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Saliva as Diagnostic Biofluid

Iqbal A. Muhammad Khyani

Disturbance in health status is due to changes in body's ecosystem. These changes are responsible for producing symptoms and signs and are reflected as bio-chemical changes in the biological fluids and tissues of the body. Historically, systemic diseases are diagnosed by reported symptoms, history, examination and bio-chemical analysis of the body fluids like blood, serum, urine and CSF etc. Tissue scraping and biopsy materials are used for cytological, histopathological and molecular diagnosis. Obtaining majority of these specimens is invasive with mental stress, physical discomfort and psychological implications for most of the patients and technique limitation for professionals.

The ability to monitor health status, disease onset, progression and treatment outcomes through non-invasive means is the most desirable goal in the health care promotion and delivery. Recently, saliva has been used as prospective diagnostic biological fluid (biofluid) by analyzing metabolomics, microbiotomics, genomics, proteomics and salivary transcriptome¹.

As a biological medium, saliva is a variable and complex fluid and is mostly produced by three pairs of salivary glands (Parotid, submandibular and sublingual) with small contribution from minor salivary glands. It is an important component for speech, digestion of food and protection from micro-organisms. It also gives useful information which can be translated and utilized for diagnosis, monitoring and management of the patients with oro-dental, pharyngeal and systemic diseases. It is now possible to obtain similar or identical information in saliva for clinical practice as from other bodily fluids. It represents an increasingly useful auxiliary means of diagnosis².

Oral fluid (Saliva) meets the demand for non-invasive, easily accessible bio-fluid of the human body that nurtures a wide spectrum of biological analytes informative for clinical diagnostic application. It is like body's mirror and is multi-constitutional promising diagnostic fluid that reflects loco-regional and systemic diseases or wellbeing.³ It has got many advantages as a clinical tool over serum, plasma or tissue including simplicity of its collection, storage and shipping, cost effectiveness, easy to get larger volume of samples and real-time repeated sampling. Its procurement is non-invasive that is stress free and reduces patient anxiety and discomfort. It is easy and safe to handle; thus reducing manipulation for biochemical analysis. It is supposed to be the ultra-filtrate of serum / blood having abundance of biochemical information and biomarkers ranging from genome, proteome, transcriptome, mRNA, metabolome and microbiotome which are concordantly present in saliva that may exhibit footprints of developing or existing loco-regional or systemic pathophysiology⁴. It has been categorized as an ideal diagnostic gadget with enormous translational values and unparalleled opportunities for clinical application. It is also useful to unveil the morbidity signatures in early stage⁵. Oral fluid is the perfect medium to be explored for health and disease surveillance⁶. Salivary diagnosis has now become a novel dynamic and sophisticated field that is being partially incorporated as part of screening, disease diagnosis, monitoring and decision making^{7,8}.

There are ample evidences that compel us to use saliva as diagnostic fluid. A great need exists for this convenient and accurate point-of-care diagnostic gadget to be used in wide spread clinical applications. This is of particular relevance in the developing countries like Pakistan, where many health risks and illnesses remained poorly defined.

Advancement in micro-fluidic and biotechnology coupled with novel research outcomes in bioengineering and information technology yielded an advanced insight in salivary diagnostics. Consequent upon a recent visionary investment by National Institute of Dental and Craniofacial Research (NIDCR) of United States for the programme of development and validation technologies for saliva based diagnostics, engineers and scientist are now able to develop portable point-of-care diagnostic platform based on nanotechnology and micro fluidic techniques for rapid detection and analysis. It is based on micro fluidic techniques combined with other advanced cutting-edge technologies in biochemical, bionanotech, bioelectrical, molecular and computerized bio-information statuses, worked on the principles of adaptation, miniaturization, integration, amplification and automation of analytical laboratory procedures into a single device or chip.

Oral Fluid Nano Sensor Test (OFNASET) is a state of art hand held automated saliva based device which has revolutionize the field of salivary diagnostics. This point-of-care electrochemical saliva based biosensor platform with mini-Lab-on-chip technique, developed recently, is giving promising results for multiplexed salivary diagnosis. The availability of this robust, simple to use, saliva based electrochemical biosensor is a couple of years ahead, for its wide spread use as saliva based clinical diagnosis and screening.

In Pakistan, salivary diagnosis is in toddler stage. Studies are underway or nearly completed at many centers which going to serve as role model and will spark new avenues for the initiation and development of salivary diagnosis in our region. Considerable excitement exists to envision Saliva based diagnosis as a clinical reality in our population.

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Oral Carcinoma : Role of Neck Dissection in N₀ Nodes

Muhammad Ance Anwer, Shakil Aqil, Maisam Abbas Onali, Uzma Tanveer

ABSTRACT: OBJECTIVE: To study the role of extent of an elective neck dissection in patients presenting with oral squamous cell carcinoma and clinically negative neck nodes. **RATIONALE:** With the increasing incidence of oral squamous cell carcinoma in our part of the world, different surgical modalities are being practiced to address one of its major poor prognostic factors – the cervical lymph node metastasis.

The purpose of this study is to find out the extent to which the elective neck dissection can be outlined in clinically negative neck patients. An extent which provides an adequate access to the involved lymph nodes, as well as which results in minimal post-operative morbidity. **STUDY DESIGN:** Retrospective study. **PLACE AND DURATION OF STUDY:** Department of Otolaryngology – Head and Neck Surgery, Liaquat National Hospital and Medical College, Karachi, from January 1995 to December 2013. **METHODOLOGY:** Medical records reviewed of patients who underwent excision of primary tumor of the oral cavity primarily tongue, cheek and retromolar trigone combined with an ipsilateral neck dissection. All patients who had primary squamous cell carcinoma greater than 2 cm with clinically negative neck nodes were included in the study. Post-operative histopathology was reviewed comparing the outcome of disease metastasis to various neck levels. **ETHICAL CONSIDERATION:** All the records were reviewed with the permission and under the supervision of the head of the department. **RESULTS:** Out of 95 patients in the study, 47 were T₂ tumors, 27 were T₃ tumors, and 21 were T₄ tumors. For T₂ tumors, 19 patients (40.42%) had neck metastasis; for T₃ tumors, 14 patients (51.85%); and for T₄ tumors, 18 patients (85.71%) had neck metastasis on final histopathology. All histological positive nodes in the neck were from level 1 to 3 with only tongue primary showing some skip metastasis to level 4 and overall there was zero metastasis to level 5. **CONCLUSION:** All patients presenting with T₂ or above oral carcinoma with a clinically negative neck should undergo a selective neck dissection which can be extended to include level 4 for advance stage primary tumors of the tongue. Modified radical neck dissection is not indicated due to negligible rates of level 5 involvement.

Key Words: Neck Dissection. N₀ neck. Oral carcinoma.

INTRODUCTION : Oral cavity squamous cell carcinoma is the most common head and neck cancer, accounting for approximately 3% of all newly diagnosed cancer cases, and the incidence is increasing due to the prevalence of cigarette smoking, alcohol drinking and betel nut chewing^{1,2}. Radical surgery with or without adjuvant chemo-radiation is the primary treatment of resectable oral cavity squamous cell carcinoma³. But, despite recent advances in surgical, radiotherapy and chemotherapy treatment protocols, the long-term survival of patients with oral cavity squamous cell carcinoma has remained almost unchanged over the past decade⁴. These unsatisfactory results and lack of improvement are explained mainly by the finding that oral cavity squamous cell carcinoma are associated with a high probability of cervical lymph node metastasis, historically regarded as the major poor prognosticator⁵⁻⁷. The classical approach to clinically palpable metastatic lymph nodes has been radical neck dissection⁸. However, given a clinically negative neck, the incidence of occult lymph node metastasis in patients with squamous cell carcinoma of the oral cavity varies in terms of size, thickness and

extent of the primary site^{9,10}. Most head and neck oncologists agree that a patient with a predicted rate of occult lymph node metastasis >15% to 20% should have either surgery or radiotherapy, rather than observation¹¹. This approach has been supported by studies that have shown histological positive nodes at levels 1 to 3 independent of the extent of neck dissection, and negligible rates of level 5 involvement¹². Surgical treatment of neck metastasis has evolved to provide oncologic efficacy while minimizing treatment-associated morbidity. Radical neck dissection involves not only resection of level 1 to 5 lymph nodes of the neck but also the tail of the parotid, submandibular gland, sternocleidomastoid muscle, internal jugular vein and spinal accessory nerve. It is a safe oncological surgical procedure that significantly reduces the risk of regional recurrences, however it produces significant post-operative morbidity, mainly shoulder dysfunction. The modified radical or functional neck dissection with preservation of at least 1 of the 3 components was shown to have equal oncologic efficacy and decreased morbidity when non-lymphatic structures were not grossly involved

with squamous cell carcinoma¹³. Greater understanding of the specific lymphatic spread of upper aerodigestive tract squamous cell carcinoma has allowed development of a therapeutic procedure termed selective neck dissection in which only lymph nodes at greatest risk of metastasis are resected¹⁴. Supporting this approach, is good prognosis even with clinically a single ipsilateral neck level 1 or 2 (N₁) metastasis¹⁵. In South East Asia, oral cancer is mainly due to use of betel nut and chewable tobacco (gutka) and these cancers tends to be more aggressive at the primary site¹⁶. The approach to treat the neck when clinically negative in such tumors is still not clear and, therefore surgeons here are subjecting patients to various forms of treatment ranging from selective supra-omohyoid to functional and radical neck dissections with variable outcomes¹⁷. In our region, treating occult neck node metastasis continues to be a matter of debate.

METHODOLOGY: It is a retrospective study . We have reviewed medical records of patients treated for oral squamous cell carcinoma with an elective neck dissection by one consultant surgeon at the department of Otolaryngology – Head and Neck Surgery, Liaquat National Hospital and Medical College, Karachi, from January 1995 to December 2013. Inclusion criteria included patients who had primary tumor greater than 2 cm i.e. T₂, T₃, T₄ with N₀ neck clinically. The neck was documented to be carefully palpated, however, difficult in patients who were obese or had thick, short necks. In cases where clinically the neck was negative, but the CT scan report showed nodes with central necrosis or evidence of metastasis were excluded. A total of 102 charts were reviewed, 1 patient had a non-squamous cell carcinoma on final histopathology and was excluded, and complete details of 6 patients could not be retrieved from the charts and were also excluded leaving a total of 95 patients in the study. All surgeries were performed by the same consultant surgeon. Specimens were sent to the histopathology department at the same institution and post-operative histopathology was reviewed and compared. Data was entered into a proforma with variables regarding basic patient details as well as the primary site and size of the tumor, surgery performed and pathological grading with neck node positivity. Categorical features were summarized with frequency counts and percentages. Data was analyzed by tabulating the variables and comparing the final neck node status with the primary tumor.

RESULTS : A total of 95 patients were enrolled in this study. The age range was from 26 to 86 (mean 56). Of these, 58 were male (61.05%) and 37 were female (38.94%). Out of these 95 patients, the tongue primary was seen in 47 patients (49.47%); cheek primary in 41 patients (43.15%); and primary in retromolar trigone in 7 patients (7.36%) (Table 1). In patients with tongue primary, all included cases had tumor originating along the lateral border with none showing extension across the midline. The patients underwent an ipsilateral neck dissection in each case. Frozen sections were sent during surgery if there was suspicion of neck nodal extension.

Variables	Frequency	Percentage
GENDER		
Male	58patients	61.05
Female	37patients	38.94
SITE		
TONGUE	47(total)	49.47
T ₂	32	33.68
T ₃	10	10.52
T ₄	5	5.26
CHEEK	41(total)	43.15
T ₂	14	14.73
T ₃	12	12.63
T ₄	15	15.78
RETROMOLAR	7(total)	7.36
T ₂	1	1.05
T ₃	5	5.26
T ₄	1	1.05

Table-1 : Demographic data, and primary site and size of tumor.

Variables(site)	Frequency(positive node)	Percentage
TONGUE	19	40.42
Level 1	12	25.53
Level 2	9	19.14
Level 3	8	17.02
Level 4	3	6.38
Level 5	0	0
CHEEK	16	39.02
Level 1	10	24.39
Level 2	6	14.63
Level 3	4	9.75
Level 4	0	0
Level 5	0	0
RETROMOLAR	6	85.71
Level 1	6	100
Level 2	5	83.33
Level 3	3	50
Level 4	0	0
Level 5	0	0

Table-2 : Final histopathological grading with neck node positivity.

Of the 32 patients having T₂ tongue tumor, 28 underwent supra-omohyoid neck dissection and 4 underwent modified radical neck dissection. Out of 10 patients having T₃ tongue tumor, 6 underwent modified neck dissection while the remaining 4 had selective neck dissection. All 5 patients having T₄ tongue tumor underwent modified radical neck dissection. It was observed that in patients with T₂ tongue tumor only 7 out of 32 patients had positive neck node status in final histopathology while the remaining were consistent with the clinically negative neck. In patients with T₃ tongue tumor 7 out of 10 had positive nodal metastasis in neck. All patients with T₄ tongue tumor revealed positive nodal metastasis on final histopathology. It was noted here that patients with advanced tongue tumor did reveal some skip metastasis to include level 4, but none at level 5 (Table 2) . There were 41 patients who presented with a cheek primary and a clinically negative neck. Lip was not involved in any of the cases documented. Out of these, 14 were T₂ of which 12 underwent supra-omohyoid neck dissection and 2 underwent a modified radical neck dissection. There were 12 patients who had a T₃ primary lesion of which 5 had supra-omohyoid neck dissection and 7 underwent a modified radical neck dissection. All 15 patients with T₄ tumor had a modified radical neck dissection. On final histopathology, 16 out of 41 patients had tumor metastasis in neck nodes. Here no skip

metastasis was appreciated to level 4, and neither did the patients with a cheek tumor irrespective of the stage have any nodal metastasis to level 5 (Table 2). The patients with a primary in the retromolar trigone were only 7 in number of which only the one staged T₂ underwent a supraomohyoid neck dissection. Rest of the patient all had a modified radical neck dissection. On final histopathology, again the T₂ primary was the only one consistent with the clinically negative neck. The T₃ and T₄ tumors revealed positivity for nodal metastasis, but remarkably none to either level 4 or 5. (Table 2) Overall, in our patients with oral cancer there were 47 patients with T₂ tumors, 27 with T₃ tumors and 21 with T₄ tumors. Of these, 19 of the T₂ tumors revealed nodal metastasis (40.42%), 14 of the T₃ tumors (51.85%) had positive necks whereas 18 patients with T₄ tumors (85.71%) had cancer metastasizing to the neck.

DISCUSSION : Most tumors in oral cavity subsites have a comparably high propensity to metastasize to regional lymph nodes in the neck¹⁸. Currently, the neck is staged by palpation and various imaging techniques, including ultrasound, computed tomography (CT), and magnetic resonance imaging (MRI), which are more accurate than palpation alone. But, up to one-third of nodal metastasis in patients with oral squamous cell carcinoma are smaller than 3 mm, which is a detection threshold that limits the sensitivity of available imaging techniques¹⁹. This low sensitivity of currently available diagnostic modalities is a problem, because a high proportion (<30%) of lymph node metastasis is left undetected in this population. These metastasis will develop into overt neck disease during follow-up¹⁸. The controversy revolving around selecting patients for an elective neck dissection focuses mainly on four issues – the need for elective treatment, selection of patients requiring this intervention, the type of intervention to be used, and the benefit of any such intervention to the disease outcome. Three management options exist so far for N₀ patients who are determined to be at significant risk of occult metastasis. First is clinical observation (watch and wait policy), which reserves neck dissection for those patients who develop regional metastasis subsequent to treatment of the primary tumor. Elective neck irradiation comes second and it delivers a tumoricidal dose of radiation to the cervical lymphatics. Elective neck dissection is the third option. Patients who develop regional metastasis during a program of clinical observation are estimated to be 50 to 59%²⁰. Regional recurrence rates after treatment of clinically N₀ patients are 2.0 to 8.0% for elective neck irradiation and 2.0% to 11.0% for elective neck dissection²¹⁻². Now the choice between selecting between these two modalities of treatment is factored on important differences, including the length of time required for treatment, the comparative cost of treatments, and the increased morbidity associated with post-irradiation surgery if later required. In principle, the indication of neck dissection in oral cancer is a problem of risk-benefit evaluation between the probability of neck metastasis, the probability of complications associated with neck dissection and the

possible prognostic influence of late diagnosis of metastasis during follow-up. The problem could be solved if it were possible to predict the risk of neck metastasis. However, this type of prediction has been difficult to introduce and apply in clinical practice²³. Davidson et al estimated the accuracy of supra-omohyoid neck dissection in detecting regional metastasis to be 98% with a sensitivity of 95% and specificity of 100%, making it currently the best modality for detecting cervical metastasis²⁴. Our study does have limitations. The retrospective design makes it susceptible to the limitations of such analysis. There was also some heterogeneity of treatment approach. Given the relatively aggressive nature of malignant disease, surgeons should always use their clinical judgment when deciding to be more or less selective in a neck dissection and adjust accordingly after considering the individual case, the patient's expected tolerance of surgical morbidity, and the aggressiveness of the tumor. This surgical series includes advanced stage disease which was offered post-operative chemotherapy plus radiotherapy for treatment of positive margins, extracapsular spread, and multiple positive lymph nodes.

CONCLUSION : This study is an observation of patients undergoing selective and modified radical neck dissection in oral cancers with clinically negative neck. We have noted that in patients with advanced, node-negative, oral squamous cell cancer, the rate of occult metastasis is alarmingly high, yet a supra-omohyoid or selective neck dissection is adequate and inclusion of level 5 neck nodes has not shown any advantage in terms of finding micrometastasis. As mentioned earlier, a small number of skip metastasis to level 4 is from primary tumors of the tongue mainly. This, however, does not take into account the final outcome i.e. recurrence or disease-free survival.

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Impact of Intra-operative Intravenous Administration of Ketamine, Fentanyl or Propofol in Decreasing Pediatric Post-tonsillectomy Emergence Agitation

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Mustafa Rafeeq Khalil, Hazem Alkhaldi

ABSTRACT: **OBJECTIVE :** To evaluate the frequency of emergence agitation after tonsillectomy in children administered ketamine, fentanyl or propofol during surgery. **STUDY DESIGN:** Prospective, doubleblind study. **PLACE AND DURATION:** Queen Rania Hospital for children KHMC, Amman, Jordan from April 2012 to April 2013. **SUBJECTS AND METHODS :** Our study included 273 children patients, of both sexes, aged 3-11 years, classed I by the American society of anesthesiologists and scheduled for tonsillectomy under general endotracheal anesthesia. Patients received intravenous induction of anesthesia using fentanyl 2 mcg/kg, propofol 2 mg/kg and traciurium 0.5mg/kg, after which a proper endotracheal tube size was secured through which a mixture of nitrous oxide/oxygen with 1 MAC of isoflurane was delivered. At the end of surgical procedure, patients received in a random fashion an intravenous dose of either ketamine 1mg/kg (GI, n=93), fentanyl 1 mcg/kg (GII, n=89) or propofol 1mg/kg (GIII, n=91). Incidence and intensity of post-operative emergence agitation was assessed using the five-step emergence agitation scale where; 1 meant obtunded with no response to stimulation, 2 meant asleep but responsive to movement or stimulation, 3 meant awake and responsive, 4 meant crying and 5 meant thrashing behavior that requires restraint. The patient scale of more or equal to 4 was considered as having emergence agitation. The frequency of emergence agitation was analyzed statistically using Chi-square test. Significant P-value was considered if it was <0.05. **RESULTS:** Post-operative emergence agitation was 4.4% in propofol group, 5.6% in fentanyl group (P>0.05) and 13.97% in ketamine group (P<0.05). **CONCLUSION:** The incidence of postoperative emergence agitation was significantly less in groups using intraoperative fentanyl or propofol compared to group using ketamine. **Key Words :** Intra-operative, Intra venous Fentanyl, Ketamine, Propofol, Seroflurane, Paediatric, Post-tonsillectomy, Emergence agitation.

INTRODUCTION: Post-operative emergence agitation is also called post-operative emergence delirium and it is a recognized phenomenon happening in children and adults in the immediate post-operative period. It is a dissociated state of consciousness in which the child is inconsolable, irritable, uncompromising or uncooperative, typically thrashing, crying, moaning or incoherent. Additional paranoid ideation has been found with these behaviors. Children with this disorder cannot recognize familiar and known objects. Pediatric post-operative emergence agitation is a frequent hazard. The use of sevoflurane as an inhalational agent in children was associated with a frequency of about 80%. Post-operative emergence agitation in children can be diagnosed by having excitation, disorientation, delirium and crying¹. Post-operative emergence agitation is a self-limited condition with no permanent impacts on child's behavior. Nevertheless, post-operative emergence agitation can lead to self-assault causing psychological injury to relatives and medical persons². Although generally self limiting (5-15 min), it can be severe resulting in physical distress to child. It is not a new phenomenon. The incidence of post-operative emergence agitation in all surgical patients is 5.3% with a more frequent incidence in children (12-13%). There were different protocols in

the hope of reducing the frequency and intensity of post-operative emergence agitation including perioperative drug administration, modification of maintenance of anesthetic method and administration of pre-operative sedative³. Administration of peri-operative drug scan be considered the most suitable clinical technique because it doesn't depend on the duration of anesthesia or the type of anesthetics administered during induction and maintenance of anesthesia⁴. Reduced doses of fentanyl 1 mcg/kg or propofol 1 mg/kg were demonstrated significantly to decrease post-operative emergence agitation if were given peri-operatively⁵. The molecular different mechanisms of these agents may affect various parameters of hazards and recovery^{6,7}. The impacts of reducing the frequency and intensity of post-operative emergence agitation and recovery pattern are variable between propofol, fentanyl and ketamine under similar clinical environments. The aim of our investigation was to evaluate the actions of peri-operative ketamine, fentanyl and propofol administration on post-operative emergence agitation in a pediatric population group scheduled for tonsillectomy.

SUBJECTS AND METHODS : Our prospective, double-blind and randomized study enrolled 273 child patients, of physical status I by the American society of

		Group I	Group II	Group III
N		93	89	91
Sex(no)	M	51	48	54
	F	42	41	37
Age (years)				
Mean(range)		5 (3-9)	6 (3-10)	7(4-11)
Weight(kg)				
Mean(range)		16(15-20)	18(17-22)	20(18-24)
ASA I(no)		93	89	91
Duration of surgery(min)				
Mean(range)		30(25-35)	25(24-30)	35(30-40)

Table-1 : Patient demographics.

	Group I	Group II	Group III
Frequency (no-%)	13(13.97)	5(5.6)	4(4.4)
Scale >or = 4			
Severe intensity(no-%)	8(61.5)	0	0
Scale 5			

Table 2. Post-operative emergence agitation incidence and intensity.

anesthesiologists, of both genders, aged 3-11 years and assigned for tonsillectomy under general anesthesia at Queen Rania Hospital for children, KHMC, Amman, Jordan, during the period of April 2012 to April 2013, after obtaining written informed consent from children's parents and approval from the board review ethics committee of Royal Jordanian medical services. Children with past history of psychological disturbances or on antiepileptic drugs were excluded from our study. Induction of general anesthesia was performed using fentanyl 2mcg/kg, propofol 2mg/kg and traciurium 0.5mg/kg, all via an intravenous line secured by the surgical ward nursing team. After administration of induction agents, a proper endotracheal tube was selected and introduced through which a mixture of oxygen and nitrous oxide (33%-66%) mixed with 1MAC of sevoflurane was given. Anesthesia was maintained using incremental doses of traciurium 0.1 mg/kg if necessary with 1MAC of isoflurane. Monitoring was accomplished using ECG for pulse rate, SPO2 for O2 saturation and ETCO2 for percentage of CO2 in exhaled breathing. At the end of surgery, children patients were randomly divided in 3 groups using sealed envelopes according to the agent administered between propofol, fentanyl and ketamine. Group I patients (n=93) received intravenous ketamine 1mg/kg, group II patients (n=89) received intravenous fentanyl 1mcg/kg and group III (n=91) patients received intravenous propofol 1mg/kg. After removal of the endotracheal tube in the theatre with airway patency, children were transferred to the recovery room where the post-operative emergency agitation was monitored and assessed between the three groups, every 5 minutes after awakening during the first post-operative hour. The frequency and intensity of post-operative emergence agitation was assessed using the five step emergence agitation scale where 1 indicated obtunded with no response to stimulation, 2 indicated asleep but responsive to movement or stimulation, 3 indicated awake and responsive, 4 indicated crying and 5 indicated thrashing behavior that requires restraint. The recorded scale more than or equal 4 was considered as having post-operative

emergence agitation and patients with scale of 5 were considered to have severe post-operative emergence agitation. Awake children patients with stable vital signs were transferred to the surgical ward. Continuous parameters were recorded as mean with standard deviation and post-operative emergence agitation was recorded as numbers and percentages and analyzed using the chi-square test. A P-value <0.05 was considered significant.

RESULTS : There were no significant discrepancies regarding sex, age, duration of surgery and weight (Table-1). The incidence of post-operative emergence agitation was 13.97% in group I (Ketamine). 5.6% in group II (Fentanyl 1) and 4. 4% in group III (Propofol). There were no significant difference ($P>0.05$) between groups II and III regarding post-operative emergence agitation frequency, nevertheless, it was less significantly less as compared to ($P<0.05$) group I. Patients in propofol group had less (but not significant) post-operative emergence agitation than patients in fentanyl group ($P>0.05$). All patients in groups II and III did not have scale 5 post-operative emergence agitation while 8 patients (61. 5%) in group I had severe (scale 5) post-operative emergence agitation. ($P<0.05$) (Table-2).

DISCUSSION : Although the reported incidence of post-operative emergence agitation after sevoflurane anesthesia was 80%, the mean frequency was 34% in other studies⁸. In the same study, post-operative emergence agitation with peri-operative ketamine 0. 5mg/kg administration was 16. 6%⁸, while we used ketamine 1mg/kg. For that reason we had lower incidence of post-operative emergence agitation in our ketamine group. Assumed causes of this condition are misperception of environmental stimuli with paranoid ideation, differing CNS effects, sympathetic activation or psychomotor effect. Our investigation showed that administration of fentanyl 1 mcg/kg or propofol 1 mg/kg at the end of surgery was similar in decreasing the frequency and intensity of post-operative emergence agitation than ketamine 1mg/kg in children patients undergoing tonsillectomy under general sevoflurane endotracheal anesthesia. Different preventive drugs were used to decrease the incidence and intensity of post-operative emergence agitation, such as fentanyl, ketamine, propofol and alpha ² adrenergic agonists ⁴. Until now, the potency of one agent over another is still unknown. A study had demonstrated that propofol or midazolam administration with fentanyl was effective in decreasing the incidence of post-operative emergence agitation, where the action of propofol or midazolam is additive or synergistic with fentanyl which reduces the frequency and intensity of post-operative emergence agitation independently. In the previous study, the final frequency of post-operative emergence agitation in the preventive groups was 15-20%⁹. The analgesic characteristics of fentanyl can reduce the frequency and intensity of post-operative emergence agitation and combination of sevoflurane anesthesia with fentanyl may be used although there is no severe post-operative pain. Another investigation showed that

propofol and midazolam reduced the frequency of post-operative emergence agitation by 40% and the final frequency of post-operative emergence agitation in the preventive groups was 40% also¹⁰. In our study we used a single agent in each group in ENT patients not as the previous two studies which used two agents in each group in eye surgery patients. Aouad MT, showed that a single administration of propofol 1mg/kg at the end of surgery can decrease the incidence of post-operative emergence agitation¹. Post-operative emergence agitation may happen in pain free subjects, and post-operative pain is a major factor of post-operative distress and agitation in children patients. So, the impacts of anesthetic methods on post-operative emergence agitation must be studied in pain free patients post-surgery¹¹. The reduced frequency of post-operative emergence agitation in previous investigations could be due to the administration of midazolam as preoperative premedication and parental presence in the recovery room. It was assumed that rapid emergence with lack of adequate pain control before agitation caused this disorder. The incidence of post-operative emergence agitation after halothane, isoflurane, sevoflurane and desflurane ranges from 2-55%. The disorder is more acutely observed with the increased use of sevoflurane and desflurane that have a rapid emergence profile due to their low blood gas solubility profile. The frequency of post-operative emergence agitation is different according to the type of surgery where it is higher in ENT or eye surgery¹². In our study we did not use a controlled study which we think, is out of our limitations. By limiting the kind of surgery, clear comparison between two drugs can be made without the surgical impact on post-operative emergence agitation. Factors incriminating are younger age, no previous surgery, poor adaptability, eye and ENT surgery, sevo and isofluranes, analgesics and short time to awakening. Agent choice for a specific aim is based on potency and also on side effects. post-operative emergence agitation can be investigated using different scales such as the pediatric anesthesia emergence delirium and Aonos scale. post-operative emergence agitation is associated with adverse events such as increased bleeding at the surgical site, pulling out a drain or an intravenous line and increased pain.

CONCLUSION : Administration of propofol or fentanyl at the end of surgery in children patients undergoing tonsillectomy under sevoflurane anesthesia could decrease the frequency and severity of post-operative emergence agitation.

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Rigid Esophagoscopy - Indications and Complications at Tertiary Care Hospitals of Urban Sindh

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ABSTRACT: **OBJECTIVE:** Aim of the study was to tabulate the indications and identify the various complications of rigid esophagoscopy at tertiary care level hospitals of urban Sindh. **STUDY DESIGN:** Descriptive study. **SUBJECTS AND METHODS:** This study was conducted at the departments of E.N.T. & Head Neck surgery, Liaquat University Hospital Hyderabad, and Abbasi Shaheed Hospital Karachi for a period of one year from July 2012 to June 2013. Out of 234 patients requiring esophagoscopy, rigid esophagoscopy was done in 221 patients of both genders and all age groups either in emergency situation or as an elective procedure, both for diagnostic and therapeutic purposes. All the patients were registered with a definitive protocol filling a pre-designed performa. **RESULTS:** Out of 234 patients, 221 patients were selected for the study. Males were 124(56.1%) and 97 (43.9%) were females. The age range was 2-70 years. Most of the patients 103(46.6%) were in the age group 1-10 years. Maximum 149(67.4%) patients were admitted through emergency. The commonest indication was foreign body in 147 (66.5%) patients, followed by esophageal carcinoma in 38(17.2%) patients. The overall complications were 9(4.1%) including one mortality, one perforation in cervical esophagus and seven minor lacerations of esophageal mucosa. **CONCLUSION:** Suffice is to say that 'Rigid Esophagoscopy' is a time-tested procedure which is utilized safely and effectively both for diagnostic as well as therapeutic purposes. Globally, the documented indications are not exactly the same due to different ecological and cultural norms. The complication rates usually correlate with the conduciveness of the environment during the procedure and experience of the surgeon.

Key Words : Rigid esophagoscopy, Foreign bodies oesophagus, Indications, Complications.

INTRODUCTION : Esophagoscopy is the procedure to visualize the interior of esophagus under illumination. The instinct of the primitive man to visualize the inside of esophagus has grown with the awareness of the problems related to the food passage. Perhaps the initial idea for esophagoscopy was developed in the ancient age some 300 B.C. years ago from the sword swallows of Greece¹. The first really practical esophagoscopy by passing a lighted straight tube down the esophagus was done by Professor Kussumaul of Freisberg in 1868². Nevertheless, it was not until the early 1900s that Chevalier Jackson invented an end-illuminated instrument similar to what is known today as rigid esophagoscope. This has yet remained the primary instrument used by otolaryngologists for diagnostic and therapeutic esophagoscopy³. In 1957, Basil Hirschowitz provided an alternative to the standard rigid esophagoscopy by the introduction of flexible fiber optic endoscope⁴. Currently, both the rigid as well as flexible varieties are being used widely by the otolaryngologists with their own indications and efficiencies for similar or different esophageal conditions⁵. Although the flexible esophagoscopy is well utilized for diagnostic purposes, the rigid system fulfils both diagnostic & therapeutic purposes equally & effectively. Therefore rigid esophagoscopy is the preferred procedure in our setting. The aim of the current prospective study was to highlight various indications with which patients presented to us

for rigid esophagoscopy and also focus on different complications encountered during the procedure in our departments.

SUBJECTS & METHODS: This descriptive study was conducted at the departments of E.N.T. & Head & Neck surgery, Liaquat University Hospital, Hyderabad, Sindh and Abbasi Shaheed Hospital, Karachi from July 2012 to June 2013. Out of 234 consecutive patients, rigid esophagoscopy was done in 221 patients of both genders and all age groups either in emergency situation or within an elective environment, both for diagnostic or therapeutic purposes. All the patients who either had history of dysphagia or had a suspected or clear cut history of foreign body ingestion were included in this study. The exclusion criteria in this study was determined on the basis of the status of patients who either had multiple systemic comorbidities making them unfit for the induction of general anesthesia or those patients having local cervical or thoracic vertebral abnormalities precluding the insertion of rigid esophagoscope. The patients were admitted through outpatient and emergency departments or through referral from other departments or hospitals. All the patients were registered with a definitive protocol with a pre designed performa which included demographic data (like age & gender etc.), presenting features, relevant investigations, details of the performed procedure and any problems or complications encountered during the procedure. Any

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post-operative problems were also noted. Finally all the data was fed into SPSS Version-16 to have the statistical assistance and to create different tables and graphs. **RESULTS :** This prospective study conducted over one year from July 2012 to June 2013. Out of 234 patients requiring esophagoscopy for different indications, 13 patients were excluded from the study following the pre-established exclusion criteria. 221 patients who were included in this study underwent rigid esophagoscopy. 124 (56.1%) patients were males & 97 (43.9%) were females. The age range was 2-70 years. Most of the patients fell into the age group 1-10 years and they accounted 103 (46.6%) (Table-1). The maximum patients i.e. 149 (67.4%) were admitted through emergency department; 57 (25.8%) through outpatient department and 15 (6.8%) were referred from other departments or hospitals. The patients usually presented with dysphagia which was either due to suspected foreign body ingestion 147 (66.5%) or due to suspected esophageal pathology 74 (33.5%). The commonest foreign body recovered in this study was coin in 79 (35.7%) patients. 10 (6.8%) foreign bodies descended spontaneously. Coin ingestion was found exclusively in children aged 1-10 years. The commonest foreign body in adults was food bolus which captured 14 (6.3%) patients. The commonest pathology in esophagus was proved to be the esophageal carcinoma and it was seen in 38 (17.2%) patients. In 12 (5.4%) patients no definitive pathology was detected on rigid esophagoscopy (Table-1). The overall complications in this study comprised 9 (4.1%) patients with one (0.5%) mortality and 8 (3.6%) morbidities (Table-2). Among the 8 morbidities one was esophageal perforation in cervical portion while 7 (2.7%) morbidities were minor lacerations of esophageal mucosa.

DISCUSSION : Rigid esophagoscopy is an integral part of not only the scheduled but emergency operation list of most of the tertiary care hospitals of urban Sindh. The patients usually present with dysphagia which is either due to suspected foreign body ingestion or due to suspected esophageal pathology. The spectrum of foreign bodies ingested usually differs with ecological pattern of different geographical entities worldwide. Hence the accidental ingestion of coins is common on the front of easy & frequent availability of coins to the hands of children. The animal and fish bone impaction is common in areas of their excessive consumption. Reviewing the literature reveals that different foreign bodies are more prevalent in different parts of the world owing to favorable circumstances & environment being prevalent there. Hence it was interesting to note that the commonest foreign bodies retrieved from esophagus were mutton bones (29.5%) in Oman⁶, fish bones (27%) in Saudi Arabia⁷ and coins (55.5%) in Jordan⁸.

The commonest foreign body retrieved in our study was coin in 79 (35.7%) patients. Coin ingestion is usually found to be the domain of young children worldwide. Younger children are more prone to accidental ingestion of foreign bodies because their dentition is not yet complete, their neuromuscular coordination mechanisms related to swallowing and upper airway protection are

Indications	No. of Patients	%
Coin	79	35.7%
Food bolus	14	6.3%
Denture	12	5.4%
Bone piece	11	5.0%
Spontaneous descent of F.B.	10	4.5%
Fish thorn	07	3.2%
Ornament	06	2.7%
Disc battery	04	1.8%
Glass ball	02	0.9%
Metallic washer	01	0.5%
Wood piece	01	0.5%
Benign stricture and web	09	4.1%
Benign tumors	15	6.8%
Malignant tumors	38	17.2%
No Esophageal pathology found	12	5.4%

Table-1 : Indications of rigid esophagoscopy n=(221).

Complications	No. Of Patients	%
Mortality	01	0.5%
Esophageal Perforation	01	0.5%
Minor Lacerations	07	3.1%
Total	09	4.1%

Table-2 : Complications of rigid esophagoscopy.

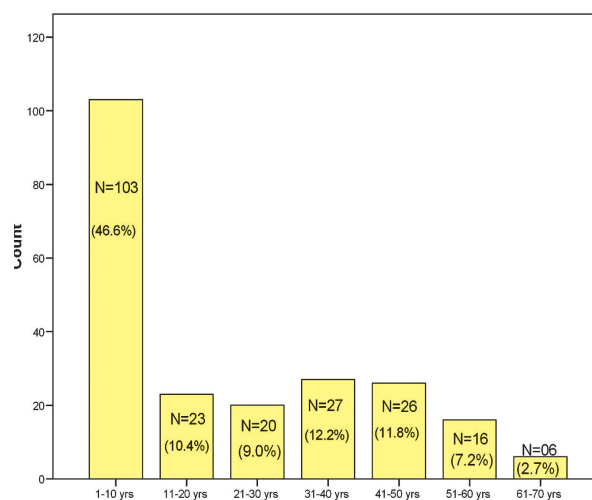


Figure-1 : Age distribution of the patients underwent rigid esophagoscopy..

not yet fully developed and their tendency to explore the world around them through their mouth⁹. Hence the highest incidence of coin ingestion has been found Trans globally in young children in various studies in the frequencies ranging from 41.3% to 88%^{8,10-4}. However the spectrum of most frequently retrieved foreign bodies in adults has been diverse and it includes food bolus, dentures and various animal & fish bones etc. In frequencies ranging from 14% to 91%^{11-2,15-6}. The most frequently retrieved foreign body in adults was food bolus in our study which accounted 14(6.3%) patients. In literature we found the frequency of food bolus impaction to vary from 4.9% to 20.7%^{10,11,17}.

The phenomenon of spontaneous descent of foreign bodies is a common occurrence. It may be observed when the foreign body is not removed immediately and observed after a period of time. It may occur with administration of smooth muscle relaxants. Also it may happen when the anesthetist delivers inhalational gases forcefully with anesthesia bag. We encountered spontaneous descent of foreign bodies in 10 (6.8%) cases during this study which is comparable with another national study on the subject¹¹. Besides the foreign bodies, the most common pathology of esophagus detected during rigid esophagoscopy, is also diverse in different studies. In our study, the most common pathology in esophagus was detected to be the esophageal carcinoma in 38 (33.5%) patients. It is comparable with another national study which found esophageal carcinoma in 115 (57.5%) patients in their study⁵. In another national study on the similar subject, esophageal webs were found to be the commonest pathology detected on rigid esophagoscopy, accounting 9(4.24%) patients¹¹. Occurrence of complications is a part of any surgical procedure and rigid esophagoscopy is no exception. However the frequency & severity of these complications depends on various factors like skill & experience of surgeon, patient's anatomical & physiological factors and the specific approach to the procedure¹⁸. Similarly, emergency situation at the time of the procedure with regards to the deteriorating status of the patient and the non-conductive operative environment, especially the issue of the availability of the proper instruments also casts its shadow on the outcome. In case of rigid esophagoscopy, the specific factors of duration of the impaction of the foreign body and the size, shape and sharpness of the foreign body have important bearing on the frequency & gravity of the complications, especially the perforation of the esophagus. In our study, the frequency of esophageal perforation is 0.5% as compared to Gabriel and Edward¹⁹ who encountered 2.6% esophageal perforation in their study. They associated this high rate with the level of surgeon's experience. The complications rate in our study is acceptable on the front of other studies in literature on the subject^{5,8,15,16}. The overall complications in our study comprised 9 (4.1%) with one mortality (0.5%) and 8 (3.6%) morbidities. The only mortality in our study was an old diabetic and hypertensive patient with a badly impacted denture who became victim of a silent myocardial infarction during the procedure. Among the 8 morbidities one was esophageal perforation in cervical esophagus with 7 other morbidities being minor lacerations of esophageal mucosa. All the morbidities were managed successfully by conservative measures including suspension of oral feeding with commencement of nasogastric tube feeding along with parenteral broad spectrum antibiotics and analgesics.

CONCLUSION : Suffice is to say that rigid esophagoscopy is a time-tested procedure which is utilized safely and effectively both for diagnostic as well as

therapeutic purposes. Globally, the documented indications are not exactly the same due to different ecological and cultural norms. The complication rates usually correlate with the conduciveness of the environment during the procedure and experience of the surgeon. The authors conclude that rigid esophagoscopy is a highly effective and safe tool for diagnostic as well as various therapeutic procedures.

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Hearing Assessment with BERA in Infants who had Received Amikacin

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ABSTRACT : OBJECTIVE : To assess the hearing levels in infants with Brainstem Evoked Response Audiometry (BERA) at the age of 6 months who had received Amikacin in neonatal period. **STUDY DESIGN:** A prospective study. **PLACE AND DURATION OF STUDY:** Department of Otolaryngology , Head and Neck Surgery, Combined Military Hospital Quetta from 1st January 2008 to 30th June 2009. **PATIENTS AND METHODS:** A total of 50 children born at CMH Quetta and kept in neonatal intensive care unit (ICU) who had received amikacin injections for 4 days or more were registered. They were given appointment for BERA testing after the age of 6 months. **RESULTS:** 30 cases showed profound degree of sensorineural hearing loss (SNHL). 10 cases showed severe degree of SNHL. 5 cases each had moderate & mild degree of SNHL. **CONCLUSION:** Amikacin causes SNHL in newborns, hence it should not be recommended for prolonged use of more than 4 days.

Keywords : BERA, Amikacin, Sensorineural hearing loss, Neonates, Ototoxicity.

INTRODUCTION : Parenteral amikacin sulfate is indicated in the short-term treatment of life threatening infections due to susceptible strains of gram-negative bacteria. These include *Pseudomonas* species, *Escherichia coli*, *Proteus*, *Providencia* species, *Klebsiella-Enterobacter-Serratia* species and *Acinetobacter* (*Mima-Herellea*) species. Clinical studies have shown amikacin to be effective in bacterial septicemia (including neonatal sepsis), serious infections of the respiratory tract, bones and joints, central nervous system (including meningitis), skin and soft tissue, intra-abdominal infections (including peritonitis) and in burns and post operative infections^{1,2}. When amikacin is indicated in newborns, it is recommended that a loading dose of 10 mg/kg be administered initially to be followed with 7.5 mg/kg every 12 hours^{3,4}. All aminoglycosides have the potential to induce auditory, vestibular, and renal toxicity^{5,6}. Toxic effects on the eighth cranial nerve can result in hearing loss, loss of balance, or both^{2,5}. Amikacin primarily affects the cochlear functions⁶. Cochlear damage results in high frequency SNHL which occurs before it is clinically apparent⁷. BERA is an objective electrophysiological technique for the evaluation of hearing thresholds and diagnosis of retrocochlear lesions^{7,8}. The study was carried out keeping in view the ototoxic effects of amikacin and the trend of its "being widely used in newborns". **PATIENTS AND METHODS :** This was a prospective study that was carried out at CMH Quetta. 50 neonates who had received amikacin while in neonatal ICU were subjected to hearing assessment by BERA at the age of 6 months. 50 newborns of both sexes admitted in neonatal ICU who had received intravenous amikacin for 5-10 days were included in the study. Premature babies were also included. Newborns at high risk of congenital hearing loss, with craniofacial and evident otologic abnormalities and those in whom duration of amikacin therapy was less than 4 days were excluded. At birth hearing thresholds were assessed by clinical testing like startling response to clapping and turning of eyes towards ringing

objects. Appointment for BERA was given to be performed at 6-8 months of age. Each infant was sedated with oral trichlorhydrate. The electrodes were connected after preparation of skin. Tone clicks and tone bursts were given and the response noted on a graph. The graph records the 5 waves called as Jewetz waves which are labeled as I-V. Amongst them, wave V is the most robust and prominent wave which if appears at the normal interval (5.5-5.75 u sec) means that the child has a normal hearing (Fig-1). Babies with hearing loss were categorized as:

Mild : 30-40 dB HL*
Moderate: 41-60 dB HL
Severe : 61-80 dB HL
Profound : 81-100+ dB HL
(*dB HL = deci Bell Hearing Levels)

RESULTS : 50 newborns were included in the study. The male to female ratio is shown (Fig-2). 30 (60%) children were found to have profound degree of SNHL. 10 (20%) children were found to have severe degree of SNHL. (10%) were found to have moderate degree of SNHL. (10%) were found to have mild degree of SNHL (Fig-3).

DISCUSSION : Advances in the knowledge of auditory evoked potentials (AEP) and of technology for their measurements have made it possible to conduct various types of hearing tests in an audiology clinic^{8,9}. AEP measurement involves recording of action potentials generated in the entire auditory pathway secondary to specific stimuli from surface electrodes placed on the scalp and face. Since the recorded potentials are recorded from electrodes far from brain stem and cortex, these are extremely minute. Moreover there is a host of other electrophysiological activity also in the background, which drowns such small signals. Hence special signal averaging techniques are required to record discernible waveforms which specifically represent the auditory pathway (Fig-3)¹⁰. At birth due to the incomplete

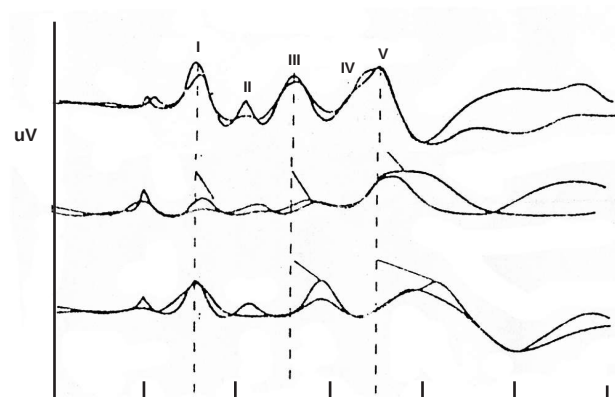


Fig-1: Different waveforms in BERA recordings.

I. Normal
II. Sensory / Cochlear hearing loss
III. Neural / Retrocochlear hearing loss

myelination of eighth cranial nerve, BERA has to be deferred for 6 months, when hearing thresholds can be determined. During this period recording of otoacoustic emissions (OAE) is the investigation of choice to detect the presence or absence of hearing⁹⁻¹¹. Amikacin is a widely used aminoglycoside antibiotic with a wide range of indications in neonates. The usual dosage is considered to be safe¹². Its ototoxic and nephrotoxic effects are usually observed when it is used in high doses or longer than 8-10 days. Newborns are highly vulnerable in all respects. When amikacin is given for longer than 5 days, monitoring of serum levels of amikacin should be considered mandatory⁴. Even in usual dosages ototoxic side effects have been recorded. Aminoglycoside toxicity primarily targets renal and cochleovestibular systems; however, no clear correlation exists between degree of nephrotoxicity and ototoxicity^{3,11}. Cochlear toxicity that results in hearing loss usually begins in the high frequencies and is secondary to irreversible destruction of outer hair cells in the organ of Corti, predominantly at the basal turn of the cochlea³. Aminoglycosides are cleared more slowly from inner ear fluids than from serum and therefore latency exists to

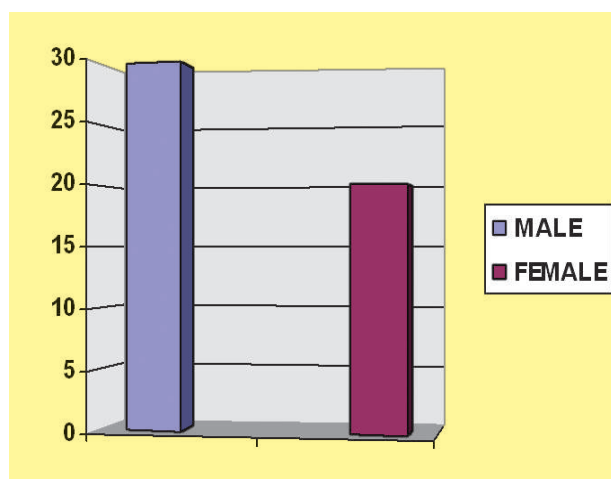


Fig-2 : Male to female ratio.

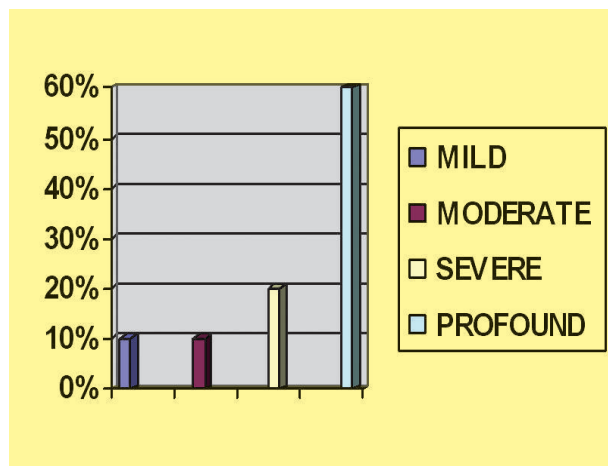


Fig-3 : Percentage sensorineural hearing loss.

the ototoxic affects of aminoglycosides. This latency can result in progression of hearing loss or onset of hearing loss after cessation of aminoglycoside treatment. Therefore continued monitoring of the patient for cochleotoxic and vestibulotoxic effects up to 6 months after cessation of aminoglycoside treatment is important^{3,11-12}. The mechanism of aminoglycoside ototoxicity is mediated by disruption of mitochondrial protein synthesis, and the formation of free oxygen radicals. The cellular basis for aminoglycoside hearing loss is a destruction of cochlear hair cells, specifically the outer hair cells. Aminoglycosides appear to generate free radicals within the inner ear by activating inducible nitric oxide synthetase and therefore increasing nitric oxide concentrations. Oxygen radicals then react with the nitric oxide to form the destructive peroxynitrite radical, which can directly stimulate cell death. Apoptosis is the primary mechanism of cell death and is mediated primarily by an intrinsic mitochondrial mediated cascade. It seems that aminoglycosides interaction with transition metals such as iron and copper potentiate the formation of these free radicals. Ultimately this cascade leads to permanent damage to the outer hair cells of the cochlea, resulting in permanent SNHL¹³⁻⁵. Aminoglycoside ototoxicity is likely to be multifactorial, and it is an area of active research. Some studies have suggested iron chelators and antioxidants as possible agents to prevent hearing loss during therapy. Certain other studies have explored the role of gene therapy as a future treatment option¹⁶⁻⁷. Currently, no treatment is available apart from amplification and; hence, prevention is paramount¹⁸⁻⁹. The definition and criteria for ototoxicity have been established by the American Speech-Language-Hearing Association (ASHA), the National Cancer Institute Common Terminology Criteria for Adverse Events (CTCAE), and by Brock^{9,12}.

ASHA defines ototoxicity as:

- (a) 20dB or greater decrease in threshold at one frequency,
- (b) 10dB or greater decreased at 2 adjacent frequencies,
- (c) loss of response at 3 consecutive test frequencies in which responses were previously obtained, when OAE or BERA is used.

The CTCAE and Brock have determined grades to further define ototoxicity as follows:

CTCAE ototoxicity grades 1-4

Grade 1 - Threshold shift or loss of 15-25 dB relative to baseline, averaged at two or more contiguous frequencies in at least one ear.

Grade 2 - Threshold shift or loss of > 25-90 dB, averaged at two contiguous test frequencies in at least one ear

Grade 3 - Hearing loss sufficient to indicate therapeutic intervention, including hearing aids (eg, > 20 dB bilateral HL in the speech frequencies; > 30 dB unilateral HL; and requiring additional speech-language related services)

Grade 4 - Indication for cochlear implant and requiring additional speech-language related services.

Brock's hearing loss grades.

Grade 0 - Hearing thresholds less than 40 dB HL at all frequencies

Grade 1- Thresholds 40 dB or greater at 8 KHz

Grade 2- Thresholds 40 dB or greater at 4-8 KHz

Grade 3- Thresholds 40 dB or greater at 2-8 KHz

Grade 4- Thresholds at 40 dB or greater at 1-8 KHz

In our study all children except those with a mild degree of SNHL were prescribed hearing aids and referred for speech therapy.

CONCLUSION : We conclude that parenteral amikacin is widely used in the neonatal ICU. The results have shown that the incidence of SNHL in neonates following the use of amikacin is very high. In view of its highly cochleotoxic effects, its use should be restricted to 4-5 days only or the risk-benefit ratio carefully assessed in each case. Counseling of parents of such infants who have received amikacin is also of paramount importance. They should be advised to be alert to any signs of impaired hearing in the infant and to seek prompt audiological consultation when there is any such suspicion²⁰.

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**EUROPEAN SCHOOL OF ONCOLOGY (ESO)
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Submucosal Resection of Nasal Septum Under Local Versus General Anaesthesia

Raahat Z M , Nadeem Uddin Naqvi, Syed Nusrat Raza

ABSTRACT: **OBJECTIVE:** To compare the economy, complications and patient's comfort in cases of SMR (sub mucous resection) under local versus general anesthesia. **DESIGN.** Randomized control trial. **PLACE AND DURATION.** This study was conducted in Otorhinolaryngology department CMH Lahore from January 2008 to August 2009. **SUBJECTS AND METHODS .** A total of 70 males having moderate to gross D N S were included. Group A (35) patients underwent SMR under local anaesthesia and group B (35) patients were operated under general anesthesia. **RESULTS.** Net per case cost difference between local and general anesthesia is RS.3528.05. Perioperative bleeding was minimum in group A and significant in group B. There was an obvious difference in post operative vomiting in two groups. It was 0% in-group A and 11.42 % in group B. In group A 85 % were confident and without an obvious stress at the time of removal of intranasal packing where as 57 % in group B were overanxious and apprehensive about the pain at the time of removing intranasal packing. Generally it was not easy to convince the patients for surgery under local anesthesia and extra ordinary efforts were made during preoperative counseling. **CONCLUSION:** Septal surgery under local anesthesia is better option in every respect and time spent convincing the patient to undergo submucous resection of septum under local anaesthesia pays off in terms of cost effectiveness and patient comfort.

Key Words: Submucous resection of septum, cost effectiveness, patient comfort.

INTRODUCTION : Global economic crisis has forced every society to review all aspects of life including medical sciences to maintain high standards with a significant reduction in cost. In this cost constraint era nasal septal surgery still remains the commonest nasal operation all over the world in both low and high civil society. Its results in terms of patient satisfaction are controversial. Hollywood is full of actors and actresses that have gone under the knife to fix a deviated septum¹. The septal pathology can be deviation, dislocation or spur. It can involve cartilage or both cartilage and bone in any combination of deviation, spur and dislocation. Nasal obstruction is the commonest indication of Submucous resection of septum. History of earliest SMR falls back to times of Killian of Germany and Freer of USA around 1847. Ephraim in Chicago and Peterson in Germany started systematic SMR in 1882². Untreated deviations resulting functional sinus problems opened the doors for functional sinus surgery³. Patient satisfaction after septal surgery has always been debatable topic⁴. Advocates of SMR under local versus general anesthesia have been there in every era but there is definite shift in favor of local anesthesia because of relative bloodless perioperative field and post operative patient comfort. Moreover local anaesthesia does not carry with it the risks of general anaesthesia in terms of aspiration and other respiratory problems. Local anesthetics are classified broadly into 2 groups, amide group (lignocaine, prilocaine, bupivacaine, mepivacaine, ropivacaine) and ester group (benzocaine, tetracaine, procaine, cocaine) Recent evidence suggests that lignocaine with adrenaline

is safe⁵. Nasal Septal surgery performed under local anaesthesia with dexmedetomidine sedation resulted in less surgical bleeding, less postoperative pain, a more stable haemodynamic state, less nausea, a shorter recovery period and a higher level of anaesthesia satisfaction⁶. The rationale for this study was based on the fact that in a developing country like Pakistan where masses are struggling below poverty line, economy is the emerging concept while selecting treatment options. If result of multi optional treatment is same, economy and patient comfort should be top consideration. If cost of operation can be reduced without compromising results in commonest nasal surgery why not benefit out of it⁷.

PATIENTS AND METHODS :

INCLUSION CRITERIA;

Obstructive DNS (Deviated nasal septum), males between 18 to 45 years of age.

EXCLUSION CRITERIA;

Simple(tiny) deviation without nasal obstruction
Abnormal coagulation profile revision septal surgery,
Overanxious and unwilling for surgery under local anesthesia were not included in group A, High risk and declared unfit for general anesthesia were not included in either group.

This study was designed as a randomized control trial in ENT department of CMH Lahore from Jan 2008 to August 2009. Patients were counseled about their disease, surgical detail, merits and demerits of general and local anesthesia. Patients were divided in two group. A and B by random number table. Age of the patients varied from 18 to 47 years. All patients had DNS with significant

nasal obstruction on patency test. Group A (35) patients underwent SMR under local anesthesia while Group B (35) patients were operated under general anesthesia. Patient counseling, coagulation profile and patient consent were the pre-requisites for surgery. Same surgeon with a clear objective to restore patency of nasal passages performed all operations. Conventional Killian's technique of SMR was adopted in both groups. Mucoperichondrial flaps elevated on both sides through Killian's incision. Obstructing cartilage removed, retaining both dorsal and caudal struts of cartilage to prevent any subsequent change in external shape of the nose. Local anaesthesia was achieved with 4 % xylocaine with Adrenaline using both surface as well as infiltrative techniques. Vaseline gauze was selected for nasal packing for 24 hours post operatively. Oral antibiotic, painkiller and antihistamine (Erythromycin, Paracetamol, and Chlorpheniramine) were given to all the patients for three days after surgery. Patients of both groups were closely observed, interviewed and their comments about the complete event (from admission to discharge) were noted.

This study was analyzed using SPSS version-16. Cost of operations and hospital stay of patient was measured by applying t-test. Patients' confidence in the doctor and patient comfort (post operative vomiting, post operative sore throat, laryngospasm) were recorded by applying chi-square test. Patient's confidence in the doctor was gauged by using a scale from 1 to 6 (rating 1 to 3 showed good confidence while 4 to 6 excellent confidence). Paired t-test was used in case of cost and hospital stay where as chi square test was used to check the significance in case of post operative vomiting, sore throat and laryngospasm. A p-value of less than 0.05 was taken as significant.

RESULTS : Total cost incurred on the seventy patients in this study was Rs 556782. 38.91% of total cost was spent on Group A (mean 6190 with std dev of 178.84 rupees). 61.04 % of total cost was spent on Group B (mean 9718.05 with std dev of 244.42 rupees). This per case difference of Rupees 3528.05 was found to be statistically significant using paired t-test (p value was <0.0001). Mean hospital stay in case of Group A after operation was 1.71 hours with std dev.1.07. Mean post operative hospital stay in case of Group B was 28.0³ hours with standard deviation of 6.28 which was statistically significant using paired t-test (p value <0.0001) (Table-1). Patient's confidence in operating surgeon was rated as excellent in 34 patients of Group A and in 12 patients of Group B, this difference was statistically significant (p value <0.0001) (Table-2). Ten patients of Group B had postoperative vomiting while none of Group A faced this problem and the difference was significant (p value of <0.0001 (Table-3). None of the patients of group A had postoperative sore throat while thirteen patients in Group B got sore throat within 24 hours in-group B. This difference was statistically significant. (p value <0.0001)(Table-4). Two patients in Group B had laryngospasm during recovery after general anesthesia where as no patient of Group A faced this spasm. This difference was not significant (p-value 0.493)(Table-5).

Group of Patient	N	Mean	Std Dev	Sig (2 tailed)
Cost of surgery Group A	35	6190 Rs.	178.84	<0.0001
Cost of surgery Group B	35	9718 Rs.	244.42	
Post opt hosp stay Group A	35	1.71453 Hrs	1.07	<0.0001
Post opt hosp stay Group B	35	28.0286 Hrs	6.28	

Table-1 : Cost of surgery and post-operative hospital stay.

Patients	Patients Confidence in Surgeon Present	Absent	Total	P-Value
Group A	0	35	35	0.000
Group B	2	33	35	
			70	

Table-2 : Patients confidence in surgeon.

Patients	Post Operative Vomiting Present	Absent	Total	P-Value
Group A	0	35	35	0.001
Group B	10	25	35	
			70	

Table-3 : Post-operative vomiting.

Patients	Post Operative Sore Throat Present	Absent	Total	P-Value
Group A	0	35	35	<0.0001
Group B	13	22	35	
			70	

Table-4 : Post-operative sore throat.

Patients	Post Operative Laryngospasm Present	Absent	Total	P-Value
Group A	0	35	35	0.493
Group B	2	33	35	
			70	

Table-5 : Post-operative laryngospasm.

DISCUSSION : Economy is the major issue in poverty-hit areas of the world. Aim of this study was to report the economical and patient friendly option of SMR. This opportunity also led the way to analyze the patient compliance in SMR under local versus general anesthesia. Both groups showed similar improvement of symptoms but there was a significant total cost difference of 1, 23,480 Rupee in group A and B. This indicates that SMR under general anesthesia is unjustified specially in poor economical states. We need to train our trainees state of the art skill to perform SMR under local anesthesia. This practice is already there in some centers⁸⁻¹³, There are advocates to withhold the routine preoperative investigations for surgery under local anesthesia and rely upon clinical evaluation and history that can save another significant 1000 Rupee per case¹⁴. Economy is the major concern but patient compliance and satisfaction can never be ignored. No rhinologist is unaware of the misconceptions about SMR, especially recurrence and worsening of pre-existing symptoms. To obviate these

misconceptions, time spent on pre operative counseling and evaluating patient's expectations is never wasted. Septal surgery definitely improves quality of life and patient satisfaction provided selection of the patient is correct and ethical¹⁵⁻⁷. SMR under local anesthesia is a better option because of short hospital stay reducing bed occupancy, being cheap, insignificant per operative bleeding, clear operative field, no serious complication, high patient morale on removal of postoperative nasal packs, not being nil by mouth for hours before and after operation, no post operative vomiting and hangover of general anaesthesia. Another advantage is avoiding postoperative sore throat. In our study it is difficult to pinpoint the source of postoperative sore throat in-group B. Most likely its source looks to be Endotracheal intubation during general anesthesia or cross infection from postoperative ward/hospital staff in hospital. Sore throats after Endotracheal intubations have been reported in literature¹⁸. There are two drawback of SMR under local anesthesia. Firstly patient has to come back next day of operation for removal of nasal packs and secondly an unpleasant metallic taste of xylocaine during operation. These drawbacks are well tolerated by most patients and we are confident to report SMR under local anesthesia a patient friendly operation as compare to SMR under general anesthesia. There are numerous merits of SMR under local anesthesia. Bed occupancy of hospital is reduced and there are minimum administrative problems for patient. Moreover patients are not exposed to side effects of general anesthesia like, feeling of being sick, sore throat, headache, dizziness, blurred vision, shivering, itching, confusion, chest infections, bladder problems, depressed respiration, damage to teeth, lips or tongue, equipment failure, malignant hyperthermia, arrhythmias, cardiac arrest and rare deaths. The incidence of 5.7 % laryngospasm during recovery after general anesthesia in group B necessitates a thorough clinical examination to look for pre existing sore throat at the time of operation because incidence of laryngospasm has been reported when general anesthesia is given to patients suffering with sore throat^{19,20}.

CONCLUSION : SMR under local anesthesia is better option .It is economical , patient friendly and carries less perioperative and post operative complications as compared to SMR under general anesthesia.

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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 accuhaler. All the patients enrolled for the study were requested to attend the ENT, Head & Neck

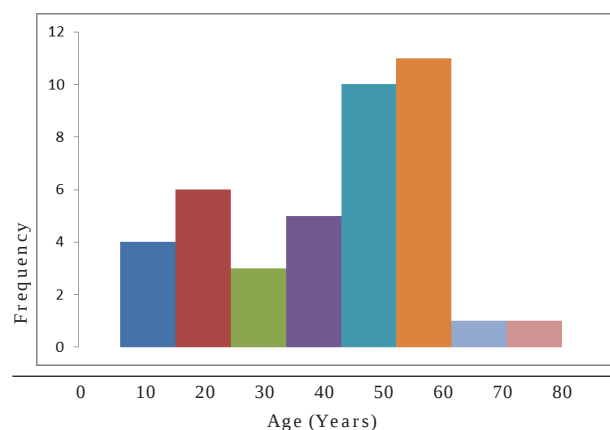


Figure 1: Age distribution.

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

Table 1: Throat symptoms in asthmatic patient (n=57).

Symptoms	Freq	%
PND	15	34.09
Hyperaemia of ppw	3	6.82
Granular ppw	3	6.82
Hypertrophic papillae post, 1/3rd of tongue	1	2.27
Laryngeal polyp	1	2.27
Oral Candidiasis	1	2.27
Dysphagia	1	2.27
Enlarged tonsils	1	2.27
No abnormality	19	43.18

Table 2: Signs of throat problem in asthmatics Patients (n=44).

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 symptoms of ENT were treated for the ENT problem. The data were analyzed manually, presenting the results in tabular format 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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Rhabdomyosarcoma Masquerading as Adenoid Hypertrophy

Mahendra Singh Hada, Chadha Vineet, Grover Mohnish

ABSTRACT: Rhabdomyosarcoma is a soft tissue sarcoma which is often encountered in the head and neck region and when present in nasopharynx can be mistaken for hypertrophied adenoids. A child presenting with complaint of bilateral nasal blockage, mouth breathing and snoring, the first clinical diagnosis that comes in our mind is that of adenoid hypertrophy. However we are presenting a case of a five years old male child who came to us with similar complaints and a history of adenoidectomy done four months back. The patient was again operated at our centre and its biopsy was sent which came out to be Embryonal Rhabdomyosarcoma. Our aim to present this case report with review of literature is to bring in notice to all of our practicing physicians and surgeons that although adenoid hypertrophy is very common in such age group, they should do a detailed clinical examination considering other differential diagnosis in their mind and exclude them before making final conclusion

Key-words: Rhabdomyosarcoma, Adenoid hypertrophy, Nasopharynx

INTRODUCTION: Rhabdomyosarcoma (RMS) is the most common solid soft tissue malignant tumor in pediatric age group¹. It is derived from primitive mesenchymal tissue expressing myogenic differentiation and probably arises from satellite cells associated with skeletal muscle embryogenesis. It accounts for approximately 75% of all pediatric soft tissue sarcomas and 15% of all pediatric solid tumors². These tumours are uncommon in adults; it follows a bimodal distribution, with peak incidence between 2 and 4 years and between 12 and 16 years³. Head and neck localizations are frequent in RMS, accounting for 35-40% of cases^{1,4}. It is a high grade tumour which is locally aggressive and has a strong potential to metastasize. Histopathologically, RMS is usually divided into four histological types: embryonal (80-85%), botryoid, alveolar and pleomorphic. Unlike other soft tissue sarcomas and osteogenic sarcoma, RMS is relatively sensitive to chemotherapy and radiotherapy⁵. However the primary treatment is still controversial with both surgical excision and chemoradiation being equivocal for RMS. Thus the standard treatment for RMS is a multimodal therapy involving chemotherapy, radiotherapy and surgery^{6,7}. Surgical challenge is represented by tumours affecting the head and neck. These anatomical sites do not generally lend themselves to a radical surgical approach as a primary procedure. Complete resection is not feasible in many patients and, even if possible, is unlikely to be achieved without major functional or cosmetic consequences⁷.

CASE REPORT: A 5 years old male child presented with complaint of mouth breathing, snoring and nasal blockage for more than two months. There was no history of nasal bleeding or foreign body insertion. He had similar complaints 4 months back, for which he was diagnosed as adenoid hypertrophy and adenoidectomy performed at a secondary centre. The specimen resected was not sent for histopathology report (HPR).

On local examination there was bulging of soft palate with a soft tissue mass palpable at nasopharynx. It was suspected that it could be a gauze piece left during previous surgery. CT study of head and neck was done which revealed a heterogenous hypodense mass in nasopharynx of size 3cm × 3cm, completely obstructing the choana. Examination under anaesthesia was suggestive of mass arising from roof of nasopharynx. Simultaneously a biopsy was taken and sent for histopathology, which came out as round cell tumor suggestive of rhabdomyosarcoma (Fig-1). Marker study revealed positive staining for actin and myogenin with negative staining for cytokeratin, this confirmed the diagnosis to be embryonal rhabdomyosarcoma. The patient had been previously operated so a surgical resection was planned (R2 resection - Debulking surgery), followed by chemoradiation. Three courses of chemotherapy with vincristine (1.4mg/m²), cyclophosphamide (750mg/m²) and cisplatin (70mg/m²) every 4 weeks were given. Radiotherapy (4500cGy in 180cGy/fx) and biweekly vincristine (1.0mg/m²) were given for maintenance therapy. Follow-up MRI of the head and neck, bone scan and chest X ray done 6 months later revealed neither local recurrence nor distant metastasis.

DISCUSSION: Rhabdomyosarcoma, a tumor derived from mesenchymal tissue, was first described by Weber in 1854⁸. Before the introduction of chemotherapy, surgical resection was the only treatment modality of RMS. But in the last four decades, chemotherapy protocols have significantly improved the long-term survival in patients with RMS: from 25% in 1970, to approximately 70% nowadays⁹. Today RMS can be divided between parameningeal RMS (PM-RMS) and RMS of other localizations. A third category can also be made that is of orbital RMS. Parameningeal RMS arises in close anatomic relationship with the meninges such as nasopharynx, nasal cavity, paranasal sinuses, middle

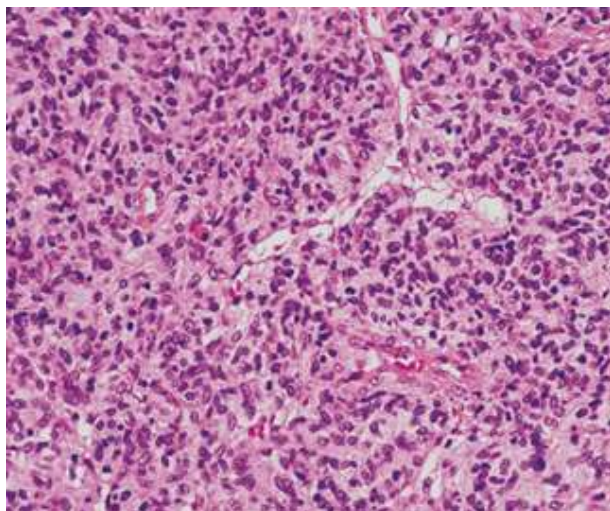


Fig-1: Histopathology slide showing small round blue cells suggestive of rhabdomyosarcoma.

ear and mastoid, infratemporal and pterygopalatine fossa. These present a surgical challenge, as excision may result in unacceptable mutilations and incomplete resection in most cases¹⁰. Partial tumour resection with macroscopic residuals i.e a debulking surgery had been advocated in such cases to avoid functional loss. Cecchetto et al. in study of 394 children compared biopsy versus debulking surgery in RMS, did not demonstrate any advantage in the overall survival and progression-free survival¹¹. However in favourable sites (i.e. non-parameningeal RMS), the most acceptable treatment is a complete resection with negative margins¹. Complete tumour removal improves survival and offers the chance to avoid radiotherapy, which is of special interest in children younger than 3 years old¹². Still it has been seen that systematic radiotherapy has showed improved survival for PM-RMS and cure of these patients remains difficult without this modality of treatment; thus even a complete surgical resection with negative margins may not avoid radiotherapy^{6,13,14}. In multivariate analysis by the IRS group on PM-RMS, meningeal involvement is an independent negative prognostic factor and a significant predictor of primary central nervous system failure¹³. PM-RMS without meningeal involvement showed an excellent five years overall survival of 92%, as compared to 57% of sinonasal and infratemporal fossa tumours with meningeal involvement by Raney et al¹³. Thus most authors believes that multiagent chemotherapy combined with radiation should be the primary treatment modality offered to children with PM-RMS^{4,6,10}. Comparing the two most frequent histological subtypes i.e. embryonal and alveolar, the latter showed a statistically significant higher tendency to metastasize through the lymphatic route¹¹. Controversy also exists over treating the positive nodes in neck with additional radiotherapy or neck dissection. If nodes are metastatic and complete primary tumour resection is feasible, neck dissection is recommended; while, if the lymphnodes are positive but the primary tumour is unresectable, they should be included in the radiotherapy

field¹⁰. In view of the low incidence of cervical lymphnode metastases of merely 3% according to the Intergroup Rhabdomyosarcoma Study (IRS)¹³, Anderson et al. saw no indication for conducting elective neck dissection¹⁵. In case of relapsing disease, second-line chemotherapy and radiotherapy are the main treatment options. Although surgery is advocated for resectable recurrent tumour, the evidence for its efficacy is very limited¹⁶. The survival rate after relapse is a dismal 10-15%. Harm/Benefit ratio in head and neck regions frequently tends in favors of chemoradiation¹⁷.

CONCLUSION: RMS should be kept in differential diagnosis of a nasopharyngeal mass, especially in pediatric age group. Every specimen excised from nasopharynx must be sent for histopathology examination.

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Sphenchoanal Polyp : A Rare Entity

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ABSTRACT: Sphenchoanal polyp (SC polyp) is a rare entity and is confused with the more common antrochoanal polyp (AC polyp). Clinically and histopathologically they are similar and can be distinguished with imaging studies (CT, MRI) and diagnostic nasal endoscopy. Identification of the offending sinus is important for complete debridement. Endoscopic sinus surgery forms the cornerstone in the surgical management of SC polyp. A case of SC polyp in an adolescent boy is presented here and literature reviewed.

Key Words: Sphenchoanal polyp, Choanal polyp.

INTRODUCTION: Polyps are oedematous hypertrophied mucosa of nasal cavity and paranasal sinuses, and those that involve the choana are called choanal polyps. While AC polyps, constituting 3-6% of all polyps¹, are common in clinical practice, other varieties, like SC polyp, are seldom seen.

CASE REPORT: A 15-year-old boy presented with one year history of nasal obstruction and nasal intonation of voice. On anterior rhinoscopy, a polyp could be seen in left nasal cavity at the level of middle turbinate fully occluding the left nasal cavity, and partially the right one. This was associated with mucopurulent secretions mainly on left side. There was no cranial nerve palsy and no history of epistaxis. X-ray nasopharynx (lateral view) showed a mass at the level of the choana, with a rim of air-shadow posteriorly [Fig-1]. X-ray of paranasal sinuses (occipitontental view) revealed clear maxillary sinuses and hazy nasal cavities (left>right). CT scan clearly revealed opacity in the left sphenoidal sinus communicating with the extrasinus mass [Fig.2]. SC

polyp was thus diagnosed. Routine pre-operative investigations were done. Under general anaesthesia, mobility of the mass was assessed. Next, the nasendoscopes (4mm scopes, 0° and 30° respectively) were introduced and negotiated superomedial to the middle turbinate. The sphenoethmoidal recess was identified and the stalk of the polyp was seen around the anterior sphenoidal wall. The stalk was excised, the sphenoidal ostium widened medially and inferiorly, and the intrasinus polypoid mucosa debrided as far as possible. The mass, 4cm×3cm in dimension, was pushed back to the nasopharynx and taken out via oropharynx [Fig-3]. It weighed 39gms. Haemostasis was controlled and anterior nasal packing done with merocel. Histopathology revealed benign inflammatory polypoid mass with scattered eosinophils. The patient recovered well and the one year follow-up period turned out uneventful.

DISCUSSION: SC polyps are one of the rare varieties of choanal polyps. Since the days of Zuckerkendl in 1892, only a few cases have been reported till date². Often



Fig-1: The arrow in this X-ray nasopharynx (lateral view) showing soft tissue bulge.



Fig-2: The CT scans (coronal view) showing opaque left sphenoidal sinus, with the mass encroaching the ipsilateral nasal cavity.

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Figure-3: The sphenchoanal polyp after removal.

confused with AC polyp due to their comparable clinical presentation, histopathology and tissue of origin. It originates from the sphenoidal sinus, protrudes into the nasopharynx through the sphenoidal ostium and approaches the choana. Aetiology of SC polyp is shrouded in mystery. According to Berg et al, it develops from benign precursor intramural cysts present in the respective sinus mucosa, surrounded by oedematous stroma³. These cysts, present in 4% of normal population⁴, have gross and microscopic similarities with the tissue architecture of choanal polyps. Biochemical examination of cyst fluid with those from choanal polyps is also comparable. In spite of a recent report suggesting prominent association between choanal polyps and allergy⁵, it is prudent to uphold that allergy has nothing to do with choanal polyps^{6,7}. Initially the polyp remains covered with normal respiratory epithelium⁸; later, islands of squamous metaplasia⁷ develop as it enlarges and comes in contact with comparatively less humidified atmospheric air. Enlargement of the mass is also attributed to lymphostasis and lymphatic thrombosis. SC polyp commonly presents with unilateral nasal obstruction, which may be associated with purulent discharge, retro-orbital headache, epistaxis, eustachian tube dysfunction (otitis media with effusion with deafness) and rarely snoring⁴. Most commonly affected are the adolescents and young adults (as in our patient) with equal gender predilection⁴. However, partly due to its rarity, and also because of the unique clinicopathological changes, SC polyp can be confused with other lesions like AC polyp, juvenile nasopharyngeal angiofibroma (JNA), meningoencephalocele⁹, inverted papilloma¹⁰ and sarcoma (pseudosarcoma). SC polyp associated with concomitant nasal polyps (ethmoidal) is rare; only one case has been reported so far¹¹. Because SC polyp presents mainly in adolescents and often degenerates into angiomatous polyp¹² due to inflammation-induced neovascularisation, it may be misdiagnosed as JNA. Repeated and unhindered tissue restructure and

remodelling result in mimicking a mesenchymal disarray in the form of stromal atypia and pseudosarcomatous changes in the polyp^{13,14}. Definitive diagnosis of a SC polyp can only be made with CT and MRI scan^{15,16,17}. They can trace the polyp to its origin and can differentiate choanal polyps from other related masses by intensity discrimination. If the maxillary sinuses are clear and sphenoidal sinus opaque, the choanal polyp should originate from the sphenoidal sinus. However, establishing the sinus of origin is always of pivotal importance¹⁷. This can be done in 3 ways.-1) With respect to the middle turbinate : SC polyp lies between the septum and medial aspect of middle turbinate. 2) The ostial opening is looked for widening and contiguity of the intranasal mass with the choanal mass should subsequently be established. 3) The major landmarks in the natural pathway of the polyps should be looked for involvement-ostio-meatal complex for AC polyp, and sphenothmoidal recess for SC polyp. Diagnostic nasal endoscopy, in cases, has met with limited success, largely due to steric hindrance. Navigation of the probe often becomes cumbersome due to the large polypoid mass in one nasal cavity and the resultant septal deviation almost occluding the other. However, histopathology always has the final say in diagnosis. The treatment of choice of SC polyp is surgery, with the aim to remove both intranasal and intrasphenoidal parts^{7,17}. Traditional methods (polypectomy, avulsion) are associated with increased chances of recurrence-as high as 25%^{4,18}. Transnasal/endonasal endoscopic sinus surgery forms the cornerstone among the surgical procedures¹⁹. Identification of the sphenoidal ostium is of immense importance as it is variable in position on the anterior sphenoidal wall, and rarely a SC polyp may originate from extra-ostial adjacent areas (like sphenothmoidal recess) and may remain confined within the sinus. Care should be taken to avoid injury to the optic nerve and internal carotid artery. If a microdebrider is not used, excision of the stalk of the polyp too close to the ostium before its widening has the danger of losing track of the mucosal pedicle which retracts within the sinus through the ostium⁴. Identification of the ostium is followed by its widening along the medial and inferior wall. A good view within the sinus is obtained and the mucosa meticulously extirpated. In conclusion, SC polyp is one of the rare forms of choanal polyps. Imaging like CT scan and MRI are essential for diagnosis, with the ultimate aim of finding the polyp's sinus of origin. This is followed by transnasal endoscopic removal of the mass along with the sinus mucosa taking due care that it neither injures any vital structure nor does it results in recurrence.

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Primary Spontaneous Transclival Cerebrospinal Fluid Leak

Kirtane M.V., Chavan .KP., Satwalekar D.R.

ABSTRACT : Cerebrospinal fluid leaks through the clivus are usually post-traumatic or occur secondary to lesions such as chordomas. The clivus is an uncommon site for a primary spontaneous CSF leak, with a PubMed search carried out in August 2014 revealing only fourteen such reported cases. We report our experience with two cases of primary spontaneous CSF leaks through the clivus, managed via endoscopic transsphenoidal approach.

Key Words : Cerebrospinal fluid leak, Spontaneous, clivus, endoscopic repair .

INTRODUCTION : Cerebrospinal fluid (CSF) leaks may be classified on the basis of etiology, anatomical site or intracranial pressure. Spontaneous CSF leaks are those for which no cause can be found. Some authors have used the term 'non-traumatic' instead of 'spontaneous' as they are of the opinion that there is no CSF leak that is truly 'spontaneous' in nature. Common sites of spontaneous CSF leaks are cribriform plate and the sphenoid sinus, especially in a pneumatized lateral recess¹. The clivus is an uncommon site for a primary spontaneous CSF leak, with a PubMed search carried out in August 2014 revealing only fourteen such reported cases²⁻⁷. We report our experience with two cases of primary spontaneous CSF leaks through the clivus, managed via an endoscopic trans-sphenoidal approach. Case 1: A 68-year-old obese, female presented with clear watery discharge from the left nostril since 4 months. There was no past history of head trauma. Clinical examination revealed no positive findings other than the watery discharge from the left nostril, which was confirmed to be CSF by a positive test for beta-2 transferrin. Computed tomographic (CT) cisternography revealed an empty sella and fluid in the left sphenoid sinus. A detailed reading of the scans however, revealed the site of leak to be in the clivus, but not from a single point (Figure 1). The patient was operated via an endoscopic trans-sphenoidal approach. On opening the sphenoid sinus, it was found to be filled with CSF, which was seen oozing out through the clivus, from multiple points, giving it an appearance of a 'watering can'. The defects were successfully repaired using a fascia lata graft and fibrin glue. This was further supported by oxidized cellulose and absorbable gelatin sponge, held in place by polyvinyl alcohol sponge pack. The CSF leak was thus successfully sealed and there has been no recurrence after 8 years followup.

Case 2: A 72-year-old obese, hypertensive female presented with clear watery discharge from the left nostril since 5-6 months. There was no past history of head trauma. The nasal fluid was confirmed to be CSF by a positive test for beta-2 transferrin. A CT Scan revealed a defect in the clivus with a small pseudomeningocele protruding out through the defect

(Figure 2). An empty sella was found to be present on magnetic resonance imaging (MRI). An endoscopic trans-sphenoidal approach was used to repair the defect. On entering the sphenoid sinus, the clival defect was visualized in the posterior wall, with a protruding pseudomeningocele and CSF leaking out. The pseudomeningocele was cauterized, the edges of the defect were defined, and a raw area created around the defect by baring the bone. The defect was then plugged using fat in a 'bath plug' fashion, held in place with fibrin glue, and oxidized cellulose and absorbable gelatin sponge. A non-absorbable polyvinyl sponge pack was placed to reinforce the repair. A post-operative CT scan revealed the fat plug in situ with successful sealing of the defect and leak. Long-term follow-up, however, could not be obtained in this patient as she succumbed to a myocardial infarction about a week after surgery. **DISCUSSION :** The incidence of primary spontaneous CSF leaks has been reported to be between 6%-40% of all CSF leaks^{8,9}, and are less common as compared to traumatic leaks¹⁰⁻¹. Various explanations have been put forth about the pathophysiology of spontaneous CSF leaks. These are usually seen in obese middle-aged females, with a raised body mass index, and are known to be associated with benign intracranial hypertension¹²⁻³. High-pressure CSF pulsations and chronic hydrostatic forces acting on thinned out skull base bone may result in defects, giving rise to CSF leaks. Empty sella, broadly attenuated skull base and arachnoid pits have also been found to be associated with spontaneous CSF leaks¹³. Menopause with its associated decrease in bone density and osteoporosis are other predisposing factors¹⁴. Transclival CSF leaks secondary to skull base lesions such as chordomas are known¹⁵⁻⁶. Primary spontaneous CSF fistulas through the clivus are however, very rare²⁻⁷. Various theories have been postulated to explain the occurrence of spontaneous clival CSF fistulas. The skull base including the clivus is formed via endochondral ossification. At birth the clivus consists of partially ossified components of the basiocciput and sphenoid body separated by the sphenooccipital synchondrosis. The age at which the spheno-occipital synchondrosis fuses is variable, although closure usually occurs by the



Fig-1: CT Cisternography (Patient 1) showing dye leaking through the clivus (white arrow). The arrowhead points towards the empty sella.

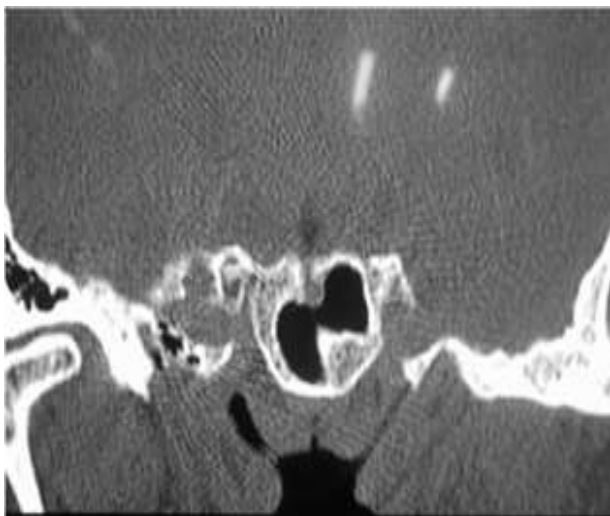


Fig-2 : CT Scan (Patient 2) showing a defect in the clivus with a protruding meningocele.

age of 17 years¹⁷. A developmental defect in this area could lead to a future area of dehiscence². It is suggested that spontaneous clival CSF leaks could occur due to erosion of the clivus secondary to repeated pulsations of the basilar artery. Repetitive increase in intracranial pressures acting on a congenitally thin bone, could eventually lead to a dehiscence and pseudomeningocele formation with a CSF fistula². Both our patients were post-menopausal, obese women with a demineralized, thinned out clivus. Also, hypertension in one of these patients could have resulted in increased arterial pressure, which over a period of time could have resulted in a bony defect. Both our patients had an empty sella, a common association with spontaneous CSF leaks. Investigation protocols for a patient with a spontaneous CSF leak are similar to those with any other type of leak and include detection of beta-2 transferrin or beta-trace protein in nasal fluid, high resolution CT scans, CT/MR

cisternography and intra-thecl fluorescein use in selected cases. In addition to this, bone density scans could be performed in patients with spontaneous leaks, to look for osteoporosis. Spontaneous CSF leaks are unlikely to heal with conservative measures, and usually require a surgical repair. All the previously reported spontaneous clival leaks have been repaired via a trans-sphenoidal route²⁻⁷. Adequate knowledge about the clival anatomy is necessary during surgery in this area, due to the close proximity of major blood vessels such as the vertical segment of the internal carotid artery. Also, a thick clivus can hold significant venous channels. The clival venous plexus extends along the basiocciput to the foramen magnum. Bone removal in this area should be done slowly as significant hemorrhage can occur. Occasionally, a drill may be required for bone removal. Both our patients underwent an effective repair of the clival defects via an endoscopic trans-sphenoidal approach.

CONCLUSION : Spontaneous clival leaks though rare, can be managed effectively via an endoscopic trans-sphenoidal approach. In case of CSF leaks within the sphenoid sinus, if the defect cannot be localized in the roof or the lateral recess, the clivus should be looked into as a possible site of leak.

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Fibrous Dysplasia of Temporal Bone

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Iqbal A. Muhammad Khyani

ABSTRACT: Fibrous dysplasia is characterized by replacement of normal bone by a variable amount of fibrous tissue and woven bone. The preferred sites include the diaphyses and metaphyses of long bones, ribs, pelvis, shoulder and craniofacial skeleton. We presents such a case because fibrous dysplasia rarely involves temporal bone and is also of particular interest to the otolaryngologist regarding management as it causes dysfunction that can be debilitating.

Key Words : Fibrous dysplasia, Temporal bone, craniofacial skeleton.

INTRODUCTION: Fibrous dysplasia (FD) is a benign, chronic, slowly progressive disease of fibro-osseous tissue. The disease is characterized by replacement of normal bone by a variable amount of fibrous tissue and woven bone¹. The term fibrous dysplasia was introduced by Lichtenstein in 1936². FD involves one or more bones but never all bones and it extends across a suture line into an adjacent bone. The preferred sites include the diaphyses and metaphyses of long bones, ribs, pelvis, shoulder and craniofacial skeleton. Rarely affects temporal bone³. The disease may be seen as unifocal (the monostotic form of the disease, MFD), multifocal (the polyostotic form of the disease, PFD) or part of McCune Albright Syndrome⁴. In MFD, single bone like a rib, the tibia or a facial bone, especially a jaw bone may be the site of a lesion. Diagnosis is made based on radiological findings and the modality of treatment is mainly conservative. However, surgery is reserved for preserving function and preventing complications¹. Fibrous dysplasia in the region of craniofacial bones is of particular interest to the otolaryngologist as it causes deformity and dysfunction that can be debilitating. We report this case because of uncommon site of disease and also the consequences of the disease on uncommon site was adequately managed with medical and surgical treatment.

CASE REPORT: 24 yr old man presented with complaints of off and on severe pain, decrease hearing and discharge from left ear. The history had begun 10 years ago. In clinical examination, there was bulging of post meal wall leads to total obstruction of external auditory canal. There was also foul smell yellowish discharge in outer part of meatus. Weber was lateralized to left ear. Rinne was positive at right and negative at left ear. In audiometric examination it was found that right ear, air conduction was 13 db, bone conduction was 13 db, left ear air conduction was 70 db, bone conduction was 17db. All blood biochemistry was normal. CT scan demonstrated a lesion involving almost all left temporal bone. The lesion had low density and the density was in accordance with fibrous dysplasia. The patient underwent the postauricular canal wall down mastoidectomy with wide meatoplasty under general anesthesia. In operation we saw that mass invaded the squamous part, obliterated the external auditory canal. The anatomical structures

were covered with dysplastic bone, so we couldnot find an anatomical land mark. The compact structure of petrotympanic suture, facial canal and semicircular canals were not seen. The attic and antrum was almost fully obliterated with bone. During working on facial canal, the facial nerve was completely covered with bone. There was small size cholesteatoma seen in the antrum. The ossicles were eroded and the tympanic cavity was filled with bone. The canal was downed. All portions of temporal bone (mastoid, tympanic, petrous and squamous) were almost found to be involved. There was not any postoperative complication with the exception of slight facial paresis.

DISCUSSION: The temporal bone may occasionally be involved by fibrous dysplasia. Involvement of the temporal bone results in progressive enlargement of the squamous, mastoid, and external canal. The temporal bone may be the site of monostotic, less frequently, of polyostotic. PFD is differentiated from MFD with severe signs of deformities, frequently spontaneous and recurrent fractures, manifest craniofacial and vertebral affects and tendency to occur on extremities⁵. Diagnosis of MFD is possible with radiographic signs and biopsy. In our case radiographic signs were enough for diagnosis⁴. Fibroblastic structure in the squamous and mastoid parts of temporal bone are in a tendency of growing⁶. The disease sometimes may cause preauricular pushing or progressive obliteration of external ear canal. The patient complains of a progressive hearing loss caused by increasing narrowing of the external auditory meatus^{5,6}. According to the involved region diplopia, smelling disorders, tinnitus, sensorineural hearing loss or vestibular disorders may happen. Fourth, sixth and seventh cranial nerve palsies may develop as the results of such mass lesions^{5,6}. Our case had conductive hearing loss and pain. The secondary complications of fibrous dysplasia may be secondary external cholesteatoma behind the canal stenosis or obliteration (16-40 %), erosion of the middle ear ossicles inner ear capsule and fallopian canal leading to a labyrinthitis and facial palsy⁷. Involvement of the middle and posterior cranial fossa dura, lateral sinus, jugular bulb and carotid artery may also be seen^{5,6}. The secondary complication of FD in our case was cholesteatoma. FD is a disease of younger people usually

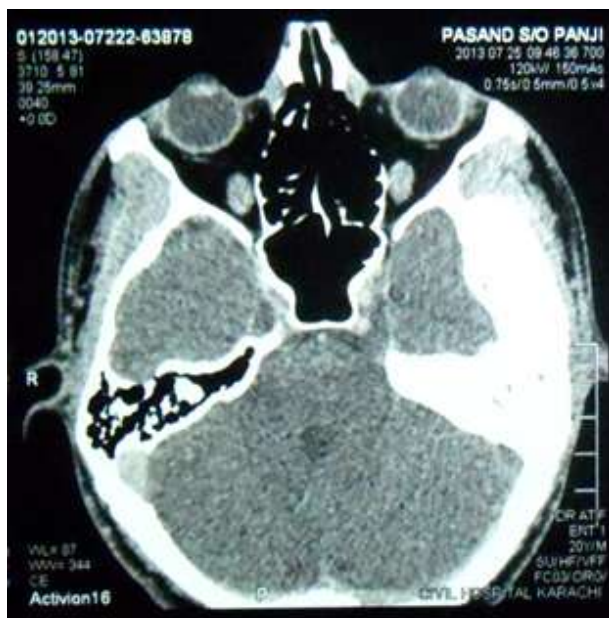


Table 2. Postoperative emergence agitation incidence and intensity

manifesting itself in childhood or early adolescence. MFD is frequently seen in puberty but PFD is generally seen in third decade or later. If the symptoms are not seen early, it may be diagnosed in late ages^{5,6}. In our case the disease was manifest after 16 age. FD disturbs anatomical relationships and causes displacements by proliferating tissue or by covering of this tissue⁴. The progressive growth of these lesions may cause difficulties in management. The pneumatized cellular structure is replaced by soft proliferative bone, it is impossible to find normal landmarks, so that vital structures such as facial nerve and semicircular canals are lost. These structures are easily vulnerated. Because of these reasons, the operation must be done by experienced surgeons⁸.

In the operation we performed, we could not find anatomical landmark. In our case patient had slight postoperative facial paresis which improved spontaneously in a few days. The Secondary complications must be prevented. In the involvement of temporal bone, the treatment depends upon the obliteration of external ear canal. If needed reconstruction must be made for external ear canal. The patients with FD must be followed up in regular periods. In progressive obliteration of external ear canal, a permanent stent can be placed⁸. In case our case because of cholesteatoma, postauricular canal-wall down mastoidectomy was performed and the cholesteatoma was excised and external ear canal was widened.

CONCLUSION: In conclusion, the treatment of FD depends upon the involved area. The patient without any complaint must be followed up. In considering that the anatomical landmarks cannot easily be found, an experienced surgeon must make operation as conservatively as possible.

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