want much greater reassurances than were previously required. The advent of internet has transgressed continental boundaries and patients often seek opinion of doctors located thousands of miles away sitting on other side of globe. Use of video in ENT outdoor department has not only greatly enhanced the patient's understanding of his disease in much lesser time but also provides the information file to the patient that he can use to get expert opinion of anyone anywhere. Digital media has thus become standard documentation tools in modern ENT clinics¹. Video / photographic documentation (using digital media) is far superior to words alone and has been termed photo-documentation².

MATERIALS AND METHODS: INCLUSION CRITERIA: All patients with some video or photographically recordable ENT finding who reported to ENT outpatient department of CMH Quetta from December 2011 to March 2012, and ENT department of CMH Multan from April 2012 to June 2012 (As the first author moved from Quetta to Multan) were included in the study.

EXCLUSION CRITERIA: Patient's refusal to enter into the study. Patients reporting to ENT outpatient during the above period first underwent initial scrutiny by conventional ENT examination. The patients with positive ENT finding (perforation of drumhead, vocal nodules, growths or papillomas of larynx, nasal polypi,

angiofibroma or long standing inorganic foreign body nose) then underwent video or photographic recording of their finding. A standard micro-CCTV camera with optical coupler (total approximate cost Rs. 50,000) was used to make video of the finding after attaching it to appropriate endoscope 0° rigid endoscope for nasal and drumhead pathology, and 90° rigid laryngoscope / fibroptic nasolaryngoscope for laryngeal pathology). Recording was made on computer hard disc, while a simple USB TV device (approximate cost Rs. 1500) connected to laptop computer was used as recording device (see Fig 1 & 2). Patients were made to understand their disease by showing the recorded video. Patients were offered appropriate surgery (myringoplasty, microlaryngoscopy, nasal polypectomy or any surgery that may be required). They were

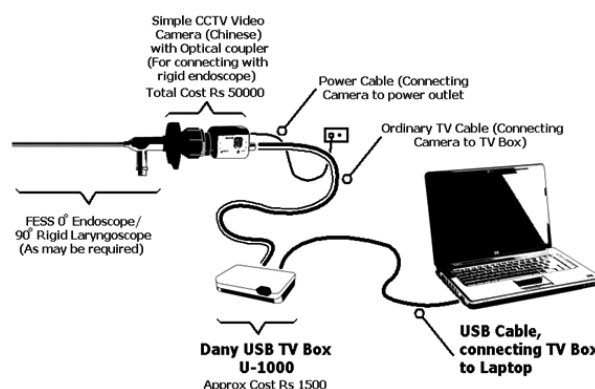


Figure 1 : Circuit diagram.



Figure 2 : A patient viewing his drumhead on laptop with the circuit described in Fig. 1

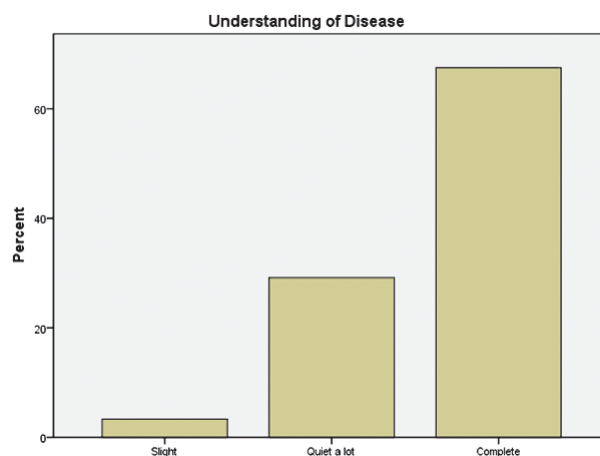


Chart 1 : Understanding level of disease in patients with video documentation.

No.	Questions	Yes	May be	No.
1.	If you had been explained about the disease in detail but not shown the video, would your understanding level about the disease been still the same?	03 (2.5%)	40 (33.2%)	77 (64.2%)
2.	After showing the video, were you suggested surgery?	97 (80.8%)	-	23 (19.2%)
3.	Did you consent for the surgery?	82 (68.3%)	-	38 (31.7%)
4.	If your disease been explained in detail without showing the video, had you still consented to surgery?	30 (25.0%)	39 (32.5%)	51 (42.5%)
5.	Did you demand a fresh video about your disease to be made and shown again after the surgery?	87 (72.5%)	-	33 (27.5%)
6.	Did you feel the same amount of reassurance about the success of surgery after seeing the video which you would have felt even without seeing the video?	09(7.5%)	-	111 (92.5%)
7.	In your opinion do you think this video documentation made you feel more reassured about the serial progress of your disease?	110 (91.7%)	-	10 (8.3%)

Table 1 : Analysis of patient response cards about the effect of video documentation

offered a copy of their video if desired. They were then given a proforma (consisting of seven questions) to fill. In case the patient consented for surgery, a sufficient time after surgery was given for wound to heal, after which many patients desired a new video to be made so as to get reassured that the pathology has been removed. After the video had been made they were again given proforma to fill. At the end of above period the record was analyzed and the observations made as shown in results. Pearson Chi-Square test was used to calculate statistical significance about whether the patient felt more reassured about progress of the disease after seeing video or without seeing video. p value was fixed as $< .05$ to be significant. RESULTS: A total of 120 consecutive patients with some photographically recordable finding were enrolled in this study with wide range of diseases of ear, nose or throat region. The results can be seen from the Table-1 given at the end. Their understanding level of disease with video documentation is graphically represented in Chart-1. Interestingly 64.2 % of patients thought that their understanding of the disease would not have been so complete if they had not been shown the video. After the video was shown, 80.8 % of patients were suggested surgery (this percentage is high because only the patients with some recordable ENT finding were subjected to video documentation). Out of those who were suggested surgery, 68.3 % consented for the

operation. Interestingly out of those who consented for surgery, 42.5 % opined that they would have not consented for surgery so quickly if they had not been shown video evidence of their disease. Out of those who underwent surgery, 72.5 % demanded a fresh post-surgery video, of which 92.5 % said that after seeing post-surgery video they felt more reassured about success of surgery. To the last question asked about serial progress of the disease, 91.7 % said that serial videos make them more reassured about progress and current status of their disease. P value with Pearson Chi-Square test came out to be .001, and being below .05 it was significantly in favour of greater reassurance level about the progress of disease after seeing video as compared to without it.

DISCUSSION: A simple and reasonably economical circuit for recording and making videos of ENT findings is shown in Fig 1 & 2. Making such video does not take more than 2 – 3 minutes, and saves a lot of time that may have otherwise been lost in educating and counselling the patient. In personal experience of the author, video documentation in ENT outpatient has the following advantages.

1. Real time video can be paused and then zoomed out at any stage, and very fine details of pathology (drumhead perforation, vocal or nasal pathology) analyzed. Digital video otoscopy is now an effective platform for tympanic membrane characterization.

- In addition, digital image enhancement and segmentation processing techniques can be applied to the acquired images, which could provide more visual detail and objective clinical interpretation³.
2. Provides greater understanding to the patients regarding the disease they are suffering from.
 3. Saves the time of Otolaryngologist and the patient by lessening the time required for patient's education and counseling.
 4. A printout of still images can be taken out and hard copy given to the patient or kept in patient's record file.
 5. Provides a video file to the patient which the patient can use for: (a) Getting opinion of distant otolaryngologist on internet. (b) Gauging the progress of his disease by comparing with serial videos. (c) Maintaining his own record file about the disease.
 6. Reassures the patient about success of surgery by showing post-op video.
 7. At times it may be used to remove patient's phobia about harboring a cancer of larynx or perforation of eardrum.
 8. Provides a reproducible record to clinician for subsequent clinical audit.
 9. Measurement of nasal airway obstruction can be performed with video endoscopic photo-documentation⁴.
 10. Video pneumatic otoscopy (VPO) is also useful for the diagnosis of conductive hearing loss (CHL) with normal tympanic membranes (TM). This is done by capturing TM images in 3 stages of the VPO (static, positive, and negative pressure stage) and measuring the amount of relative position differences of the umbo. In one study, the results in diagnosing Stapedial fixation and Ossicular discontinuity were comparable to that with Temporal Bone Computer Tomography (TBCT)⁵.
 11. Its value as a teaching aid for anatomy, physiology, pathology of ENT region, and its role for understanding endoscopic surgeries is now well established. Videography is the most practical and effective method of documenting and teaching ENT endoscopy⁶.
 12. Its usefulness has now extended much beyond ENT frontiers including anaesthesia. Video laryngoscopy (VL) has been shown to improve first attempt success compared to direct laryngoscopy (DL) in many clinical settings⁷.
- A software program has been developed that allows the creation and administration of digital pictures and videos using only one program. Filing is done automatically⁸. Video documentation of clinical record is a subject that has now generated quiet an interest among the clinicians for number of reasons. In the field of ENT, it was first used in Japan in 1954. Its use was limited initially for documentation, understanding and patient's education of vocal fold movement, and hence called video stroboscopy. It was then taken up by ENT's closest neighbor i.e. the dentist, this time the reason was to document serial progress

of the maloccluded teeth to orthodontic treatment⁹. Due to the advantages of this meticulous record keeping its use has now extended to involve other specialties. Considering the overwhelming advantages of video and photographic documentation of ENT pathologies, its use in ENT outdoor is certainly very beneficial both for the patient and clinician. However a limiting factor is the very high cost of video recording equipment coupled with extremely expensive endoscopes particularly those of branded companies. Numerous improvisations have been suggested to overcome this 'cost barrier'. In one study a digital camera (Nikon Coolpix 950 and Coolpix 990) was placed in contact with Zeiss and Leica microscope's one ocular lens¹⁰. However this technique recorded only microscopic image. In another study, endoscopic images were monitored by attaching a flexible or rigid endoscope to a camera by special adapter screws onto the lens top¹¹. In yet another improvised modification a VMS-001 USB Microscope (a webcam designed for higher magnification) was attached to endoscope using a disposable camera head drape¹². In another technique for video recording of ENT pathologies, a JVC GX-N8U color video camera was connected to Hopkins endoscope using a Karl Storz quick connect adapter. This improvisation was however expensive¹³. In a slightly different technique, Barr GD suggested a low cost improvisation. A Nikon Coolpix 4600 4 megapixel camera was attached to endoscope using modified blue bottle top of mineral water bottle as a connector / adapter¹⁴. Now coming to the printout of videos and still images of ENT pathologies, a study suggested that the pictures produced by the color video printers (Sony UP 5000 & Sony CVP G500) were of unexpectedly high quality and compared very favorably with those produced by conventional color film photography in color, image sharpness and resolution. The video printouts made with the recorder on 'pause' mode produced unwanted electronic horizontal lines either on the top or bottom of the printouts. This could be avoided by making the print of the desired image while the videotape was running¹⁵. The circuit used to record ENT pathologies in our study may not produce very high resolution pictures, but it certainly has the advantage of being extremely cheap and therefore easily accessible and affordable in countries like Pakistan with low income economy. The picture quality is reasonable enough for clear visualization and documentation of any ENT pathology, both for clinician and patient. Moreover the study shows that the level of patient satisfaction is much greater with this form of documentary evidence.

CONCLUSION: Video documentation in ENT outdoor practice definitely increases the patient's confidence, his understanding of the disease, saves the patient's time and subsequent visits and greatly adds to patient's reassurance before and after surgery. Moreover new locally improvised techniques have overcome the 'cost barrier'. Apart from its professional and academic advantages, cost effective equipment for video documentation of ENT pathologies also enormously

enhances the general image and reputation of ENT department in any setup.

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Underlay Versus Onlay Myringoplasty and its Outcome: Experience at Tertiary Care Hospitals

*Muhammad Rafique, **Muhammad Shuja Farrukh, **Atif Hafeez Siddiqui

ABSTRACT: **OBJECTIVE:** To determine the outcome of different types of myringoplasty regarding hearing improvement and closure of perforation. **PLACE & DURATION OF STUDY:** This study was conducted in the departments of E.N.T – Head & Neck Surgery, Liaquat University Hospital Hyderabad and Dow University of Health Sciences & Civil Hospital Karachi from January 2008 to December 2011. **STUDY TYPE:** Descriptive study. **SUBJECTS & METHOD:** Fifty cases of tubo-tympanic type of CSOM with dry central perforation for last 8-12 weeks, having good cochlear reserves and air bone gap not more than 40dB were included in this study. Patients of either sex with age ranged from 12-40 years were included. Detailed history was acquired and thorough clinical examination was performed with main consideration that ear should be dry for around 8-12 weeks with no primary infection and no pathology in nose, nasopharynx and oropharynx. Patients with active ear discharge, mastoiditis or any other impending complication, history of recent infection within last 8 weeks, with sensori-neural deafness or air bone gap more than 40 dB, patients having eustachian tube insufficiency or having gross abnormality in nearby anatomical structures were excluded from the study. The data was analysed by SPSS version 21 using Pearson Chi-Square test for statistical significance. **RESULTS:** A total of 50 cases were included in this study, among which 34 were males and 16 were female patients (ratio 2.1:1). The mean age was 26.4 years. Majority of the patients (78%) had past history of discharging ear with central perforation while 10% of patients had subtotal perforation. In this study 25 patients were operated by underlay technique among them graft uptake was successful in 22 patients and failed in 3 patients. In 25 patients myringoplasty was performed by onlay technique, graft uptake was successful in 23 patients and failed in 2 patients. The result shows that graft uptake was successful in 45 (90%) out of 50 patients and failure was encountered only in 05 (10%) patients. Complete closure of perforation was achieved in 33 cases (66%). The reduction in the size of perforation or partial uptake of the graft was achieved in 12 cases (24%). In 5 cases, graft was rejected resulting in re-perforation as before. In our study 30 patients (60%) showed 20db to 30db improvement in hearing after surgery whereas 15 patients (30%) showed betterment between 10db to 20db in their hearing while 5 patients (10%) had less than 10db improvement in hearing after surgery. **CONCLUSION:** The ultimate goal of myringoplasty is to have a new reconstructed healed tympanic membrane with restoration of hearing as much as possible. In our study, there was no significant difference in achieving these goals by using two different techniques of myringoplasty. **Key Words:** Myringoplasty, Underlay graft, Onlay graft, Hearing improvement, Closure of perforation.

INTRODUCTION: The problem of ear drum perforation is almost as old as the human history¹, but its incidence in general population is still debatable. Tympanic membrane perforation is mainly caused by acute or chronic suppurative otitis media (ASOM or CSOM) and trauma, either accidental or iatrogenic. Around 70-80% of perforations healed naturally while rest of 20-30% needs surgical repair². In a survey it was discovered that 4% of native American children had perforated tympanic membrane³. Perforation caused after placing gromets in children having otitis media with effusion is estimated around 3%⁴. An increased incidence is noted during childhood and in young adults mainly due to higher incidence of CSOM in this group of population^{5,6}. A dry central perforation in a tympanic membrane (TM) chiefly has two effects. One is otorrhea and other is hearing impairment. In such perforations a Myringoplasty operation is usually performed. Two classical techniques have been described as underlay and onlay procedures. Underlay technique is very popular and is widely used as it is relatively simple to perform⁷.

In this the graft is placed medial to the tympanic membrane remanant and malleus. Smaller central perforations are ideal for such technique avoiding the complications of anterior blunting and lateralization, although the reduction in middle ear space and adhesion formation are among its disadvantages. Poor vascular supply to the graft due to limited bed size is also a potential threat for failure². On the other hand onlay myringoplasty is more challenging and mainly used for total perforations or anterior perforations. Although the rate of success is higher but it takes longer time to heal. However the rate of success by either technique is very much debatable as there are studies with variable results of both procedures in terms of achieving an intact ear drum. This study is carried out to compare the results of underlay and onlay techniques of myringoplasty in terms of achieving post operative closure of tympanic membrane perforation and improvement in hearing. **SUBJECTS & METHOD:** This study was conducted in the Departments of E.N.T – Head & Neck Surgery, Liaquat University Hospital Hyderabad and Dow

University of Health Sciences, Civil Hospital Karachi between January 2008 and December 2011. Fifty cases were included in this study where myringoplasty was done. In this study two main surgical techniques were used i.e. underlay and onlay. In 25 cases underlay technique of myringoplasty was done while in 25 cases onlay technique was used. Detailed history acquired and thorough clinical examination was done in all cases. Patients were selected from both genders and from different age groups, between 12-40 years, with dry tympanic membrane perforation for more than 12 weeks and air bone gap not more than 40 dB. It was made sure that there should be no primary infection in nose, throat or other adjacent areas in selected subjects. Patients with active ear disease, mastoiditis, any impending complication, sensori-neural deafness, age above 40 years or below 12 years (extremes of ages), eustachian tube insufficiency, diabetics, hypertensive, patients suffering from any other metabolic disorder or chronic illness like tuberculosis or hepatitis were excluded from the study. Thorough clinical examination of ear, nose and throat, examination under microscope beside routine investigations, audiological assessment by pure tone audiometry, radiological assessment of nasopharynx, paranasal sinuses and mastoid were carried out pre-operatively. The audiometry was performed in all selected patients in a sound proof chamber with no ambient noise by qualified audiologist at standard frequencies. Masking was applied in all cases. The techniques which were used in these patients were underlay and onlay. Transcanal approach was considered in small pinhole perforation. Endaural approach provided better surgical exposure than transcanal approach whereas post auricular approach provided maximum exposure during surgical procedures. The grafting material used was temporalis fascia, as it is freely available, having better flexibility and minimal BMR. All the surgeries were performed under general anaesthesia using operating microscope. The data collected was analysed by mean for quantitative variable and frequency and percentages were calculated for qualitative variables. Statistical analysis was carried out by SPSS version 19 using Pearson Chi-Square test for statistically significant difference in results of underlay and onlay techniques of myringoplasty regarding closure of perforation and hearing improvement. P-value of < 0.05 was established as significant.

RESULTS: A total of 50 patients were included in this study out of which 34 were males and 16 were females with male to female ratio of 2.1:1. The age group distribution showing majority of patients (44%) were between the age of 21-30 years. The mean age was found to be 26.4 years (Fig: 1). In selected patients, 45 (90%) had history of discharging ear but after conservative treatment a dry central perforation was obtained while 5(10%) patients had dry traumatic perforation. In our study 4 (8%) patients had small perforation occupying upto 1/4th of ear drum while 20(40%) patients had medium sized perforation occupying upto 1/2 of the size of TM. 21(42%) patients had large perforation occupying upto 2/3rd of TM area, while 5(10%) patients had subtotal perforation. This study shows that majority (82%) of the patients had either medium or large size perforations. In our study of 50 patients, 6 (12%) patients

had antero-inferior perforation, 4 patients (8%) had antero-superior perforation, only one patient (2%) had postero-inferior perforation, 16 patients (32%) had large anterior perforation, while majority of the cases i.e. 18 patients (36%) had central perforation, and only 5 patients (10%) had subtotal perforation. The study shows that

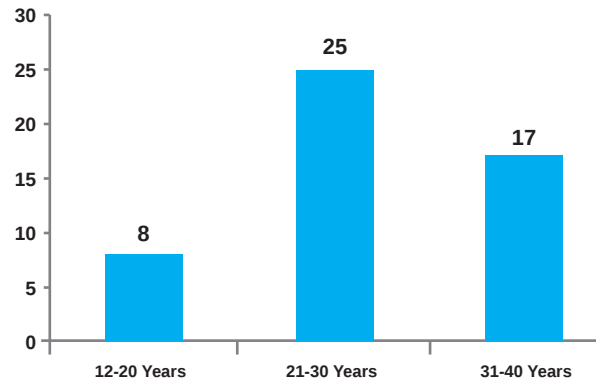


Fig-1 : Distribution of Age in Groups (n= 50).

Site of Perforation	Frequency	Percentage
Antero-inferior	06	12%
Antero-superior	04	8%
Postero-inferior	01	2%
Anterior	16	32%
Central	18	36%
Size of Perforation	Frequency	Percentage
Small (1/4th of TM)	04	8%
Medium (1/2 of TM)	20	40%
Large (2/3rd of TM)	21	42%
Subtotal	05	10%

Table-1 : Showing site and size of perforations (n=50).

Degree of Hearing Loss	Pre-operative Audiogram	
	No of cases	%
10-20 dB	5	10%
21-40 dB	45	90%
<40 dB		

Table-2 : Showing hearing loss pre and post-operatively (n=50).

Association of graft acceptance groups and myringoplasty techniques types				
Graft Acceptance	Myringoplasty techniques types		Pearson Chi-Square	P-value
	UnderLay(n=25)	On Lay (n=25)		
	n	%	n	%
Complete Uptake	17	68.0	16	64.0
Partial Uptake	5	20.0	7	28.0
Total Rejection	3	12.0	2	8.0

Table-3 : Graft Acceptance by different techniques.

Association of Hearing improvement groups and myringoplasty techniques types				
Hearing improvement	Myringoplasty techniques types		Pearson Chi-Square	P-value
	Under Lay	On Lay (nF25)		
	n	%	n	%
20 - 30 db	16	64.0	14	56.0
10 - 20 db	6	24.0	9	36.0
0 - 10 db	3	12.0	2	8.0

Table-4 : Hearing improvement after myringoplasty.

majority of the patients (68%) had either anterior or central tympanic membrane perforation (Table: 1). In our study 45 patients (90%) had moderate degree of conductive hearing loss (21-40 dB loss) while 5 patients (10%) had mild deafness (10-20 dB loss). Table:2 In our study autologous temporalis fascia graft was used in all cases. The patients were operated with different techniques of myringoplasty. Underlay technique was used in 25 patients (50%) while onlay technique was adopted in 25 patients (50%) (Table: 3). In 25 patients out of 50 in which underlay technique was used, graft uptake was successful in 22 patients and failed in 3 patients while in 25 patients in whom myringoplasty was performed by onlay technique, graft uptake was successful in 23 patients and failed in 2 patients. Complete closure of perforation was achieved in 33 cases (66%). The reduction in the size of perforation or partial uptake of the graft was achieved in 12 cases (24%). In 5(10%) patients graft was rejected resulting in re-perforation as before (Table: 3). 60% of the patients in present study showed 20-30 db improvement in hearing after surgery. In 15(30%) patients 10-20 db improvement in hearing was achieved, while 5(10%) patients had less than 10 db improvement in hearing after surgery. PTA repeated 12 weeks after surgery and the results were compared with the pre-operative pure tone audiogram. Results are shown in Table:4. Statistical analysis expressed that there was no significant difference in results of both underlay and onlay techniques in terms of graft uptake and hearing improvement.

DISCUSSION: Many persons live their lives without knowing that they have tympanic membrane perforations usually because they are entirely asymptomatic. Patient do not approach consultants for repair of such perforation until the perforation is associated with recurrent infection or causing significant hearing loss. Presence of pain alerts the physician to a concurrent disease process. Problem is often more intense with bilateral perforated ear drum. Discharging ears are usually treated conservatively to acquire a dry perforation as the yield of grafting is much better in dry ears. Discharging ears refractory to conservative treatment might need mastoid exploration. In bilaterally dry perforated tympanic membrane, it is better to choose worse ear for myringoplasty first in order to save the better ear from iatrogenic complications. If tympanic membrane perforation is present in a patient's single hearing-capable ear than only incipient life-threatening complications justify repair attempts^{9,10,11}. Medical therapy for perforations is for controlling otorrhea¹². Ototoxicity may develop with the use of known topical ototoxic ear drops with perforated tympanic membrane and several types of ossicular defects may also be encountered. Frequency and type of ossicular defects varies among ears with presence or absence of cholesteatoma. Resorption of the ossicular chain is most pronounced in the former which are mainly due to more extensive contact with keratinized epithelium in cholesteatoma¹³. An intact ossicular chain is more frequently found in chronic granulating otitis media and as sequelae to tubo-tympanic CSOM. Anterior & inferior perforation usually associated with intact ossicular chain. Patient with total perforation might have a defective handle of malleus & may also have erosion of the long

process of the incus. Treatment of tympanic membrane perforation falls into 3 categories. No treatment is usually required in minimal hearing loss patients having no history of recurrent ear infection. The second option when perforation is small and involves neither the umbo nor the annulus. Down the history several methods had been applied to achieve a healed perforation, Once the simplest but now obsolete method was to cauterize the edges of the tympanic membrane perforation with trichloroacetic acid (10% solution), and then apply a small patch of cigarette paper applied over mechanically stripped perforated margin. A fat-plug myringoplasty can be performed^{14,15}. Other recently reported forms of office treatment use fibrin glue or a patch composed of a hyaluronic acid ester and a dressing component. The use of basic fibroblast growth factor with a patch that consists of a silicone layer and atelo-collagen has been tried in very small number of patients with excellent success. The third option is to perform tympanoplasty with the patient under local or general anesthesia. Approach in this surgery may be post aural, endaural or transcanal depending on the location and size of the tympanic membrane perforation. The most commonly used grafting material is temporalis fascia. Grafts may be placed either medially (underlay) or laterally (onlay) to the tympanic membrane remnant and handle of malleus. In our series underlay technique was used in 25 cases and onlay in 25 cases. Onlay technique is indicated in cases where meatus is narrow and bony protrusion is present anteriorly. Graft material commonly used in myringoplasty is autologous temporalis fascia because of excellent take rate¹⁶. In our study all the patients were grafted with temporalis fascia (n=50). A new office technique of conservative myringoplasty using lyophilized homograft dura and fibrin glue has been described and was carried out on 1305 ears to close central perforation of the tympanic membrane with 90% success rate. If it fails a conventional myringoplasty can always be performed¹⁷. Cartilage as a graft material has also been used in perforated ear drum successfully in certain centres^{18,19,20}. Myringoplasty in young children is generally avoided due to recurrent upper respiratory tract infections. But it has been advocated in some cases to restore child's auditory function, to prevent ossicular damage and also to prevent migration of squamous epithelium. One study of 189 cases, reports 90% success rate with central perforations and 70% in marginal perforations²¹. In another series of 83 patients 100% success rate was claimed²¹. Complications may be avoided with regular follow ups. Perforations in the pars tensa rarely lead to complications, as compare to perforations in the pars flaccida. Every operation carries a risk of exacerbating hearing loss. Exact incidence of such hearing loss is unclear, and rate of reported cases vary widely in the medical literature. One series showed approximately 1 per 500 operations resulted in much worse hearing, while another series showed that nearly 2% of patients had some degree of increase hearing loss²². In a small group of patients, persistent eustachian tube dysfunction leads to late complications, such as cholesteatoma, re-perforation, or middle ear effusion. Repaired drums re-perforate in as many as 10% of patients. Potential for late perforation and cholesteatoma

formation require regular follow-up for many years after apparently successful surgery.

CONCLUSION: The ultimate aim of tympanic membrane grafting procedure is to have new reconstructed tympanic membrane with functions as close as possible to original tympanic membrane. In our study myringoplasty was done by two different techniques. A satisfactory rate of graft uptake was achieved by both techniques and most of the patients had completely dry ear and improved hearing. The difference in graft uptake was insignificant when both methods were analysed statistically. The two techniques can be used alternative to each other as per choice of surgeon. The experience of surgeon, facilities available and regular follow ups are much more important to achieve good success than to the technique alone. The age also affects the myringoplasty success rate and in our study the adults show better results. Results also depend upon the functioning of the eustachian tube and presence of infections in surrounding areas such as nose and nasopharynx.

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Predictors of Outcomes Following KTP Laser Supraglottoplasty for Severe Laryngomalacia

John Drew Prosser, James Arthur Norton, Jack Calvin Borders, Anjum Naveed

ABSTRACT: **INTRODUCTION:** Laryngomalacia is the most common cause of infant stridor. The majority of cases are self-limited but up to 20% of patients require surgical intervention secondary to severe airway obstruction or poor weight-gain. **PATIENTS AND METHODS:** IRB approved, retrospective study in a tertiary care children's hospital was planned . to determine what factors predict short-term (in-hospital) and long-term (out patient follow-up) success following laser supraglottoplasty for severe laryngomalacia. **RESULTS:** 31 children underwent laser supraglottoplasty from Feb 2009-Sept 2010. Co-morbidities included gastro-oesophageal reflux disease GERD (58%), prematurity (32%), neurologic (13%), cardiac (13%), and synchronous airway lesions SALs (23%). Age <2 months was associated with lower cure rates (71% vs 100%, $p=0.0285$), but not longer hospital stays or more non-invasive ventilatory support (NIV). Children with neurologic comorbidities required a longer duration (57 vs 5 hours, $p<0.0001$) of NIV and longer stays (3.5 vs 1.19 days, $p<0.0001$). GERD was not associated with more NIV or worse cure rates. Children with cardiac comorbidities tended to have longer inpatient stays but this did not reach statistical significance ($p=0.076$). Children with SALs had longer inpatient stays (2.57 vs 1.16 days, $p<0.0001$) and required more NIV (33.1 vs 5.5 hours, $p=0.002$). They were also more likely to receive Heliox ($p=0.05$). Prematurity trended patients toward longer hospital stays, more NIV and lower cure rates ($p=0.08$, 0.11, and 0.19 respectively). Complication rates were 12.9 percent. **CONCLUSION:** This study confirms that primary laser supraglottoplasty has a high success rate (90.3%). Patients with neurologic comorbidities and SALs have longer hospital stays and require more inpatient support. Age < 2 months is associated with lower cure rates.

Key Words: Laryngomalacia, KTP laser, Supraglottoplasty.

INTRODUCTION: Laryngomalacia (LM) is a condition characterized by dynamic collapse of supraglottic structures during inspiration causing airway obstruction. An omega shaped epiglottis is often associated with laryngomalacia (Fig1). It is the most common cause of stridor in infants¹. The condition typically presents between 2-6 weeks of age, progresses until 6-9 months and resolves after the age of 2 years. In up to 20% of cases surgical intervention is required secondary to severe airway obstruction, acute life-threatening events, documented obstructive sleep apnea, poor weight-gain or failure to thrive². Supraglottoplasty with or without epiglottopexy is generally considered the primary initial intervention in severe LM requiring surgical intervention. If primary intervention fails to be curative patients typically undergo a secondary supraglottoplasty or are considered for tracheostomy. Synchronous airway lesions (SALs) in children with LM are well documented with an incidence approaching 58%³. LM patients with certain medical co-morbidities have poorer outcomes following supraglottoplasty compared to those without. Specifically, neurologic co-morbidities are associated with a higher rate of revision supraglottoplasty and eventual tracheotomy⁴. We aim in this study to identify the factors which predict short-term (in-hospital) and long-term (out patient follow-up) success or failure following primary laser supraglottoplasty for the treatment of severe laryngomalacia.

PATIENTS AND METHODS: A retrospective study was performed at a tertiary care academic children's medical center. Children who were diagnosed with severe

laryngomalacia and who underwent KTP laser supraglottoplasty between February 2009 and September 2010 were included in the study. The diagnosis of laryngomalacia was made based on clinical presentation and confirmed by awake flexible fiberoptic laryngoscopy. Supraglottoplasty was performed for poor weight gain, witnessed apneas, confirmed obstructive sleep apnea (OSA), or severe life-threatening respiratory events. Surgery was performed utilizing the KTP laser by removing the redundant tissue over the arytenoids as

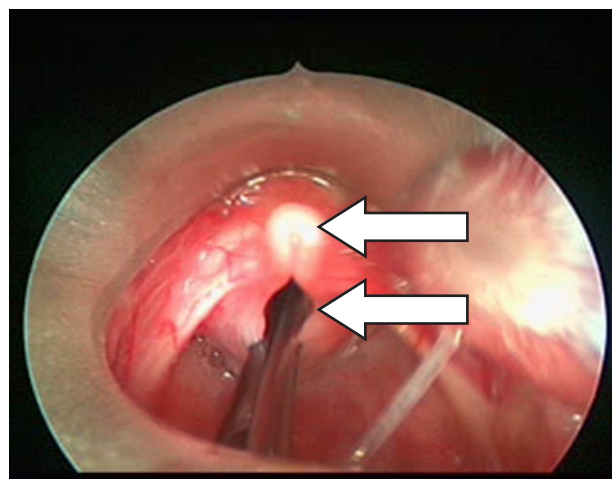


Figure-1: Endoscopic view of patient with laryngomalacia. Upper arrow indicate Omega shaped epiglottis, Lower arrow indicate prominent aryepiglottic fold

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Figure-2: 4 point use of KTP laser to reduce the bulk of epiglottis and aryepiglottic fold.

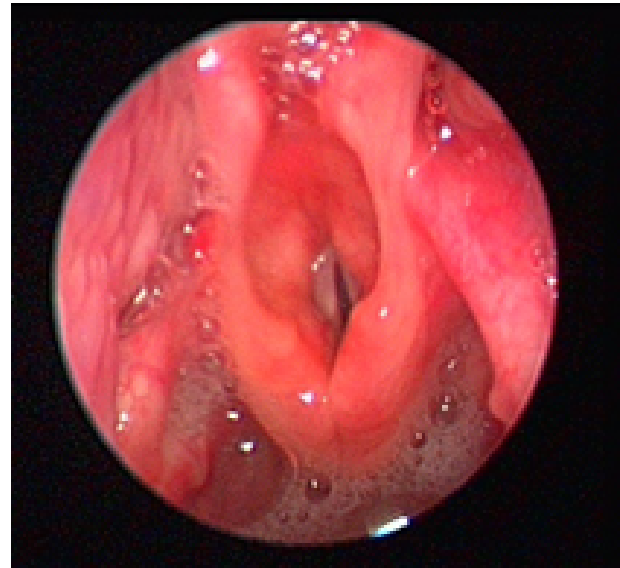


Figure-3: Late post operative view larynx after KTP laser supraglottoplasty.

well as the lateral aspects of the epiglottis (Fig-2). A comprehensive airway evaluation was performed at the time of surgery, and any Synchronous Airway Lesions were documented. Patients having supraglottoplasty by any other technique or inadequate documentation of hospital course were excluded. Charts were reviewed for age, co-morbidities, SALs, length of in-hospital invasive (intubation/ ventilation/ SIPAP) and non-invasive (Heliox/ supplemental oxygen/ racemic epinephrine/ CPAP) respiratory support. Length of hospital stay, outpatient resolution of symptoms, and any associated complications were reviewed. Patients were divided into age groups based on age at the time of surgery: <2 months, 2-10 months, and >10 months of age. Co-morbidities were classified as GERD, cardiac, neurologic, prematurity or SALs.

STATISTICAL ANALYSIS.

Means and standard deviations were calculated with Microsoft Excel program. Comparisons between groups were made using a paired t-test. Statistical significance was determined by using a p-value less than or equal to 0.05.

RESULTS: Thirty-one children were identified for inclusion in this study. The average age at primary supraglottoplasty was 8 months of age (range 1-60 months). Co-morbidities included GERD (58%), prematurity (32%), neurologic co-morbidities (13%), cardiac co-morbidities (13%), and synchronous airway lesions (23%). When stratified by age at primary surgery (<2 months, 2-10 months, and >10 month of age), age <2 months was associated with persistence of symptoms on outpatient follow-up (71% vs 100% resolution rate, $p=0.0285$). Age was not associated with longer inpatient stay or the requirement for more non-invasive ventilatory support. In regards to co-morbidities as inpatients, those children with neurologic co-morbidities required a longer

duration of non-invasive ventilatory support (57 vs 5 hours, $p<0.0001$) following surgery and subsequently had longer inpatient stays (3.5 vs 1.19 days, $p<0.0001$). Gastro oesophageal reflux disease as a co-morbidity was not associated with increased in-hospital support, prolonged stay or outpatient failures. Children with cardiac co-morbidities tended to have longer inpatient stays (2.25 vs 1.37 days) but this did not reach statistical significance ($p=0.076$). Children with synchronous airway lesions had significantly longer inpatient stays (2.57 vs 1.16 days, $p<0.0001$) and required more inpatient support (33.1 vs 5.5 hours, $p=0.002$). Patients with SAL were significantly more likely to receive Heliox therapy (29% vs 4%, $p=0.05$) than those without other airway lesions. Children with a history of prematurity trended toward longer hospital stays, more in-patient support and lower cure rates but none of these reached statistical significance ($p=0.08$, 0.11, and 0.19 respectively). No patients required re-intubation or tracheotomy (Table-1).

Comorbids	Percentages	Average post-operative Inpatient Stay	Statistical Significance for longer Hospital stay (P-Value)
GERD	58%	1.16 days	-
Prematurity	32%	2.75 days	0.08
Neurological Comorbid	13%	3.5 days	<0.0001
Cardiac	13%	2.25 days	0.076
SAL	23%	2.57 days	<0.0001

Table-1 : Frequencies and post operative stay with comorbids.

Complication	Percentages
Aspiration	6.45%
Persistent Stride	3.22%
Inadequate Reflux	3.22%

Table-2 : Complications of procedure (n=31).

Resolution of symptoms on follow-up was 90.3 %. Postoperative view of supraglottoplasty after healing can be seen in (Fig-3). Complication rates were 12.9 percent and included 2 cases of aspiration which resolved with conservative treatment, 1 case of persistent stridor, and 1 case of increased emesis/reflux symptoms following surgery. No particular group was associated with increased rate of complications (Table-2).

DISCUSSION: This study confirms the high rate of success with primary laser supraglottoplasty in the treatment of severe laryngomalacia (90.3%). In our cohort the most common comorbidities were gastro oesophageal reflux disease, prematurity, SALs. Of the co-morbidities both neurologic and SALs were associated with a longer need for inpatient non-invasive ventilatory support and subsequently longer inpatient hospitalizations. While cardiac co-morbidities trended toward longer in-patient stays this did not reach statistical significance. Gastro oesophageal reflux disease was very common in our cohort as published in previous studies⁵, and its presence did not significantly affect outcomes however all patients with documented reflux were aggressively treated. The finding that children with synchronous airway lesion were more likely to require Heliox is not surprising given that our group commonly uses this medication in the immediate post-operative period in children with airway stenosis. Younger age (< 2 months) at primary surgery was associated with decreased cure rates on long-term follow-up when compared with those > 2 months presumably because of the severity of disease. No patient's required intubation or tracheotomy. Identifying these factors pre-operatively can both direct pre-operative parent counseling and guide post-operative therapy. Also this data suggests that children should undergo a complete airway evaluation at the time of primary surgery to assess for synchronous airway lesions as this

will significantly affect post-operative management. **CONCLUSION:** This study confirms that laser supraglottoplasty is associated with high success rates. Patient's with neurologic co-morbidities and synchronous airway lesion have longer hospital stays and require more inpatient support. Age < 2 months is associated with lower cure rates. This data should guide management and informed consent.

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A Case History Sheet for Children with Hearing Impairment

*Nachiketa Rout , **Ankita Kumari

ABSTRACT: **OBJECTIVE:** The aim of the study is to develop a case history sheet to enable accurately elicit and depict information for children with hearing impairment. **METHOD:** Based upon the review of 200 'traditional' case history sheets, a new proforma was designed. The new sheets were put to use without any additional orientation to the clinicians following which 30 filled in sheet were randomly analyzed and compared. **RESULTS:** Significant improvements in appropriate information ($p < .05$) were observed across all 22 domains except social development. Marked improvements were noted in documenting informations which directly influence initiation of management of general complaints (from 9.5% to 70%), purpose of visit (from 14% to 100%) and family history (from 6% to 100%). **CONCLUSIONS:** Information documented in the case history improves if the case history sheets are made more closed ended and include normative values.

Key Words: Case history, Hearing impairment.

INTRODUCTION : "A first-class history is a necessary prelude to a first class diagnosis"¹. Case history is the first instance when the clinician comes in contact with the client and sets the process of recovery in motion. Case history sheets are a sort of prop for the students and physicians¹, to obtain relevant and focused information concerning an individual that facilitates an appropriate diagnosis and treatment plan². Audiologist is charged with the responsibility of diagnosing and non-medically treating hearing loss^{3,4}. Silverman (1984) stated that diagnosis demands a unique blend of science and art⁵. Fredrick (1921) considered case history is both an art and a science, and reflects the highest degree of the skills, judgment, tact and breadth of clinical experience of the recorder¹. Clinician's art of communicating with the client reflects his expertise and inspires confidence and trust. The art of history taking involves the degree to which the clinician can appropriately use his/her personal attributes and skills to assist clients of different age, sex and culture, clients with different belief systems and problems to develop a sound client-clinician relationship. Lord Platt, (cited in Hegde, 2008) one of the greatest of teacher at University College of Medicine in London, was of the firm opinions that "if you listen to your patient long enough she/he will tell you what is wrong with her/him"⁶. The art end of the science art continuum may introduce more than a modest amount of personal bias into the evaluation when a less scientific approach is used⁷. This reinforces the need for a well defined case history proforma which would direct the clinician to observe all the available factors, formulate testable hypothesis using clearly stated answerable questions, test those hypothesis to determine their validity, and formulate conclusions based upon the tested hypothesis⁸. Haynes et al, (1992) gave "seven general topics or areas of inquiry that are useful in any diagnostic session. These are: (1) What is the respondent's perception of the problem? (2) When and under what conditions did the communication disorder arise?, (3) In what ways has the communication disorder changed since its onset?, (4) What are the

consequences (the handicapping conditions) of the problem?, (5) How have the client and family attempted to cope with the problem? (6) What impact? has the client's communication disorder had on the rest of the family? (7) What are the client's (or parents?) expectations regarding the diagnostic session?" (8) After a review of commonly used case history proformas deployed with the children with hearing loss, it was felt that there was a need to develop a case history proforma both for clinician as well as a student. The aim of the study is to develop a "Case History Sheet" to accurately elicit and depict information for children with hearing impairment. The objective of the study is: (1) Retrospective survey the accuracy and adequacy of case history information on 200 filled in case history sheets, (2) Survey of 3 Indian and 6 foreign standard case history proforma, (3) Design of a Case History Proforma based upon the finding of objective 1 and 2 for use with children having hearing impairment (4) Field test of revised case history proforma.

PATIENTS AND METHODS: Study was carried out in four phases which addressed each of stated objectives. In first phase a random sample of 200 out of 3000 case files of children (birth to 10 years age), reported with hearing problems during 2006-08, at Ali Yavar Jung National Institute for the Hearing Handicapped (AYJNIHH), Eastern Regional Centre (ERC), Kolkata were selected. The case history sheets contained information as per a standardized format used in the Institute. All the data taken was authentic as it was collected by the trainees in audiology and speech-language pathology, under the supervision of a consultant, who was a post graduate in speech and hearing with a clinical experience of 6 years or more. The information obtained under various subheadings (Table 1) and were tabulated and scored using two point rating scale (i.e., 0- for missing information as well as for inappropriate/incomplete information and 1- for correct and adequate information). This rating was provided on certain guidelines (Table-1). In phase two, the six case history forms (appendix II) of other national and international

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institutions or clinics in the field of audiology and speech language pathology were reviewed to identify the important information apart from what is present in case history sheet used. In phase three, a preliminary case history sheet was designed based on the findings of analysis and study of case history forms. These sheets were then validated by five audiologists. A test retest reliability of the case history form was done. Case history information was collected twice from fifteen clients with a gap of 14 days. The measures of reliability were applied on the data. Test retest reliabilities scores were high ($r=0.99$) and all the items were considered in the final case history tool (appendix III). In phase IV, the form was used for collecting case history information for children reported with hearing problems during 2009-10 at AYJNIHH, ERC. The information was collected using the modified form and with no additional training. This was done so as to exclusively identify the efficacy of developed case history sheet. Finally 30 out of 512 revised filled in case history sheets were randomly selected and analysed under various subheadings as in phase I of the study. Descriptive analysis and chi-square test was done to identify the subheadings which improved significantly on use of revised case history sheets. RESULTS: The percentage of unfilled/ missing and appropriately filled information in the case sheets in phase I and IV are shown in table 2. Comparisons of inappropriately and unfilled /missing data collected in phase-I and phase-IV are shown in figure 1 and figure 2 respectively. A finding of survey of case history sheet reflects that the demographic data (except date of birth, address and phone number), handedness and parent age were correct in more than 90% of the case history sheets. Hence these didn't call for any change. On comparing the reviews of 200 filled in case history sheets in phase I and 30 filled in (revised) case history sheets in phase IV, significant improvements ($p= 0.05$) was observed across all domains (except social development) as indicated by chi square test. Major improvement could be seen in general complaint (from 9.5% to 70%), purpose of visit (from 14% to 100%) and family history (Pedigree) (from 6% to 100%). Unfilled and missing information reduced in all subheadings (by different %) with maximum improvement in family history (Pedigree) (from 49% to 0%), consanguinity (from 40% to 10%), prenatal medical history (from 64% to 26.5%) and post natal medical history (from 54.5% to 20%). In Phase IV, information of family structure and auditory behaviour, added in revised case history sheet, were appropriately written in 16.7% and 66.7% respectively. Few subheadings (social development and natal medical history) showed significant negative results as they were in appropriately filled. These results and the significance are discussed in the following section.

DISCUSSION: In Phase I of the study it was found that the demographic data was correctly documented in 87.77% of case files, though there were incorrect and missing portion of this information like, address being correct only in 57% cases and date of birth in 69%. This is probably due to decreasing trend for letters in this world of e-mail and SMS. Loss of art of writing address in a correct format results in failure to reach out to the patient if and when required. Correct address needs to be depicted as 70% of India resides in villages which get connected by the post offices. Secondly, errors were noticed in documenting the date of birth as eliciting the

exact date of birth is often a challenge because of both personal and cultural reasons. It is not uncommon to find the parents associate the date of birth with a festival or an event. Its then up to the clinician to relate the event and guess the date of birth which is not possible if the clinician is un aware about the calendar system and festivals of India. The date of birth helps in identifying the exact age and the amount of delay across various developmental domains (e.g., language, social, motor etc). However it was left unfilled (28% of case) or was inappropriately filled, probably due to patients telling the date in terms of seasons or the Hindu calendar

S. No.	Variables	Meaning of inappropriate for them
1	Date of birth	Date of birth not written in "day/month/year" format and/or does not Correlate correctly with age.
2	Address	The correct way of writing is not followed i.e. village, post office, police station, district with pin code
3	Phone number	The STD code not written, or the mobile number of </> 10 digits.
4	Parent income	Income of any one of the parent is unfilled /vacant.
5	General complaint	Not written in terms of patient's language, vaguely written "speech and hearing problem". Mention of unnecessary details (e.g., no history of otorrhea, otalgia, etc)
6	Purpose of visit	Not written according to patients Priorities
7	Onset of the problem	Specific age at which onset was perceived, not written
8	Progress of the problem	No standard way of notation followed(e.g., not written in terms of-static, deteriorating, improving)
9	Treatment taken	Information not synchronized, home treatment is not mentioned, homeopathic and ayurvedic treatment not mentioned.
10	Probable cause	It is often written same as the medical history

Table 1: The meaning of inappropriate for the variables considered.

S. No	Case History	Missing	Appropriate	Chi-Square
1	Date of birth	Phase I 28% Phase II 16.7%	Phase I 69% Phase II 80%	.000
2	Address	0%	57%	.000
3	Phone number	22%	58.5%	.000
4	Parent's education	7.5%	80.5%	.000
5	Parent's occupation	0%	90%	.000
6	Parent's income	0%	2%	.000
7	General complaint	0.5%	9.5%	.000
8	Purpose of visit	2.5%	14%	.000
9	Onset of the problem	0%	58.5%	.000
10	Progress of the problem	6.5%	54.5%	.000
11	Treatment taken	16.5%	38.5%	.000
12	Probable cause	27%	31%	.000
13	consanguinity	40%	50%	.000
14	Family history(Pedigree)	49%	6%	.000
15	Medical history:-Prenatal	64%	26.5%	.000
	Natal	19%	52.5%	.000
	Post natal	54.5%	39.5%	.000
16	Developmental history	26%	46.4%	.000
17	Language development	20%	56%	.000
18	Social development	17.5%	62%	.000
19	Educational history	33.5%	28%	.000
20	Remarks	20%	45.5%	.000
21	Auditory behaviour	-	0%	.000
22	Family structure	-	16.7%	.000

Table 2: The percentage of unfilled/missing, appropriately filled and inappropriately filled information.

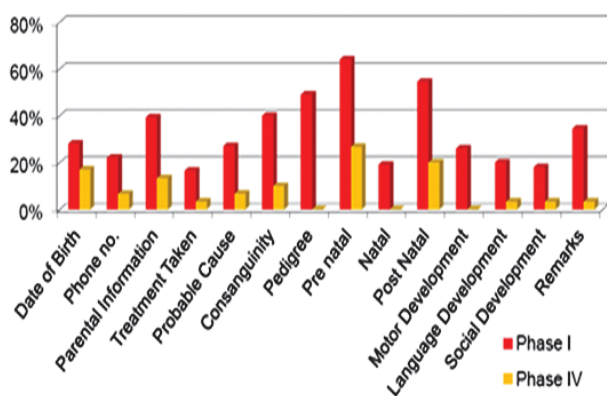


Figure-1: Comparison of unfilled data in phase I and phase IV.

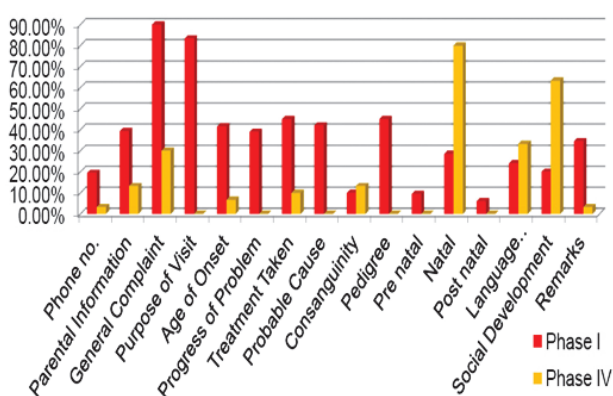


Figure-2: Comparison of inappropriately filled data in Phase I and Phase IV.

followed in their religion/region. While revising the case history sheet, the format of noting address (i.e. village, then post office, then police station, then district with the pin code) was added and field testing showed a significant ($p < .05$) increase in accuracy of address noting, though pin codes were found missing making it still incomplete in 40% of case history sheets. There is a need to orient the clinicians about the significance of the Indian calendar, local festivals and the structure in which postal addresses are documented. The complaint and condition should be asked in a culture specific and in a descriptive way. For example, what are the core difficulties the child faces as compared to his friends in terms of attending to social and personal needs like fulfilling basic needs, at school, while playing with friends, at social occasions, in different acoustic environments (quiet/noisy/moderately noisy etc), with and without speech reading cues etc. Auditory capabilities should be asked by giving real life examples e.g. "during the first six months of life was the child noisy or unusually quite? Did he/she stop to 'no' from behind at around 8 months or at around 1 year did she get excited when her father/ mother called her from the other room and named some things or events etc. The complaint of client reflects the participation limit (handicap) of the client and helps fixing his/her treatment priorities. Asking about the overall behaviour at school is of great help in understanding the degree of hearing loss e.g.: at school does the teacher complain that the child is inattentive, naughty, picks up quarrels, copies others, is poor in

studies, gets inattentive and disturbs others especially when he/she sits in the last few benches etc often reflect a lot about the auditory capability and language proficiency of the child. Most of the symptoms elicited by hearing loss are indirect and emerge through other behaviours. The probable cause of the hearing loss should be elicited in an open ended fashion. Many narrations might sound unreasonable or even may be incorrect but reflects the perception of the parents/ caregivers and reflect the myths which are pervasive in society regarding hearing loss and speech problems. Above all it helps in deciding counselling priorities and preparing answers which would not be found in western books used to teach audiology in India and Pakistan. A young couple was getting their seven year old child screened in a hearing screening camp at Odisha. The child's hearing loss was reported by the school teacher as she could not respond to questions when she sat in the last two benches. She was having a clear cut moderate degree of sensory neural hearing loss with a few misarticulations of sibilants and fricatives when a pure tone audiometry was performed. The father was quiet happy as she was being issued a behind the ear hearing aid however the mother tried finding excuses and seemed hesitant to have the hearing aids for the child. The clinician wanted to know the reason behind not accepting the hearing aid. The mother narrated, when the child was five years old she went to the local 'makar sakranti' fair. She was watching a local magician performing a trick, the magician had whispered something to her ears and since then she had poor hearing. She believed as a magician had caused the hearing loss so another magician could cure it by casting off the spell. Letting the clients speak helps understanding their perceptions and in turn getting the facts clear. This description of the complain and the perception of cause was ignored during the case history, which leads to lesser acceptance of the management protocol and addressing them leads to a better participation of the parents as they feel that their problem has been heard and understood. In the present study only 9.5% and 31% of files had appropriately written general complaint and probable cause respectively. General complain was found vaguely written as "Speech and hearing problem" in 90% of case files. In the revised form options were provided below complaints indicating the purpose of visit. Some clinicians commented about the space constrains in the history sheet which leads to paraphrasing the most important part of the information. Space provided for noting information under the subheadings is often less attended to and goes by the printer's choice or by the size of sheet employed. Hence the size of paper used in revised case history sheet was changed to A3 from previously used A4. This made it possible to increase spacing for general complaint and probable cause was increased which indirectly conveyed to increase weight age and detail for these subheadings (Appendix II). This led to an improvement in accuracy from 9.5% to 70% and 31% to 93% for general complaint and probable cause respectively. The intervention should always follow the treatment priorities of patient. For instance, many a times a child with hearing loss who has been using a hearing aid and needs educational guidance or repair his/her hearing aid, comes to the clinic. If the priorities/ purpose of visit are noted clearly the client can be directly directed to the special educator or the electronic technician for the needful. If the purpose of visit is skipped, the file falls into the usual track in

which all the evaluations are completed first, following which management plan is discussed. Spending a lot of time on getting detail test battery done to diagnose the child is unproductive both for client and clinician. Similarly, purpose of visit reflects patients primary areas where he came seeking help first. In phase I, only 14% of case files had purpose of visit appropriately written. In redesigned case history proforma, the options provided were those of patient's prime needs and space was provided to write their priority specifically (if any). This led to a significant ($p < .05$) improvement in accuracy (from 14% to 83.5%). Onset of hearing loss is an important prognostic indicator and is significant for age of intervention. As stated by Northern and Downs (1991) onset of hearing loss affects the learning process of children. Thus, it should be noted carefully, specifying the exact age of onset⁹. But in phase I, information demanded as "onset of problem", had exact age mentioned in only 58.5% of case sheets, while in the rest it was noted as "since birth or childhood". These are insignificant to the clinician. In revised sheet the depiction of onset of problem was paraphrase as "age at which Hearing/Speech language difficulty was noted" This led to depiction of exact age in 93.3% of case sheets. Previous treatments availed and their success or failure shapes the clients perception about the disorder and efficacy of treatment/ habilitative method it guides the amount of participation required by child and family members. The medical history, family history and consanguinity have important risk indicators which can help us identify hearing loss in children at an early age. Proper natal history about the time of delivery, type of delivery, presentation and the health of child in perinatal age help us identify risk indicators in the child. In absence of universal new born hearing screening program in India focusing on at risk children may be used for early detection and intervention in Indian context¹⁰. Hence to make medical history more informative and diagnostic for the child, it was detailed in the revised case history sheet based on survey of other case history sheets and the high risk register given by Joint Committee on Infant Hearing (JCIH, 2007)¹¹. Since the realization of importance of those risk indicators is lagging, the appropriateness noted for natal information dropped from 54.5% to 20% in the field testing of revised sheet. Speech and language therapy follows a developmental model. Identifying the developmental stage of child would help in deciding the baseline and target for therapy. The age of developmental histories help identify problems in child, like cognitive impairment. Finding of survey of case history sheets were used to increase diagnostic value of developmental histories in case history sheet. The weaknesses were overcome by providing specific age ranges of motor developmental milestones as stated in Ghai, 1990¹², Language developmental milestones as stated in Rao, 1992¹³ and Social /Cognitive development as stated by Karanth, 2007¹⁴ in the revised sheet. In the field test the accuracy improved to 60% and 63.3% for motor and language development. As many as 21% of medicos in Eastern India advice a child's parents to wait for some time rather than recommending an immediate audiological evaluation¹⁵. Providing developmental milestones would alert the professional for a delay and the need for a referral. Further noting details of the professionals whom the child had approached would help orientation of professionals. Such an exercise will trigger the process of early identification and rehabilitation especially in countries like India, Pakistan,

Bangladesh etc where universal newborn hearing screening programme is yet to commence at a national level. The reverse pattern observed for social development, may be attributed to the lack of importance attached to the area of development especially by the professional who prefer to look hearing impairment through the medical model perspective. It's assumed that children with hearing impairment unlike the children in the autism spectrum disorders or the cognitively impaired group do not present social adjustment problems. The ultimate goal of aural rehabilitation is to enable the child be a member of the society and get included. So the usual trend of audiologists and otolaryngologists to ignore the social and cognitive prerequisites by assuming 'normalcy' of this domain should be avoided. Similarly the perinatal history was elaborated with questions like type of delivery, place of delivery, birth weight, presentation, hyperbilirubinemia, birth asphyxia, admission in NICU etc which needs skill to be asked in native language. It's unfortunate that the majority educators in India still do not appreciate the need to write books in the native language or to categorically train the young professionals to do a case history in the native language. There is a need to design medical and rehabilitation studies in the national language of India or any country as it would facilitate clinicians and patients relate better. The case history ends up with remarks by the clinician and may include the observation of the clinician. It is the most important aspect of the case history because it gives overall impression of the child as observed and perceived by a trained mind. Often revision of form increases alertness and reduces recurrent errors. As a result of revision, the accuracy of some subheading like probable cause, treatment taken and parent income were added. Apart from this, certain information were found in study of case history forms from other national and international institutions or clinics in the field of audiology and speech language pathology, were added in revised case history sheets¹⁶⁻²³. These were: family structure (nuclear/joint) (the significance of it in today's time is more as nuclear families lack the level of speech and language stimulation that a joint family had); Handedness separately for – Grasp, play with toys, eating, and writing (a child may or may not have developed fine hand skills when gross hand skill may be present); Milestones for auditory behaviour with the normal age of their development, till 2 years of age (gives indication of presence or absence of hearing loss). Hence, a good combination of close ended and few open ended questions make information complete, at the same time avoiding unnecessary padding of case history sheet.

CONCLUSIONS: Modifying case history forms by making it a bit closed ended along with providing normative values across different developmental domains significantly improves the accuracy and amount of information which is documented. There is a need to sensitize new clinicians about obtaining a case history in the native language. There is a need to be specifically oriented about the calendar system, festivals etc followed in the region, the style of writing a postal address, listening to the caregiver's perception of the aetiology, specific behaviours of the child and management endeavours. The major risk indicators for hearing impairment need to be detailed to the clinician along with the lead questions (in native language) to elicit the same and lastly to document social development needs to be elaborated as it was paid less attention.

APPENDIX :

Appendix I : Case history sheet used in phase I.

Case No.	DATE:
Informant:	Referred by:
I. Case Name :	
Age/ Sex:	Date of Birth:
Address:	Phenol:
	Rural/ Urban:
Religion:	Community:
Language Known:	Mother Tongue:

Parental Information	Name	Age	Education	Occupation	Income
Father					
Mother					

Family Income slab: r < Rs. 6500/- r Rs 6500/-to Rs 10000/-
r > Rs. 10000/-(Income per month)

II. A. General Complaint:

b. Purpose of visit:

First check-up r Referral r Hearing aid r Repair of Hearing aid r Ear mould

Repair/ change of mould r Speech Therapy r Psychological Evaluation

Vocational Training r Placement r Educational Guidance

Handicapped Certificate r Disability Certificate

r Any other

c. Onset of the problem d. Progress of the problem

e. Treatment taken so far

f. Probable cause of the problem

g. Family history h. Consanguinity

III. MEDICAL HISTORY

Prenatal

Natal

Post Natal

IV. DEVELOPMENTAL HISTORY

Head Control r Turn Over r Sitting r Crawling

Walking r Bowel and Bladder Control r Feeds himself/ herself

Dresses himself/ herself r Hearing r Vision

HANDEDNESS

Right Handed r Left Handed r Mixed Laterality

VI. LANGUAGE DEVELOPMENT

Babbling r First Word r Phrases

Simple Sentences r Receptive Language r Expressive Language

VII. SOCIAL AND BEHAVIORAL HISTORY

Recognizes parents r Makes eye contact r Prefers to play by himself

Socializes with peers and elders r Exhibits temper tantrum r Irritable

Distractive r Restless r Aggressive r Any Other

VIII. EDUCATIONAL HISTORY

a. Attends r Special School r Regular School r Drop Out

b. No. of years of schooling c. Performances

IX. REMARKS

X. RECOMMENDATIONS

Good	Fair	Poor
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Appendix II–Case history sheets reviewed. Case History Sheet, AYJNIHHH, Mumbai Case History Sheet, AYJNIHH, SRC, Secunderabad Case History Sheet, AYJNIHH, NRC, New Delhi Case History Form, Speech Language & Hearing Clinic, Louisiana State University, Los Angeles, Case History, Alaska Speech and Hearing Clinic, Child Speech/ Language Pathology Case History Form, University of Florida, Speech and Hearing Clinic, Florida, Case History-Pediatric-Audiology, University of Nebraska, Nebraska, Child Case History Form (Audiology), university of Arizona, Speech and Hearing Sciences, Pediatric Case History-Audiology, North west Ohio Hearing Clinic, Ohio.

Appendix III – developed and validated case history form for children.

Case name:	Sex: Date: __/__/__						
Case no.:	Date of Birth: __/__/__						
Informant:	Age: __years__months						
Referred by:	Ph. No.:						
Address:	Place: Rural/ Urban						
VIII./House no.-	Community:						
SC/ST/OBC/GEN							
P. O.-	Mother tongue:						
P. S.-	Language known:						
Dist.-	Religion:						
Pin- <table border="1"><tr><td></td><td></td><td></td><td></td><td></td><td></td></tr></table>							

Parental Information	Name	Age	Education	Occupation	Income Slab
Mother					
Father					

Consanguinity: (Specify relationship)

Family History: Nuclear/

Joint family



General Complaint:

Purpose of visit:

- ☐ Hearing Aid ☐ Educational Guidance ☐ Hearing Evaluation
☐ Ear Mould ☐ Speech Therapy ☐ Disability Certificate
☐ Repair of Hearing Aid ☐ Vocational Training ☐ Psychological Evaluation

Age at which hearing/ speech-language difficulty was noticed:

Earlier treatment/ investigation/ hearing aid used:

Probable cause of problem:

Progress of problem: Static/ Improving/ Deteriorating

Amount of quality time spend with the child: hrs

MEDICAL HISTORY:

Pre-natal (Conception to birth)	Peri-natal (birth to 7days)	Post-natal (7 days to 2 year)
Rubella	Delivery: fullterm/ preterm/ postterm	High Fever
Mumps/ Measles	Delivery at: home/ at hospital	Acquired Trauma
X-Ray	(Normal/ Forceps/ Caesarian)	Meningitis
Poor Health	Birth cry: Normal/ Feeble/ Dealed/	NICU>5days
Accidents	Absent	Pathological jaundice
Self medication	Low Birth weight(<1500gm)	Craniofacial
Unsuccessful	Birth asphyxia	abnormalities

abortion Any other	Presentation: Normal/ Breech/ Cord around the neck NICU > 5days Hyperbilirubimia Any other	associated with HL Seizures Ear discharge/ ache Any other
Genetic abnormality (if any):		
Any additional information significant for diagnosis/ remediation:		

DEVELOPMENTAL HISTORY: Parental perception - ☐ Age appropriate ☐ Delayed

☐ Holds neck steady (2-6 mths): _____ ☐ Stands with support (9 mths): _____

☐ Sits without support (8 mths): _____ ☐ Walks alone (15mths): _____

(Ghai, 1990)

HANDEDNESS: Grasp: ☐ right ☐ left ☐ mixed Eating: ☐ right ☐ left ☐ mixed

Writing: ☐ right ☐ left ☐ mixed Play with toys: ☐ right ☐ left ☐ mixed

LANGUAGE DEVELOPMENT: Parental perception - ☐ Age appropriate ☐ Delayed

Parental concern: ☐ Misarticulation ☐ Fluency ☐ voice ☐ language delay/ disorder

☐ Cry/ Differential cry (0-3 mths): _____ ☐ Phrases (around 18mths): _____

☐ Babbling (3-8 mths): _____ ☐ Sentences (around 24 mths): _____

☐ First meaningful word (12-18 mths): _____ ☐ Predominant mode of communication:

(Rao, 1992)

AUDITORY BEHAVIOR: Parents suspect hearing loss - ☐ yes ☐ no

☐ Child awakens/ startles/ cries to loud sound (0-3 mths)

☐ Responds to "no", recognizes mothers voice, turns towards the speaker (3-6 mths)

☐ Child responds to his/ her name & turns head to localize source of sound (6-9 mths)

☐ child responds to music by body and head movements (9-12 mths)

☐ child can point to several body parts, & follow action words; stop, sit, throw (18-20 mths)

☐ upon verbal request can pick up an item from 5 or more items (2-2.6 years) (RAPID, 1992)

SOCIAL/ COGNITIVE DEVELOPMENT:

Parental perception- ☐ Age appropriate ☐ Delayed

☐ Respond to mother by smile (0-6 mths) ☐ Recognizes in a photo (18-24 mths)

☐ holds arms up to be lifted (6-12 mths) ☐ wants to help and please (24-30 mths)

☐ plays ball co-operatively, identifies self in a mirror (12-18 mths)

☐ Enjoys pretend play (36-42 mths) ☐ poor eye contact ☐ prefers to stay alone

(Karanth, Com DEALL, 2007)

EDUCATIONAL HISTORY: ☐ age appropriate ☐ has learning difficulties.....

☐ yet to be admitted in school ☐ can read/ write in _____

☐ attends - regular school/ special school ☐ School performance - good/ fair/ poor

REMARKS:

RECOMMENDATION:

STUDENT CLINICIAN

SUPERVISOR

ACKNOWLEDGEMENT: The authors thank, Director, Prof R Rangasayee AYJNIIH, Assistant Director, AYJNIIH, ERC for permitting us to conduct the study. Authors acknowledge the expert suggestions for case history sheet from Dr. A.K.Sinha, Sri. Suman Kumar, Sri. Indranil Chatterjee, Sri. Nilanjan Paul and Smt. Pamella Samadar.

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Nasopharyngeal Angiofibroma with Intracranial Extension; Post Radiotherapy Down Staging and Surgical Excision

Tariq Rafi, Beenish Nisar Ahmed, Muhammad Waqas, Nisar Ahmed

ABSTRACT: Nasopharyngeal angiofibroma is a locally aggressive, histologically benign, vascular neoplasm. This neoplasm accounts for 0.05% of head and neck tumors and affects almost exclusively male adolescents. Surgery is considered as the primary treatment of nasopharyngeal angiofibroma. Other treatment modalities such as radiotherapy and chemotherapy are still recommended for intracranial extension involving the cavernous sinus or the internal carotid artery. We report a rare case of nasopharyngeal angiofibroma of stage 4b with intracranial extension. The treatment consisted of radiotherapy and post radiation down staging of tumor. New stage 4a is then treated with surgical excision post angioembolization via lateral rhinotomy approach. We discuss the role of radiotherapy in down staging the tumor and making it possible to excise the tumor effectively in advance stage 4b of nasopharyngeal angiofibromas.

Key Words: Nasopharyngeal angiofibroma, Intracranial extension, Lateral rhinotomy, Down staging tumor.

INTRODUCTION: Nasopharyngeal angiofibroma is a slow growing, locally aggressive, histologically benign vascular tumor affecting the adolescent males. Incidence showed it as 0.05% of all head and neck tumor. Various treatment modalities like surgery, radiotherapy, embolization, chemotherapy and hormonal therapy are used and each has its own limitations. Radiotherapy is the treatment of choice for patients of advance stage. This case is reported due to its rarity, as it was an advance stage lesion and radiotherapy was given to patient. On followed up the patient showed a good response in terms of hemostasis, reduction in size and down staging thus making it possible to remove surgically. This case has given us astonishing results and made an advance stage of untreatable case to treatable with using radiotherapy as prime modality and then surgical excision.

CASE REPORT: A 18-year young boy presented in January 2010 with history of right sided nasal blockage, bleeding and purulent discharge from right nostril for last 1 year. Examination showed patient was anaemic in his general physical examination and on local examination there is widening of the bridge of the nose. Anterior rhinoscopy showed purulent discharge in the right nasal cavity and reddish lobulated mass occupying whole right side. Posterior rhinoscopy showed mass occupying right half of nasopharynx. Decreased nasal patency of right side. Sense of olfaction was absent on right side. Other ENT exam was unremarkable. A computerized tomography (CT) scan with contrast and MRI done that showed large lobulated vascular mass around right pterygopalatine fossa extending into nasal cavity, nasopharynx on right side, infratemporal fossa through pterygomaxillary fissure, intracranially extending across the base of skull, eroded sphenoid sinus and involving right cavernous sinus. The mass in its greatest dimensions was 75 X 56 mm. The final diagnosis was stage IVb nasopharyngeal angiofibroma with to intracranial extension (Fig-1). In view of the

intracranial extension, the patient was not considered for surgical resection and hence radiotherapy was started. External beam radiotherapy was delivered through a wedge pair of anterior and oblique co-planar cobalt beams to a dose of 4600 cGy/ 23 Fr /5Fr/wk/ 31 days after doing a CT simulation. The therapy schedule was uneventful. Patient was reviewed six month later because he was lost to follow up by patient as the patient is from a distant place. A follow up CT and MRI scan was done. Repeated scan showed mass in the region of nasopharynx predominantly on the right side extending in to infratemporal fossa through pterygomaxillary fissure, eroded sphenoid sinus but no involvement or extension seen in cavernous sinus. Findings are consistent with previously known diagnosis of angiofibroma. It measured 45 X 42 mm. Now the stage of the tumor was found to be as stage 4a (Fig-2). Then as a protocol of treatment of stage 4a, angioembolization was done and excision of lesion was done with utilizing lateral rhinotomy approach (Fig-3). Patient is now on regular follow up and is stable.

DISCUSSION: Nasopharyngeal angiofibroma is type of a slow growing, locally aggressive, histologically benign vascular tumor affecting the adolescent boys. This exclusive occurrence among boys is probably linked to the androgen. The site of origin is thought to be either from the superior aspect of the sphenopalatine foramen or from the pterygo-palatine fossa, in the recess behind the sphenopalatine ganglion at the exit of the pterygoid canal¹. A clinical triad of unilateral nasal obstruction, recurrent spontaneous epistaxis and nasal drainage is diagnostic of nasopharyngeal angiofibroma. Most often biopsy is not done as it is highly vascular but a biopsy done as in our case confirms the diagnosis. Three classification systems, used to stage nasopharyngeal angiofibroma are Fisch's, Chandler's and Radowski's adaptation of Sessions' classification are essentially based on the extent of the disease². Various treatment modalities like cryotherapy, sclerosing therapy, hormonal treatment, radiotherapy³, chemotherapy, embolization

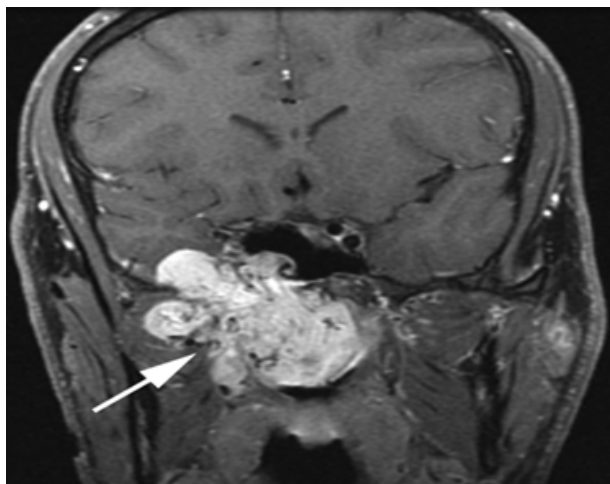


Figure-1: Scan of patient showing stage 4-B.

and surgery^{4,5} are used to treat nasopharyngeal angiofibroma. Since it is rarely seen, there are no standard guidelines available in the literature especially for advanced cases. Essentially treatment depends on the physician preference, available expertise and patient preference. Surgery is used to treat nearly two thirds of the patients. Endoscopic removal is also considered for selected cases with preoperative embolization to control bleeding at the time of removal^{6,7}. Radiotherapy offers a very good local control rate, as high as 80-85% with the tumors regressing very slowly over two to three years. McAfee et al. have reported 91% control with a dose of 30-36 Gy and have not seen any complications of radiotherapy in a follow up of two to five years⁸. Nasopharyngeal angiofibroma with advance stage disease is treated with radiotherapy. Tumors invading cavernous sinus considered inoperable because of bleeding from cavernous venous plexus and potential injury to the internal carotid artery or cranial nerves. Surgical defects in the dura and possibility of uncontrollable cerebrospinal fluid leak. A dose of 36-46 Gy is recommended over a period of 4-5 weeks. Endocrine hypo function, cataract formation and second malignancies, the possible side



Figure-3 : Tumor excised via lateral rhinotomy approach.

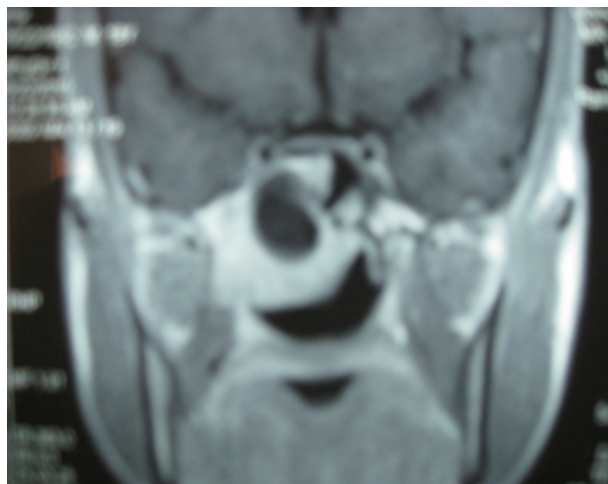


Figure-2: Scans Repeated After Radiotherapy Showing down Staging.

effects of radiation have to be kept in mind⁸ and hence radiotherapy needs to be used only when surgery is not possible or in residual and recurrent lesions. State of art radiotherapy in the form of 3DCRT, IMRT and proton therapy may help to reduce the late radiation toxicities. In this case radiotherapy is used as prime treatment. Patients stage of tumor was changed, making it possible for us to remove it surgically as well.

CONCLUSION: We presented this case of invasive angiofibroma stage 4-b. Which is usually inoperable, but by using the radiotherapy modality the scenario was changed and disease became curable with surgical removal. This benign vascular tumor is having a tendency to invade locally. There are multiple treatment options. In this case we have used the radiotherapy modality to down stage the disease and change the state of patient. By using radiotherapy we find out that inoperable stage of disease became operable.

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Pseudoepitheliomatous Hyperplasia of Tongue Treated by Microdebrider Shaver

Vanita Sarin, Bhanu Bhardwaj, Jaskaran Singh Gill, Baldev Singh

ABSTRACT : PEH is a difficult-to-treat, extreme-degree acanthosis characterized by proliferation of the epithelium. shows the same histopathological features as of epidermal hyperplasia. We present this case report of successful treatment of rare pseudoepitheliomatous hyperplasia of tongue using microdebriders shaver in an 18 year old male. This patient was immunocompetent male with a swelling over the dorsum of the tongue since 10-12 years which started increasing in size and was associated with pain while swallowing and foreign body sensation. Biopsy revealed pseudoepitheliomatous hyperplasia. Curative surgery with microdebrider shaver was successfully performed under general anaesthesia. **CONCLUSION:** Use of microdebrider shaver is safe and effective method in the treatment of difficult to treat cases of pseudoepitheliomatous hyperplasia.

Key Words: Pseudoepitheliomatous hyperplasia, Tongue lesion, Microdebrider shaver.

INTRODUCTION: Pseudoepitheliomatous hyperplasia (PEH) is a difficult-to-treat extreme-degree acanthosis characterized by preparative, hyperplastic process of the epidermis. The histological formation is the outcome of abnormal and reactive epithelial proliferation that occurs in response to underlying infection, inflammatory, neoplastic conditions and chronic cutaneous wounds¹. Conventional therapy for PEH is extensive surgical excision, which can lead to poor cosmetic outcomes, especially when local flaps or skin grafts are required for reconstruction. Topical photodynamic therapy (PDT) offers an alternate non-invasive treatment with good cosmetic outcome for intraepithelial neoplasia and inflammatory dermatosis, such as psoriasis and viral warts²⁻⁴ but have not been found useful in treatment of pseudoepitheliomatous hyperplasia even though these disorders and PEH share similar histological features, namely epidermal hyperplasia³. Both atypical cells and proliferating epithelial cells can selectively concentrate the photosensitizing agents, which may trigger photodynamic reactions or secondary effects.

Microdebrider shaver has been found to be useful in the management of lingual tonsil hypertrophy with minimal bleeding and post-operative pain⁵. However to our knowledge, there has been no clinical trial to date to test the effectiveness of microdebrider shaver in the treatment of PEH. We present this case report of the effective use of microdebriders shaver in treatment of rare PEH of tongue.

CASE REPORT: An 18 year old presented to us with swelling over dorsum of tongue since 10-12 years which gradually progressed in size and was associated with pain while swallowing and foreign body sensation. On examination the dimensions of swelling were 3.5cm x 2.5cm with irregular surface and well defined margins (Fig-1). Biopsy was taken which revealed features suggestive of pseudoepitheliomatous hyperplasia (Fig-4). There was no evidence of malignancy. After an

informed consent, debridement of lesion was done with microdebrider shaver (speed:2400rpm). The lesion was shaved off in layers till smooth and soft surface of tongue was felt (Fig-2). Haemostasis was achieved with bipolar cautery. Post-operative recovery was uneventful. Regular follow up was done for period of 6 months with no evidence of any recurrence (Fig-3).

DISCUSSION: PEH is a type of exuberant proliferation of the epithelium with down-growth into the dermis occurring in a variety of settings. The pathogenesis still remains unclear. The histological features are similar with well-differentiated, invasive squamous cell carcinoma, or may obscure an underlying malignant process, such as melanoma and granular cell tumour. Though there is no standard or optimal treatment; inappropriate invasive modalities such as cryotherapy and CO₂ laser curettage leads to an extension of the lesion area. This clinical case presentation indicates that microdebrider shaver is an effective mode of treatment when applied to PEH. Microdebrider are powered instruments which provide an excellent, safe, and thorough technique in endoscopic nasal surgery and transoral adenoidectomy. They provide atraumatic dissection with minimal bleeding which enables decreased surgical time and faster post-operative healing⁶. Recovery period in the debrider assisted adenoidectomy was shorter than conventional adenoidectomy with faster recovery⁸. With microdebrider complete resection, accurate removal, less collateral damage, less post-operative pain and faster recovery can be achieved¹¹. These factors were associated with an excellent response in treatment of PEH with microdebrider shaver. Various studies have demonstrated that microdebrider was successfully used in the complete clearance of adenoids. Photodynamic therapy (PDT) is being used in the treatment of epithelial neoplastic cells in Acanthotic keratosis, Bowens disease, and squamous cell carcinoma which absorb much more photo sensitizer than normal cells, leading to the



Figure-1: Clinical photograph of the PEH of the tongue.

elimination of the atypical cells. A study on the viral wart showed that PDT using an LED source achieved clearance rates of 81% (mean of 3.34 treatments)⁴. Complete clearance of periungula hand warts in 18 of 20 patients (30 of 40 warts) was achieved in a pilot study of PDT with Amino Levulinic Acid after a mean of 4.5 treatments⁷. PDT leads to the release of inflammatory mediators, like interleukin², interleukin 1- β , and tumour necrosis factor α , suggesting that another mechanism for the clearance of these cells is in the indirect stimulation of local immune responses in the lesion area. Although the PDT parameters that were employed for the viral wart or the epithelial neoplasm were also used for PEH, it responded poorly. This suggests that the lack of effectiveness of PDT could be attributed to the peculiar pathological pattern, not to the neoplastic or inflammatory epithelial proliferation of PEH. Another possibility for the lack of response of PDT is the thickness of the skin keratin layer in PEH. A previous study showed that two precancerous lesions, oral verrucous hyperplasia and oral leukoplakia, responded well to

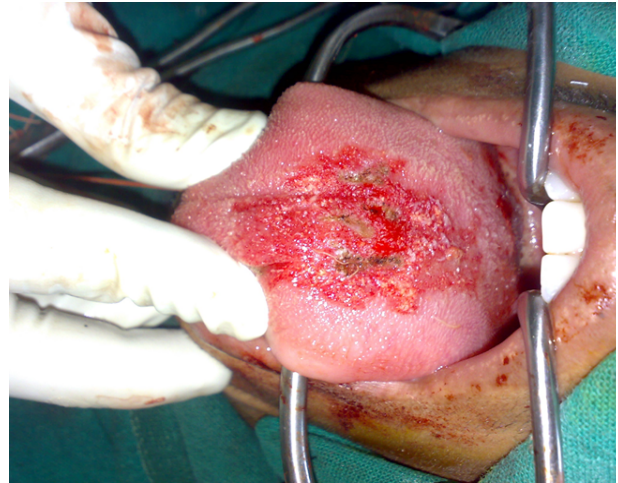


Figure-2: Photograph after removal of lesion by microdebrider shaver.

topical 20% Amino Levulinic Acid-PDT; all 8 oral verrucous hyperplasia lesions achieved complete recovery, 8 of 24 oral leukoplakia lesions showed complete recovery¹⁰. The major difference between PEH and oral verrucous hyperplasia or oral leukoplakia is the thickness of oral mucosa and the cutaneous surface keratin layer. Oral leukoplakia or oral verrucous hyperplasia lesions with a thinner keratin layer achieved complete recovery, which enabled more amino levulinic acid to diffuse into the tumour tissue¹⁰. This indicates that the poor response is associated with absorbance of the photosensitizing agent in PEH, not with the illumination dose. However with use of microdebrider shaver there was no such limitation and lead to complete removal of PEH. Nevertheless, large retrospective comparative follow-up study will be required for the re-confirmation of the successful use of microdebrider shaver in case of rare PEH of tongue.

CONCLUSION : This case report suggests that microdebrider shaver is effective and powerful mode of treatment of PEH of tongue.



Figure-3 : Photograph after 6 months of surgery.

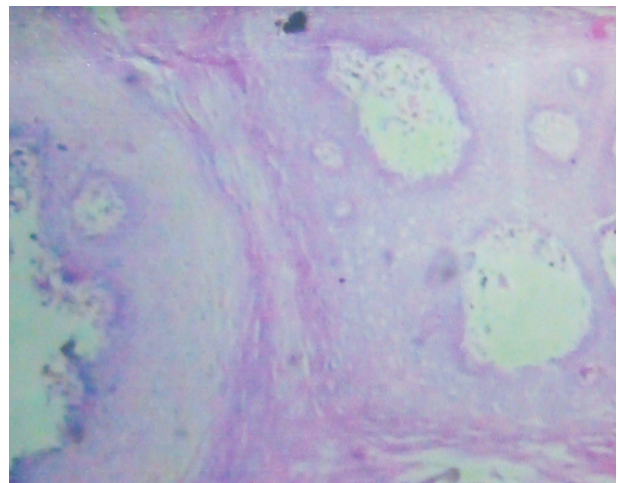


Figure-4 : H & E stained section shows hyperplastic stratified squamous epithelium which is thrown into long ridges and forming meshwork at places

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Candida Albicans Retropharyngeal Abscess

Zalilah Musa, Irfan Mohamad, Khairul Bariah Johan, Azian Harun

ABSTRACT: Retropharyngeal abscess is a potentially lethal deep neck infection, which is usually caused by anaerobes, Gram positive and Gram negative organisms. It is a disease of children in whom over 95% occur in children aged less than 6 years old. It is rare in adult but the frequency is increasing nowadays. However the mortality incidence is less due to advent of antibiotics. Fungal agents are rarely associated with such infections. We report a rare case of retropharyngeal abscess in a 60-year old adult with diabetes mellitus in whom *Candida Albicans* was the implicated pathogen.

Key Words: Retropharyngeal abscess, Adult, *Candida albicans*.

INTRODUCTION: Retropharyngeal abscess is a potentially sinister deep neck infection especially among immunosuppressed individuals such as in diabetes mellitus patients. It is because of the suppressed immunity status, which makes them prone to develop serious complications such as mediastinitis and jugular vein thrombosis. Bacteria are by far the commonest organism involved in the pathogenesis. Anaerobes, aerobes and Gram negative organisms were usually identified on culture of the drained pus. The commonly isolated organisms include Group A Beta-hemolytic streptococci and *Staphylococcus aureus*^{1,2}. Fungal agents were rarely reported as a cause of retropharyngeal abscess.

CASE REPORT: A 67 year old Malay male with underlying diabetes mellitus on medication presented with complaint of difficulty in swallowing for two weeks. He had odynophagia and was unable to tolerate solid food and even fluids. It was associated with the presence of left neck swelling which was noticed one week prior to admission. He claimed that the swelling was increasing in size. A day prior to admission, he had coughed out yellowish pus mixed with saliva. He denied hoarseness of voice and breathing difficulty. There was no loss of appetite and no loss of weight. Clinical examination

showed a medium built man who appeared to be comfortable in supine position. He had no drooling of saliva and no respiratory distress. Blood pressure recording was 110/80 mmHg, pulse rate was 80 beats per minutes and he was afebrile. There was a diffuse left lateral neck swelling which extended to the anterior part of neck (Figure 1a and 1b). It was tender, warm and fluctuant. There was no trismus. Oropharyngeal examination revealed an erythematous and bulged posterior pharyngeal wall with uvula deviation to the right side. The patient was edentulous and oral hygiene was fair. Laryngoscopic examination revealed a bulged area over the right pyriform fossa with pooling of saliva and pus. Epiglottis was normal while vocal cords were not visualized. Blood investigation showed total white blood cell count of 8.3×10^9 /L and hemoglobin level of 12.9 g/dl. Blood sugar level was 7.2 mmol/ L. Tuberculin test was negative. Lateral soft tissue neck x-ray revealed widening of prevertebral soft tissue at level C1 to C7 with presence of air pockets (Figure 2). A computed tomography (CT) scan showed presence of an ill defined thin rim-enhancing hypodense collection (Figure 3a and 3b). The lesion involved retropharyngeal region extending into prevertebra space from level C1 to T4/T5 causing bulging into oropharynx, which consequently resulted



Fig.-1a & 1b: Fullness at left lateral part of neck which extends anteriorly.



Fig.-2: Lateral soft tissue neck x-ray showing widening of soft tissue of prevertebral area with area of lucency indicating air content.

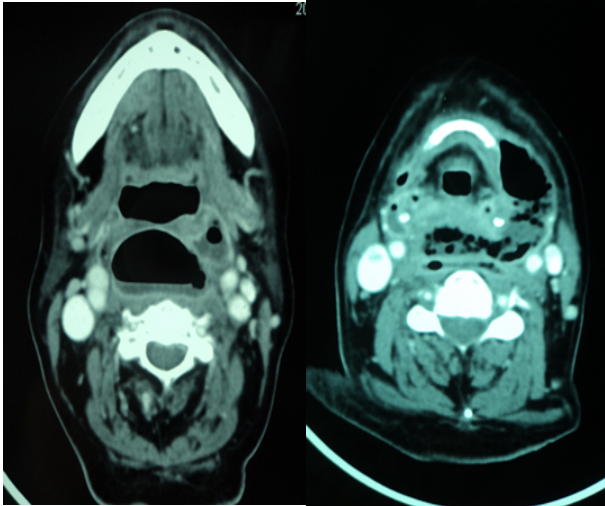


Fig.-3a & 3b: An extensive neck space abscess involving retropharyngeal and prevertebral region.

in mild narrowing of lumen. The diagnosis of retropharyngeal abscess was made and the patient was started on intravenous (IV) Ceftriaxone 1 g bd, IV Metronidazole 500 mg tds and IV Cloxacillin 1 g qid. Incision and drainage was performed via both external and internal approach. From external incision 2 cm below angle of mandible, there was collection of yellowish thick pus posterior to strap muscle at left side of neck which continues up to left pyriform sinus and posterior pharyngeal wall (Figure 4). Thirty milliliter (mL) of thick pus was drained out. Intraorally another vertical incision was given at the most bulging area at posterior pharyngeal wall from which 3 mL of thick yellowish pus was drained. The pus specimens were sent for microbiological investigation. Patient was put on nasogastric tube for feeding. After two days, the pharyngeal wall bulge subsided. Culture results revealed pure growth of yeast which was later identified as *Candida Albicans* (Figure 5). No other bacteria including anaerobes, was isolated from the specimens. Examination for acid fast bacilli was also negative. He was started on oral Fluconazole 200mg daily. A repeat CT scan was done which showed no recollection of pus. The nasogastric tube was removed as the patient was able to tolerate orally well. He was discharged with oral fluconazole 200mg once daily for a complete course of two weeks. **DISCUSSION:** Retropharyngeal abscess is a deep tissue neck infection which can be life threatening. The anatomical location of the space increases the likelihood of developing upper airway obstruction, descending mediastinitis and jugulo venous thrombosis. Retropharyngeal abscess among adults is more common in males than in females with percentage of males being affected is around 60%². Retropharyngeal abscess occurs mainly during infancy and childhood in whom 90% of cases occur before the age of 6 months.². In children it is frequently associated with viral upper respiratory infections, pharyngitis and otitis media. All these infections cause adenopathy of retropharyngeal lymph

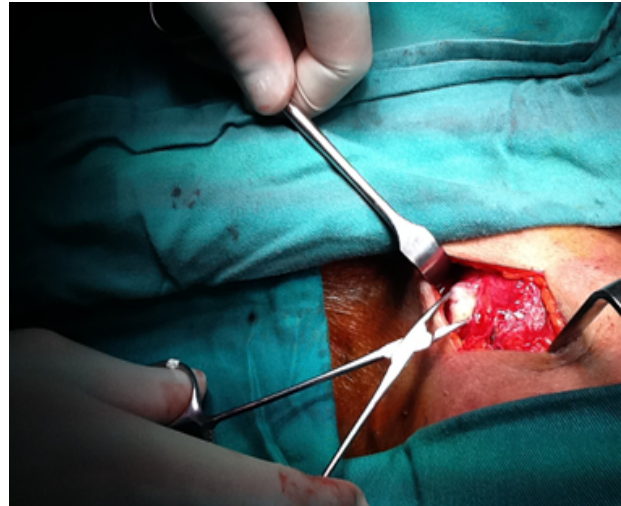


Fig.-4: Pus coming out from underneath strap muscle originated from retropharyngeal region intraoperatively.

nodes and suppuration which gives rise to retropharyngeal abscess formation^{1,2,3}. The facts that these lymph nodes regress in childhood may account for low incidence of disease in adults^{2,4}. Majority of patients present with symptoms of sore throat, dysphagia or neck pain as seen in this patient^{1,2}. Only a minority of patient presented with airway obstruction. Compared to children, majority of adult retropharyngeal abscess also have history of intraoral procedures, trauma, hypopharyngeal foreign body or odontogenic infection^{2,5}. In our patient, the predisposing factors were old age and diabetes mellitus, which is associated with immunocompromised status. The predominant organisms grown from these abscesses are Group A Beta-hemolytic streptococci, *Staphylococcus aureus*, *Hemophilus influenza* and anaerobic cultures commonly are *Bacteroides*, *Peptostreptococcus* and *Fusobacterium* species^{1,2}. In the present case, a rare occurrence *Candida Albicans* was noted. This patient is an elderly diabetic patient who also faced with senescence of immune system that can alter his host defence mechanism which predisposes him to any type of infection, including invasive Candidiasis. *Candida* spp. have been reported to cause fungal infections in humans, ranging from non life threatening mucocutaneous diseases to invasive diseases that can involve any organ⁶. *Candida Albicans* occur naturally as a commensal of mucous membranes and the digestive tract. *Candida Albicans* are present in oral cavities of 15 to 75% of population⁷. The fungus, which is normally a harmless, is associated with root caries and has been observed in patients with infected gingival crevices⁸. In our patient, *Candida Albicans* might have invaded the oral mucosa and persist within the epithelium causing superficial lesions. These infections reach the retropharyngeal region through the loose connective tissue planes between muscles of neck. One major route is via lateral pharyngeal space to retrovisceral space⁹. Life threatening complications following retropharyngeal infections due to *Candida. Albicans* such as descending

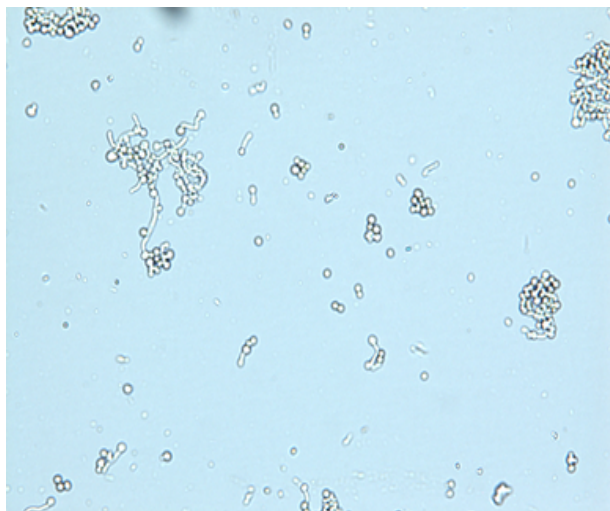


Fig.-5: Candida Albicans grown on corn meal agar slide culture (X400 magnification).

mediastinitis have been reported¹⁰. Other complications that can occur are airway obstruction, septicemia and aspiration pneumonia. Diagnosis of retropharyngeal abscess is mainly on clinical grounds along with supportive imaging study. Lateral soft tissue X-ray of neck appeared to be the single most valuable investigations in evaluation of retropharyngeal space as evidenced by study conducted over 23 patients in Singapore General Hospital¹¹. Plain radiograph showed widened prevertebral soft tissue on lateral view of neck. Wholey et al. in his study among adults and children in 1954 concluded that measurement greater than 7mm at C2 and 22mm at C6 are abnormal and strongly support retropharyngeal abscess¹². CT-scan and MRI of neck can differentiate abscess from simple cellulitis and other cause of retropharyngeal swelling². It does not only confirm the diagnosis but more importantly it is able to localize the involved area and facilitate the intra-operative approach. For the management of candidiasis, Clinical Practice Guidelines by the Infectious Diseases Society of America 2009 stated that the typical intravenous dosage of Amphotericin B deoxycholate at 0.5-0.7 mg/kg daily is used for invasive candidiasis but dosage as high as 1mg/kg daily should be considered for invasive Candida infections caused by less susceptible species like Candida Glabrata and Candida Krusei. For patients with invasive candidiasis, fluconazole should be administered with a loading dose of 800 mg (12mg/kg) followed by a daily dose of 400 mg (6 mg/kg); a lower dosage is required in patients with creatinine clearance < 50 mL/min¹³. The introduction of triazoles like fluconazole has been an important contribution for treatment of this disease¹⁴. As in this patient he was initially started on IV metronidazole 500 mg tds, IV ceftriaxone 1 g bd and IV cloxacillin 1 g qid. Once the culture revealed growth of

Candida Albicans, oral Fluconazole 800 mg loading dose was given followed by 400 mg once daily was commenced and continued for two weeks. Urgent surgical drainage is mandatory to eradicate the abscess. Access to the retropharyngeal space can be through an external transcutaneous incision anterior to sternocleidomastoid muscle or transoral approach by making a longitudinal incision on the pharyngeal wall¹⁵. On rare occasion both approaches are used as seen in this patient. Choice of drainage is actually depend on location of the abscess. External transcutaneous approach can also allow drainage of lateral pharyngeal space and to some extent the submandibular and sublingual region. Thus it is used when retropharyngeal abscess spread to these regions. The external incision also enables inspection of carotid sheath and contents for possible erosion. Sometimes external approach is used if early recurrence occurs or if abscess does not resolve rapidly with transoral drainage. In this patient as the abscess was extensive, both approaches were used for drainage.

CONCLUSION: Retropharyngeal abscess is one of the serious deep tissue neck infections. It can be caused by various types of organisms depending on source of infection. A rare case of an immunocompromised adult with underlying diabetes mellitus having Candida Albicans retropharyngeal abscess is reported.

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(F) **RESULTS** should include precise findings without comments with the help of tables, figures and charts numbered in sequence as appeared in text.

(G) **DISCUSSION** including comment on results and its relation to those of other authors. Arguments should be well founded and rephrased to avoid plagerism.

(H) **REFERENCES** should be numbered consecutively in order in which they are first mentioned in the text. All references should confirm to the style of uniform requirements for manuscripts submitted to biomedical journals in Voncouvr style eg, JAFARY NA, ZAIDI SH: Cancer in Pakistan; Journal of Pakistan Medical Association, 1987; 37: 178-183. For books: Medical Ethics in the contemporary era. Editors: S.H. Zaidi, Maqbool H. Jafri, Unaiza Niaz Anwar; Shaukat Ali Javed. Publishers: The Royal Book Company, Pakistan medical Journalist Association, Karachi.

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