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It should begin with the full title of the article. The abstract should not be more than 200 words. The abstract should state the purpose of the study or investigation, basic procedures, main findings and principal conclusion.

Key words
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Abbreviations
Standard abbreviations should be used whenever possible. The full term for the abbreviation should precede the first use of the abbreviation in the paper.

Ethical aspects
For ethical aspects the World Medical Association’s code of ethics in BMJ, 1964; 2: 177 will be considered. Authors should indicate in methods whether permission of relevant ethical committee have been taken if necessary.

Statistical analysis
Statistical analysis should be described in full detail to enable a knowledgeable reader with access to the original data to verify the reported results. Study design should be stated with details about randomization.

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Medicolegal Issues in ENT Practice

Introduction
In Europe, America and any other developed countries all doctors are working with medical insurance coverage. If there is any malpractice, negligence, any harm or even death occurs the patient or patient’s party can sue a case against that particular doctor and in most of the cases if that claim is proved then indemnity or compensations is paid by the insurance company. In Bangladesh we all are working without any insurance cover and for the last couple of years not only in ENT but many of our professional colleagues are facing many medicolegal issues, a lot of complains against physicians is raised and some of them have a direct impact on physicians life and career. In most of the cases in Bangladesh, media play a negative role, some third party come forward with ill motive and doctors are in a great harassment. Consent and miscommunications is one of most important points which lead to complains against surgeons in Otolaryngology and in other medical discipline. Documentations and using of unusual terms is another well known reason of errors in medicine general and ENT specifically. Addressing the law of each country regarding physicians who are practicing is very vital.

What is Malpractice?
Malpractice is described as negligence or misconduct that injures a patient who is treated under standard conditions by a physician or surgeon. Our local medical association has announced that malpractice is also involved when a patient incurs harm due to lack of information, experience or attention, and that can include failure or delay in diagnosis, improper performance, complication of surgery or inadequate postoperative management. In recent years, malpractice litigations against physicians have increased. Socioeconomic status of countries, innovations in medical practices, increased awareness in society, development of insurance systems, and high education level may be the cause of this increasing trend. Physicians should be educated in the medicolegal aspects of malpractice and awareness should be raised accordingly to overcome the situation.

Medicolegal Aspects
For a claim in negligence to succeed, the claimant must prove 3 things

1. That the doctor owed them a duty of care. If any patient consults a doctor, and doctor offers any advice or treatment the doctor has undertaken the duty of care towards that patient.

2. That the doctors practice fell below an acceptable standard of care. For many years, the Courts used the Bolam principle alone to judge the standard of medical care delivered. This principle states:“ he is not guilty of negligence if he has acted in accordance with a practice accepted as proper by a responsible body of medical men skilled in that particular art”

3. That the patient suffered harm as a direct result of that substandard care. This is often the hardest point of the three to prove and many claims fail. For example
a patient bringing a claim against a surgeon who did not diagnose cancer promptly would have to prove that this delay directly harmed his or her clinical outcome.

The claim process must commence within the required statutory time frame. If negligence is proven, it results in liability for compensation for the injured patient for the harm suffered as a result of the negligence.

Negligence in the context of Invalid Consent:
A patient may successfully sue his or her doctor in negligence if he or she proves that the information he or she was given and on which he or she based his or her consent to treatment was deficient in some way. If she or he can demonstrate this and convince the court the following:

a) He or she would not have agreed to treatment if he or she had been in possession of the correct information.
b) The harm he or she suffered was a direct result of this treatment. Then the claim may be successful.

Claims related to Otolaryngology
Medical negligence claims fall into three broad groups:

1. Delay in or failure to make a diagnosis.
2. A recognized complication occurs after a surgical procedure.
3. An adverse outcome of treatment (both medical and surgical).

In the first group the typical scenarios include a patient with vague otological symptoms later found to have an acoustic neuroma; patients with globus like symptoms who are subsequently found to have oesophageal cancer or otalgia with tongue base or tonsillar carcinoma.

In the second group the case may be argued on the point that the surgeon’s skills were inadequate but is more normally fought around the quality and content of the consent process. Typical scenarios include recurrent laryngeal nerve damage following thyroid surgery, facial nerve damage following parotid or mastoid surgeries, accessory nerve damage in neck dissection, orbital complications and CSF leak following endoscopic sinus surgery, reactionary or secondary haemorrhage following tonsillectomy.

In this situation the criticism of a surgeon’s skill is normally defended particularly if he or she performs regularly and he or she has audit data about it’s outcome, however it is an argument for avoiding occasional surgery. With regards to consent, the claimant will argue that the surgeon did not mention or explained details of any complications and had this been done, they would not have proceeded to that operation. Further it is extremely important to explain to the patient the option of no treatment at all, and the potential consequences of that. This can be more easily defended with supportive and thorough documentation.

Finally the third group represents a more difficult area and mostly due to lack of communication between the clinicians and patients. Often there are unrealistic expectations of outcome and a subsequent failure to acknowledge this in an angry patient. Typical scenarios include dissatisfaction with appearance after cosmetic surgery or rhinoplastic, failure to address symptoms with nasal surgery or poor hearing after ear surgery.

One study from the Department of Otolaryngology, Istanbul University, Medical Faculty by Mehmet et al showed that thyroidectomy is the main cause of malpractice claims, tonsillectomy is the most
common cause of death, and the second most common cause of malpractice claims.

Medical records:
The primary purpose of medical records is to support ongoing patient care, provide a crucial source of information in health care system. Records must.

a) Be clear, accurate and legible including date and time and duly signed by the doctor
b) Be made during or after each episode of patient care.
c) Record every consultation, discussions about patient,s care, possible complications of surgery, treatment outcome, any alternative to surgery, future management plan, palliative care etc.
d) Not be altered, amended or added after original episode of care.
e) Avoid abbreviations.
f) Record abnormal test results.
g) Records must be stored and retained for future use or research.

Unaware of common laws:
Despite the fact that judicial systems regarding malpractice differ between countries, similar risks, issues, and outcomes exist, and physicians are typically unaware of the medicolegal aspects of their specialty until faced with a lawsuit alleging malpractice. Therefore, all physicians should at least be aware of common legal terms and medicolegal aspects of their specialty, and duties that both a plaintiff and a defendant have in a case of malpractice. In our legal system, there are no substances in the field of criminal or civil law that regulate criminal and legal responsibility of physicians. In order for physicians to be legally accountable, an improper performance is needed. Investigation of malpractice claims is a technical matter and therefore the judge asks the expert doctors (member of NIFM) if there has been such a fault.

Conclusion
There is no guarantee to overcome any complaints in medicine or surgery but the following measures can be taken to minimize the risk.

a) Time is taken to establish a good relationship with the patient.
b) Time is taken to explain the diagnosis and any treatment plans and the patient should understand that. Informed consent is to be taken in every step of treatment stage.
c) Patient should not be forced to have surgery even it is a right decision.
d) Finally everything should be documented and stored for future reference.

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Surgical Outcome and Quality of Life After Total Laryngectomy in Advanced Laryngeal Cancer- A Study in Combined Military Hospital, Dhaka

Muhammad Ali Azad¹, Belayat H Siddiquee², AKM Asaduzzaman³, Faisal Bin Mohsin⁴, Mohammad Abul Hasnat⁵

Abstract

Introduction: Total laryngectomy is the gold standard treatment for advanced laryngeal cancer. Sacrifice of voice is one of the most important shortcomings of the procedure. Possibility of achieving good quality voice is greater with prosthesis compared to other method. Post laryngectomy voice rehabilitation with prosthesis yield excellent outcome in most of the cases. Swallowing, pulmonary and olfactory rehabilitation should be managed by multidisciplinary team for better quality of life (QoL).

Objectives: The purpose of this study was to observe the outcomes of voice, swallowing pulmonary and olfactory rehabilitation and QoL following total laryngectomy.

Methods: This cross sectional retrospective clinical study was conducted at the Head & Neck Oncology Unit, Combined Military Hospital (CMH), Dhaka. Total 57 candidates were selected. Diagnosis was done by thorough clinical examination, Fibre Optic Laryngoscopy. Contrast Enhanced Computed Tomography (CECT) scan of neck was done except few cases where MRI of neck was done for subtle cartilage erosion was suspected. Examination under anaesthesia, direct larangoscopy and biopsy was done for every cases. Candidates were post chemo-radiated/ radiated biopsy proven recurrent cases, clinically nonfunctional larynx with aspiration and radiologically evident of cartilage erosion. In all cases artificial voice prosthesis was used. All the laryngectomyes underwent voice, swallowing, pulmonary and olfactory rehabilitation in laryngectomy club of head & neck oncology unit, CMH Dhaka for a period of 3 months as per standard protocol.

Address of correspondence: Lieutenant Colonel (Dr.) Muhammad Ali Azad, Classified ENT Spl & Head - Neck Surgeon, Dept. of ENT and Head-Neck Surgery, Combined Military Hospital, Chattogram, Bangladesh. Mobile: +8801714056245, E-mail: aliazad101052@gmail.com
**Introduction:**
Total laryngectomy is still indispensable procedure in treating advanced or recurrent cancer of larynx and hypopharynx. The larynx has important functions in olfaction and respiration and is more than just an organ of voice production. Its removal requires rehabilitation of all three systems. Perhaps loss of voice is the most distressing to the patients as they lose power of communications and establishment of an acceptable voice is critical for successful psychological adjustment. Multidisciplinary team effort is mandatory to achieve optimal results and good QoL.

Prosthetic rehabilitation of voice in laryngectomized patient has become popular after the original article published by Singer and Blom (1980)\(^1\). Subsequently several high quality voice prosthesis were introduced and have been used successfully such as Panje\(^2\), Groningen\(^3\) etc. The possibility of achieving good voice is greater with prosthesis comparing with the esophageal voice. Now a days the provox voice prosthesis is the commonest prosthesis used. The first provox voice prosthesis manufactured by Atos Medical, Sweden in 1990. Several version of provox introduced till date. In 2009 the third generation provox vega with smart Inserter was introduced. In our study provox voice prosthesis and vega voice prosthesis were used\(^4-6\).

**Materials and Methods:**
This cross sectional retrospective study was conducted among the patients suffering from advanced laryngeal cancer had undergone total laryngectomy from Jan 2013 to Jan 2020 in the department of ENT & head-Neck surgery, Combined Military Hospital, Dhaka. Candidates were post chemo-radiated/ radiated biopsy proven recurrent cases, clinically non functional larynx with aspiration and radiologically evident of cartilage erosion.

**Results:** Among the 57 patients 42 of them are using voice prosthesis without any complications till to date. Voice rehabilitation started after wound healing & developed meaningful voice in around 6 weeks. Satisfactory speech & voice outcomes were observed near about 3 months. Voice quality was assessed by multivariate statistical analysis. Excellent voice was observed for 38 patients, good voice for 12 patients, fair voice for 05 patients and poor voice for 02 patients. Troubleshooting like mycotic infection developed in 6 patients which was managed by anti-fungal medication with regular appropriate cleaning, Pharyngocutaneous fistula developed in 5 patients, 3 healed later by pressure dressing and anticholinergic & 1 required exploration and flap reconstruction, 01 developed recurrent stomal stenosis which managed surgically by Y-V advancement. Prosthesis expelled out in 3 cases. 02 cases developed dysphagia due to tonicity of pharyngoesophageal (PE) segment & managed by botox injection. Significantly better voice & swallowing were reported by patients undergone laryngectomy alone in comparison with patients receiving adjuvant radiotherapy & patient undergoing salvage laryngectomy.

**Conclusion:** Awareness should be developed as sacrifice of voice box is no more a permanent comorbidity of total laryngectomy. Excellent voice can be developed by insertion of voice prosthesis as well as swallowing pulmonary and olfactory rehabilitation following laryngectomy for better of QoL.

**Key words:** Voice Prosthesis, Voice Rehabilitation, Quality of Life, Total Laryngectomy.
Detailed history, clinical examination and investigations were done and recorded in the form. Informed written consent was taken in each case. Methods of using the voice prosthesis with potential problems and also swallowing, pulmonary and olfactory rehabilitation were discussed with each patient preoperatively.

**Table I:**
The outcome of using voice prosthesis.

<table>
<thead>
<tr>
<th>Initiation</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Swallowing</td>
<td>After 14 days</td>
</tr>
<tr>
<td>Speech</td>
<td>After 21 days starting of semisolid diet from liquid.</td>
</tr>
</tbody>
</table>

**Table II:**
Post operative initiation of swallowing & speech Clinical Data N= 57

<table>
<thead>
<tr>
<th>Outcome</th>
<th>No</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>No complication</td>
<td>42</td>
<td>73.68</td>
</tr>
<tr>
<td>Mycotic infection</td>
<td>6</td>
<td>10.52</td>
</tr>
<tr>
<td>Fistula and closed</td>
<td>5</td>
<td>8.77</td>
</tr>
<tr>
<td>Expelled out</td>
<td>3</td>
<td>5.26</td>
</tr>
</tbody>
</table>

**Table-III:**
Showing clinical data of all patients (N=57).

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Finding</th>
</tr>
</thead>
<tbody>
<tr>
<td>MaleFemale</td>
<td>561</td>
</tr>
<tr>
<td>Age range (mean)</td>
<td>45-77 (58.6)</td>
</tr>
<tr>
<td>Indication of laryngectomy (site)</td>
<td>No. (%)</td>
</tr>
<tr>
<td>- Supraglottic</td>
<td>27 (47%)</td>
</tr>
<tr>
<td>- Glottic</td>
<td>16 (28%)</td>
</tr>
<tr>
<td>- Pyriform fossa</td>
<td>14 (25%)</td>
</tr>
<tr>
<td>Radiation No. (%)</td>
<td>31</td>
</tr>
<tr>
<td>- With Pectoralis Major Myofascial Flap</td>
<td>20 (35%)</td>
</tr>
<tr>
<td>- Without Pectoralis Major Myofascial Flap</td>
<td>11 (20%)</td>
</tr>
<tr>
<td>Upfront No. (%)</td>
<td>26 (45%)</td>
</tr>
<tr>
<td>Reconstruction by FALT No. (%)</td>
<td>1 (1.75%)</td>
</tr>
<tr>
<td>Voice rehabilitation No. (%)</td>
<td></td>
</tr>
<tr>
<td>- Primary Tracheo Esophageal Puncture (TEP)</td>
<td>52 (91%)</td>
</tr>
<tr>
<td>- Secondary TEP</td>
<td>05 (9.0%)</td>
</tr>
<tr>
<td>- Primary tonicity control, TEP- Myotomy</td>
<td></td>
</tr>
<tr>
<td>- Secondary tonicity control, PE</td>
<td></td>
</tr>
<tr>
<td>- Botox injection</td>
<td>2 (3.50%)</td>
</tr>
<tr>
<td>Follow up No. (%)</td>
<td></td>
</tr>
<tr>
<td>- Days with provox in situ till date</td>
<td>54 (94.73%)</td>
</tr>
<tr>
<td>- Days without Provox till date</td>
<td>03 (5.26%)</td>
</tr>
</tbody>
</table>
Results:
In this series total 57 patients were studied. Among the 57 patients 42(73.68%) patients had no complication with excellent voice outcome. We found 7(12.28%) patients having mycotic infection. Prosthesis had to be changed in these 7 patients. We found 5(8.77%) patient with tracheo-oesohageal fistula. Expelled out 3.

Mean voice quality (MVQ) score:
• To allow the use of the voice quality in multivariate statistical analysis, a mean voice quality (MVQ) score was established by calculating the sum of the individual ratings (1-5) during the whole study period, divided by the number of voice quality evaluations per patient.
• Mean voice scores were rounded (excellent, e" 4.5; good, 3.5 - 4.4; etc.).

The assessment of voice quality was performed using the following 5 points scale rating:
• Excellent 5
• Good 4
• Fair 3
• Poor 2
• No voice 1

Excellent and good indicate a fluent and intelligible voice used under all social circumstances, and excellent was used only when the patient’s voice approached normal.

Fair indicates a somewhat less satisfactory voice that was still used as the main method of communication.

Poor indicates a voice with unsatisfactory quality that was not useful as a primary communication method.

Discussion:
Rehabilitation following total laryngectomy is multidimensional. Voice rehabilitation is one of them. Others are pulmonary and olfactory.
Voice rehabilitation:
For the last 140 years the methods of voice rehabilitation is gradually improving. There are three methods of rehabilitation of voice in laryngotomies patient.

1. Oesophageal voice.
2. Electrolarynx.
3. Tracheo-esophageal puncture (TEP).

In our study all the 57 cases were rehabilitated with TEP with provox and vega voice prosthesis of 6mm and 8 mm internal diameter according to the on table measurement of TE party wall. This procedure for restoration of speech in patients who had undergone total laryngectomy was first introduced by Blom and Singer in 1979. This valve formed a one way conduit for air into the oesophagus and also prevents leakage of oesophageal contents into the airway. Voice prosthesis is actually a one way valve made of medical grade silicon. This is a barrel shaped device with two flanges. One flange enters the oesophagus while the other one rests in the trachea. It actually fits snuggly into the tracheo-oesophageal puncture wound. This prosthesis is provided with a unidirectional valve at its oesophageal end. TEP can be performed either immediately after laryngectomy or 6 weeks following successful laryngectomy. TEP performed along with laryngectomy is known as primary TEP and if performed 6 weeks after laryngectomy it is known as secondary TEP. It should be state that radiotherapy poses no threat to TEP. This procedure initially was reserved for patients who have got flap reconstruction during primary surgery, failed to acquire oesophageal speech even after prolonged effort, and are displeased with the voice produced by artificial larynx. Currently primary TEP is getting popular.
Anatomical site for puncture is 8 - 10mm from the cut edge of trachea.

TEP should ideally be performed in the midline, thereby decreasing the risk of bleeding from midline vessels. Structures that need to be penetrated during TEP procedure include:

1. Membranous posterior wall of trachea.
2. Oesophagus (Consists of 3 muscles layers coated with oesophageal mucosa).
3. Interconnecting tissue in the tracheo-oesophageal space.

Trouble shooting of TEP:
1. Fungal colonization.
2. Leakage through prosthesis.
3. Leakage around prosthesis.
4. Immediate aphony / dysphonia.
5. Hypertonicity problems.
6. Delayed speech.

**Pulmonary rehabilitation:**
After total laryngectomy patients have excessive sputum production, coughing with forced expectoration. The heat moisture exchanger (HME) protects the airway, maintains a more natural tracheal environment, and decreases mucous production and coughing as the trachea is more protected from drying and cooling (which can cause thick and crusty mucous to form). For HME restoration of upper respiratory tract function is possible.

**Olfaction rehabilitation:**
There is anosmia or hyposmia following laryngectomy due to odor molecules cannot reach olfactory epithelium for by passing and creating new airway. Impaired olfaction leads to reduced flavor, food enjoyment and reduced food intake. This reduces the QoL significantly.

Hilgers et al. developed nasal airflow inducing manoeuvre (NAIM) in which repeated extended yawning movement is performed lowering the jaw keeping the lips securely closed. This maneuver induces negative pressure in the oral cavity and oropharynx which generates nasal airflow, enabling odorous substances to reach the olfactory epithelium again.

50% of the patients can be rehabilitated by NAIM procedure. Birgit Risberg-Berlin confirmed that the NAIM is easy to learn and rapidly improves smell and taste.

A single intervention session is sufficient, but many patients benefit from repeated training.

**Conclusion:**
Nobody is ready to sacrifice his voice at any cost. Total laryngectomy with rehabilitation
of voice, pulmonary and olfaction is a new dimension for post laryngectomy rehabilitation in recent advancement of surgical skill and technology. It improves the quality of life tremendously. The success of the operation has aroused inspiration amongst the patients and their families as well.

References:
Incidence of Thyroid Cancer in Thyroid Swelling, Study of 200 Cases

M A Matin¹, Mohammad Saiful Islam², Md. Abdur Razzak³, Mohosana Khanam³, Md. Abdullah Al Harun², Shahjahan Kabir⁴, AKM Saifuddin⁴, AKMA Sobhan⁴

Abstract:
Objective: The incidence of thyroid cancer has rapidly increased in the United States (US) and other developed countries over the past 30 years but there is no study to find out the true incidence of thyroid cancer in Bangladesh. The aim of this study is to compare FNAC with histopathology reports and to find out the true incidence of thyroid malignancy in thyroidectomy patients presenting with thyroid swelling.

Methods: This is a prospective study of 200 thyroid swelling patients underwent thyroid surgery done at Shaheed Suhrawardy Medical College Hospital, a tertiary Care Hospital in Dhaka from July 2017 to December 2020. FNAC and histopathology reports were studied to find out the incidence of benign and thyroid malignancy among the thyroid swelling.

Results: The age of the patients ranged from 8 to 75 years. The mean age was 37.2 years. There were 156 female and 44 male patients with female male ratio 3.54:1. Diagnostic categorization of 200 thyroid swelling underwent surgery, FNAC based on Bathesda classification showed that 163 (81.5%) cases were cytologically benign, 37 (18.5%) cases were malignant category. Out of 200 cases histopathology showed 134 cases(67.0%) are benign and 66(33.0%) are malignant thyroid swelling. Among the benign lesions 96.31% are colloid goiter and among the malignant lesions 93.4% are papillary thyroid carcinoma.

Conclusion: Although FNAC is an essential diagnostic test to rule out thyroid malignancy but histopathological examination is the only way to give true incidence of thyroid malignancy among the thyroid swelling and it is observed that there is high incidence of thyroid malignancy(33.0%) among the thyroid swelling patient underwent thyroid surgery.

Key words: FNAC, Histopathology, Thyroid cancer

Introduction:
The incidence of thyroid cancer has increased dramatically during the past three decades and it is now the fastest growing cancer in women¹. Bangladesh especially North Bengal area is an endemic zone for iodine deficiency goitre and one of the aetiology of thyroid cancer is iodine deficiency. They present as

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visible neck swelling which moves on
deglutition. Any patient presented with thyroid
swelling are routinely investigated for
ultrasonogram of the thyroid gland, serum TSH
and FNAC. Final diagnosis requires
morphological examination for which
histopathological examination becomes
mandatory test. In 1870 Rugu and his
associate Joham Vent have first advocated
surgical biopsy as an essential tool. The
diagnostic method of FNAC was first
published in 1883 by Leyden. But the
diagnosis of thyroid swellings using aspiration
cytology was first reported by Martin and Ellis
in 1930. FNAC, however has limitation
related to specimen adequacy, sampling
techniques, skill of performing the procedure,
interpretation of the aspirate, overlapping
cytological features between benign and
malignant follicular neoplasm and also in the
detection of some papillary carcinoma
associated with other pathology like
multinodular goiter, cystic changes. Mundasad et al had done a comparative study
between FNAC and histopathology and
founded that FNAC had a sensitivity(52.6%),
specificity(86.6%) and accuracy(79.1%) for
thyroid malignancy.

Aims and Objectives: This study was carried
out to see the true incidence of benign and
malignant thyroid lesions among the thyroid
swellings after histopathological examinations
following thyroidectomy.

Methods:
This cross sectional study was done among
patients undergoing thyroidectomy between
July 2017 to December 2020 at Shaheed
Suhrawardy Medical College Hospital,
Bangladesh. The patients were selected
consequently as and when they presented
during the study period considering inclusion
and exclusion criterias. The selected patients
were examined clinically and routine
ultrasonography, TSH, FNAC, routine
haematological investigations, Chest X-ray
ECG, CT scan if indicated were done. All
patients FNACs were done by two senior
cytologists. All surgeries were done by the
senior surgical staffs and all thyroidectomies
specimens were examined by two senior
histopathologists.

Statistical analysis
The data collected was analysed using SPSS
version 20 and depicted using descriptive
statistics.

Inclusion criteria
Patients with thyroid swelling with normal
thyroid hormone profile undergoing
thyroidectomy.

Exclusion criteria
Patients of thyroid swelling with hyper or hypo
thyroid function, patients with co-morbidities,
unfit for surgery, patients who refused surgery
and inoperable thyroid malignancy were
excluded from the study.

Results:
The age of the patients ranged from 8 to 75
years with a mean age 37.2 years (Table I)
The thyroid lesions were more common in
females than male in a ratio of 3.54:1 (table
II). Table III shows FNAC findings of 200 cases
where 163 are benign and 37 cases are
malignant lesion with benign malignant ratio
is 4.4:1. Among the benign lesions the most
common lesion is multinodular or colloid
goiter (78.5%). Table IV shows out of 37
malignant cases of FNAC finding, 94.56% is
papillary carcinoma. Histopathological
examinations of all 200 thyroidectomy
specimens showed 124 cases (62%) are
colloid goiter and 59 cases (29.5%) are
papillary carcinoma (Table V). Table VI shows
incidence of benign and malignant lesions
among 200 specimens. There are 134 (67%)
benign lesions and 66(33%) malignant lesions, so approximately benign and malignant ratio is about 2:1 which is very worrying. Finally among the thyroid cancer about 93.4% is papillary carcinoma (Table VII).

**Table I :**
*Age distribution of thyroidectomy patients (n=200)*

<table>
<thead>
<tr>
<th>Age in yrs</th>
<th>No. of patients</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>8-20</td>
<td>7</td>
<td>3.5</td>
</tr>
<tr>
<td>21-30</td>
<td>36</td>
<td>18</td>
</tr>
<tr>
<td>31-40</td>
<td>74</td>
<td>37</td>
</tr>
<tr>
<td>&gt; 40</td>
<td>83</td>
<td>41.5</td>
</tr>
</tbody>
</table>

Mean age 37.2

**Table II :**
*Sex distribution (n=200)*

<table>
<thead>
<tr>
<th>Sex</th>
<th>No. of patients</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female:</td>
<td>156</td>
<td>78</td>
</tr>
<tr>
<td>Male:</td>
<td>44</td>
<td>22</td>
</tr>
</tbody>
</table>

Female: Male = 3.54:1

**Table III :**
*FNAC of thyroid swelling (n=200)*

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>No. of patients</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nodular or colloid goiter</td>
<td>157</td>
<td>78.5</td>
</tr>
<tr>
<td>Papillary thyroid</td>
<td>35</td>
<td>17.5</td>
</tr>
<tr>
<td>Follicular lesion</td>
<td>4</td>
<td>2.0</td>
</tr>
<tr>
<td>Lymphocytic thyroiditis</td>
<td>2</td>
<td>1.0</td>
</tr>
<tr>
<td>Non Hodgkin’s lymphoma</td>
<td>1</td>
<td>0.5</td>
</tr>
<tr>
<td>Medullary carcinoma thyroid</td>
<td>1</td>
<td>0.5</td>
</tr>
</tbody>
</table>

**Table IV :**
*FNAC diagnosis of thyroid malignancy (n=37)*

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>No. of patients</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Papillary carcinoma</td>
<td>35</td>
<td>94.56</td>
</tr>
<tr>
<td>Follicular carcinoma</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Medullary carcinoma</td>
<td>1</td>
<td>2.7</td>
</tr>
<tr>
<td>Non Hodgkin’s lymphoma</td>
<td>1</td>
<td>2.7</td>
</tr>
</tbody>
</table>

**Table V :**
*Histopathological diagnosis of thyroid swelling (n=200)*

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>No. of patients</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Colloid/MNG</td>
<td>124</td>
<td>62.0</td>
</tr>
<tr>
<td>Lymphocytic thyroiditis</td>
<td>8</td>
<td>4.0</td>
</tr>
<tr>
<td>Follicular adenoma</td>
<td>2</td>
<td>1.0</td>
</tr>
<tr>
<td>Papillary carcinoma</td>
<td>59</td>
<td>29.5</td>
</tr>
<tr>
<td>Hurthle cell adenoma</td>
<td>3</td>
<td>1.5</td>
</tr>
<tr>
<td>Follicular carcinoma</td>
<td>2</td>
<td>1.0</td>
</tr>
<tr>
<td>Medullary carcinoma</td>
<td>1</td>
<td>0.5</td>
</tr>
<tr>
<td>Non Hodgkin’s lymphoma</td>
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<td>0.5</td>
</tr>
</tbody>
</table>

**Table VI :**
*Incidence of benign and malignant lesions based on histopathology (n=200)*

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>No. of patients</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benign lesions</td>
<td>134</td>
<td>67.0</td>
</tr>
<tr>
<td>Malignant</td>
<td>66</td>
<td>33.0</td>
</tr>
</tbody>
</table>

Benign: Malignant = 2:1 (approx)
Table VII:
Incidence of thyroid cancer based on histopathology (n=66)

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>No. of patients</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Papillary carcinoma (including Hurthle cell adenoma)</td>
<td>62</td>
<td>93.4</td>
</tr>
<tr>
<td>Follicular carcinoma</td>
<td>2</td>
<td>3.03</td>
</tr>
<tr>
<td>Medullary carcinoma</td>
<td>1</td>
<td>1.5</td>
</tr>
<tr>
<td>Non Hodgkin’s lymphoma</td>
<td>1</td>
<td>1.5</td>
</tr>
</tbody>
</table>

Discussion:
The incidence of thyroid cancer has rapidly increased in the United States (US) and other developed countries over the past 30 years. Although some researchers believe this is a true increase in thyroid cancer, but this increase is due to better diagnostic testing such as ultrasonography and fine-needle aspiration biopsy, resulting in the detection of disease that is unlikely to cause symptoms or death of the patient.

Other countries have seen similar increases in thyroid cancer. From 1993 to 2011, South Korea witnessed a 15-fold increase in thyroid cancer with nearly the entire increase attributed to papillary cancers. Davies and Welch also showed, using the SEER program and data, that the rates of follicular, medullary and anaplastic thyroid cancers show no significant change from 1973 to 2002. Our study also found similar result of increasing incidence of thyroid cancer and most of which are papillary carcinoma. The most important part of our study is limitation of FNAC which includes false negative result and false positive results. Sikder had done accuracy of fine needle aspiration cytology and had found that accuracy was 90% and sensitivity was 68.75%. Bloch had done a comparison study between FNAC and histopathology and had found accuracy of FNAC was 91.6%.

In our study false positive was 7 and false negative was 27 out of 200 thyroidectomy patients and overall sensitivity were 57.8%, specificity 95%, PPV 84% and NPV 83.22%.

Conclusion:
As the incidence of thyroid cancer is increased over the last decade. It is also increased in Bangladesh. Our study observed 33% cases are thyroid cancer among the thyroid swelling underwent thyroid surgery. Ultrasonography and FNAC are both essential diagnostic tool for thyroid swelling but final diagnosis to rule out thyroid cancer is surgical excision and biopsy. In our study benign to malignant ratio is about 2:1 so FNAC proven benign lesions should not left untreated.

References:


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10. Kent WD, Hall SF, Isotalo PA, Houlden RL, George RL, Groome PA. Increased incidence of differentiated thyroid carcinoma and detection of subclinical disease. CMAJ. 2007; 177:1357–1361


Comparison between Conventional Microdissection and CO\textsubscript{2} Laser in the Treatment of Vocal Cord Polyp

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Abstract:

Background: Vocal cord polyp usually arises from the epithelium and the lamina propria. Minimally invasive dissection procedures are employed to treat these vocal cord polyps for an effective outcome. Two types of microsurgical techniques were developed gradually and practiced namely, the conventional laryngeal microsurgery, which involves the use of cold instruments and the laryngeal laser micro-surgery.

Objective: To compare the conventional cold dissection and CO\textsubscript{2} laser methods in the treatment of vocal cord polyp.

Methods: A randomized prospective study was conducted at the Department of Otolaryngology-Head & Neck Surgery, at Bangabondhu Sheikh Mujib Medical University (BSMMU) between July 2017 and June 2019. A total of 60 cases were studied on the following parameters: a. Visual analysis on stroboscopy b. Voice analysis –GRBAS (grade, roughness, breathiness, asthenia, strain) indices c. Duration of surgery d. Peroperative bleeding.

Results: During first postoperative assessment, both groups had the normal symmetrical waves, while 50% of cases still had aperiodicity but all patients had the near normal periodicity in the second postoperative assessment. Regarding glottic closure, during preoperative assessment, almost all patients had incomplete glottic closure due to mass lesion as polyps. During first postoperative assessment, glottic closure was found to be better in group B (83% of cases) than group A (76% of cases), while during second postoperative assessment, all patients of both groups had around 95% glottic closure. The mean duration of laser technique (7.1 ± 1.1 minutes) was less than the conventional technique time (15.6 ± 1.9 minutes), also mean of operative bleeding of laser technique (zero pack) is less than the conventional two (2 packs).

Conclusion: There is no significant difference between both groups in all parameters except operative time and bleeding, as laser technique has less time and clear field.

Keywords: Conventional microlaryngeal surgery, CO\textsubscript{2} laser, Stroboscopic examination, GRBAS indices

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Introduction:
Vocal cord polyp usually arises from the epithelium and the lamina propria. The incidence of vocal cord polyp has been increasing due to vocal abuse. Misuse of voice lead to excessive mechanical stress and trauma in the membranous portion resulting in wound formation in the vocal fold leading to development of vocal cord polyp. The pathological changes occur within the superficial layer of the lamina propria. Minimally invasive dissection procedures are employed to treat these vocal cord polyp for an effective outcome. Two types of microsurgical techniques were developed gradually and practiced namely, the conventional laryngeal microsurgery, which involves the use of cold instruments and the laryngeal laser micro-surgery.

The aim of micro-laryngeal surgery is to restore the normal function of vocal folds and to avoid injury of deep layers to prevent scarring of vocal folds. The cold knife is the conventional method to remove superficial lesions of vocal folds. The lesions are micro dissected from the superficial layers preserving the deep layer of lamina propria and the vocal ligament to help good healing and avoid scarring of vocal folds. Nowadays, there is a great development in using the laser in micro-laryngeal surgeries. The CO$_2$ laser allows surgeons to achieve better intra-operative homeostasis, minimal tissue damage and manipulation. Using laser makes it easy for the surgeon to resect superficial lesions without affecting the waveform of the vocal fold mucosa. In this study, both micro surgical techniques by cold steel and laser have been compared in the management of vocal cord polyp. The groups were assessed through vocal cord morphological observation by video stroboscopy and by comparative analysis of subjective voice assessment parameters using GRBAS. The GRBAS scale is an expert auditory perceptual assessment to evaluate the grade of dysphonia of the voice. The severity of dysphonia is quantified under five parameters: G (grade), which represents overall voice quality, R (roughness): irregular glottic pulses, B (breathiness): turbulent air leakage through an insufficient glottic closure, A (asthenicity): weakness in the spontaneous phonation, S (strain): an excessive force associated with spontaneous phonation. Each item is graded from 0 to 3: 0 = no perceived abnormality, 1 = mild abnormality, 2 = moderate abnormality and 3 = severe abnormality. Stroboscopic examination is an expert subjective assessment of vocal folds which examines its function and biomechanics, so it can determine the myriad of vocal fold pathologies. Specifically, it evaluates several parameters of the vibration cycle, including fundamental frequency, periodicity, closure of the glottis, and vocal fold symmetry.

Aims and Objectives:
The aim of the study is to compare the conventional cold dissection and CO2 laser methods in treatment of vocal cord polyp.

Methods:
A randomized prospective study was conducted at the Department of ENT and Head-Neck Surgery, at Bangabondhu Sheikh Muzib Medical University (BSMMU) between July 2017 and June 2019. A total of 60 cases were studied on the following parameters:

a. Visual analysis on stroboscopy
b. Voice analysis – GRBAS indices
c. Duration of surgery
d. Peroperative bleeding

Written and informed consent was taken prior to surgery for each patient.
Exclusion criteria:
1. Age below 17 years
2. Professional singers and actors
3. Patient unfit for general anaesthesia
4. Pregnant women and mentally impaired persons

All patients were encouraged to have a trial of conservative medical and rehabilitative therapy before consideration of surgery. This included voice therapy; general voice hygiene efforts such as voice moderation, hydration, mucolytics and humidification; smoking cessation; and anti-reflux diet with or without anti-reflux medications.

Patients were generally taken up for surgery on persistence of symptoms on failure of medical treatment for at least 6 weeks. Patients were then assigned to the following two groups by the total consecutive sampling method:

A. Microdissection group
B. Laser excision group

All the patients underwent surgery under general anaesthesia. Laser safe endotracheal tubes were used for intubation in patients of the laser excision group. Operating microscope at 400-mm focal length through a suspension laryngoscope was used for all surgeries.

Group A
The vocal fold lesion was pulled to the midline by a forceps and excision was done along vocal folds edge by micro-scissor. Homeostasis was achieved by a compression on the wound by a piece of gauze soaked with adrenaline.

Group B
All laser precautions were applied. The Carl Zeiss CO₂ laser with 2 W power, super-pulse mode and interval 0.2 ms were connected to the microscope by a micromanipulator with 250-mm spot size. The surgeon put a piece of gauze in subglottic space to protect the endotracheal wall from a laser beam. The vocal fold lesion was pulled to the midline by forceps and excision was done along the edge of vocal folds by using CO₂ laser. A piece of gauze soaked with adrenaline was used to clean surgical wounds. The vocal fold’s muscle was protected to avoid deep injury and scar.

All patients were received intraoperative corticosteroids to prevent laryngeal edema then turned over to anesthesiologist for extubation and all lesions were sent to histopathological examination. All surgical interventions were done by the same surgeon.

Postoperative care and follow-up:
All patients have received antibiotics, anti-inflammatory and anti histamine, H₂ blocker drugs, and were counseled to have voice rest, plenty of fluids, and to avoid smoking. Both groups were compared accordingly. Operative time: measured in minutes. (Conventional method: the operative time was estimated from first mucosal incision by micro scissor till completion of homeostasis by a piece of gauze soaked with adrenaline & CO₂ laser method: the operative time was estimated from first mucosal incision by CO₂ laser till completion of hemostasis.) II. Bleeding: was measured by number of pieces of gauze used for hemostasis. III. Functonal assessment was done three times on the basis of stroboscopic examination and GRBAS indices: first assessment was done before the surgical intervention, 2nd assessment was done after 1 month of the operation and the final assessment was done after 3 months of the operation.

Data management:
Data were analyzed by SPSS version 18. Normally distributed scale data were described as mean and standard deviation. Categorical data were presented as number and percent. Comparison between groups regarding a categorical variable was done using chi-square test.
Results:
Group A was 30 patients underwent the conventional cold dissection method and group B was 30 patients underwent CO₂ laser dissection method. Here we compared between the two methods regarding GRBAS scale, stroboscopic examination, surgical time and amount of bleeding.

Preoperative assessment by stroboscopic examination revealed that all patients in both groups had incomplete glottic closure, asymmetrical motion, absent mucosal wave, & decreased amplitude with aperiodicity. During post-operative assessment, there was no statistically significant difference between both groups regarding glottis closure, asymmetrical motion, mucosal wave, amplitude, and periodicity. Also there was no statistically significant difference between both groups regarding their quality of voice parameters (GRBAS scale).

Table I:
Stroboscopic Findings in Group A during Preoperative, First Postoperative and Second Postoperative Assessments.

<table>
<thead>
<tr>
<th>Finding</th>
<th>Pre operative assessment n (%)</th>
<th>1st post operative assessment n (%)</th>
<th>2nd post operative assessment n (%)</th>
<th>P value (bet. Pre-op and 2nd post-op assessment)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glottic Closure</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Incomplete</td>
<td>30 (100%)</td>
<td>7 (23.33%)</td>
<td>2 (6.66%)</td>
<td>&lt;.032</td>
</tr>
<tr>
<td>Complete</td>
<td>0 (0%)</td>
<td>23 (76.66%)</td>
<td>28 (93.33%)</td>
<td></td>
</tr>
<tr>
<td>Symetrical motion</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asymetrical</td>
<td>30 (100%)</td>
<td>5 (16.66%)</td>
<td>3 (10%)</td>
<td>&lt;.036</td>
</tr>
<tr>
<td>Symetrical</td>
<td>0 (0%)</td>
<td>25 (83.33%)</td>
<td>27 (90%)</td>
<td></td>
</tr>
<tr>
<td>Mucosal wave</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Absent</td>
<td>30 (100%)</td>
<td>10 (33.33%)</td>
<td>2 (6.66%)</td>
<td>&lt;.032</td>
</tr>
<tr>
<td>Present</td>
<td>0 (0%)</td>
<td>20 (66.66%)</td>
<td>28 (23.33%)</td>
<td></td>
</tr>
<tr>
<td>Amplitude</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Decreased</td>
<td>30 (100%)</td>
<td>8 (26.66%)</td>
<td>5 (16.66%)</td>
<td>&lt;.045</td>
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<tr>
<td>Normal</td>
<td>0 (0%)</td>
<td>22 (73.33%)</td>
<td>25 (83.33%)</td>
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<tr>
<td>Periodicity</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aperiodic</td>
<td>30 (100%)</td>
<td>15 (50%)</td>
<td>3 (10%)</td>
<td>&lt;.036</td>
</tr>
<tr>
<td>Periodic</td>
<td>0 (0%)</td>
<td>15 (50%)</td>
<td>27 (90%)</td>
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</table>
Table II:
Stroboscopic finding in Group B during pre-operative, first post operative and second post operative assessment.

<table>
<thead>
<tr>
<th>Finding</th>
<th>Pre operative assessment n (%)</th>
<th>1st post operative assessment n (%)</th>
<th>2nd post operative assessment n (%)</th>
<th>P value (bet pre-op and 2nd post op. assessment)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glottic Closure</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Incomplete</td>
<td>30 (100%)</td>
<td>5 (16.66%)</td>
<td>1 (3.33%)</td>
<td>&lt; .012</td>
</tr>
<tr>
<td>Complete</td>
<td>0 (0%)</td>
<td>25 (83.33%)</td>
<td>29 (96.66%)</td>
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<tr>
<td>Symetrical motion</td>
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</tr>
<tr>
<td>Asymetrical</td>
<td>30 (100%)</td>
<td>4 (13.33%)</td>
<td>2 (6.67%)</td>
<td>&lt; .032</td>
</tr>
<tr>
<td>Symetrical</td>
<td>0 (0%)</td>
<td>26 (86.66%)</td>
<td>28 (93.33%)</td>
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<tr>
<td>Mucosal wave</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Absent</td>
<td>30 (100%)</td>
<td>5 (16.66%)</td>
<td>2 (6.67%)</td>
<td>&lt; .032</td>
</tr>
<tr>
<td>Present</td>
<td>0 (0%)</td>
<td>25 (83.33%)</td>
<td>28 (93.33%)</td>
<td></td>
</tr>
<tr>
<td>Amplitude</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Decreased</td>
<td>30 (100%)</td>
<td>7 (23.33%)</td>
<td>4 (13.33%)</td>
<td>&lt; .041</td>
</tr>
<tr>
<td>Normal</td>
<td>0 (0%)</td>
<td>23 (76.67%)</td>
<td>26 (86.33%)</td>
<td></td>
</tr>
<tr>
<td>Periodicity</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aperiodic</td>
<td>30 (100%)</td>
<td>16 (53.33%)</td>
<td>3 (10%)</td>
<td>&lt; .036</td>
</tr>
<tr>
<td>Periodic</td>
<td>0 (0%)</td>
<td>14 (46.66%)</td>
<td>27 (90%)</td>
<td></td>
</tr>
</tbody>
</table>

Table III:
Comparison between Group A and Group B regarding operating time (min)

<table>
<thead>
<tr>
<th>Operating time</th>
<th>Group A (30 cases)</th>
<th>Group B (30 cases)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>15.60</td>
<td>7.1</td>
<td></td>
</tr>
<tr>
<td>SD</td>
<td>1.9</td>
<td>1.1</td>
<td></td>
</tr>
<tr>
<td>Median</td>
<td>15.1</td>
<td>6</td>
<td>&lt; .001</td>
</tr>
<tr>
<td>Minimum</td>
<td>11</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Maximum</td>
<td>20</td>
<td>10</td>
<td></td>
</tr>
</tbody>
</table>

In this study, there is a statistically significant difference between both groups regarding the operative time and bleeding in favor of laser technique. The mean duration of laser technique (7.1±1.1 minutes) was less than the conventional technique time (15.6±1.9 minutes), also mean of operative bleeding of laser technique (zero pack) is less than the conventional two (2 packs).

Discussion:
Newer microlaryngeal instruments have been developed which allow precise microscopic excision of vocal fold lesions with preservation of the deep layer of the lamina propria and muscle layer. Development of the videostroboscope has allowed surgeons to assess the impact of their surgery on the subtle features of vocal fold vibration. Stroboscopy provides excellent real time
mucosal wave movement endoscopically and helps in evaluating pattern of mucosal fold vibration, Regrowth of normal mucosa and subsequent normal waveforms was seen on videostroboscopy following microlaryngeal excision of benign lesions\textsuperscript{16,19}.

In this study, during preoperative assessment, stroboscopic examination revealed that asymmetry and aperiodicity of mucosa of vocal folds were the main finding in both groups. During first postoperative assessment, both groups had the normal symmetrical waves, while 50\% of cases still had aperiodicity but all patients had the near normal periodicity in the second postoperative assessment. The mucosal wave had marked improvement in both groups and there was no remarkable difference in the degree of improvement of wave amplitude. Regarding glottic closure, during preoperative assessment, almost all patients had incomplete glottic closure due to mass lesion as polyps. During first postoperative assessment, glottic closure was found to be better in group B (83\% of cases) than group A (76\% of cases), while during second postoperative assessment, all patients of both groups had around 95\% glottic closure. In this study, the laser had better results during the first postoperative assessment but there was no significant difference between both techniques during the second postoperative assessment. This is matched with previous studies like Benninger who did not detect any clinical outcome differences in 37 patients with vocal fold polyps, cysts, and nodules and were treated by micropot CO\textsubscript{2} laser excision or by conventional microdissection. Video stroboscopic evaluation of vocal folds edges and mucosal waves showed significant improvements from preoperative and postoperative assessment in both groups. In addition, the symmetrical phase had the same trends\textsuperscript{11}. In this study, preoperative and postoperative perceptual voice analysis was done by one rater using the GRBAS scale. During second postoperative assessment, there was no statistically significant difference between both groups regarding their quality of voice parameters (GRBAS; P value >0.05) Zhang et al compared between CO\textsubscript{2} laser and conventional methods in management of vocal fold polyps, the evaluation of voice outcome by GRBAS scale showed no significant difference between both techniques after 3 months follow up\textsuperscript{4}.

Divakaran et al used GRBAS scale to evaluate the voice of patients of benign vocal fold lesions after CO\textsubscript{2} laser, which was treated by super pulsed mode at 6 W power. They followed up the patients at 2, 6 weeks and 3 months after surgery. There was a significant improvement in the GRBAS scale, they found that preoperative median of GRBAS score was 9, which improved to 6 after 2 weeks and reached score of 2 after 3 months of surgery\textsuperscript{14}. In this study, there is a statistically significant difference between both groups regarding the operative time and bleeding in favor of laser technique. The mean duration of laser technique (4.9 § 1.2 minutes) was less than the conventional technique time (13.4 § 2 minutes), also mean of operative bleeding of laser technique (zero pack) is less than the conventional one (1.7 packs).

Motta et al mentioned that the value of the CO\textsubscript{2} laser comes from giving better operative hemostasis and no direct tissue contact of the instrument is necessary for resection, improving the view of the operative field giving better working conditions for the surgeon\textsuperscript{15}. There are many factors that detect the thermal effects of the laser on tissue, one of them is the physical energy of the chosen laser beam, also water content and tissue vascularity. In general, the use of laser with 5-10 W of power, pulse duration of 0.01\textsuperscript{0.05} seconds and a micro spot of 250 mm at 400mm
focal length is preferred to minimize thermal side effects\textsuperscript{14}. However, the definite adjustment of laser should be selected according to the practical needs of the surgeon, e.g., higher energy and shorter focus for cutting and lower energy and longer focus for coagulation\textsuperscript{16}. The CO\textsubscript{2} laser has become the best choice for most microlaryngeal surgery with the value of better microscopic control and less postoperative edema\textsuperscript{17}. Finally, this study ensures that there is no significant difference in voice outcome of both techniques during the second postoperative assessment, this is matched with other studies like Benninger who conducted another randomized, prospective trial comparing micro spot CO\textsubscript{2} laser excision with a spot size of fewer than 250 mm and microdissection in the removal of vocal fold benign lesions like polyps, nodules, and cysts. He found no difference in clinical outcomes when comparing microdissection with laser excision of these lesions\textsuperscript{11}. This is unmatched with previous studies which stated that conventional microlaryngeal surgery was better. Abitbol et al conducted a study of laser versus conventional microlaryngeal surgery for the management of benign lesions. In their study, 40 patients with different benign lesions have undergone micro laryngeal surgeries for the removal of their lesions, 20 patients by CO\textsubscript{2} laser and the other 20 patients by conventional microlaryngeal surgery. Prior to surgery and 2 weeks after it, the patients were examined by videoendoscopy, assessment of the degree of dysphonia was done by auditory perceptual assessment (APA) and acoustic voice analysis. They demonstrated that the postoperative examination of all cases operated upon by laser showed congestion of both vocal folds lateral to the free edge as well as a decrease in the stroboscopic wave amplitude. On the other hand, in cases operated upon by conventional microlaryngeal surgery, there was slight congestion of both vocal folds and the stroboscopic waves returned to normal in most cases (18 out of 20). The difference between pre and postoperative values of the four acoustic parameters in the two groups were compared together and showed insignificant difference in all the parameters except the shimmer percentage, which was better in the conventional microlaryngeal surgery group, so they concluded that expert surgeon is recommended as vocal fold structures are extremely delicate and to avoid tissue trauma, which could be best offered by conventional microlaryngeal surgery and should be completed by behavior modification (voice therapy) to reach optimal results of voice function\textsuperscript{19}. The difference between the results of our study and Abitbol et al results may be due to the duration of postoperative follow-up, as their postoperative follow-up was after 2 weeks, but in our study, the final postoperative assessment was done after 3 months.

**Conclusion:**
In this study, there is no significant difference between both groups in all parameters except operative time and bleeding, as laser technique has less time and clear field.

**References:**
3. Keilmann A, Biermann G, Ho’rmann K. CO\textsubscript{2} laser versus conventional
microlaryngoscopy in benign changes of the vocal cords. Laryngo Rhino Otologie.1997; 76(8):484–489


Relationship between Thickness of Early Oral Tongue Carcinoma (T\textsubscript{1}, T\textsubscript{2}) with Cervical Lymph Node Metastasis

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Abstract:

**Background:** Carcinoma of oral tongue is the most common oral cancer and because of its structure and function is prone for early local and regional spread of cancer. The final outcome of a primary tongue carcinoma patient depends upon various prognostic factors like thickness of tumor, depth of invasion, size of lesion and neck node metastasis. Risk of metastasis and spread to neck nodes increases with increase in tumor thickness.

**Methods:** This prospective observational study was carried out in the Department of Otolaryngology-Head & Neck Surgery, Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka for 18 months. Thirty patients with early oral tongue carcinoma i.e. T\textsubscript{1} & T\textsubscript{2} as per UICC and AJC criteria were included in this study by purposive non-randomized sampling technique. Result of the study were expressed as mean, standard deviation (+SD), frequency and percentages. Unpaired Student’s t-test and Pearson’s correlation co-efficient (r) test were performed.

**Results:** Result of the study showed the mean (+SD) thickness of the tumor was 3.62 (+1.46) mm. Minimum thickness 1.1mm and maximum thickness 7.8mm. Only 21 (70%) subjects neck node were metastasized from tongue and mean (+SD) tumor thickness of the positive neck node metastasis was 5.54 (+1.07) mm and negative neck node metastasis was 2.87 (+0.75) mm. This indicated a significant difference between the groups. Pearson’s correlation co-efficient r (+0.981) which indicated tumor thickness was positively correlated with neck node metastasis.

**Conclusion:** Tumor thickness of the early oral carcinoma positively correlated with neck node metastasis. Correlation between thickness and metastatic lymph node can help planning the treatment regimen and indicate the disease prognosis.

**Key words:** Relationship, thickness, early oral tongue carcinoma (T\textsubscript{1}, T\textsubscript{2}), cervical lymph node metastasis.

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Introduction:
Carcinoma of oral tongue is the most common oral cancer in the world with a reported incidence of 17.8–52% and the second commonest cancer of oral cavity in India\textsuperscript{1}. Tongue, because of its structure and function is prone for early local and regional spread of cancer. Prognosis of primary tongue carcinoma depends upon stages of the disease. But 81% have one year survival rate whereas the five year survival rates are reported to be 48% to 56\textsuperscript{2-4}.

Mortality and morbidity of primary tongue carcinoma remain unraveled despite all the advancement in the field of oncology and surgery. The final outcome of a primary tongue carcinoma patient depends upon various prognostic factors like depth of invasion, size of lesion and neck node metastasis & its extra capsular spread and many other predictive indicators\textsuperscript{5}.

Tumor thickness is the distance measured from the surface of the tumor including the keratin to the point of maximum invasion in the underlying connective tissue stroma. In cases of ulcerated tumors, base of the ulcer serves as the reference point. Depth of invasion is considered as a synonym for tumor thickness\textsuperscript{2}. Many studies have used the terms “depth of invasion” and “tumor thickness” synonymously whereas, few studies like Moore et al (1986) defined tumor thickness and depth of invasion as two different entities. According to them, depth of invasion means the extent of cancer growth into the tissue beneath an epithelial surface. He defined tumor thickness as the entire tumor mass\textsuperscript{8}.

The mean tumor thickness for patients with neck node metastasis came out to be 9.9 mm. However, it has been found that most of these cases have a cut off value of 5 mm. This value of 5 mm was found significant to predict the cervical lymph node metastasis as no case with lesser thickness had nodal metastasis\textsuperscript{2}. A study conducted by O-Charoenrat et al (2003) in London showed that patients with tumors exceeding 5 mm thickness had a metastatic rate of 64%. Whereas, those tumors less than 5 mm, the incidence of cervical nodal metastasis was only 16\textsuperscript{7}.

The primary tongue carcinoma is characterized by high potential for local invasiveness and distal metastasis. The metastasis is first to sentinel and then to other cervical lymph nodes which has an impact on patient’s survival rate. Studies have been carried out worldwide to show the important prognostic factors of survival among which correlation between the increasing tumor thickness and an increased risk of cervical metastasis is important\textsuperscript{5,8}.

An accurate, noninvasive method capable of detecting and measuring tumor thickness is yet to be established. To obtain such information preoperatively, digital palpation, USG of tongue, magnetic resonance imaging (MRI) and postoperatively histopathological examination are performed. The tongue carcinoma patients are treated surgically by excision of the primary tumor with neck dissection depending upon the stage of the tumor alone\textsuperscript{9}. Optical micrometer is a modern tool to measure the thickness.

Tumor thickness is yet to be uniformly measured. Some authors measured the distance from the deepest point of tumor invasion to the most protruding part of the tumor (tip of the papilla) in exophytic lesions and to the ulcer base in ulcerated lesions, whereas others measured from the deepest point of the tumor to an imaginary line that reconstructed the healthy mucosa. Furthermore, some authors ignored the keratin layer and inflammatory infiltrate, while
others provided no data on this issue. Assuming that healthy tissue presents greater resistance to the vertical than to the superficial growth of the tumor, it is reasonable to think that the most aggressive tumors are those with the greatest capacity to grow downwards vertically\textsuperscript{10,11}.

Risk of metastasis and spread to neck nodes increases with increase in tumor thickness. Previously this relation of tumor thickness and the metastasis to neck nodes was studied by many authors of different countries\textsuperscript{12-15}. Fawzy et al. (2017) demonstrate that conservative elective neck dissection is indicated in patients with stage I/II oral tongue carcinoma whose tumors are >4 mm in thickness as they mostly have latent metastasis\textsuperscript{16}. The tongue has characteristic structural features including a high content of muscle bundles and a rich lymphatic network that may influence the properties of tumor spread in it.

The depth of invasion (DOI) indicates the spread of tumor growth to the tissues underlying the epithelium. The tumor thickness (TT) is related to the thickness of the total tumor mass. It is better to consider the DOI rather than thickness of the mass\textsuperscript{17,18}. This study is designed to see the relationship of DOI of early oral tongue carcinoma (T\textsubscript{1}, T\textsubscript{2}) with neck node metastasis.

**Methods:**

**Study design:** Prospective observational study,

**Study place:** Department of Otolaryngology-Head & Neck Surgery at, Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka, Bangladesh.

**Study period:** July’ 2017- January’ 2019.

**Sample Size and calculation:** Thirty patients with early oral tongue carcinoma i.e. T\textsubscript{1} & T\textsubscript{2} as per UICC – AJC criteria were included in the study by purposive non-randomized sampling technique. Sample size for the study was determined by \( n = \frac{(u + v)^2 \times \sigma^2}{(\mu - \mu_0)^2} \).

**Exclusion criteria:** (a) Tumor involving base of the tongue or grossly invading floor of mouth, (b) Recurrent cases, (c) Cases with a second primary carcinoma in oral cavity.

**Procedure:** The study was conducted with proper clearance from university IRB (BSMMU). Patients with T\textsubscript{1} & T\textsubscript{2} Oral Tongue carcinoma admitted in the department of Otolaryngology & Head-Neck Surgery, BSMMU. Patients were selected as per inclusion, exclusion criteria and taking informed consent. Digital palpation was carried out to get idea about tumor size and apparent thickness. MRI was done to measure tumour thickness and extension. Neck was assessed by clinical examination and MRI. Just after surgery Tongue and Neck dissection specimens were checked visually to see the excision margin and lymphnodes (if any visible or palpable lymph node and their level & number), were sent for histopathological examination. Histo-pathological size, thickness & neck node metastasis were considered for TNM staging (p TNM). Tumor was cut in a bread loafing pattern and the section showing maximum tumor involvement was taken in the cassette. All the obtained lymph nodes and sections were dissected and fixed. Pathological size greatest diameter >4cm & thickness > 10 mm (DOI) was excluded from the study.

**Statistical analysis:** Data were entered in statistical package SPSS-24 (trial version) in order to analyze all quantitative analysis (mean and standard deviation) and qualitative variables (frequency and percentages). All the data were compiled and sorted properly and the numerical data were analyzed statistically by using SPSS-24, trial version.
The results were expressed as frequency, percentage and mean ± SD. Unpaired Student’s t test was performed to compare all the quantitative parameters between both groups (with neck node metastasis and without neck node metastasis). Pearson’s correlation co-efficient (r) test was performed to explore the relationship (positive or negative relationship) between thicknesses of early oral tongue carcinoma (T$_1$, T$_2$) with neck node metastasis. $p$ value < 0.05 was accepted as significant.

**Results:**

The youngest patient in our series was 25 years age and the oldest one was 75 years. (Figure-1). Majority (66.7%) of the study population were male and 33.30 % were female. (Figure-2)

Among thirty(30) cases majority were illiterate (40%) and equal number have attended the primary level of education (40%). Secondary school were attended by 13.3% and higher secondary level by 6.7% patients. All female (33.3%) patients were House wife.

Among the male subjects, 14 (46.6%) were from low socio economic strata, and 04 (13.3%) were from middle class. Only 2 (6.7%) cases came from high socioeconomic condition.

Out of 30 patients 18 (60%) were smokers, 23 (76.7%) were taking betel leaf, 16 (53.3%) were chewing betel nut and 6 (20%) were alcoholic in their habit. Among them, tip of the tongue involved in 2 (6.7%) cases, lateral border involved in 20 (66.7%) cases, ventral

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**Fig.-1:** Distribution of study population according to age (n=30)

**Fig.-2:** Distribution of study population according to sex (n=30)
surface in 4 (13.3%) and dorsum of tongue involved in 4 (13.3%) cases.

Clinically primary tongue tumors was categorized as $T_1$ and $T_2$. Among 30 patients, majority 18 (60%) were $T_2$ and 40% were $T_1$.

But after obtaining the histopathological report the stages of tumor were categorized as $T_1N_0$, $T_1N_1$, $T_2N_0$ and $T_2N_1$. (Figure-3)

Among 30 subjects, majority 21 (70%) of the study subjects neck node were involved and only 9 (30%) subjects neck node were not metastasized from tongue.

In this study, tumor thickness < 2 mm of positive neck node metastasis was 0 (0%) and negative neck node metastasis was 7 (23.3%), thickness 2-4 mm of positive neck node metastasis was 2 (50%) and negative neck node metastasis was 2 (50%) and thickness > 4-7.8 mm of positive neck node metastasis was 17 (89.47%) (Table-I).

The mean ($\pm$ SD) thickness of tumor was 3.63 ($\pm$1.47) mm. Minimum thicknesses was 1.1 mm and maximum thickness was 7.8 mm (Table I). In tumor thickness ≤4 mm group, 7 (23.3%) were smokers, 7 (23.3%) were taking betel leaf, 7 (23.3%) were chewing betel nut and 3 (10%) were alcoholic in their habit. In tumor thickness > 4-7.8 mm group, 11 (36.7%) were smokers, 16 (53.3%) were taking betel leaf, 9 (30%) were chewing betel nut and 3 (10%) were alcoholic in their habit.

In tumor thickness ≤4 mm group, lateral border involved in 7 (23.3%) cases only. In tumor thickness > 4-7.8 mm group, tip of the tongue involved in 2 (6.7%) cases, lateral border involved in 13 (43.3%) cases, ventral surface in 4 (13.3%) and dorsum of tongue involved in 4 (13.3%) case.

The mean ($\pm$ SD) tumor thickness of positive neck node metastasis was 5.55 ($\pm$1.07) mm and negative neck node metastasis was 2.88 ($\pm$0.75) mm. This indicated a significant difference between the groups (Table-II).

### Table I:

<table>
<thead>
<tr>
<th>Thickness of tumor in mm</th>
<th>Number of patients with positive lymph node in neck</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;2</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>2.4</td>
<td>2</td>
<td>50%</td>
</tr>
<tr>
<td>&gt;4-7.8</td>
<td>17</td>
<td>89.47%</td>
</tr>
</tbody>
</table>

### Table II:

<table>
<thead>
<tr>
<th>Tumor thickness (mm)</th>
<th>Neck node metastasis</th>
<th>t-test</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean ± SD</td>
<td>Positive (n=19)</td>
<td>Negative (n=11)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5.55±1.07</td>
<td>2.88±0.75</td>
<td>9.22</td>
</tr>
<tr>
<td>Range</td>
<td>4.3 - 7.8</td>
<td>1.10 - 4.0</td>
<td></td>
</tr>
</tbody>
</table>

Data were expressed as mean ± SD. Unpaired Student’s ‘t’ test was performed to compare neck node metastasis. Level of significance was calculated at p<0.05. N= Study subjects.
In this study, mean (± SD) tumor thickness of positive neck node metastasis was 5.55 (±1.07) mm and negative neck node metastasis was 2.88 (±0.75) mm. This indicated a significant difference between the groups.

In this study, tumor thickness has positively strong correlation with neck node metastasis. This correlation was statistically significant (Table-III).

### Table-III :

**Correlation of tumor thickness with neck node metastasis (N=30)**

<table>
<thead>
<tr>
<th>Thickness of tumor (mm)</th>
<th>r</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>With neck node metastasis</td>
<td>+ 0.981</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

Pearson correlation coefficient test was performed to observed correlation of tumor thickness with neck node metastasis. Level of significance was calculated at p<0.05. N= Study subjects. In this study, tumor thickness was positively correlated with neck node metastasis. This correlation was statistically significant.

**Discussion:**

The present study was undertaken to observe relationship between thicknesses of early oral tongue carcinoma (T₁, T₂) with neck node metastasis. For this study, a total number of 30 cases of early oral tongue carcinoma (T₁, T₂) that has the inclusion criteria were enrolled as a study sample.

In this study clinically stage of tumor was categorized as T₁ and T₂. Majority of the incidence were reported 60% in T₂ stage. Clinically staging done according to length (according to AJCC, 2016)¹⁹. As far we know tongue have rich lymphatic supply, crisscross manner of intrinsic muscle and as a mobile organ so with the duration it spread aggressively. Most of our study population are illiterate, came from low socioeconomic stage, lack of knowledge of risk factor and lack of consciousness about aggressiveness of the tumor. So, earlier tongue lesion they neglected it, as a result it spread with greater length.

Pathologically stage of tumor was categorized (according to AJCC, 2016) as T₁N₀, T₁N₁, T₂N₀ and T₂N₁¹⁹. Tumor staging according to thickness or depth of invasion crucial for the management prognosis of early oral carcinoma. Many studies have used the terms depth of invasion and tumor thickness synonymously².

Our study shows majority subject in T₂N₁ (40%) stage and T₁N₁ (33.3%). Previous studies have shown the tumor thickness is the important prognostic factor in treatment of patients of early oral tongue carcinoma (T₁, T₂)²⁰.

In this study, tumor thickness <2 mm of positive neck node metastasis was 0 (0%) and negative neck node metastasis was 7 (23.3%), thickness 2-4 mm of positive neck node metastasis was 2 (50%) and negative neck node metastasis was 2 (50%) and thickness >4-7.8 mm of positive neck node metastasis was 17 (89.47%). We thought the thickness of attack and micro vascular proliferation caused by neoplastic growth might determine proximity to the blood vessels and lymphitic channels, thus facilitating the metastatic process in this study. Almost similar to finding observed at Fawzy et al; 2017¹⁶.

Positive neck node metastasis was more in subjects whose tumor thickness > 4-7.8 mm and negative neck node metastasis was more in subjects whose tumor thickness <2 mm. Available literature states that, chances of
occult neck metastasis are almost nil if depth of tumor is up to 2 mm and similar results were observed in present study. Various researchers of different countries reported that, occult neck metastasis in tumors with depth > 4 mm were 62.2%, 64.70% and 70.3% respectively. Authors observed that, tumors with depth > 4 mm had 60% neck metastasis in present study. They utilized ultrasonography to know pre-operative depth of tumor. They suggested that it was quickly available and low cost effective. In present study, relatively older population was affected more by oral tongue cancer than younger. The youngest and the oldest patients were 25 and 75 years respectively in present study. This may be due to longer use of tobacco, alcohol, betel nut and exposure of other risk factor. Almost similar to the findings observed by the various investigators from different countries.

This study shows 66.7% of the study subjects were male and only 33.3% were female. This may be due to male subjects are use more tobacco, alcohol, betel nut and betel leaf than female. Almost similar to the findings observed by the various investigators from different countries.

In present study, majority were illiterate (40%) and primary level (40%) of education. They have not proper knowledge about the risk factor of tongue cancer, disease process and prognosis of tongue cancer. So they were suffered more. Only 13.3% and 6.7% study subjects had secondary and higher secondary level of education. This finding were agreement with Fawzy et al; 2017.

In present study, majority were illiterate (40%) and primary level (40%) of education. They have not proper knowledge about the risk factor of tongue cancer, disease process and prognosis of tongue cancer. So they were suffered more. Only 13.3% and 6.7% study subjects had secondary and higher secondary level of education. This finding were agreement with Fawzy et al; 2017.

In present study, out of 30 patients 23 (76.7%) were taking betel leaf, 18 (60%) were smokers, 16 (53.3%) were chewing betel nut and only 6 (20%) were alcoholic in their habit. As far we know smoking is one of the highest risk factor to produce tongue cancer, but female were included in this study who were not smokers. So betel leaf is the major risk factor in present series. Gupta and Mehta (2000), Balaram et al. (2002) and Jetley et al. (2017) found similar results in their studies. Jetley et al. (2017) observed the favored smoking method was bidi and cigarette. All the smokers were males. The preferred form of smokeless tobacco was gutka, and khaini/surti. They also observed a larger number of male smokeless tobacco users in their study. In contrast a large population based study among tobacco users in Mumbai by Balaram et al. (2002) noted that smokeless tobacco users were mostly women. A study based in Southern India provided strong evidence that smoking bidi is more hazardous than cigarette smoking. Low educational attainment, occupation as a farmer or manual worker and various indicators of poor oral hygiene were associated with significantly increased risk. The study found that among men, 35% of oral cancer was attributable to the combination of smoking and alcohol drinking and 49% to pan-tobacco chewing, whereas among women, chewing and poor oral hygiene explained 95% of oral cancer.

On the other hand, study did by Fukano et al. (1997) showed that tongue tumors exceeding 5 mm carried a risk of 65% for neck metastases, whereas those infiltrating 5 mm or less had a risk of only 6%. Yuen et al. (2002) showed in their study that tumor thickness is prognostic for both nodal and local recurrence in oral carcinomas. They showed the variation in the tumor thickness and its effect on the neck metastasis. A tumor
thickness less than 3 mm, had 0% local recurrences and had 8% nodal metastases; tumor thickness of more than 3 mm and up to 9 mm had 44% subclinical nodal metastasis and 7% local recurrence; tumor thickness of more than 9 mm had 53% subclinical nodal metastasis and 24% local recurrence. Local recurrence occurred significantly more in the group with tumor thickness of more than 8 mm.

Mücke et al. (2016) highlight the importance of tumor thickness as a predictive variable in tongue cancer. Specifically, a cut-off point of 8 mm allowed for a more accurate and statistically precise prediction of lymph node metastasis. Hu et al. (2015) found that the tumor thickness is a more reliable method for neck node metastasis than tumor volume.

In present study, tip of the tongue involved in only 2 (6.7%) cases, lateral border of tongue were involved in most (66.7%) of the cases, ventral surface (13.3%) and dorsum of the tongue (13.3%) also involved. Commonly we know lateral aspect is mostly involved followed by ventral aspect. This finding was agreement with the study of Aslam et al. (2012).

This study shows, the mean (± SD) thickness of tumor was 3.63 (±1.47) mm. Minimum thicknesses was 1.1 mm and maximum thickness was 7.8 mm. Among the study subjects 21 (70%) neck node were metastasized from tongue and the mean (± SD) tumor thickness of positive neck node metastasis was 5.55 (±1.07) mm and negative neck node metastasis was 2.88 (±0.75) mm. This indicated a significant difference between positive nodal metastasis subjects and negative neck node metastasis subjects. Tumor thickness was positively correlated with neck node metastasis. Tumor thickness is thought to involve the multiple proteolytic enzymes, among which are the matrix metalloproteinases (MMPs). MMPs are a family of proteases commonly expressed in invasive tumors and the adjacent stroma and it are thought to play an important role in tumor invasion, increase thickness and metastasis. This correlation was statistically significant. This finding was agreement with Fawzy et al. (2017).

There is also controversy regarding the thickness values that differentiate patients according to their survival. Ghazi et al. (2019) found that patients with tumors of 4.3 mm thickness have a significantly higher. Their multivariate analysis showed that the thickness of the tumor had the greatest influence on neck node metastasis of their patients. Brown et al. (1989) also described the cut-off point as being 3 mm, whereas Spiro et al. (1986) concluded that patients showed a significant neck node metastasis rate above a tumor thickness of 2 mm. Moore et al. (1986) differentiated five groups of patients according to their tumor thickness and found that the neck node metastasis rate significantly increased with increasing tumor thickness, without identifying a cut-off point.

Conclusion:

- After analyzing the results of present study it can be concluded that tumor thickness of the early oral carcinoma positively correlated with neck node metastasis. Correlation between thickness and metastatic lymph node can help planning the treatment regimen and indicate the disease prognosis.
- It clearly demonstrate that conservative elective neck dissection is indicated in patients with Stage I/II oral tongue carcinoma whose tumours are > 4 mm in thickness as they mostly have latent metastasis.
Acknowledgement:
I would like to express my special gratitude to all of my teachers of Department of Otolaryngology-Head & Neck Surgery, BSMMU, my colleagues and special thanks and grateful to all of my patients.

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Conflict of Interest: The authors have no conflict of interest.

References:


Correlation of Ultrasonography Guided Fine Needle Aspiration Cytology with Postoperative Histopathology in Diagnosis of Thyroid Nodule

Md. Jaber-Al-Sayied¹, A Allam Choudhury², Sonia Jahan Bithi³, Ashim Kumar Biswas⁴, Riashat Azim Majumder⁵, Md. Abdur Razzak⁶, Md. Hasanul Haque⁷, Md. Quamruzzaman⁸

Abstract:

**Background:** Fine-needle aspiration cytology (FNAC) is recommended as a decisive diagnostic step in the workup of patients with nodular thyroid disease. Unfortunately, FNAC can miss malignancies in smaller and deeper nodule. Ultrasound guided FNAC (US-FNAC) can reduce this error in suspicious thyroid nodule.

**Objectives:** To find out the correlation of USG guided FNAC with postoperative histopathology in diagnosis of thyroid nodule.

**Methods:** After obtaining clearance and approval from Institutional Review Board, all 45 patients of thyroid nodule who were admitted in the Department of Otolaryngology – Head & Neck surgery of Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka from April 2017 to August 2018 and had fulfilled the inclusion and exclusion criteria were selected for the study. Each patient was assessed before surgery by USG guided FNAC and post operatively by histopathology.

**Results:** In this study mean age of the respondents was 33.33 years with SD±10.84. Male female ration was 1:5.4. USG guided FNAC was reported by ‘The Bethesda System for Reporting Thyroid Cytopathology’ (TBS-RTC). Of the 45 specimens 2 samples were nondiagnostic or
unsatisfactory (Class I), 26 samples were benign (Class II), 2 samples were showing Atypia of Undetermined Significance or Follicular lesion of Undetermined Significance (Class III), 6 were showing follicular neoplasm or suspicious for a follicular neoplasm (Class IV), 5 samples were suspicious for malignancy (Class V) and 4 samples were positive for malignancy (Class VI).

On comparison of ultrasound guided FNAC with histopathology the sensitivity for correct diagnosis was 94%, specificity was 93%, positive predictive value was 88%, negative predictive value was 96% and accuracy was 93%. Pearson’s correlation coefficient was 0.85 which is very strong for positive relationship.

Conclusion: USG guided FNAC is the most accurate method for diagnostic evaluation of thyroid nodules.

Key words: USG guided FNAC, Thyroid.

Introduction:
Thyroid nodules are common in adults, which may be detected by palpation in 3-7% of patients. The prevalence may be raise as high as70% or more, if sensitive imaging such as ultrasonography is being employed. Most of these thyroid nodules are benign in nature. To avoid unnecessary surgery ultrasonography and FNAC is being used as a diagnostic tool to differentiate between malignant and benign lesions. Although accurate diagnosis between follicular carcinoma and follicular adenoma is difficult by FNAC\(^1\).

In patients with nodular disease FNAC is widely recommended as an initial and crucial test to select those patients who require excision of the lesion and subsequent histologic diagnosis. If FNAC proves to be either suspicious or malignant, surgery is indicated. The optimal diagnostic strategy is aiming to avoid surgery in patients with benign thyroid disease, while at the same time performing prompt surgical treatment of patients with thyroid carcinoma. To achieve this, FNAC must score high on test characteristics. This can be achieved by USG guided aspiration.\(^2\)

5-38% of clinically detectable thyroid nodules are malignant. Of the initial screening tests for patients with thyroid nodules, FNAC is widely used. It is used to differentiate benign from malignant thyroid nodules and helps preoperatively in selecting patients for surgery. But USG guided FNAC may increase its accuracy & will reduce unnecessary thyroid surgeries\(^3\).

Historically, the diagnostic criteria and reporting nomenclature of FNAC is varied internationally. These are epitomized by the North American National Cancer Institute (Bethesda) terminology (2007), Italian (2007, 2014), Australian (2014), Japanese (2013) and British Thyroid Association/Royal College of Pathologists guidelines (2002, 2007, and 2016). The terminology for non-diagnostic, benign, malignant and suspect for malignancy is similar across each of these classifications with minor differences in emphasis for the equivocal/indeterminate category. Numerical categories increase accuracy, aid local audit, allow comparison with other centers including internationally and can guide discussion on further management\(^4\).

The aim of this study was to identify the correlation of USG guided FNAC with postoperative histopathology in thyroid nodule. Sensitivity, specificity, positive predictive value, negative predictive value and accuracy of USG guided FNAC was also evaluated after the surgical removal and histopathological diagnosis.

Methods:
This prospective observational study was performed on 45 patients in the Department of Otolaryngology – Head & Neck surgery, Department of pathology, Department of radiology & imaging, Bangabandhu Sheikh Mujib Medical University, Dhaka from April
2017 to August 2018. After obtaining clearance and approval from Institutional Review Board, all patients of thyroid nodule who were admitted into Department of Otolaryngology – Head & neck surgery of the concerned institution and fulfill the inclusion and exclusion criteria was recruited as subjects in the study. Patients with thyroid nodule, age ranging from 20 to 70 years was included in the study. Patients not ready for surgery, with already diagnosed thyroid lesions by histopathology & all toxic goiters confirmed by clinical evaluation were excluded from the study. Diagnosis of thyroid nodule was done by clinical examination, USG of thyroid and USG guided FNAC of thyroid. FNAC was carried out under ultrasound guidance so that the needle position can be controlled and samples can be regarded as representative, even within very small nodules. A written “informed consent” was taken. Experienced radiologist performed an ultrasonography guided fine needle aspiration with the use of 10 ml disposable syringe with 23-gauge needle by using a perpendicular puncture. When the needle tip reached the target nodule, the needle was observed as a small echogenic spot within the nodule on the US monitor. After placing needle tip in the appropriate area of the target nodule, sampling was commenced. After obtaining a sample, the specimen was mounted immediately onto a glass slide. Specimens were fixed with 95% ethanol and were sent for cytological evaluation. Reporting was done by “the Bethesda system for reporting Thyroid Cytopathology” (TBS- RTC). Then all other relevant investigations were done & informed written consent was taken from all patients for surgery except Bethesda class I. Patients with non-neoplastic FNAC diagnoses underwent surgery because of pressure symptoms or unwillingness to carry out follow-up. All patients, reported as Bethesda class II - VI were operated under general anesthesia. Postoperative histopathology report was obtained & correlation was done with preoperative USG guided FNAC. Data were collected by interview and by laboratory investigation using structured data collection sheet.

**Statistical Analysis:**

Data were processed and analyzed using Microsoft Excel 2016 (Microsoft office professional plus 2016). Correlation of USG guided FNAC with histopathology was done by Pearson’s correlation coefficient.

**Results:**

The mean age of the respondents was 33.33 years with SD±10.84. Most of them were female, house-wife & living in rural areas. Highest number of respondents were diagnosed as Bethesda class II in USG guided FNAC.

### Table I

**Distribution of different lesions diagnosed by histopathologist (n=45)**

<table>
<thead>
<tr>
<th>Group by classes</th>
<th>USG guided FNAC</th>
<th>Histopathology</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Benign</td>
<td>Malignant</td>
</tr>
<tr>
<td>I Non-diagnostic or unsatisfactory</td>
<td>2 (4.44%)</td>
<td>Not operated</td>
</tr>
<tr>
<td>II Benign</td>
<td>26 (57.72%)</td>
<td>25</td>
</tr>
<tr>
<td>III Atypia of undetermined significance or follicular lesion of undetermined significance</td>
<td>2 (4.44%)</td>
<td>1 (FA)</td>
</tr>
<tr>
<td>IV Follicular neoplasm or suspicious for a follicular neoplasm</td>
<td>6 (13.32%)</td>
<td>1 (FA)</td>
</tr>
<tr>
<td>V Suspicious for malignancy</td>
<td>5 (11.10%)</td>
<td>0</td>
</tr>
<tr>
<td>VI Malignant</td>
<td>4 (8.88%)</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>45</td>
<td>27 (60%)</td>
</tr>
</tbody>
</table>

Key PTC: Papillary thyroid carcinoma, FA: Follicular adenoma, MTC: Medullary thyroid carcinoma, FTC: Follicular thyroid carcinoma
The table shows 2 samples (4.4%) were class I, 26 (57.72%) were class II, 2 (4.4%) were class III, 6 (13.32%) were class IV, 5 (11.1%) were class V, 4 (8.88%) were malignant class VI. There were 2 false positive cases from correct diagnosis and only 1 smear was false negative when compared with histopathology. True positive was 15 cases & true negative was 25 cases.

In current study Pearson’s correlation coefficient is 0.85. Which reflects USG guided FNAC has very strong positive relationship with post operative histopathology. Performance of USG guided FNAC reveals Sensitivity 94%, Specificity 93%, Positive predictive value 88%, Negative predictive value 96%, Accuracy 93%.

Table II:

<table>
<thead>
<tr>
<th>Malignant lesions (n= 16: 36%)</th>
<th>Histopathology</th>
<th>USG guided FNAC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Papillary carcinoma</td>
<td>9</td>
<td>5 Suspicious formalignancy (PTC)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3 Malignant (PTC)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 Benign</td>
</tr>
<tr>
<td>Follicular carcinoma</td>
<td>6</td>
<td>5 Follicular neoplasm</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 Atypia of undetermined significance</td>
</tr>
<tr>
<td>Medullary carcinoma</td>
<td>1</td>
<td>1 Malignant (MTC)</td>
</tr>
<tr>
<td>Total</td>
<td>16</td>
<td>16</td>
</tr>
</tbody>
</table>

On histopathology of these smears, there were 16/45 cases with malignant thyroid lesions.

Table III:

<table>
<thead>
<tr>
<th>Benign lesions (n= 27: 60%)</th>
<th>Histopathology</th>
<th>USG guided FNAC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Colloid goiter</td>
<td>16</td>
<td>Benign</td>
</tr>
<tr>
<td>Multinodular goiter</td>
<td>7</td>
<td>(Consistent with a benign follicular nodule)</td>
</tr>
<tr>
<td>Follicular adenoma</td>
<td>2</td>
<td>Atypia of undetermined significance</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Follicular neoplasm</td>
</tr>
<tr>
<td>Hashimoto’s thyroiditis</td>
<td>2</td>
<td>Benign</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(Consistent with lymphocytic thyroiditis)</td>
</tr>
<tr>
<td>Total</td>
<td>27</td>
<td>27</td>
</tr>
</tbody>
</table>

On histopathology 27/45 (60%) specimens were benign lesions.
**Table IV:**

*Correlation of USG guided FNAC with Histopathology.*

<table>
<thead>
<tr>
<th>US FNAC Category</th>
<th>USG FNAC</th>
<th>Histopathology</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>Colloid goiter</td>
</tr>
<tr>
<td>Non diagnostic</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Benign</td>
<td>26</td>
<td>16</td>
</tr>
<tr>
<td>Atypia of undetermined significance</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Follicular neoplasm</td>
<td>6</td>
<td>1</td>
</tr>
<tr>
<td>Suspicious for malignancy</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Malignant</td>
<td>4</td>
<td></td>
</tr>
</tbody>
</table>

Key: US FNAC = USG guided fine needle aspiration cytology, PTC = Papillary carcinoma of thyroid, FTC = Follicular carcinoma of thyroid, MTC = Medullary carcinoma of thyroid.

Table showing US FNAC findings were in concordance with histopathology.

**Discussion:**

USG guided FNAC is a least invasive, simple and most accurate method to evaluate thyroid nodule. Ultrasound guidance allows continuous visualization of the needle during insertion and sampling with resulting in pinpoint accuracy with a high level of safety.

In the present study, age of the patients ranged from 18-65 years with a mean age of 33.33 years with SD±10.84 years. These findings are in conformity with Irfan et al. 2014. They reported mean age 33.35 ± 11.77 years. This finding may be due to prevalence of endemic goiter is more in younger age group.

In our study most of the respondents were female. This finding has concordance with Haberal et al. 2008, where 83.8% respondents were female and 16.2% respondents were male. Goiter is predominantly present in female as there is estrogen receptor in thyroid which stimulates goitrogenesis.

In our study most of the respondents were from rural area. It defer from study of Irfan et al. 2014, where 68.75 % respondents were from urban area and 31.25% respondents were from rural area. Lack of health education, more consumption of goitrogen may be the cause of higher goitrogenesis in rural areas.

We found that occupation of the most of the respondents were housewife. This finding has concordance with Kocak et al. 2013, where goiter prevalence was highest in agricultural workers (35.3%) and housewives (32.2%), and lowest in the unemployed (3.5%). They concluded that there was significant difference between occupational groups and goiter prevalence. Our most of respondents were female and goiter is more common among them. This may explain why goiter is common in housewives.
In the present study, USG guided FNAC of thyroid lesion result was interpreted as per Bethesda system. Most of our respondents belong to Bethesda class II, which is similar to a meta analysis on The Bethesda System for Reporting Thyroid Cytopathology (TBS RTC) of Massimo et al. 2012. Where 59.3% of 25445 patients reported as Bethesda class II. Bethesda class II is benign lesion, most of thyroid lesions are benign.

In our study Bethesda class-I was 4.44%, Class II -57.72%, class -III 4.44%, class IV -13.32%, class V -11.1%, class VI -8.88% (Table I) which is in concordance with a meta analysis of Massimo et al. 2012 where class I-12.9%, class II-59.3%, class III 9.6%, class IV 10.1%, class V 2.7%, class VI 5.4%. In class I & class V it is different from our study. This difference may be due to their inclusion of free hand as well as USG guided FNAC. In our study ultrasound guidance reduce rate of non-diagnostic rates. Al Sindi et al. 2013 evaluated USG guided FNAC in thyroid lesion, they also categorize their subjects as Bethesda system. They had class I -8.5%, class II-72.5%, class III – 10%, class IV- 3%, class V- 3.5%, class VI- 2.5%. USG guidance reported low non-diagnostic value in this study. Major problems associated with free hand FNAC are significant false negatives (missed neoplasms) and difficulties in accurate identification of follicular lesions leading to wrong FNAC diagnoses. In our study we observe 2 false positive cases and both are of follicular adenoma. Al Sindi et al. 2013 reported that all of their false positive cases were follicular adenoma. Though false positive cases are much lower in USG guidance. Mustafa et al.2006 reported 33.3% false positive cases in palpation guided or free hand FNAC where as in USG guidance FNAC it was much lower (25%). This finding is due to the fact that FNAC has a limitation to differentiate follicular adenoma from follicular carcinoma.

The accuracy of FNAC depends crucially on the technique, operator-performing the aspiration and the cytopathologist-analyzing it. Even under optimal conditions, the false negative rate for thyroid neoplasms can vary from 1% to 6% due to wrong diagnosis or sampling errors. In our study there is a false negative case 1/45. It is similar to Daniele et al. 1998. Who reported false negative in 1% cases of USG guided FNAC. He observed the false negative rate much lower for US-FNAC when compared with free hand FNAC. These false negative cases are may be microcarcinoma (<1cm) which may be missed by USG. Microcarcinoma is usually papillary carcinoma and our false negative case was confirmed as papillary carcinoma by histopathology. Other cause may be the fact that cystic lesion harbor occult malignancy in 10% of cases. USG guided aspirates are usually done in solid component of nodule.

A review of studies that evaluated the role of US-FNAC in the detection of thyroid cancer revealed a sensitivity of 76%–98%, specificity of 71%–100%, false-negative rate of 0%–5%, false-positive rate of 0–5.7%, and overall accuracy of 69%–97%. Our results have shown Pearson’s correlation coefficient was 0.85. Which reflects USG guided FNAC has very strong positive relationship with post operative histopathology& in our study sensitivity and specificity of US-FNAC was 94% and 93% respectively. The PPV 88%, NPV 96% and the diagnostic accuracy was 93%.

In our study most of the malignant lesion was papillary carcinoma (9), rest are follicular carcinoma (6) and medullary carcinoma (1%). Which is similar to the Pannersalvam et al. 2013 where papillary carcinoma was 61.5%. Daniele et al. 1998 reported papillary carcinoma 71.7%, follicular carcinoma 7.6% and medullary carcinoma.
1.9%. Among 9 cases of our study 5 were suspicious for malignancy (PTC), 3 were malignant (PTC) and 1 was benign in USG guided FNAC; Among 15 reported cases of Al Sindi et al. 2013 in USG guided FNAC 5 were suspicious for malignancy, 3 were malignant and 1 was benign lesion. In our study 6/16 cases were follicular carcinomas among them 5 were follicular neoplasm and 1 was atypia of undetermined significance in USG guided FNAC; Al Sindi et al. 2013 reported 4/15 cases were follicular carcinomas among them 2 were follicular neoplasm and 2 was atypia of undetermined significance in USG guided FNAC; in our study 1/16 case was of medullary carcinoma which was reported as malignant (MTC) in USG guided FNAC which is similar to Al Sindi et al. 2013.

In our study most of the benign lesion of histopathology was colloid goiter (16/27) multinodular goiter was (7/27) both were reported as benign in USG guided FNAC (Table 3&4). Which is in consistent with Irfan et al. 2014 where most of benign lesion reported as colloid goiter (51%)5.

Some of the potential advantages of US-FNAC in the evaluation of nodular thyroid disease is guiding the needle to take samples from non-palpable nodules. The major benefit of this technique is accurate sampling of small or multiple nodules. Certain sonologic features of thyroid lesions are predictive of malignancy and hence such lesions can be accurately aspirated14. Another crucial benefit of using US-FNAC is significant reduction in the number of inadequate aspirates11. It is possible that reduced number of inadequate aspirates may potentially lead to increase in the yield of cancer and the diagnostic accuracy of FNAC. The rate of inadequate specimens in our study was 4.4 % (2 out of 45 samples), which is comparable to the above quoted studies. (Table I & IV)

We categorized cytological results into six classes according to Bethesda description for thyroid cytology. Such categorization of FNAC smears results is necessary to allow clinicians to use cytology results to guide patient management with specific reference to the need for thyroidectomy. Our study showed that use of better reporting system (Bethesda methods) there was relatively low rate of non diagnostic or inadequate smears, allowing it to be useful method for determining the treatment plan for non palpbale smaller thyroid nodules. In our study the incidence of adequate specimens was 43/45 (96%) with US- FNAC as compared to the Kim et al. 2009 who found it 81% in his series of 201 patients15.

**Conclusion:**
USG guided FNAC is nearly as accurate as histopathology in diagnosis of thyroid nodule.

**Recommendation:**
Small and suspicious thyroid nodule on USG should undergo an USG guided FNAC.

Inadequate smears from free hand FNAC yields accurate result by USG guided FNAC.

**References:**


Original Article

Parathyroid Adenoma: an experience in BIRDEM General Hospital

Shawhely Mahbub¹, Sudhangshu Shekhar Biswas², Badhon Kumar Dey³, Md. Shariful Alam⁴, Jahirul Hoq⁵

Abstract:

Background: Parathyroid adenoma is most commonly associated with primary hyperparathyroidism which leads to hypercalcaemia. Hypercalcaemia results in multiple stone formation in Kidney and biliary tract which indicates surgical removal of tumor. Perioperative management of patient is essential to prevent mortality and morbidity. The purpose of this study is to analyze a case series of patient having parathyroid adenoma with difficulties, to localize the adenoma and to take the measures to maintain the normal level of calcium in pre, per and postoperative period.

Methods: This retrospective study was carried out in BIRDEM General Hospital and Ibrahim Medical College from May 2017 to December 2019. 14 patients who were diagnosed as primary hyperparathyroidism due to parathyroid adenoma who had been managed at the BIRDEM General Hospital, Dhaka, Bangladesh from May 2017 to December 2019 were reviewed and included.

Result: Among 14 patients 8 were female and 6 male (M: F=3:4). Age ranges from 26 to 71 years with mean age was 52 years. Serum PTH were above normal (>65 pg/ml) in all cases. Serum calcium level were above normal in 12 cases (85.71 %) and 2 (14.29%) had normal levels. Serum phosphate levels were within normal range. Excision of adenoma done in all cases which were confirmed by frozen section per-operatively. None of our patients develop any complication during and after surgery.

Conclusion: Successful management of parathyroid adenoma requires combined skills of surgeons, endocrinologists, anesthesiologists and pathologists. Improvement after operation is quite remarkable and rewarding.

Key words: Parathyroid adenoma, Hypercalcaemia, Scintigraphy.

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Introduction:
Parathyroid adenoma is a benign tumour of the parathyroid glands. The parathyroid glands are located in the neck, near or attached to the back side of the thyroid gland. The normal parathyroid gland weighs approximately 50-70 mg. Parathyroid hormone produced by chief cells of parathyroid gland which regulates calcium, phosphate and vitamin D homeostasis.

Primary hyperparathyroidism (PHPT) is a disorder of one or more of the parathyroid glands. It is the third most common endocrine disorder after diabetes mellitus and thyroid disease. The parathyroid gland(s) become overactive and secret excess amounts of parathyroid hormone. As a result blood calcium rises to a level that is higher than normal (called hypercalcaemia).

The incidence of PHPT is increasing with a rate of 42 in 100,000 per year. While in women over 60 years of age the average annual incidence approaches 190:100,000 per year.

Approximately 80 percent of people with primary hyperparathyroidism (PHPT) have few or no symptoms. In this people PHPT is typically diagnosed after an elevated calcium is detected when a blood test is done for some other reason.

However, there are sometimes nonspecific symptoms that might be related to the elevated calcium level. This includes- Joint aches, fatigue, weakness, loss of appetite, mild depression, difficulty concentrating, excessive thirst, frequent urination, constipation.

In majority of the patients parathyroid adenoma are associated with hypercalcaemia.

Hypercalcaemia is usually managed by:

- Intravenous fluids and diuretics:
  - Extremely high calcium can be a medical emergency. Patient needs hospitalization for treatment with intravenous fluid and diuretics to prompt lower the calcium level to prevent arrhythmia or damage to the nervous system. Fluids are usually given 2.5-3 ml/kg/hr (range 4-6 litre/day). And diuretics, usually frusemide, which decreased tubular reabsorption of calcium.

- Bisphosphonates:
  - Intravenous anti osteoporotic drugs, which can quickly lower calcium level, are often used to treat hypercalcaemia due to cancer (risk associated with this treatment include osteonecrosis of the jaw and certain types of thigh fractures).

- Corticosteroid (Prednisolone):
  - If hypercalcaemia is caused by high level of vitamin D, short term use of prednisolone is useful. It decreases the absorption of calcium from gut.

- Calcitonin:
  - Subcutaneous or intravenous, may also be used.

Methods:
Medical records of 14 patients with a diagnosis of parathyroid adenoma who had been managed at the BIRDEM General Hospital, Dhaka, Bangladesh from May 2017 to December 2019 were reviewed and included.

Patient’s age, sex, presenting symptoms and duration of these symptoms prior to diagnosis, clinical findings, side and site of the adenoma were noted. Preoperative serum parathyroid hormone, serum calcium and serum phosphate were recorded.

For localizing the tumour, parathyroid scintigraphy was done preoperatively. Scintigraphy shows the site of the parathyroid adenoma, number and size of the parathyroid adenoma, relation with the thyroid gland which helps the surgeon during surgery.
The operative findings were recorded. Any operative complications (if any) both immediate and delayed were noted.

**Preoperative preparations taken:**
Commonly associated conditions that were checked and/or managed preoperatively are: hypercalcaemia, hyperphosphataemia, hypomagnesaemia, electrolytes imbalance, low albumin, low creatinine clearance. The day before surgery the department of Histopathology was informed for frozen section biopsy.

**Surgical technique:**
Normal level of calcium, acid base balance and electrolytes were ensured.

Scintigraphy of parathyroid adenoma was again reviewed by surgeon before starting the surgery.

Experienced and skilled anesthesiologists were present during surgery to tackle any unwanted situations during surgery like cardiac arrhythmia, heart failure and neurovascular irritability like complications.

Our all the 14 patients were operated under general anesthesia. Cervical collar incision was made. Flap was raised and strap muscles were retracted on the site of parathyroid adenoma. Then the lobe of the thyroid gland was mobilized, recurrent laryngeal nerve was identified on that side. After that parathyroid adenoma was searched and possible tissues were dissected and sent for frozen section.

At the same time blood sample was also collected for intraoperative rapid parathormone measurement for biochemical documentation for successful removal of parathyroid adenoma.

After getting confirmation result of frozen section and intraoperative rapid parathormone level, surgery proceeded and the wound was closed in layers.

**Postoperative period:**
Post operatively patients might develop hypocalcaemia. So all the patients were monitored closely to observe any features of hypocalcaemia. Monitoring of serum calcium level were also done in the laboratory, initially 4 to 6 hours after surgery then every 12 hourly to avoid severe hypocalcaemia or hungry bone syndrome.

**Results:**
14 patients with a mean age of 52 were included in the study (Table I). Female sex was dominant (57.1%) (Table II). Among the patients 9 (64.2%) were diabetic and 5 (35.7%) were hypertensive (Table III).

On clinical presentation, most of the patients were asymptomatic hypercalcaemic, and it was 8 (57.1%) in number. Skeletal manifestations constituted in 35.7% (n=5). Osteoporotic changes were present in 21.4% (n=3) and compression fractures were in 14.2% (n=2).

In 35.7% (n=5) patients were associated with renal stone. 7.2% (n=1) patient presented with abdominal pain (chronic pancreatitis). Clinical presentations of the patients are shown in Table IV.

On laboratory investigations, the preoperative calcium level were raised in 12 cases (85.71%) and 2 (14.29%) had normal levels. The preoperative parathyroid level were above normal (>65 pg/ml) in all cases (100%). Among the patients there were vitamin D deficiency 4 (28.5%), electrolytes imbalances 3 (21.4%) and dyslipidaemia 3 (21.4%) shown in Table V. Vitamin D deficiency and electrolytes imbalances were corrected before surgery.

In all the patients scintigraphic examinations were performed for preoperative localization of adenoma(s) (100%). Variation of location of parathyroid adenoma are shown in Table VI.
Among them 11 (78.6%) patients only underwent parathyroidectomy. And 1 (7.2%) patient underwent parathyroidectomy along with hemithyroidectomy as the parathyroid adenoma was intrathyroidal, 1 (7.2%) patient underwent parathyroidectomy along with partial lobectomy, 1 (7.2%) patient underwent parathyroidectomy along with nodulectomy (Table VII).

Peroperatively parathyroid adenoma was confirmed in every case by frozen section.

Post operatively among the 14 patients 12 (85.7%) needed intravenous calcium supplementation and 2 patients (14.2%) had normal calcium level and didn’t need any form of calcium supplementation. Up to 1 year of follow up none of our patients develop any complication.

<table>
<thead>
<tr>
<th>Table I :</th>
<th>Age distribution of study population (n=14)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age group in years</td>
<td>Frequency</td>
</tr>
<tr>
<td>21-30</td>
<td>1</td>
</tr>
<tr>
<td>31-40</td>
<td>1</td>
</tr>
<tr>
<td>41-50</td>
<td>3</td>
</tr>
<tr>
<td>51-60</td>
<td>7</td>
</tr>
<tr>
<td>61-70</td>
<td>1</td>
</tr>
<tr>
<td>71-80</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>14</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Table II :</th>
<th>Sex distribution (n=14)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td>Frequency</td>
</tr>
<tr>
<td>Male</td>
<td>6</td>
</tr>
<tr>
<td>Female</td>
<td>8</td>
</tr>
<tr>
<td>Total</td>
<td>14</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Table III :</th>
<th>Comorbidities among study subjects (n=14)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Comorbidities</td>
<td>Frequency</td>
</tr>
<tr>
<td>Type II diabetes mellitus</td>
<td>9</td>
</tr>
<tr>
<td>Hypertension</td>
<td>5</td>
</tr>
<tr>
<td>Chronic kidney diseases</td>
<td>2</td>
</tr>
<tr>
<td>Renal stone</td>
<td>5</td>
</tr>
<tr>
<td>Osteoporosis</td>
<td>3</td>
</tr>
<tr>
<td>Compression fracture</td>
<td>2</td>
</tr>
<tr>
<td>Chronic pancreatitis</td>
<td>1</td>
</tr>
<tr>
<td>Dyslipidemia</td>
<td>3</td>
</tr>
<tr>
<td>Parkinson’s diseases</td>
<td>1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Table IV :</th>
<th>Clinical presentation of study population (n=14)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Presentation</td>
<td>Number (%)</td>
</tr>
<tr>
<td>Asymptomatic hypercalcaemia</td>
<td>8(57.1%)</td>
</tr>
<tr>
<td>Diffuse body pain</td>
<td>3(21.4%)</td>
</tr>
<tr>
<td>Back pain</td>
<td>3(21.4%)</td>
</tr>
<tr>
<td>Abdominal pain</td>
<td>1(7.2%)</td>
</tr>
<tr>
<td>Renal stone</td>
<td>5(35.7%)</td>
</tr>
<tr>
<td>Fatigue</td>
<td>4(28.5%)</td>
</tr>
<tr>
<td>Nausea and vomiting</td>
<td>1(7.2%)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Table V :</th>
<th>Important laboratory findings (n=14)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variable</td>
<td>Values</td>
</tr>
<tr>
<td>Hypercalcaemia (&gt;11 mg/dl)</td>
<td>12(85.7%)</td>
</tr>
<tr>
<td>Elevated PTH (&gt;65pg/ml)</td>
<td>14(100%)</td>
</tr>
<tr>
<td>Vitamin D deficiency (&lt;40ng/ml)</td>
<td>4(28.5%)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Table VI :</th>
<th>Location of parathyroid adenoma by scintigraphy in study subjects(n=14)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Laterality</td>
<td>Superior</td>
</tr>
<tr>
<td>Right</td>
<td>2(14.2%)</td>
</tr>
<tr>
<td>Left</td>
<td>3(21.4%)</td>
</tr>
</tbody>
</table>
Table VII:
Operative procedures (n=14)

<table>
<thead>
<tr>
<th>Surgical approach</th>
<th>Number (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parathyroidectomy</td>
<td>11(78.6%)</td>
</tr>
<tr>
<td>Parathyroidectomy+ hemithyroidectomy</td>
<td>1(7.2%)</td>
</tr>
<tr>
<td>Parathyroidectomy+ lobectomy</td>
<td>1(7.2%)</td>
</tr>
<tr>
<td>Parathyroidectomy+ nodulectomy</td>
<td>1(7.2%)</td>
</tr>
</tbody>
</table>

Discussion:
This study was done in a single nationally representative tertiary care institution to evaluate trends, presentation, management and outcome in patients with parathyroid adenoma underwent parathyroidectomy.

In case of primary hyperparathyroidism, patients usually are of sixth or seventh decade in contrast to the younger age group. In this cohort study, mean age of the patient was 52 (ranges from 26 to 71).

Moreover the prevalence of primary hyperparathyroidism was often observed in female of post-menopausal age. In our study number of female was also predominant.

In our study, clinical presentations, perioperative management and outcome was similar in both male and female. Here majority of the patient was asymptomatic and detected during routine biochemical screening.

Parathyroid tumours are generally not visible or palpable clinically. But one of our patients who was very lean and thin, the parathyroid mass was visible on the neck. The other patients had symptomatic presentation including renal compromise and stone, musculoskeletal disorder, gastrointestinal complaints and psychiatric symptoms.

Nephrolithiasis is the most frequent presentation in patient with renal disorder, where as severe bone disorder has been identified in less than 3% of cases. In our study presentation of renal and bone disorder was equal 37.5% in each.

Hyperparathyroidism increases bone turn over and reduces mineral density causing osteopenia, osteoporosis and fracture which is the frequent complication in late diagnosed hypercalcaemia. Radiologic findings of osteopenia, osteoporosis and fracture were documented in the present study.

In our study, preoperative parathormone levels were above normal in all cases (100%). Preoperative serum calcium level in 12 (85.7%) cases were elevated and in 2 (14.2%) cases were in normal ranges.

The lower levels of vitamin D (in 28.5% cases) in our study also support the hypothesis that vitamin D deficiency might play a role in the pathogenesis of primary hyperparathyroidism.

In our study all the patient had done preoperative scintigraphy for localization of adenoma.

There are usually 4 parathyroid glands in human. Two of the glands are usually located on the bottom and the other two are on top of thyroid gland. Generally superior glands are smaller than the inferior glands. Parathyroid adenoma usually developed from one of the lower glands. Very rarely, parathyroid glands may be intrathyroidally localized (less than 2%).

In this current study, 64.2% cases parathyroid adenoma originated from lower glands and one cases was intrathyroidal. All patients were suffering from a single parathyroid adenoma.

In our 14 cases, 12 cases were hypercalcaemic preoperatively, they were managed with intravenous fluid and frusemide diuretics.

Intraoperative rapid parathormone measurement has been used in all the cases.
In this method surgeon can be sure that hyperfunctional parathyroid glands are removed. Parathyroid hormone is produced only in the parathyroid glands and the intact parathyroid hormone has half-life of less than 5 minutes. Therefore, blood concentration of parathyroid hormone will rapidly decrease shortly after removal of all over expressing parathyroid tissue\(^ {21}\).

Alhefdhi et al. showed that parathyroid hormone level decreased by 50% in 96.5% of patients\(^ {22}\).

For further confirmation in all the cases intraoperative frozen section were done.

Previously as a surgical technique, bilateral neck exploration was accepted as gold standard. But now-a-days precise preoperative localization of parathyroid adenoma causes minimally invasive surgical procedure.

Only parathyroidectomy has the advantages of shorter operative time, decreased surgical dissection, lower costs, shorter hospital stay and a decreased risk of transient postoperative hypocalcaemia compared with bilateral neck exploration\(^ {23}\).

Transient hypocalcaemia is the most common complication after parathyroid surgery ranges from 5-52% and the most commonly accused condition is hungry bone syndrome\(^ {24,25}\). The syndrome has been reported to develop in 13% cases\(^ {26}\). In this series, 12 (85.7%) cases developed transient hypocalcaemia and required calcium supplementation. But none of the patient developed hungry bone syndrome.

Recurrence rate of primary hyperparathyroidism is 3-5%\(^ {27}\). We have followed up the patients for 1 year after operation, there was no recurrence.

**Conclusion:**

Parathyroidectomy is the only treatment of parathyroid adenoma. Due to lack of facilities, skill and limitation of knowledge regarding perioperative management of parathyroidectomized patients, parathyroidectomy is difficult to done in many institutions. A successful parathyroidectomy needs appropriate preoperative evaluation, localization, experienced and skilled surgeon and meticulous surgery. The important limitation of our study was its retrospective nature and the study population was small. However, the incidence of primary hyperparathyroidism is reported to be rare. We believe that our study provides comprehensive data on clinical features of parathyroid adenoma, perioperative management and contributes to valuable reference data.

**References:**


25. Schneider DF, Mazeh H, Sippel RS, Chen H. Is minimally invasive parathyroidectomy associated with greater recurrence compared with bilateral exploration? Analysis of more than 1,000 cases. *Surgery* 152(6), 1008–1015 (2012).


Quality of Life Assessment after Canal Wall Down Mastoidectomy: Our Experiences in Shaheed Ziaur Rahman Medical College Hospital, Bogura

Md. Khorsed Alam¹, Md. Saiduzzaman², Md. Asadur Rahman³, Syed Sanaul Islam⁴, Mohammad Anisur Rahman⁵, Kanchan Kumar Sarker⁶

Abstract:

**Objective:** To determine subjective outcomes after cholesteatoma surgery.

**Design:** Cross sectional observational study

**Methods:** Study place: Shaheed Ziaur Rahman Medical college Hospital (SZMCH), Bogura, Bangladesh

**Study population:** Chronic otitis media (COM) with extensive cholesteatoma.

**Interventions:** Canal wall down mastoidectomy for cholesteatoma.

**Main Outcome Measures:** In this study, the Chronic Ear Survey (CES) was provided to all patients preoperatively and one year after surgery. The preoperative and postoperative score differences were analyzed. We also assessed correlations between chronic ear survey scores and air conduction threshold.

**Results:** Seventy six patients were enrolled in our study & marked improvements were found in total CES score & all subscale scores postoperatively (P value: 0.00). The total CES score and symptom subscale scores were observed greater improvement (P value: 0.00). Significant negative linear correlations were observed among total CES scores, symptom subscale scores and air conduction thresholds (P<.05).

**Conclusion:** The present study suggests that canal wall down mastoidectomy (CWDM) provides a significant improvement in the post-operative Quality of life (QoL) & there is a significant association between subjective outcomes & the objective audiometric results.

**Keywords:** Cholesteatoma, Chronic ear survey, Quality of life, Canal wall down mastoidectomy, Chronic otitis media.

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Introduction:
Cholesteatoma surgery is one of the most controversial topics in otology. The aims for surgery are to eradicate the infection, to make well epithelialized, self-cleaning ear, to reconstruct hearing mechanism and to improve quality of life (QoL). The aim of cholesteatoma surgery is not simply to remove disease in order to create a safe ear. Most of the patients present with hearing loss & may not be satisfied with treatment that gives no apparent benefit. CWDM is an established surgical technique in the management of cholesteatoma. Number of modifications has been introduced in CWDM in order to overcome some of its drawbacks while maintaining its best outcome. Advantages of CWDM are complete removal of the disease, easy inspection of the hidden area of cholesteatoma, less formation of the new retraction pockets, early detection of recurrence of disease and improved post-surgical outcome\(^1\). Although the expectations of hearing gain after surgery is minimal but a successful tympanoplasty or ossiculoplasty can reconstruct the mechanism hearing and improve hearing status.

Presently, the results of cholesteatoma surgery have focused on hearing gain and eradication of the disease, which are measured by objective pure tone audiometry. But there is some discrepancy between hearing results after surgery or anatomical changes of the ear canal and satisfaction of the patients with ear symptoms in daily life. Thus, patient-based subjective outcomes after micro ear surgery have evaluated in some trials\(^2,3\).

Some studies have been structured to assess QoL after cholesteatoma surgery and some specific tools are also available. Recently to evaluate the specific aspects of COM and its impact on daily life, several specific surveys have been developed\(^4\). Nadol et al first introduced the chronic ear Survey (CES) which is a statistically validated questionnaire, specific for patients affected by COM & it has a significant correlation with the pure tone audiometry, with other QoL surveys, and undergoing to a marked post-surgical improvement\(^5,6\). The CES is composed of 13-item survey that measures the frequency, duration and severity of problems associated with COM. It is divided into three subscales that include activity restrictions, symptoms and medical resource utilization. According to the patient’s answers to the questionnaire, a score resulting in a scale ranging from 0 to 100 is obtained with 0 indicating the maximum restriction of quality of life.

Objectives of this study were to (1) measure subjective outcomes using the CES before & after cholesteatoma surgery, (2) compare preoperative & postoperative CES score, (3) correlated CES scores with objective pure tone audiometry.

Methods:
This cross sectional study was carried out in the Department of ENT & Head-Neck surgery, Shaheed Ziaur Rahman Medical College Hospital, Bogura, Bangladesh during the period of July 2017 to January 2020. We enrolled 76 patients admitted for Chronic otitis media with cholesteatoma. Micro-otoscopy and pure tone audiometry were performed in all patients. The diagnosis was confirmed by microscopic examination & CT scan of the temporal bone. All patients were candidates for surgery & a CWD technique was performed, due to the large extent of the pathology, anatomical conformation and/or erosion of the external ear canal. CWDM with tympanoplasty was carried out in a single stage. Partial obliteration of the neo-mastoid cavity with bone dust & cartilage was performed. All patients underwent standard pure-tone audiometry for testing conventional
frequency range (0.25 to 8 kHz). Pure-tone average (PTA) values were calculated as the mean of 0.5, 1, 2, and 4 kHz thresholds. Audiological assessment performed 24 hours preoperatively and 12 months post-operatively. The CES questionnaire was translated from English into Bengali & was administered preoperatively and at 1 year postoperatively, and differences in scores within the groups were analyzed. Scoring for each CES question was normalized to a scale of 0 to 100, with 100 being the highest score. The total scores and sums of subscale scores were averaged on the basis of the number of questions included in each category.

Patients undergoing revision surgery, patients with bilateral disease who underwent a different surgical technique in the two ears, patients affected by petrous apex cholesteatoma and Patients with other medical conditions that could affect QoL were excluded from this study.

Statistical analysis was performed using SPSS statistical software. We adopted the Mann-Whitney test to compare parametric mean values and used the paired t test to compare changes within groups. We evaluated correlations between CES scores and objective AC thresholds using Spearman rank correlation analysis. \( P<.05 \) was considered statistically significant.

**Results:**
The results are shown in tables and figures.

**Table - I :**
*Gender distribution (n=76)*

<table>
<thead>
<tr>
<th>Gender</th>
<th>Frequency (n)</th>
<th>Percent(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>44</td>
<td>57.9</td>
</tr>
<tr>
<td>Female</td>
<td>32</td>
<td>42.1</td>
</tr>
<tr>
<td>Total</td>
<td>76</td>
<td>100</td>
</tr>
</tbody>
</table>

**Table - II :**
*Distribution of Age (n=76)*

<table>
<thead>
<tr>
<th>Age</th>
<th>Frequency (n)</th>
<th>Percent(%)</th>
<th>Mean age</th>
</tr>
</thead>
<tbody>
<tr>
<td>Below 12 years</td>
<td>19</td>
<td>25</td>
<td>10.11</td>
</tr>
<tr>
<td>13-35 years</td>
<td>38</td>
<td>50</td>
<td>23.68</td>
</tr>
<tr>
<td>Above 35 years</td>
<td>19</td>
<td>25</td>
<td>46.37</td>
</tr>
<tr>
<td>Total</td>
<td>76</td>
<td>100</td>
<td>25.96</td>
</tr>
</tbody>
</table>

**Audiological outcome:**
Pre-operatively, the mean PTA(AC threshold) was 46.57 dB (SD = ± 15.61). Whereas at the 12-month post-operative assessment, the overall mean PTA (AC threshold) was 43.88 dB (SD = ± 17.10). The mean preoperative PTA & mean postoperative PTA differences were statistically significant (\( p=0.000 \)). The mean preoperative ABGs were 26.51±8.38 dB and the mean postoperative ABG had improved to 24.17±10.16dB.

The pre- and post-operative audiological results are reported in Table III.

**Table- III :**
*Pre- and Post-operative Audiological Data*

<table>
<thead>
<tr>
<th>PTA</th>
<th>AC threshold(Mean)</th>
<th>BC Threshold(Mean)</th>
<th>AB gap(Mean)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preop PTA(dB)± SD</td>
<td>46.57±15.61</td>
<td>20.11±9.64</td>
<td>26.51±8.38</td>
</tr>
<tr>
<td>postop PTA(dB)± SD</td>
<td>43.88±17.10</td>
<td>19.75±9.52</td>
<td>24.17±10.16</td>
</tr>
<tr>
<td>MD(95% CI)</td>
<td>2.69(1.75,3.64)</td>
<td>0.36(0.23,0.49)</td>
<td>2.33(1.38,3.28)</td>
</tr>
<tr>
<td>P value</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
</tr>
</tbody>
</table>

*MD: Mean difference*
Quality of Life Assessment after Canal Wall Down Mastoidectomy
Md. Khorsed Alam et al

Table - IV :
Postoperative Complications

<table>
<thead>
<tr>
<th>Complications</th>
<th>Cases (n=76)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recurrence</td>
<td>0</td>
</tr>
<tr>
<td>Ear drum retraction</td>
<td>4</td>
</tr>
<tr>
<td>Residual TM perforation</td>
<td>4</td>
</tr>
<tr>
<td>Myringitis</td>
<td>2</td>
</tr>
<tr>
<td>Facial nerve palsy</td>
<td>1</td>
</tr>
<tr>
<td>Residual cholesteatoma</td>
<td>0</td>
</tr>
<tr>
<td>Discharging mastoid cavity</td>
<td>4</td>
</tr>
</tbody>
</table>

Chronic Ear Survey
The preoperative and 12 month’s postoperative administration of the CES results were compared in this study. The mean preoperative total score was 38.17. This score was improved to 74.87 at 1 year postoperatively (P=0.000; Figure 1), and The improvements in each subscale score were 25.28(28.17, 22.40) for the AR, 44.33(47.06, 41.60) for the S, and 40.46(44.40, 36.51) for the MR. The total score and each subscale score improvements were significant (P value: 0.000 Table:V).

Analysis of correlation & comparison of subjective Vs objective audiometric outcomes
The Symptom subscale(S) score & total CES score had significant negative correlation with the air conduction threshold preoperatively & postoperatively (Fig.3). Other subscale scores also showed negative correlations with the hearing thresholds, but not to a statistically significant degree(P>.05).

Table - V :
Comparison of preoperative & postoperative CES scores

<table>
<thead>
<tr>
<th>Mean score ±SD</th>
<th>AR</th>
<th>S</th>
<th>MR</th>
<th>Overall</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preop</td>
<td>42.43±5.00</td>
<td>32.94±8.91</td>
<td>39.14±4.68</td>
<td>38.17</td>
</tr>
<tr>
<td>Postop</td>
<td>67.63±11.39</td>
<td>77.27±10.88</td>
<td>79.71±16.35</td>
<td>74.87</td>
</tr>
<tr>
<td>Mean difference</td>
<td>25.28(28.17,22.40)</td>
<td>44.33(47.06,41.60)</td>
<td>40.46(44.40,36.51)</td>
<td>36.7</td>
</tr>
<tr>
<td>P value</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
</tr>
</tbody>
</table>

AR: activity restriction, S: symptoms, MR: medical resources utilization

Figure 3 Scattergrams of total CES scores and pure-tone audiometry (PTA) air conduction (AC) thresholds. Linear analysis of correlation was performed using Spearman rank correlation analysis.
Discussion:
The purpose of the study was to see the patient based subjective outcomes preoperatively & postoperatively for patients with CSOM with cholesteatoma and to see the correlation with objective audio metrical outcomes. Doctor-based objective measurements or patient-based subjective outcome measurements can be used to assess outcomes of surgery in COM. Doctor-based objective measurements like complete disease eradication, formation of a safe and dry ear, and hearing reconstruction, which were used in most reports. On the other hand, patient-based outcome measurements evaluate QoL following surgery using validated tools. As subjective patient based outcome measures do not always correlate with objective doctor based outcome measures, so a combined outcome assessment of both measures is needed. The chronic ear survey has been validated in various reports and is recently the only disease specific outcome survey to assess QOL in COM.

In this study, at 12-months post-operative assessment by CES, CWDM patients showed a significant improvement in all subscale scores and total score. The patients who underwent CWDM patients, aural symptoms, distress related to the frequent medical visits and activity restriction (mainly water restrictions) becomes significantly less over time. It is consistent with another study conducted by Jung KH et al.

However, the Symptom subscale score was markedly lower in the preoperative group, and it was improved more significantly after surgery. These findings suggest that the subjective symptoms of chronic otitis media, such as hearing loss, otalgia and ear discharge influenced the outcome. Postoperative activity restriction subscale improvements scores were relatively lower than other subscales suggesting that patients were more careful about their daily activities even after successful surgery. As Nadol et al. reported that patients having lower total scores had more significant postoperative improvement, and lower individual scores were also predictive of a postoperative increase in the CES score, the greater improvement in the total CES score and symptom subscale scores in our series may be partly a result of lower preoperative Symptom subscale scores.

Regarding objective audiometric outcomes, average hearing did not improve significantly. As most of the patients had extensive cholesteatomas and had undergone CWDM, and only half of them were conducted ossiculoplasty, the hearing results in our series were relatively poor (Table III). It is compared with another study conducted by D. LUCIDI et al.

As the points about hearing impairment are included in the symptom subscale, so hearing thresholds affected the symptom subscale scores. Air conduction thresholds showed linear negative correlations with the overall CES score and the symptom subscale scores. A similar study conducted by Jung KH et al. reported on 21 patients in primary surgery group, the total CES score and some subscale scores showed significant correlations with the objective clinical outcomes.

The association between air conduction threshold and CES scores is a questionable topic: Nadol et al. reported that the CES questionnaire is specifically formed on the basis of level of hearing and they showed strong association between audiometric thresholds.
threshold and overall score. According to Baumann et al.\textsuperscript{16} the correlation is only between audiometric threshold and COMOT\textsuperscript{15} hearing function and mental health subsections. Lailach et al.\textsuperscript{17} showed a moderate relation between AC threshold and total score of COMOT\textsuperscript{15} and strong relation between AC threshold and the HF subsections. Other studies\textsuperscript{12,18}, \textsuperscript{18} demonstrated only partial or no relation at all between audiomery and the survey' subscales. Our study recommends that a hearing impaired patient does not essentially presents subjective impairment in the overall QOL. Our data also imply that audiometric thresholds are not sufficient to evaluate patients satisfaction. Other aural symptoms (such as foul smelling ear discharge, otalgia, frequent need of medical visits, water restriction) and mental health status are also influential in post-operative assessment for comparison of different techniques.

Limitations:
CWDM are usually done in extensive chronic ear disease, and therefore patients may presents with severe clinical features. Our post-operative follow up duration was approximately 12 months and more long term follow-up results would be more reliable to assess the quality of life. Impact of recurrence, possible revision surgery, experience of the surgeon, social and cultural factors are also crucial factors affecting outcomes which could not be considered in this study.

Conclusion:
This study showed significant quality of life improvement on average 12 months postoperative period of CWDM. The overall CES score and all subscale scores have strong correlations with the objective audiometric thresholds.

Acknowledgement:
I wish to express my heartfelt gratitude to all the patients who inspired me with their endless support with regular follow up, valuable consent & patience.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee.

References:


Complications of Parotid surgery: A study in 60 cases

Kazi Atikuzzaman¹, Mushfiqur Rahman², Naseem Yasmeen³

Abstract:

Objective: To evaluate the common complications following parotid surgery.

Material & methods: A retrospective study was done from January 2011 to December 2019 in the Department of ENT & Head Neck Surgery, Enam Medical College & hospital, Savar. Sixty (60) patients with both benign & malignant parotid disease underwent surgical treatment was selected for this study. All cases were diagnosed preoperatively by Fine Needle Aspiration Cytology (FNAC). Patients with preoperative facial nerve palsy were excluded from this study. Patients were followed up for six months and per operative & postoperative complications were evaluated.

Results: Out of 60 patients, superficial parotidectomy was done in 52 (86.67%) patients and total conservative parotidectomy was done in 08 (13.33%) patients. In this study 56 cases were benign and 04 cases were malignant. Among this 41 (68.33%) pleomorphic adenoma, 05 (8.33%) warthin’s tumour, 03 (5%) benign lymphoepithelial cyst, 03(5%) haemangioma, 02(3.33) sialocele, 01(1.67) dermoid and 01 (1.67%) had salivary fistula. All 04(6.67%) malignant cases were diagnosed as mucoepidermoid carcinoma. Majority of pleomorphic adenomas (92.68%) involved the superficial lobe of the gland. Most commonly observed post operative complication was facial nerve paresis (05%), but only 1.67% developed permanent palsy. Others complication includes Hypoesthesia of the greater auricular nerve (05%), Frey’s syndrome (3.33%) & wound infection (3.33%).

Conclusion: Facial nerve palsy is the frequent complication after parotid surgery in this study. Surgeons have to pay attention to minimize the risk of complication during parotidectomy. However, this operation continues to be a challenge on account of the wide range of tumours encountered and the variations in size and location and the facial nerve preservation.

Keywords: Parotid surgery, pleomorphic adenoma, complications
Introduction:

Salivary gland tumors represent 3-10% of all head and neck neoplasms\(^1\). These tumors occur predominantly in major salivary glands\(^2,3\). The parotid gland is affected most often, ranging from 36.6% to 83%. Malignant tumors are a minority, occurring in 15-32% of cases\(^1,4,5\). The most common malignant and benign tumors are the mucoepidermoid carcinoma and the pleomorphic adenoma, respectively\(^6,7\). The pleomorphic adenoma comprises 45-60% of all salivary gland tumors. Approximately 80% occur in the parotid gland, usually in the inferior pole of the superficial lobe; however, less frequently, it can occur at the deep lobe or in the accessory parotid tissue\(^8\).

Benign parotid tumors present as painless, well-defined, mobile lesions, of firm-elastic consistency, with slow growth, without alterations of the overlying skin, remaining asymptomatic for a long period of time. Dysphagia may be present in deep lobe parotid tumors or in cases of parotid tumors with extension in the parapharyngeal space. A significant proportion of malignant tumors exhibit a clinical picture difficult to differentiate from benign tumors, especially in the early stages of evolution. Alarm signs and symptoms of malignant parotid tumors are pain, rapid growth with surrounding tissue invasion, ulcerations of the overlying skin, pathological cervical adenopathy, facial nerve palsy, otalgia, weight loss, and reduced appetite\(^15\).

The surgical treatment planning varies according to the histological type of parotid tumor. Surgery for malignant tumors must follow the oncological principles, while benign lesions require less invasive surgical treatment\(^26\). For this reason, preoperative diagnostic classification of parotid lesions into benign or malignant type is of paramount importance. Since biopsy is banned for the parotid territory, because facial nerve injury and permanent salivary fistulae pose a severe risk to the procedure, the preoperative imaging diagnosis supported with cytologic investigation becomes the key element of optimum management. Several surgical approaches have been described to treat this tumor. In 1895, Senn described enucleation as the technique of choice. However, tumor removal was incomplete with an unacceptable rate of recurrence.\(^9\) Total parotidectomy removes all gland tissue lateral and medial to facial nerve, whereas superficial parotidectomy removes parotid gland lateral to the facial nerve. In extracapsular dissection, it is not performed any dissection of the facial nerve\(^8,10-14\).

There are ample data pertaining to site specific morbidity following parotidectomy (e.g. facial nerve weakness, salivary fistula, and Frey’s syndrome); however, the literature on general postoperative surgical morbidity following parotidectomy is lacking\(^15\). Our investigation aims to provide a reference in parotidectomy surgery including patient demographics, operative variables, and to evaluate the common complications and postoperative outcomes following parotid surgery.

Material & methods:

A retrospective study was done from January 2011 to December 2019 in the Department of ENT & Head Neck Surgery, Enam Medical College & Hospital, Savar. Sixty (60) patients with both benign & malignant parotid disease underwent surgical treatment was selected for this study.

All cases were diagnosed preoperatively by Fine Needle Aspiration Cytology (FNAC) and confirmed by postoperative histopathology report. Patients with preoperative facial nerve palsy were excluded from this study. Investigator himself was remain vigilant on every aspect of the study starting from case selection, follow up, investigating patients, data sheet filling up, maintenance of all records, data checking, data entry, analysis and report writing. He was personally examine each and every case and was constantly guide the proceeding as far as possible. Patients were followed up for six months and postoperative complications were evaluated.
## Results:

### Table I:

**Demographic data of 60 patients**

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Median: 39.5</th>
<th>Range: 14-65</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>Male: 48</td>
<td>Female: 12</td>
</tr>
<tr>
<td>Sex</td>
<td>Right: 27</td>
<td>Left: 33</td>
</tr>
<tr>
<td>Previous parotid operations</td>
<td>03</td>
<td></td>
</tr>
</tbody>
</table>

### Table II:

**Types of surgery performed (n= 60)**

<table>
<thead>
<tr>
<th>Name of surgery</th>
<th>Number of patients</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Superficial parotidectomy</td>
<td>52</td>
<td>86.67%</td>
</tr>
<tr>
<td>Total conservative parotidectomy</td>
<td>08</td>
<td>13.33%</td>
</tr>
</tbody>
</table>

### Table II:

**Distribution of disease for parotid surgery (n=60):**

<table>
<thead>
<tr>
<th>Nature of disease</th>
<th>Number of patients</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pleomorphic adenoma</td>
<td>41</td>
<td>68.33%</td>
</tr>
<tr>
<td>Superficial lobe</td>
<td>38</td>
<td>(92.68%)</td>
</tr>
<tr>
<td>Deep lobe</td>
<td>03</td>
<td>(7.32%)</td>
</tr>
<tr>
<td>Warthins tumor</td>
<td>05</td>
<td>12.5%</td>
</tr>
<tr>
<td>Benign lymphoepithelial cyst</td>
<td>03</td>
<td>8.33%</td>
</tr>
<tr>
<td>Haemangioma</td>
<td>03</td>
<td>8.33%</td>
</tr>
<tr>
<td>Sialocele</td>
<td>02</td>
<td>3.33%</td>
</tr>
<tr>
<td>Dermoid</td>
<td>01</td>
<td>1.66%</td>
</tr>
<tr>
<td>Parotid fistula</td>
<td>01</td>
<td>1.67%</td>
</tr>
<tr>
<td>Mucoepidermoid Carcinoma(Low grade)</td>
<td>04</td>
<td>6.67%</td>
</tr>
</tbody>
</table>

### Table IV:

**Common postoperative complications:**

<table>
<thead>
<tr>
<th>Complications</th>
<th>No. of patients</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Facial nerve palsy</td>
<td>03</td>
<td>5%</td>
</tr>
<tr>
<td>Hypoesthesia of great auricular nerve</td>
<td>03</td>
<td>5%</td>
</tr>
<tr>
<td>Frey's syndrome</td>
<td>02</td>
<td>3.33%</td>
</tr>
<tr>
<td>Wound Infection</td>
<td>02</td>
<td>3.33%</td>
</tr>
<tr>
<td>Recurrence</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Salivary fistula</td>
<td>0</td>
<td>0%</td>
</tr>
</tbody>
</table>
Table V:

Study of nerve injury after parotid surgery:

<table>
<thead>
<tr>
<th>Nerve injured</th>
<th>No. of patients</th>
<th>percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Facial nerve</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temporary (partial)</td>
<td>02</td>
<td>3.33%</td>
</tr>
<tr>
<td>Permanent (partial)</td>
<td>01</td>
<td>1.57%</td>
</tr>
<tr>
<td>Great auricular nerve (C2,3)</td>
<td>03</td>
<td>05%</td>
</tr>
</tbody>
</table>

Table VI:

Branches of facial nerve injured during parotid surgery

<table>
<thead>
<tr>
<th>Types of injury</th>
<th>Branches</th>
<th>No. of patients</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single branch</td>
<td>Temporal</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td></td>
<td>Zygomatic</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td></td>
<td>Buccal</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td></td>
<td>Mandibular</td>
<td>02</td>
<td>3.33%</td>
</tr>
<tr>
<td></td>
<td>Cervical</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Multiple branch</td>
<td>Lower trunk (cervicofacial)</td>
<td>01</td>
<td>1.67%</td>
</tr>
<tr>
<td>Complete</td>
<td>All</td>
<td>0</td>
<td>0%</td>
</tr>
</tbody>
</table>

Discussion:

Facial weakness is a major complication after parotidectomy, which severely affects patient quality of life postoperatively. The reported incidences ranges from 14.0 to 23.1% in terms of temporary facial weakness, with one exceptionally high occurrence of 64.6%. Our aim was to see the early and late complications in patients undergoing parotid surgery. Successful management depends on accurate clinical assessment and diagnosis with appropriate use of FNAC and imaging. Parotidectomy is the main modality of treatment and is safe procedures. The type of parotidectomy is planned based on the intraglandular location of the tumour. Benign parotid tumors are treated with superficial parotidectomy. Management of malignant parotid tumor depends on the tumor stage and histological grade; those in the advanced stage are treated with total parotidectomy with MRND along with adjuvant chemoradiotherapy. A comprehensive understanding of the anatomy of the facial nerve with meticulous dissection is paramount to reducing the incidence of facial nerve injury during parotidectomy. The overall prognosis is good for all type of parotid gland tumors, with early proper diagnosis and appropriate treatment. Long-term follow-up is necessary as these tumors tend to recur. Since the most malignant tumor is asymptomatic and long standing benign tumor can undergo malignant change, community awareness, and early referral are necessary, as the prognosis is good if treated early.

Out of 60 patients, superficial parotidectomy was done in 52 (86.67%) patients and total conservative parotidectomy was done in 08...
In this study 56 cases were benign and 04 cases were malignant. Among this 41 (68.33%) pleomorphic adenoma, 05 (8.33%) warthin’s tumour, 03 (5%) benign lymphoepithelial cyst, 03(5%) haemangioma, 02(3.33) sialocele, 01(1.67) dermoid and 01 (1.67%) had salivary fistula. All 04(6.67%) malignant cases were diagnosed as low grade mucoepidermoid carcinoma. Majority of pleomorphic adenomas (92.68%) involved the superficial lobe of the gland. Most commonly observed post operative complication was facial nerve paresis (05%), but only 1.67% developed permanent palsy. Others complication includes Hypoesthesia of the greater auricular nerve (05%), Frey’s syndrome (3.33%) & wound infection (3.33%).

The cases of transient facial nerve paresis generally resolved within 6 months, with 90% within 1 month. Temporary paresis usually resolves, according to Laccourreye, within the 18th post-operative month\textsuperscript{16,17}. In this study temporary paresis resolved within 6months. The rate of facial nerve injury was higher in recurrent cases & those involved the deep lobe of parotid. Malignancy and recurrent tumors were common risk factors of postoperative facial weakness in previous studies\textsuperscript{22-24}. In our study, the size of the tumor was not a significant risk factor for facial weakness, but the subsite of the tumor was. Previously, one study found that tumors larger than 70 \, cm\textsuperscript{3} correlated with a significant risk for facial weakness\textsuperscript{16}. In the case of malignant tumors, it is important to secure a safety margin during surgery. Therefore, there can be a high possibility that the facial nerve is intentionally resected during surgery. The rate of recurrence is very low (0%) in this study. The clinical incidence of Frey’s syndrome, after parotidectomy, has been reported in various studies, to be as high as 50% (severe in 15%). Gustatory sweating is detected in almost 100% of cases, evaluated by means of a post-operative iodine-starch test\textsuperscript{17}. Salivary fistula and sialocele are usually self-limiting problems and are initially submitted to conservative treatment. Anticholinergic drugs induce a temporary decrease in salivary secretion and are consequently considered useful in fistula management.

**Conclusion:**
Transient facial palsy is the most common postoperative complication. The best means of reducing iatrogenic facial nerve injury in parotid surgery still remains a clear understanding of the anatomy, good surgical technique with the use of multiple anatomic landmarks & use of modern instruments eg. nerve monitor.

**Limitations:**
This study is subject to some limitations inherent to the use of a large national database. It is hospital based one centre study that is not representing whole feature of country The most notable of these is the absence of procedure-specific outcomes such as facial nerve paresis or recurrence and the inability to assess complications beyond six months of postoperative period.

**References:**


Surgical Outcome of Parapharyngeal Tumour

Kazi Shameemus Salam¹, Samia Quadir², Md Momin Uddin³, Syed Farhan Ali Razib⁴, Md Abdul Sattar⁵, Md Mosleh Uddin⁶, Belayat Hossain Siddiquee⁷

Abstract:

Background: Parapharyngeal tumours are rare accounting for 0.5-1.5% of all head neck tumours. The anatomy of the Parapharyngeal space (PPS) is responsible for a wide variety of tumours arising from PPS.

Objective: Evaluation of the strategy for parapharyngeal tumor surgery based on preoperative symptoms, clinical signs, imaging investigations and histopathology.

Methodology: This retrospective study was carried out in the Department of Otolaryngology and Head Neck surgery in Bangabandhu Sheikh Mujib Medical University (BSMMU) included 32 patients were underwent surgery for primary parapharyngeal tumors between January 2018 and December 2019. Informed written consent was obtained from the patients prior to their inclusion in the study. In regard to histologic type there were 21 cases salivary gland origin tumors and 11 of neuro-genic tumors. The following data were evaluated preoperative symptoms, histological type, surgical approach and complications patients were evaluated following a laboratory investigations.

Results: The most common symptoms of these tumors were a neck swelling. Total of 18 tumors were located in the prestyloid and poststyloid space cases were located 10(31.25%) and 4(12.50%) in the pre and poststyloid. Majority 12(37.50%) was found pleomorphic adenomaof deep lobe of parotid gland followed by 6(18.75%) were schwannoma,4(12.50%) were neurofibroma, 3(9.38%) were ectopic salivary gland tumor,2(6.25%) were mucoepidermoid carcinoma, 2(6.25%) were adenocarcinoma. First bite syndrome and lower lip palsy were common post operative complications. Transcervical approach was the most often performed approach in this study (56.25%).

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Conclusion: Parapharyngeal tumours most often derived from parotid gland. Most of them are non-malignant. Pleomorphic adenoma is the more common. Surgical resection being the mainstay of treatment. Tumours of this complex anatomy call for careful preoperative planning and great skill for selecting the right approach and for management with minimal morbidity and recurrence.

Keyword: Parapharyngeal tumours, pleomorphic adenoma, surgical treatment

Introduction:
Parapharyngeal tumors are rare and a challenge to the surgeon as they are large and intimately related to carotids and lower cranial nerves at the time of presentation. It is a triangular fat-filled compartment of the suprathyroid neck lateral to the pharynx. It is described as an inverted pyramid with the floor of the pyramid at the skull base and the apex at the level of the greater cornu of the hyoid bone. Parapharyngeal tumors are rare pathologies that comprise approximately 0.5% - 1.5% of all head and neck tumors. Eighty percent of them are benign and 20% are malignant. The most common lesions arise from the salivary glands followed by neurogenic tumors. Patients may present with locally advanced tumours which are intimately associated with important neurovascular structures like carotids, vagus & hypoglossal nerves. These tumours can extend higher into masticator space and can be intimately associated with facial nerve and skull base. They can compress the airway and present with stridor. Some of them can secrete vasoactive amines and can be part of a syndrome involving multiple sites. Some of these tumors may be associated with cranial nerve palsy at the time of presentation. Surgery of these locally advanced tumors is challenging and requires expertise and experienced surgeon and anesthesiologist. Though the outcome of treatment of benign parapharyngeal tumors is good with regard to survival, serious complications and morbidity can result due to treatment.

Methods:
This retrospective study was carried out in the department of otolaryngology and Head Neck surgery in BSMMU included 32 patients underwent surgery for primary parapharyngeal tumors between January 2018 and December 2019. Informed written consent was obtained from the patients prior to their inclusion in the study. In regard to histologic type there were 21 cases salivary gland origin tumors and 11 of neurogenic tumors. The following data were evaluated. Preoperative symptoms, histological type, surgical approach and complications patients were evaluated following a laboratory examination. Enhanced CT and MRI scans were used to confirm the location, size, extension of the tumor as a preoperative diagnosis. In particular the following aspects were evaluated. Tumour shape and the tumour margin, the association of the tumour location with major vasculature, surrounding tissue and the deep lobe of the parotid gland (DLPG). Whether the tumor localization was prestyloid salivary or neurogenic poststyloid. Preoperative imaging was also used to estimate the origin of the tumour, the extent of malignancy and tumor vascularity. For the examination of the histology of the tumour, fine needle aspiration cytology (FNAC) was performed in the majority of cases. In the case of malignancy, additional imaging examination was performed to inform the selection of a treatment plan. Where tumors exhibited the possibility of paraganglioma, MRA, CT angiography, Color Doppler study was performed to evaluate the vasculature.
associated with the carotid artery. All patients enrolled in the study underwent surgical treatment. The plan for the surgical approach was selected according to the tumour location, histological findings, the relationship to anatomical structures and the suspicion of malignancy.

Results:
The common age group was found 41-60 which (68.75%) minimum age was 23 and maximum age was 67 years. The mean age was 45.67(±13.72) years (Table-I). Female was predominate 59.4% and male was 40.6% (Figure-1). Regarding sign and symptoms the most common symptoms of neurogenic tumors were a neck swelling (100%), sore-throat (34.38%), dysphagia (28.13%) and dysphonia (25.0%) and intraoral mass (18.75%)(Table-II). Preoperative CT or MRI imaging was used to evaluate the location of each tumour. A total of 18(56.25%) were located in the prestyloid space, poststyloid were 10(31.25%) and 4(12.50%) in the pre and poststyloid. The size of each tumor was measured with CT or MRI imaging. The most frequent range for tumor size was 3.0 4.0 mm (17 cases; 53.13%) followed by 4.0 5.0 mm (8 cases; 25.00%) (Table-III). Regarding pathological diagnosis, it was observed that majority 12(37.50%) was found pleomorphic adenoma of deep lobe of parotid gland followed by 6(18.75%) schwannoma, 4(12.50%) neurofibroma, 3(9.38%) ectopic salivary gland tumor, 2(6.25%) mucopidermoid carcinoma, 2(6.25%) adenocarcinoma (Table-IV). First bite syndrome and lower lip palsy were common post operative complications (Table-V). Transcervical approach was the most often performed approach in this study 18(56.25%), cervical- transparotid 8(25%), cervical-transmandibular 5(15.63%) and trans-oral 1(3.13%) approaches were also used (Table-VI).

Table I:
Age distribution of the study population (n=32)

<table>
<thead>
<tr>
<th>Age in years</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>20-30 yrs</td>
<td>03</td>
<td>9.38</td>
</tr>
<tr>
<td>31-40 yrs</td>
<td>05</td>
<td>15.63</td>
</tr>
<tr>
<td>41-50 yrs</td>
<td>14</td>
<td>43.75</td>
</tr>
<tr>
<td>51-60 yrs</td>
<td>08</td>
<td>25.00</td>
</tr>
<tr>
<td>&gt;60 yrs</td>
<td>02</td>
<td>6.25</td>
</tr>
<tr>
<td>Mean ±SD</td>
<td>45.67±13.72</td>
<td>Range 23-67 years</td>
</tr>
</tbody>
</table>

Figure 1: Sex distribution of the study patients

Figure 2: Distribution of patients according to tumour origin (n=32)

Table II:
Incidence of preoperative symptoms in parapharyngeal tumors (n=32)

<table>
<thead>
<tr>
<th>Symptoms</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neck swelling</td>
<td>32</td>
<td>100.00</td>
</tr>
<tr>
<td>Sore-throat</td>
<td>11</td>
<td>34.38</td>
</tr>
<tr>
<td>Dysphagia</td>
<td>9</td>
<td>28.13</td>
</tr>
<tr>
<td>Dysphonia</td>
<td>8</td>
<td>25.00</td>
</tr>
<tr>
<td>Intraoral mass</td>
<td>6</td>
<td>18.75</td>
</tr>
<tr>
<td>Fullness of ear</td>
<td>5</td>
<td>15.63</td>
</tr>
<tr>
<td>Hearing impairment</td>
<td>3</td>
<td>9.38</td>
</tr>
<tr>
<td>Cervical pain</td>
<td>2</td>
<td>6.25</td>
</tr>
<tr>
<td>Pulsatile tinnitus</td>
<td>1</td>
<td>3.13</td>
</tr>
<tr>
<td>Cranial nerve palsy</td>
<td>1</td>
<td>3.13</td>
</tr>
</tbody>
</table>
Table III:
Tumor location and size measured by CT and MRI of the study patients (n=32)

<table>
<thead>
<tr>
<th>Tumor location</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prestyloid</td>
<td>18</td>
<td>56.25</td>
</tr>
<tr>
<td>Poststyloid</td>
<td>10</td>
<td>31.25</td>
</tr>
<tr>
<td>Prestyloid poststyloid</td>
<td>04</td>
<td>12.50</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Size of the tumor</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.0-3.0 cm</td>
<td>07</td>
<td>21.87</td>
</tr>
<tr>
<td>3.0-4.0 cm</td>
<td>17</td>
<td>53.13</td>
</tr>
<tr>
<td>4.0-5.0 cm</td>
<td>08</td>
<td>25.00</td>
</tr>
</tbody>
</table>

Table IV:
Final pathological diagnosis

<table>
<thead>
<tr>
<th>Pathological diagnosis</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pleomorphic adenoma of deep lobe of parotid gland</td>
<td>12</td>
<td>37.50</td>
</tr>
<tr>
<td>Schwannoma</td>
<td>6</td>
<td>18.75</td>
</tr>
<tr>
<td>Neurofibroma</td>
<td>4</td>
<td>12.50</td>
</tr>
<tr>
<td>Ectopic salivary gland tumor</td>
<td>3</td>
<td>9.38</td>
</tr>
<tr>
<td>Mucoepidermoid carcinoma</td>
<td>2</td>
<td>6.25</td>
</tr>
<tr>
<td>Adenocarcinoma</td>
<td>2</td>
<td>6.25</td>
</tr>
<tr>
<td>Adenoid cystic carcinoma of deep lobe of parotid</td>
<td>2</td>
<td>6.25</td>
</tr>
<tr>
<td>Carotid body tumour</td>
<td>1</td>
<td>3.13</td>
</tr>
</tbody>
</table>

Table V:
Post operative complication of the study patient (n=32)

<table>
<thead>
<tr>
<th>Complications</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>First bite syndrome</td>
<td>07</td>
<td>21.88</td>
</tr>
<tr>
<td>Lower lip palsy</td>
<td>05</td>
<td>15.63</td>
</tr>
<tr>
<td>Facial nerve palsy</td>
<td>02</td>
<td>6.25</td>
</tr>
<tr>
<td>Pharyngeal pain</td>
<td>01</td>
<td>3.13</td>
</tr>
</tbody>
</table>

Table VI:
Surgical Approaches of the study population

<table>
<thead>
<tr>
<th>Surgical Approaches</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transcervical</td>
<td>18</td>
<td>56.25</td>
</tr>
<tr>
<td>Cervical-transparotid</td>
<td>08</td>
<td>25.00</td>
</tr>
<tr>
<td>Cervical-transmandibular</td>
<td>05</td>
<td>15.63</td>
</tr>
<tr>
<td>Trans-oral</td>
<td>01</td>
<td>3.13</td>
</tr>
<tr>
<td>Total</td>
<td>32</td>
<td>100</td>
</tr>
</tbody>
</table>

Discussion:
In this study observed that the common age group was found 41-60 which (68.75%) minimum age 23 and maximum age 67 years. The mean age was 45.67 (±13.72) years. Majority of the patients in our series were in the 4th decade of life. Other studies in literature also have reported maximum incidence of parapharyngeal tumors in the age group of 40 years to 47 years. The mean age of patients treated for PPS tumors ranges from 42 to 53 years; however, some authors include patients under 18 years of age in the analysis. Their population mean age was 52 years.

In current study showed that female was predominate 59.4% and male 40.6%. Rzepakowska et al. reported there were 46 (67.6%) women and 22 (32.4%) men with a mean age of 52.2 years (age range 33–92 years). Regarding sign and symptoms the most common symptoms of neurogenic tumors were a neck swelling (100%), sore-throat (34.38%), dysphagia (28.13%) and dysphonia (25.0%) and intraoral mass (18.75%). Ijichi K and Murakami study reported that the most common symptoms of neurogenic tumors were a neck mass (37.5%), hoarseness (12.5%) and pharyngeal pain (12.5%). The most common symptoms of salivary gland tumors were the presence of a mass on the neck (30.8%) and abnormal sensation of the pharynx (15.4%). The most
frequent symptom in the cohort of the present study was a neck mass followed by pharyngeal mass; this is comparable with other studies. Dysphasia and pain have also been reported to be common symptoms. Rzepakowska et al. studied in 2018, reported a feeling of an obstacle in the pharynx, hoarseness, speech disorders, tongue numbness and nasal congestion. Rzepakowska et al. studied in 2020, symptoms on admission were present in 43 (63.2%) patients. Most of them had foreign body sensations in the throat (35/68), difficulty swallowing (33/68), a neck mass (29/68) or symptoms of Eustachian tube dysfunction (15/68). Thirty-two percent of patients (22/68) were asymptomatic and were diagnosed accidentally.

In this study, showed that preoperative CT or MRI imaging was used to evaluate the location of each tumor. A total of 18 (56.25%) were located in the prestyloid space, poststyloid were 10 (31.25%) and 4 (12.50%) in the pre and poststyloid. The size of each tumor was measured with CT or MRI imaging. The most frequent range for tumor size was 3.0–4.0 mm (17 cases; 53.13%) followed by 4.0–5.0 mm (8 cases; 25.00%). Gupta et al. reported that the average size of parapharyngeal space tumor was 6 cm ± 3 cm. This was similar to most studies which reported average diameter of 5 cm. Few of our patients presented with tumors of massive size (10 cm × 12 cm). In Rzepakowska et al. study the majority of tumors 39 (57.4%) were located in the prestyloid space. There were 11 (16.2%) poststyloid tumors and the same number of tumors involving both localizations. They identified that neurogenic tumors were more likely to be located in the poststyloid area than other types of tumors. The concealed location of PPS tumors and their slow growth contribute to the rather large volume at diagnosis. In Rzepakowska et al. study only 25% of the tumors were smaller than 4 cm and tumors larger than 5 cm accounted for 33.8%. Most authors present only the measures for the largest tumors in their series but do not analyze the cumulative influence of tumor size on the outcomes; for example Sun et al. found that the longest mean diameter of PPS tumors was 5.6 cm Chang et al. reported a largest tumor size of 6.8 cm among their 51 cases and Presutti et al. described an 8 cm diameter as the largest.

In present study regarding pathological diagnosis, it was observed that majority 12 (37.50%) was found pleomorphic adenoma of deep lobe of parotid gland followed by 6 (18.75%) were schwannoma, 4 (12.50%) were neurofibroma, 3 (9.38%) were ectopic salivary gland tumor, 2 (6.25%) were mucoepidermoid carcinoma, 2 (6.25%) were adenocarcinoma. In the Islam et al study reported salivary gland origin tumours were the most numerous (47%). Neurogenic tumours constituted 33% while chemodectomas 16%. Pleomorphic adenoma of the deep lobe of parotid gland and neurofibroma were the most numerous in the study. Liu et al corroborated this observation reporting that the sympathetic and vagus nerves were the most common nerves of origin in head and neck schwannomas. A study by Tryggvason et al. revealed that schwannomas arise in nerves with a sensory component and are associated with sensory ganglia. In addition, it was reported that the majority of sympathetic chain schwannomas are associated with the superior cervical ganglion.

In this study, showed that first bite syndrome and lower lip palsy were common post operative complications. In the Ijichi and Murakami study FNMB palsy typically occurred following surgery to remove tumors.
of salivary origin, as the surgery was performed close to the mandible. The second most common complication in these previous studies was the presentation of FBS. FBS also occurred in the present study following prestyloid tumor surgery. In this study observed that transcervical approach was the most often performed approach in this study 18(56.25%), cervical-transparotid 8(25%), cervical-transmandibular 5(15.63%) and trans-oral 1(3.13%) approaches were also used. In islam et also reported similar observation they showed transcervical approach was the most often performed approach in this study (73%). transcervical-transparotid (10%), transcervical-transmandibular (13%) and trans-oral (4%) approaches were also used.

Conclusion:
Locally advanced parapharyngeal space tumours present with large tumours with close proximity to important neurovascular strictures and some of them are malignant. Surgery is challenging and the main modality of treatment. CT and MR imaging had a decisive meaning in the diagnostic process. Majority of the tumour can be accessed by cervical approach.

References:


Effects of Enlarged Adenoids on Middle Ear Pressure and Hearing

Md. Noor Kutubul Alam¹, S M Nazmul Huque², A B M Delowar Hossain³, Kazi Atikuzzaman⁴, Mohammad Jamal Hussain⁵, Mostafa Kamal Arefin⁶

Abstract:
Background: Adenoids are common childhood upper respiratory tract problem which frequently obstruct the nasopharyngeal opening with tubal occlusion causes reduction in middle ear pressure with conductive hearing loss.

Objective: To observe middle ear pressure and level of hearing in children with enlarged adenoids.

Methods: This cross sectional observational study conducted among 72 children of enlarged adenoids admitted or attended in Dhaka Medical College Hospital and Bangabandhu Sheikh Mujib Medical University Dhaka.

Results: 72 children of enlarged adenoids of age ranges between 5-12 years with male female ratio was 1.25:1. Mouth breathing (65.27%), hearing impairment (59.72%), nasal obstruction (55.55%) and snoring (56.94%) were the presenting symptoms of the patients. Majority of the patients of this study came from middle class (52.77%). Most of the patients with enlarged adenoids were grossly enlarged (51.38%). 43.05% grossly enlarged adenoids had significant hearing loss. In this series 65 ears (45.13%) had type A Tympanogram. 58 ears (40.27%) has Type B Tympanogram and 21 ears (14.58%) has Type C Tympanogram.

Conclusion: This study revealed significant association between enlarged adenoids and conductive hearing loss of variable degree and negative middle ear pressure.

Keywords: Adenoids, Middle ear pressure, Hearing

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Introduction:
Adenoids hypertrophy are frequent health problem for young children. Adenoids are component of Waldeyer’s ring and because of their anatomic position can be relevant in the pathogenesis of otitis media when they are inflammed and/or enlarged. Adenoids can create mechanical eustachian tube obstruction. Adenoids are very small at birth and progressively enlarge as a result of increased immunologic activity. The Adenoids appear to be at it’s largest in the seven-year-old age group. Involution of the adenoids begin after puberty. Regression of the adenoids occur rapidly after 15 years of age in most children. Hypertrophied and chronically infected adenoids had increased load of pathogenic bacteria, especially beta-lactamase producers, as compared with nondiseased adenoids. An equilibrium exists between the normal flora of the adenoid tissue and their local immunologic response and this equilibrium can become disrupted with recurrent acute viral or bacterial infections or colonization with pathogenic bacteria, resulting in hypertrophied lymphoid tissue.

Evaluation of adenoids are much more difficult because it is not easily accessible on physical examination. Lateral neck radiography may be helpful to assess adenoids hypertrophy. Historically, the adenoids has been associated with upper airway obstruction, and more recently with the persistence of otitis media with effusion. Clinical symptoms are more common in a younger age group, due to the relative small volume of the nasopharynx and the increased frequency of upper respiratory tract infections.

The function of middle ear is to transmit sound wave from external ear to inner ear by its transformer mechanism. The normal middle ear pressure is -100mm of H$_2$O to +50mm of H$_2$O and normal middle ear compliance is 0.39 ml to 1.30ml. Middle ear pressure (MEP) is believed to influence sound transmission primarily by increasing the stiffness and damping of tympanic membrane.

Due to mechanical obstruction of eustachian tube by enlarged adenoids, negative pressure is being created within the middle ear. Resulting in vascular engorgement with increased capillary permeability leading to pouring of fluid in the middle ear. Negative pressure is also responsible for retraction of tympanic membrane, together with accumulated fluid influence the middle ear mass effects producing reduced middle ear compliance and conductive type of hearing loss.

The risk of otitis media with effusion was more than seven times as more among adenoidal group than among the non-adenoidal control. Gross nasopharyngeal obstruction is significantly associated with type B tympanogram. The diagnosis of otitis media with effusion correlated significantly with the degree of nasopharyngeal obstruction. In otitis media with effusion middle ear pressure reduces below -100mm H$_2$O. In otitis media with effusion usually mild to moderate degree of hearing loss develops.

Methods:
This study was done in the department of Otolaryngology and Head-Neck surgery in the Bangabandhu Sheikh Mujib Medical University, Dhaka and Dhaka Medical College Hospital, Dhaka from February 2012 to August 2012. Inclusion criteria were all patients with enlarged adenoids of both sex from 5 to 12 years of age. Exclusion criteria were Patients or their guardian who refused to include this study, Patient with hearing loss due to chronic suppurative otitis media or other causes than adenoids, child with profound hearing loss, congenital deafness, cleft palate.
With proper ethical consideration after taking an informed consent from the guardian of all selected patients were interviewed, examined and investigated. Total 72 patients were included in this study. Diagnosis of enlarged adenoids was based on the symptoms and clinical presentation of the patient, clinical examination and radiological investigation (e.g. X-ray nasopharynx lateral view). Middle ear condition was assessed by clinical examination, otoscopy, microscopic examination of ears and tympanometry. Hearing threshold was assessed by audiometry (pure tone audiometry) along with clinical assessment. All the information and data was recorded and compiled in a structured data sheet. All the data was analyzed by standard statistical methods and computer software (SPSS-16, Sigma Stat-3.2).

Results:
Maximum numbers of patients presented with enlarged adenoids belonged to 5 – 8 years (77.78%). In this study among the patients with enlarged adenoids 55.55% were male and 44.44% were female. Thus male to female ratio was 1.25:1.

Table-I :
Age and Sex distributions of patients of adenoids (n=72)

<table>
<thead>
<tr>
<th>Age in years</th>
<th>Male</th>
<th>Female</th>
<th>Number of patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt;5-8</td>
<td>31</td>
<td>25</td>
<td>56 (77.78%)</td>
</tr>
<tr>
<td>&gt;8-12</td>
<td>9</td>
<td>7</td>
<td>16 (22.22%)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>40 (55.55%)</strong></td>
<td><strong>32 (44.44%)</strong></td>
<td><strong>72 (100.0%)</strong></td>
</tr>
</tbody>
</table>

Table-II :
Presenting symptoms of adenoids (n=72)

<table>
<thead>
<tr>
<th>Symptoms</th>
<th>Number of Patients</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mouth breathing</td>
<td>47</td>
<td>65.27</td>
</tr>
<tr>
<td>Hearing impairment</td>
<td>43</td>
<td>59.72</td>
</tr>
<tr>
<td>Snoring</td>
<td>41</td>
<td>56.94</td>
</tr>
<tr>
<td>Nasal obstruction</td>
<td>40</td>
<td>55.55</td>
</tr>
<tr>
<td>Dribbling of saliva</td>
<td>33</td>
<td>45.83</td>
</tr>
<tr>
<td>Sleep disturbance</td>
<td>27</td>
<td>37.5</td>
</tr>
<tr>
<td>Earache</td>
<td>13</td>
<td>18.05</td>
</tr>
<tr>
<td>Voice change</td>
<td>14</td>
<td>19.44</td>
</tr>
<tr>
<td>Epistaxis</td>
<td>2</td>
<td>2.77</td>
</tr>
<tr>
<td>Headache</td>
<td>7</td>
<td>9.72</td>
</tr>
</tbody>
</table>

Majority of the patients of this study were suffering from mouth breathing (65.27%) hearing impairment (59.72%). Nasal obstruction (55.55%) and snoring (56.94%).
### Table-III:
**Socio-economic status of the patients (n-72)**

<table>
<thead>
<tr>
<th>Socio-economic status</th>
<th>Adenoids with Normal ear &amp; Hearing</th>
<th>Adenoids with conductive hearing loss</th>
<th>Total (Percentage)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Affluent class</td>
<td>5 (6.94%)</td>
<td>5 (6.94%)</td>
<td>10 (13.88%)</td>
</tr>
<tr>
<td>Middle class</td>
<td>15 (20.83%)</td>
<td>23 (31.94%)</td>
<td>38 (52.77%)</td>
</tr>
<tr>
<td>Poor class</td>
<td>9 (12.5%)</td>
<td>15 (20.83%)</td>
<td>24 (33.33%)</td>
</tr>
<tr>
<td>Total</td>
<td>29 (40.27%)</td>
<td>43 (59.72%)</td>
<td>72 (100%)</td>
</tr>
</tbody>
</table>

Majority of the patients of this study came from Middle class 38(52.77%).

### Table-IV:
**Different sizes of enlarged adenoids with hearing status (n=72)**

<table>
<thead>
<tr>
<th>Sizes of adenoids</th>
<th>Adenoids with Normal ear &amp; Hearing</th>
<th>Adenoids with conductive hearing loss</th>
<th>Total (Percentage)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mildly enlarged</td>
<td>11 (15.27%)</td>
<td>1 (1.38%)</td>
<td>12 (16.66%)</td>
</tr>
<tr>
<td>Moderately enlarged</td>
<td>12 (16.66%)</td>
<td>11 (15.27%)</td>
<td>23 (31.94%)</td>
</tr>
<tr>
<td>Grossly enlarged</td>
<td>6 (8.33%)</td>
<td>31 (43.05%)</td>
<td>37 (51.38%)</td>
</tr>
<tr>
<td>Total</td>
<td>29 (40.27%)</td>
<td>43 (59.72%)</td>
<td>72 (100%)</td>
</tr>
</tbody>
</table>

Most of the patients with enlarged adenoids were grossly enlarged 51.38%. Mildly enlarged adenoids has 16.66%. Moderately enlarged adenoids has (31.94%). Adenoids with conductive hearing loss has (59.72%).

### Table-V:
**Severity of hearing loss in ears with adenoids (144 ear)**

<table>
<thead>
<tr>
<th>Hearing threshold AC</th>
<th>No of ears</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal (&lt;25dB)</td>
<td>65</td>
<td>45.13%</td>
</tr>
<tr>
<td>Mild (26-40dB)</td>
<td>21</td>
<td>14.58%</td>
</tr>
<tr>
<td>Moderate (41-55dB)</td>
<td>52</td>
<td>36.11%</td>
</tr>
<tr>
<td>Moderately severe (&gt;55dB)</td>
<td>6</td>
<td>4.16%</td>
</tr>
</tbody>
</table>

Among the 144 ears mild (26-40dB) hearing loss was in 14.58% of ears, moderate (41-55 dB) hearing loss was 36.11% of ears and moderately severe (>55dB) hearing loss was 4.16% of ears.
Table VI:
Severity of conductive hearing loss based on air bone Gap (dB) among the Ears with Enlarged Adenoids (n=79)

<table>
<thead>
<tr>
<th>AB Gap in PTA</th>
<th>Adenoids enlargement</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mild to Moderate enlarged</td>
<td>Grossly enlarged</td>
</tr>
<tr>
<td>&lt;15dB</td>
<td>10 (12.65%)</td>
<td>11 (13.92%)</td>
</tr>
<tr>
<td>20-30 dB</td>
<td>7 (8.86%)</td>
<td>42 (53.16%)</td>
</tr>
<tr>
<td>&gt;30dB</td>
<td>0</td>
<td>9 (11.39%)</td>
</tr>
<tr>
<td>Total</td>
<td>17 (21.51%)</td>
<td>62 (78.48%)</td>
</tr>
</tbody>
</table>

Among the patients with grossly enlarged adenoids air bone Gap <15dB was in 11 Ears (13.92%), air bone Gap range 20dB-30 dB was in 42 Ears (53.16%) and air bone Gap >30dB was in 9 Ears (11.39%). The severity of conductive (AC) loss had found significantly related with the size of adenoids enlargement. (P = 0.001).

Table VII:
Types of Tympanometry in both ear (n=144)

<table>
<thead>
<tr>
<th>Tympanometry</th>
<th>Right ear (%)</th>
<th>Left ear (%)</th>
<th>Total (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(n-72)</td>
<td>(n-72)</td>
<td>(n-144)</td>
</tr>
<tr>
<td>Type A</td>
<td>32 (44.44%)</td>
<td>33 (45.83%)</td>
<td>65 (45.13%)</td>
</tr>
<tr>
<td>Type B</td>
<td>28 (38.88%)</td>
<td>30 (41.66%)</td>
<td>58 (40.27%)</td>
</tr>
<tr>
<td>Type C</td>
<td>12 (16.66%)</td>
<td>9 (12.5%)</td>
<td>21 (14.58%)</td>
</tr>
</tbody>
</table>

In this series 65 ears 45.13% had type A Tympanogram. Type B Tympanogram and Type C Tympanogram had 58 ears 40.27% and 21 ears 14.58% respectively. There was no significant relation between the right and left ears in middle ear pressure and compliance in tempanometry (P = 0.774).

Discussion:
Enlarged adenoids are common among the children. Adenoids hypertrophy has been identified as an aetiological factor in recurrent or persistent otitis media with effusion. To determining adenoidal hyperplasia, the physician typically relies on ent examinations, lateral neck radiograms, and history. Only physical examination gives little information about size of adenoids. On the other hand, the lateral neck radiograph provides an excellent view of the adenoids. Radiologically adenoids mildly enlarged when nasopharyngeal airway obstruction <1/3, moderately enlarged when nasopharyngeal airway obstruction >1/3 but <2/3, and grossly enlarged when nasopharyngeal airway obstruction >2/3.

This study was conducted to find out the correlation of hearing and middle ear pressure in children with enlarged adenoids. This study also finds out the different demographic factors related to the enlarged adenoids. Finally, this study finds out the different degree of conductive hearing loss among the children with enlarged adenoids.
In this study the patients age range between 5-12 years. Male female ratio was 1.25:1. Majority of the patients presented with more than one symptoms. The common symptoms of the patients of adenoids were mouth breathing (65.27%) hearing impairment (59.72%). These findings of this series are consistent with the findings of a reported series. A study showed mouth breathing and hearing impairment in 77.00% and 83.00% cases respectively. Nasal obstruction (55.55%) and snoring (56.94%) in this series are consistent with the findings of a previous study. A study reported nasal obstruction and snoring is 40.79% and 40.79% cases respectively. Sleep disturbance, dribbling of saliva, earache, voice change, epistaxis, headache were found 37.5%, 45.83%, 18.05%, 19.44%, 2.77%, and 9.72% respectively.

Most of the patient with enlarged adenoids came from middle class 52.77%(38 patient), the next highest incidence 33.33%(24 patient) in the poor class. The relative lower incidence in poor class is possibly due to lack of knowledge, ignorance about the health problems and failure to pay attention to health problems over the other daily requirements and hence failing to attend the hospital.

In the present study patients with enlarged adenoids has the incidence of conductive hearing loss is 59.72%(43 patient). Grossly enlarged adenoids has significant hearing loss 43.05%(31 patients). The child with adenoids with normal ear & hearing and adenoid with conductive hearing loss have significant relation with the different sizes of adenoids. More the size of adenoids more the effect on middle ear pressure and hearing. A study shown large adenoids have an influence on the hearing level of children, but probably via the negative middle ear pressure.

In our study the hearing loss found in the patients with enlarged adenoids range from 26dB to 55dB among 54.86% of ears. Hearing loss between 26dB to 40dB was 14.58%, 41dB-55dB was 36.11% & >55dB was 4.16%. Hearing threshold depends upon the severity of otitis media with effusion.

This study showed 29 patients(40.27%) of enlarged adenoids has normal hearing. Among 37 patients(51.38%) of grossly enlarged adenoids 6 patient(8.33%) has normal hearing. A study carried out in Nepal shown that air-bone gap did not correlate with the increasing grade of adenoids hypertrophy. A study in Canada among 273 children shown only laterally hypertrophied adenoids tissue encroaching upon the eustachian tube orifice significantly causing conductive hearing loss.

In this study 37 patients(51.38%) has grossly enlarged adenoids. Among the patients with grossly enlarged adenoids air bone gap <15dB was in 11 ears(13.92%), air bone gap range 20db-30 dB was in 42 ears(53.16%) and air bone gap >30dB was in 9 ears (11.39%). The severity of conductive (AC) loss had found significantly related with the size of adenoids enlargement. A study shown that the adenoids hypertrophy in children may lift the hearing threshold level.

In this series 65 ears(45.13%) has type A Tympanogram. Type B Tympanogram and Type C Tympanogram has 58 ears (40.27%) and 21ears (14.58%) respectively. The reduced middle ear pressure is due to blockage of the eustachian tube by enlarged adenoids, absorption of middle ear air and presence of fluid in middle ear.

In this study it is seen that middle ear pressure change and hearing impairment mostly affecting bilaterally. This bilateral ear involvement was due to enlargement of adenoid tissue from midline interfering the tubal function.
Conclusion:
To observe the middle ear pressure and the level of hearing in children with enlarged adenoids this cross sectional study shows enlarged adenoids had significant effects on middle ear pressure and conductive type of hearing impairment. Early diagnosis and intervention should be encouraged to control the, morbidity and complications of middle ear diseases with hearing impairment in childhood with enlarged adenoids.

References:


Correlation between FNAC and Histopathology in the Diagnosis of Thyroid Lesions

Md. Nazmul Haque1, Mahmudul Amin Sakik2, Mohammad Ashequr Rahman Bhuiyan3, Moshammat Fatima Akhter4, Saif Rahman Khan5, Mohammad Zakaria Sarker6, Md. Abul Hossain7

Abstract:

Objective: To observe the correlation between fine needle aspiration cytology (FNAC) and Histopathology in the diagnosis of thyroid lesions.

Methods: It was a Retrospective record review study. One hundred four (104) Patients with enlarged thyroid gland of both sexes were selected from admitted patients of National institute of ENT, Tejgaon, Dhaka. Duration was from January 2017 to December 2018. Every patients had preoperative FNAC & postoperative histopathology report of thyroid lesions.

Results: FNAC diagnosis of thyroid lesions were correlated with histopathology diagnosis. Out of 104 patients 26 were male 78 were female. Male-Female ratio were 1:3. Out of 104 patients most Patients were 31 to 40 years of age Group. Out of 104 cases of FNAC 9 cases were false Cyto-diagnosis. Overall accuracy rate was 91.35%.

Conclusion: FNAC is a reliable, safe and relatively accurate method as preoperative evaluation in thyroid gland swelling before surgery. FNAC has more accuracy in detecting thyroid gland malignancy and therefore it is a reliable diagnostic test for evaluation of thyroid swelling.

Key words: Thyroid swelling, FNAC, Histopathology.

Introduction:

Thyroid diseases are common problem in our country. Thyroid gland is the largest endocrine gland in the body and the first gland to develop in fetal life1. Thyroid nodules are common in general population and one of the commonly encountered problem in day to day clinical practice though it is more commonly found in women2. It has been estimated that palpable thyroid nodules are present in 4-7% of the population but when examined by ultrasound as many as 50-70% is known as incidental findings3. Thyroid Hormone is one of the important hormones of the body and have an essential role in metabolism. Without proper functioning of this hormone, there is disruption of this rhythm and cause dysfunction of organ.
and organ system. A multitude of diagnostic test like ultrasonogram, thyroid scan, fine needle aspiration cytology, thyroid function test and many more are available to evaluate thyroid diseases. Fine needle aspiration cytology (FNAC) is considered as the most common reliable test for the diagnosis of thyroid nodule. Final diagnosis requires morphological examination of thyroid lesions for which FNAC and histopathological examination becomes mandatory tests. FNAC is simple, readily available, reliable, time saving and minimally invasive procedure. It is useful for diagnosis of pathological lesions of multiple organs such as lymph nodes, breast, thyroid gland etc. Being superficial and easily accessible thyroid is an ideal organ for FNAC procedure; it also helps in deciding the line of treatment and taking decision about the surgical procedure. Total thyroidectomy is indicated in patients with thyroid malignancy, thyrotoxicosis, or toxic multinodular goiter and chronic thyroiditis.

Histopathological examinations of surgically excised thyroid swelling are also one of the accurate ways to determine the pathology. Primary objective of this study was to compare the results of FNAC and Histopathology in diagnosis of various thyroid lesions.

Objectives:
1. Primary- To observe the correlation between preoperative fine needle aspiration cytology (FNAC) and postoperative Histopathology in the diagnosis of thyroid lesions.
2. Secondary- (a). To observe the gender, age distribution of the patients with thyroid swelling, (b). To see the percentage of non-neoplastic and neoplastic lesions of thyroid gland.

Materials and methods:
This retrospective record review was carried out in the department of ENT and Head Neck Surgery at NIENT from January 2017 to December 2018. Within 2 years of the study duration total 104 patients of thyroid swelling were included in this study. FNAC and Histopathological Examination were performed in all patients. During the study duration, 130 patients who underwent thyroid surgery in my unit were provisionally selected. Out of 130 patients both preoperative FNAC & postoperative histopathology reports were available in 104 patients; So 104 patients were finally selected for this study. The selected patients were subjected to clinical examination, thyroid function test, FNAC, routine hematological investigations, ultrasound scan and histopathological examinations of the thyroidectomy specimens. Correlation of FNAC with Histopathology reports were done in those patients.

Inclusion criteria:
- Patients underwent thyroid surgery due to Thyroid Lesions.
- Patients age between 10 to 70 years.

Exclusion Criteria:
- Patients taking systemic steroid therapy.
- Completion and Revision thyroid surgery.

Results: Among 104 patients most of the patients were between 21 to 50 years. Mean age was 29.5 years. The minimum age was 11 years while maximum age 70 years. Out of 104 patients only 25% were male.

<table>
<thead>
<tr>
<th>Table - I : Gender Distribution.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
</tr>
<tr>
<td>--------</td>
</tr>
<tr>
<td>Male</td>
</tr>
<tr>
<td>Female</td>
</tr>
</tbody>
</table>
### Table – II:
*Age distribution (n=104)*

<table>
<thead>
<tr>
<th>Age (Years)</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>11-20</td>
<td>14</td>
</tr>
<tr>
<td>21-30</td>
<td>27</td>
</tr>
<tr>
<td>31-40</td>
<td>35</td>
</tr>
<tr>
<td>41-50</td>
<td>20</td>
</tr>
<tr>
<td>51-60</td>
<td>7</td>
</tr>
<tr>
<td>61-70</td>
<td>1</td>
</tr>
</tbody>
</table>

### Table – III:
*FNAC of thyroid swelling (n=104)*

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>No of patients</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non Neoplastic</td>
<td>68</td>
<td>65.38</td>
</tr>
<tr>
<td>Neoplastic</td>
<td>36</td>
<td>34.62</td>
</tr>
</tbody>
</table>

### Table – IV:
*FNAC diagnosis of Non neoplastic thyroid swelling (n=104)*

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>No.of patients</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-Neoplastic</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Multinodular goitre</td>
<td>60</td>
<td>57.69</td>
</tr>
<tr>
<td>Thyroiditis</td>
<td>8</td>
<td>7.69</td>
</tr>
</tbody>
</table>

### Table – V:
*FNAC diagnosis of malignancy in thyroid swelling. (n=104)*

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>No.of patients</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Follicular Carcinoma</td>
<td>10</td>
<td>9.61</td>
</tr>
<tr>
<td>Papillary Carcinoma</td>
<td>22</td>
<td>21.15</td>
</tr>
<tr>
<td>Medullary Carcinoma</td>
<td>2</td>
<td>1.9</td>
</tr>
<tr>
<td>Anaplastic Carcinoma</td>
<td>2</td>
<td>1.9</td>
</tr>
</tbody>
</table>

### Table – VI:
*Histopathological diagnosis of non-neoplastic thyroid swelling:*

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>No of Patients</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>non neoplastic</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Multinodular goitre</td>
<td>58</td>
<td>55.76</td>
</tr>
<tr>
<td>Thyroiditis</td>
<td>8</td>
<td>7.69</td>
</tr>
</tbody>
</table>

### Table – VII:
*Histopathological diagnosis of neoplastic thyroid swelling:*

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>Number of Patients</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Follicular Carcinoma</td>
<td>9</td>
<td>8.65</td>
</tr>
<tr>
<td>Papillary thyroid Carcinoma</td>
<td>26</td>
<td>25</td>
</tr>
<tr>
<td>Medullary Carcinoma of thyroid</td>
<td>2</td>
<td>1.9</td>
</tr>
<tr>
<td>Anaplastic Carcinoma</td>
<td>1</td>
<td>0.96</td>
</tr>
</tbody>
</table>
Discussion:
Clinical assessment of thyroid lesions by means of physical examination, hormone study, and ultrasonography is not completely reliable. Fine needle aspiration cytology is the initial investigation in the diagnosis of thyroid swelling. FNAC is a very important and highly selective and minimally invasive pre operative diagnostic tool. The technique is safe, simple and quick with low complication rates. Studies have demonstrated that among all the diagnostic modalities FNAC is the most accurate cost effective test for rapid diagnosis of thyroid swelling.

The technique is safe, simple and quick with low complication rates. Studies have demonstrated that among all the diagnostic modalities FNAC is the most accurate cost effective test for rapid diagnosis of thyroid swelling. FNAC is a very important and highly selective and minimally invasive pre operative diagnostic tool. The technique is safe, simple and quick with low complication rates. Studies have demonstrated that among all the diagnostic modalities FNAC is the most accurate cost effective test for rapid diagnosis of thyroid swelling.

In this study accuracy of FNAC in the diagnosis of thyroid swelling was compared with some of the available international studies. Females are major victims of thyroid diseases.

Gender wise distribution shows that thyroid lesions were predominant in female with ratio of M:F (1:3). Most of the other studies also have same with M:F ratio ranges from 1:3.84 to 1:11.2.

Age distribution in this series, most were between 31-40 years age group. Mean age was 29.5 years. Shafirusam, Momtaz N Khan A- 2000 in study showed that mean age is 32 with statistical analysis there is no significant difference between the mean age of two studies (Z=2.00,P<0.05). Highest number of patients were found in 3rd and 4th decades which did not differ with this study.

In this study preoperative FNAC was done for 104 cases. Out of 104 cases of thyroid swelling 65.38% were non neoplastic and 34.62% were neoplastic among which 10 patients (9.61%) were follicular neoplasms, 22 (21.15%) papillary carcinoma of thyroid, 2 (1.9%) medullary carcinoma of thyroid, 2 (1.9%) anaplastic carcinoma of thyroid.

Among 104 cases of thyroid swelling those underwent surgery and subsequent results were compared with histopathological examination.

### Table – VIII:
**Correlation of FNAC with result of Histopathological Examination.**

<table>
<thead>
<tr>
<th>FNAC</th>
<th>Number of Patients</th>
<th>Correct Cytological diagnosis</th>
<th>False Cytological diagnosis</th>
<th>Histopathological findings in case of false cytodiagnosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Colloid goitre</td>
<td>60</td>
<td>56</td>
<td>4</td>
<td>1. Papillary thyroid carcinoma.</td>
</tr>
<tr>
<td>2. Hashimoto’s thyroiditis</td>
<td>8</td>
<td>6</td>
<td>2</td>
<td>1. Multinodular goitre</td>
</tr>
<tr>
<td>3. Papillary thyroid carcinoma</td>
<td>22</td>
<td>22</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>4. Follicular Neoplasm</td>
<td>10</td>
<td>8</td>
<td>2</td>
<td>1. Multinodular goitre</td>
</tr>
<tr>
<td>5. Anaplastic carcinoma.</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>1. Papillary thyroid carcinoma.</td>
</tr>
<tr>
<td>6. Medullary carcinoma.</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>
histopathological examinations nine (9) cases were false negative. In 60 cases of multinodular goitre 4 were false cytological diagnosis, in 8 cases of Hashimoto’s thyroiditis 2 were false cytological diagnosis, in 10 cases of follicular Neoplasm 2 cases were Nonconclusive cytological diagnosis and 1false cytological diagnosis of anaplastic carcinoma. The diagnostic accuracy of FNAC for thyroid swelling in this series was 91.35%. This is compared with that of altavillaetal (92.86%)15 and Handu at al (4) grunt et al (7) found false negative rate of only 0.7% in 439 patients, khageswan Rout et al was 96.05%. Result of this study is almost similar to that of the international studies.

Conclusion:
FNAC is an excellent minimally invasive inexpensive procedure to diagnose Thyroid lesions. But it requires experience as well skills of the pathologist for correct aspiration, identification and interpretation regarding diagnosis.

References:
Outcome of Interlay Type 1 Tympanoplasty for Large Central Perforation

Md. Mahmudul Huq1, S.M. Mostofa Qaiyoum2, Md. Saifullah Ibne Mannan3, Md Kamruzzaman4

Abstract:
Background: Perforation of the tympanic membrane may occur from various reasons. Most of these perforations heal spontaneously, whereas the remaining long-standing perforations that lead to recurrent ear discharge need tympanoplasty. Interlay Type 1 Tympanoplasty, a newer technique has shown promising results with higher success rate in terms of hearing gain and graft uptake.

Objective: To analyze the results of interlay Type 1 Tympanoplasty in terms of graft uptake and hearing improvement in cases of inactive mucosal chronic otitis media (COM) with large central perforation.

Methods: This is a prospective study of 24 months (January 2018 to December 2019) duration conducted in department of E.N.T. Khulna medical college, Khulna and data was collected from the 60 patients admitted for tympanoplasty. Results were calculated in terms of graft accepted or rejected and decrease in air bone gap.

Result: The graft uptake rate in the present study was found to be 91.67% and the patients reported an improvement in terms of hearing. Pre operatively mean air bone gap was 26.5dB and post operatively after 12 weeks mean air bone gap improved to 17.58dB.

Conclusion: Interlay Type 1 Tympanoplasty is an effective technique over conventional methods in terms of both graft uptake as well as hearing improvement in large central perforation.

Keywords: Chronic Otitis Media, Interlay, Type 1 Tympanoplasty, Graft uptake.

Introduction:
Chronic otitis media (COM) is a major health problem in a developing country like Bangladesh, especially in low socio economic strata (prevalence >10%). COM has a major impact on the social life of a person in the form of hearing disability. The discharge from the ear is also troublesome causing great discomfort to the patient.

Perforation of the tympanic membrane primarily results from middle ear infections, trauma or iatrogenic causes. Up to 80% of these perforations heal spontaneously. For the remaining, surgical repair, known as tympanoplasty, is usually proposed.
Tympanoplasty is a procedure done to repair the defect in the tympanic membrane after eradicating all the disease in the middle ear cleft with or without reconstruction of ossicularchain. Type I tympanoplasty is a surgical technique that involves the repair of the tympanic membrane in cases where the only existing lesion is a tympanic membrane perforation. It is the most common otological procedure after myringotomy.

Tympanoplasty is one of the most commonly done otological procedure. It was introduced by Berthold and further developed by Wullstein and Zollner.

Many techniques of myringoplasty are described in the literature. A few of the numerous techniques include Underlay, Overlay, Inlay, and Interlay.

It is classified based on the placement of graft in relation to the remnant tympanic membrane as:

a. Underlay technique—graft is placed medial to the mucosal layer.

b. Overlay technique—graft is placed lateral to the fibrous layer of tympanic membrane after elevating all squamous epithelium.

c. Interlay technique—graft is placed between fibrous and the endothelial (mucosal) layer of the drum remnant.

Each technique has its advantage as well as disadvantage. Some of the workers are of the view that overlay technique is more useful in repairing large and anterior perforation while Underlay technique is ideal for posterior perforation.

Underlay technique is considered technically easier, less time-consuming and has shown to be having higher success rate.

Interlay technique has many advantages upon the underlay and overlay technique. In it the graft is kept in between the mucosal and the fibrous layers which eventually grow on the inner and the outer surface of the graft leading to closure of the perforation. Thus this mucosal and fibrous layer plane is the most physiological plane for keeping the graft layer thus contributing to the following advantages:

a. There is no blunting, as the anterior sulcus is skin lined.
b. No lateralization, as the graft is placed medial to mallets and fibro-squamous layer.
c. No epithelial cyst formation.
d. No medialization.
e. Can clear tympanosclerosis from anterosuperior quadrant easily.
f. Myringitis due to endothelium overgrowth on the graft is avoided.
g. No reduction in middle ear space.
h. The Interlay approach has shown promising results with success rates higher than 90%.

Aims and Objectives:
1) To evaluate the results of type 1 tympanoplasty by interlay technique
2) To assess the uptake of graft
3) To assess the hearing improvement
4) To study complications associated with interlay technique

Methods:

Study design and setting
The present study is a randomized prospective study of 24-month duration from
January 2018 to December 2019 in 60 patients of chronic otitis media inactive mucosal type with large central perforation admitted in the E.N.T department at Khulna Medical College and Hospital, Khulna. The study was conducted after getting ethical clearance from the Ethical committee. Patients and the attendants were informed and counselled regarding the disease process, surgical procedure involved and the expected outcomes, complications and alternative treatments available. Written and informed consent was taken from the patient as well as the attendant.

**Study period:** The duration of study was two years from January 2018 to December 2019. The follow up period was 3 months.

**Sample size:** 60 patients from the outpatient department of E.N.T at the Khulna Medical College and Hospital, Khulna. Results were calculated in terms of graft take up rate and hearing improvement.

**Inclusion criteria:** Cases of chronic otitis media with inactive mucosal disease with a large central perforation and pure conductive hearing loss were included in the study. The ear was dry for at least 6 weeks. Both males and females in the age group of 15 to 60 years of age were included in the study.

**Exclusion criteria:** Following patients were excluded from the study- Patients with active mucosal disease; patients with squamosal disease; patients with ossicular discontinuity/ necrosis; patients with sensorineural and mixed hearing loss; patients below 15 years and above 60 years were excluded from the study; patients with diabetes mellitus, patients with active focus of infection in throat, nose and oral cavity; patients with recurrent disease (revision cases); patients who fail to follow-up for at least 3 months.

**Procedure:** All cases of Chronic Otitis Media with large central perforation and conductive hearing loss (After diagnosing by Pure Tone Audiometry and Otoscopic) were admitted in the E.N.T. ward, relevant history, clinical findings, tuning fork tests, routine investigations along with X-Ray mastoid and Diagnostic Nasal Endoscopy (DNE) were carried out. Pre-operatively all patients had a Pure Tone Audiogram with an average of four frequency (0.5/1/2/4 Khz) calculated for both air conduction and bone conduction. Post auricular approach and temporals fascia was used as a graft material in techniques of tympanoplasty under local Anesthesia.

**Results:**

The present study comprised of total 60 patients of which 27(45%) were male and 33(55%) were female patients. The age of the patients ranged from 17 to 60 years, with the mean age group 32.53 years with standard deviation 9.37. Maximum number of patients were in the age group of 21 to 30 years.

<table>
<thead>
<tr>
<th>Age group (years)</th>
<th>Number of patients</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>17-20</td>
<td>6</td>
<td>10</td>
</tr>
<tr>
<td>21-30</td>
<td>24</td>
<td>40</td>
</tr>
<tr>
<td>31-40</td>
<td>20</td>
<td>33.33</td>
</tr>
<tr>
<td>41-50</td>
<td>8</td>
<td>13.33</td>
</tr>
<tr>
<td>51-60</td>
<td>2</td>
<td>3.33</td>
</tr>
<tr>
<td>Total</td>
<td>60</td>
<td>100</td>
</tr>
</tbody>
</table>

**Table-I:**

*Age distribution of the patients.*

**Gender distribution**

- Male 55%
- Female 45%
The preoperative air-bone gap (ABG) was between 11-20 dB in 10(16.67%) patients, 21-30 dB in 35(58.33%) patients and 31-40 dB in 15(25%) patients, with the mean ABG being 26.5dB with standard deviation of 6.98 as shown in table II.

**Table-II :**

*Preoperative air bone gap of the patients*

<table>
<thead>
<tr>
<th>Pre operative ABG(dB)</th>
<th>Number of patients</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;10</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>11-20</td>
<td>10</td>
<td>16.67</td>
</tr>
<tr>
<td>21-30</td>
<td>35</td>
<td>58.33</td>
</tr>
<tr>
<td>31-40</td>
<td>15</td>
<td>25</td>
</tr>
</tbody>
</table>

Post operatively graft accepted in 55(91.67%) patients while graft rejection was observed in 5(8.33%) patients at the end of 12 weeks as shown in figure-1.

![Graft uptake](image)

At the end of 12 weeks the post-operative mean ABG was reduced to 17.58dB with standard deviation 6.88 and the postoperative ABG changing to less than 10 dB in 8(13.33) patients, between 11 and 20 dB in 38(63.33) patients and between 21 and 30 dB in 11(18.33%) patients and no improvement in 3(5%) patients, all of which were statistically significant.

**Table-III :**

*Postoperative air bone gap of the patients.*

<table>
<thead>
<tr>
<th>ABG(dB)</th>
<th>Number of Post-operative patients</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;10</td>
<td>8</td>
<td>13.33</td>
</tr>
<tr>
<td>11-20</td>
<td>38</td>
<td>63.33</td>
</tr>
<tr>
<td>20-30</td>
<td>11</td>
<td>18.33</td>
</tr>
<tr>
<td>31-40</td>
<td>3</td>
<td>5</td>
</tr>
</tbody>
</table>

![Improvement of hearing after operation](image)

**Table-IV :**

*Complications*

<table>
<thead>
<tr>
<th>Complications</th>
<th>Number of patients</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Graft medialization</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Graft laterization</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Perforation</td>
<td>5</td>
<td>8.33</td>
</tr>
<tr>
<td>Post aural wound infection</td>
<td>1</td>
<td>1.66</td>
</tr>
<tr>
<td>Partial flap necrosis</td>
<td>1</td>
<td>1.66</td>
</tr>
<tr>
<td>Granular myringitis</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Alteration of test</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>7</strong></td>
<td><strong>11.66</strong></td>
</tr>
</tbody>
</table>

**Discussion**

Bangladesh is one of the countries with highest load of chronic otitis media\textsuperscript{18}. It is important being a curable cause of deafness. It is mostly the end result of acute otitis media and is characterized by deafness and
persistent discharge from the middle ear through a tympanic membrane perforation.

Tympanoplasty is the operative procedure performed to repair the perforation in ear drum by repairing the tympanic membrane. It is a beneficial procedure to protect the middle ear and inner ear from future damage. Improvement in hearing sensitivity is also observed.

Tympanoplasty has come a long way after it was first introduced by Wullstein and Zollner in the early 1950s as there was a constant desire to improve the technique as well as outcomes. In the past few years, interlay technique of tympanoplasty has gained a lot of popularity and has emerged as the preferred approach because of its low incidence of complications and promising results.

In the present study, the graft uptake rate was found to be 91.67% which is in accordance with study by Kawatra et al who reported success rate of 93.3% and is slightly better than study conducted by Hay et al on 116 ears who found success rate of 91%.

Jain S et al studied 500 cases and reported the success rate of 96.6 and Patil et al reported 96% which is slightly better than our results. Komune S et al studied interlay myringoplasty in 69 ears and achieved success rate of 94.2%.

In the present study mean ABG changed from 26.5 dB preoperatively to 17.58 dB post operatively at the end of 12 weeks.

In study by Subramanya et al mean ABG changed from 28.5 dB preoperatively to 15.83 dB post operatively. In study by Jain S et al the mean ABG was 26.08 ± 8.32 dB and mean postoperative ABG reducing to 10.12 ± 5.84 dB. In the study by Kawatraet al ABG improved from 27.50 dB preoperatively to 13.67 dB postoperatively after 16 weeks and in study by Patil et al the mean preoperative ABG was 36.42 ± 12.01 dB which improved to 9.7 ± 6.71 dB at the end of 3rd month.

In the present study Only 5 (8.33%) patients had graft failure. There was no improvement in hearing in 3(5%) patients. Complication Occur in 7(11.66%) patients which is consistent with the study by Patil et al.

Conclusion:
Although interlay Type 1 tympanoplasty technique requires additional expertise in surgery, it is an effective technique over conventional methods like overlay or underlay for graft uptake and hearing gain in large central perforation. The complications associated with this are less as compared to other techniques. This study indicate interlay is the best approach for chronic otitis media with large central perforation of mucosal variety.

References:
16 Vishal US. A one-year prospective study to evaluate the results of superiorly based tympanomeatal flap in endoscopic myringoplasty conducted in district hospital, belgaum and KLES hospital and MRC, Belgaum during July 2003 to June 2004. Dissertation, MS(ENT), 2006.
A Diagnostic Dilemma of Lateral Neck Cyst: A Lesson Learnt

Dayang Anis Asyikin Ahmad Nazari1,2, Mohamad Khir Abdullah1, Noorizan Yahya1, Siti Halimahtun Sahab1, Loo Lit Yee1, Mohd. Razif Bin Mohamad Yunus2

Abstract:
Large cystic mass is an unusual presentation of papillary thyroid carcinoma, accounting for less than 10% of cases. To make a diagnosis of papillary thyroid carcinoma is challenging since the tumour can mimic a benign lateral neck mass. Therefore, a systematical approach to a patient with neck lump is required so that accurate diagnosis and appropriate treatment can be made. We present a case of a 25-year-old female presenting with an asymptomatic left neck cystic mass diagnosed as a metastatic lymph node of papillary thyroid carcinoma only after surgery.

Keywords: Cystic neck mass, Papillary thyroid carcinoma, lateral neck mass, metastasis

Introduction:
Neck swelling is one of the most common chief complaint in otolaryngology department and may represent a diagnostic challenge. Most of the lateral neck cystic swelling are proven to be benign in 90% of patients in the young adult age1. However, in older adults with this presentation, it is crucial to exclude metastatic tumour especially of head and neck region. Papillary thyroid carcinoma is the most common form of thyroid cancer and it can appear as a solid or cystic neck mass. Even though, only 6.2% of all the lymph node metastasis were purely cystic2, it is crucial to include cystic nodal metastasis in the diagnosis of neck mass so that it would not be missed and appropriate management can be carried out to the patient.

Case Report:
A 25-year-old female patient presented with a painless left sided neck swelling, progressing slowly over the past 4 years. She has no constitutional symptom or local compressive symptom. Clinically, patient was euthyroid. There was an 8x10cm soft, non-tender cystic mass at her left lateral of the neck. The overlying skin was normal. Cervical lymph nodes were not enlarged. Laryngoscopy was performed, no abnormality was seen.

Thyroid function test was normal. In view of the above findings, a clinical diagnosis of left brachial cyst was made. Contrast-enhanced computed tomography (CT) scan of the neck showed multiloculated thin-walled, hypodense
cystic mass predominantly at posterior triangle of the left neck, deep to the sternocleidomastoid muscle, measuring 5.5 x 6.1 x 10.4 cm in size. There was presence of enhancing septa within, no calcification or enhancing solid component seen. There was also a solid nodule in the left thyroid lobe, measuring 1.2 x 0.8 x 1.2 cm with multiple enlarged cervical lymph nodes bilaterally, largest at left neck (Figures 1).

Fine needle aspiration and cytology of the swelling revealed smears of abundant macrophages against a background of watery colloid and blood. No ductal follicular cells were seen. No atypical or malignant cells. Attempts made to reach the left thyroid nodule for aspiration and cytology however failed.

The patient underwent surgical exploration. Intra-operatively, multiple lobulated blackish left neck cysts resembling cystic degenerative lymph nodes were visualised, largest at level III measuring 5x6 cm (Figure 2). There were few satellite lesions at level II, III and IV seen and excised. Incisional biopsy of left thyroid nodule was also performed as there was a strong suspicion of malignancy.

Histopathological report showed papillary thyroid carcinoma. Thus, total thyroidectomy with left modified radical neck dissection was performed. 3 cystic degenerative lymph nodes over supraclavicular region attached to left internal jugular vein and fibrofatty tissue were removed together with the other lymph nodes. The final histopathological examination of the specimen reported, papillary thyroid carcinoma with metastatic nodes obtained from paratracheal and supraclavicular region. The patient made an uneventful recovery. 3 months post-surgery, the patient received radioactive iodine therapy and suppressive thyroxin therapy.

Discussion:
Most of the lateral neck cystic swellings are proven to be benign in 90% of patients in the young adult age and the most common differential diagnosis of a cystic lateral neck mass is brachial cleft cyst. They are usually unilateral, typically seen in the lateral part of
the neck and clinically apparent in late childhood or early adulthood. Conversely, more than 75% of lateral neck masses in population older than 40 years old are caused by malignant tumour and the incidence of neoplastic cervical lymphadenopathy continues to increase with age. Therefore, in older adults with this presentation, it is crucial to exclude metastatic tumour especially of head and neck region.

In this case report, we described a case of young adult female with a slow growing mass on the lateral part of the neck with uncertain radiological and histopathological findings. She was being diagnosed with metastasis lymph node of papillary thyroid carcinoma only after surgery. Papillary thyroid carcinoma with nodal cystic metastasis is rare, accounting only 6.2% of all the lymph node metastasis. Because of the rarity of this cystic presentation, and it can mimic benign cyst clinically, the diagnosis may be missed and subsequently affecting the management.

Through this case report, we would like to point out that correct diagnosis during pre-operative workup is challenging yet crucial because unnecessary surgery or complication can be avoided. A systematic approach should be followed when dealing with neck mass as it can be a common clinical presentation with broad differential diagnosis including malignant disease. A detailed history and proper physical examination help to categorize the mass to be of infective, inflammatory, autoimmune, or neoplastic in nature and this information can aid in narrowing down the diagnosis.

Besides that, the role of imaging is also important as it can enhance the accuracy of preoperative diagnosis. Ultrasound is regularly used initially to confirm the cystic nature of the lesion. Meanwhile, complementary imaging modalities such as CT scan and magnetic resonance imaging (MRI) can provide information on the cyst location and the extension, co-existing thyroid nodule, presence of solid components, calcification and cervical lymphadenopathy that allows optimal preoperative planning. The advantages of MRI over CT scan include better soft tissue resolution, safer contrast agents and lack of ionizing radiation. By comparison CT scan offer the advantages of superior assessment of bony structures, shorter examination time, wider patient access and lower cost. Calcification is the hallmark of papillary thyroid carcinoma. In this case, apart from the cystic lesion demonstrated in the CT, there was also small thyroid nodule with cervical lymphadenopathy but there was no calcification or enhancing solid components seen. These appearances were not consistent of papillary thyroid carcinoma.

Hence, we faced a shadow of doubt in making the diagnosis. We continue the investigation by performing fine need aspiration and cytology (FNAC). However, our diagnosis remains unclear as the FNAC reported as colloid fluid only. A study showed FNAC is less sensitive in diagnosing cystic neck masses compared with solid masses with a false negative rate of 50-67% but the accuracy can be increased if it is done sonographically because we can obtain material from both wall and solid part of the cyst. On the other hand, based on consensus guidelines by Society of Radiologist in Ultrasound (SRU) on the management of thyroid nodules detected on sonography, nodule should undergo ultrasound guided FNA. Ideally, in this case we should perform ultrasound guided FNA of the cystic mass and thyroid nodule as this can help in establishing a diagnosis.

Our patient underwent surgical exploration after all the investigations were inconclusive and she was diagnosed with papillary thyroid
surgery postoperatively. Thus, another operation which was, thyroidectomy with left modified neck dissection was performed 2 months later. In relation to this, intraoperative frozen section can be done if there is high index of suspicion of malignancy to avoid multiple surgeries.

In conclusion, this case draws our attention to the importance of systematic approach in dealing with lateral neck cyst cases so that diagnostic dilemma can be improved. A systematic approach is crucial to ensure that the diagnosis of papillary thyroid carcinoma would not be missed as the course of management can be vary from another benign cyst of the neck.

Conflict of Interest:
The authors declare no conflicts of interest.

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References:
Case Report

Congenital Cholesteatoma in Adult: Is it Still Possible?
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Abstract:
Congenital cholesteatoma is a mass of squamous epithelium located medial to an intact tympanic membrane without previous history of tympanic membrane perforation, otorrhoea or otological surgery. We described a 24 year old gentleman with a left postauricular discharging fistula for 3 years with recent history of gradual hearing loss, tinnitus and recurrent episodes of positional vertigo. Clinical examination noted left postauricular fistula opening and otoscopy showed a whitish mass medial to a bulging intact tympanic membrane. High-resolution computed tomography of temporal bone was suggestive of cholesteatoma. Left modified radical mastoidectomy was done and he recovered with resolution of symptoms.

Keywords: Congenital cholesteatoma, fistula, mastoidectomy, computed tomography scan, vertigo

Introduction:
Congenital cholesteatoma (CC) is an expanding cystic mass of keratinizing squamous epithelium located medial to an intact tympanic membrane in patients without any prior history of tympanic membrane perforation, otorrhoea or otological surgery. However, a previous history of otitis media or effusion does not exclude CC¹. It is most commonly postulated to originate from rests of epithelial cells in middle ear which failed to involute during intrauterine life. These keratinizing squamous epithelium will progress slowly and ultimately result in a locally invasive cholesteatoma². It is mainly a disease of childhood with a paucity of adult cases reported. We report a case of CC with discharging post auricular fistula as the sole complaint.

Case Report:
A 24 year old gentleman presented with history of discharging left postauricular fistula for the past 2 years. He also complained of gradual hearing loss and tinnitus for the past 1 year with history of positional vertigo lasting minutes for the past month. Otherwise, he denied any history of otorrhoea, ear surgery or local trauma. Clinical examination showed a left postauricular fistula opening with surrounding erythema and depressed mastoid bone area on palpation. Otoscopy revealed bulging left tympanic membrane with whitish mass seen
medial to tympanic membrane. However, there was no sagging of posterior external auditory canal seen.

Pure tone audiometry showed conductive hearing loss of 40 dB over left side and a normal hearing contralaterally. Left and right ear had a type C and type A tympanometry respectively.

Noleakage of perilymph seen on Valsalva manoeuvre which was done intraoperatively. Tympanoplasty was done using temporalis fascia graft.

Histopathological examination confirmed the diagnosis of cholesteatoma. Upon follow-up at 4 months postoperatively, he had a full and uneventful recovery with no residual vertigo and no worsening of his hearing.

Discussion:
CC is mostly seen in pediatric age group with a mean age of presentation at 5 years. However, there is a scarcity of reports in adult population. Misale et al. reported a series of 6 patients ranging from 18 to 49 year old with a mean of 27.5 year old. Our case illustrates an atypical presentation in an adult.

Due to the slow growing nature of CC, patients with CC can be asymptomatic. Clinical presentation is determined by the site and extent of disease. CC can occur at the petrous apex and in the middle ear cleft.
However, for middle ear cleft CC, it is classically seen at the middle ear, medial to an intact tympanic membrane with the anterosuperior quadrant being the commonest site and posterosuperior quadrant being second most common. Conductive hearing loss is the most common symptom, although unilateral hearing loss is frequently unrecognized in young children. Hearing loss may only be identified as cholesteatoma grew to a large size filling the middle ear cavity or when ossicles are eroded as illustrated in our patient where only remnants of malleus remained. 

Priyanka et al. reported a similar case with discharging post auricular fistula as the sole presentation, however, unlike our patient, the cholesteatoma sac was confined to the mastoid region only. We postulate that the postauricular fistula in our patient is likely a complication from chronic mastoiditis as suggested by the erosion of mastoid air cell septae and dehiscence of lateral mastoid wall. His vertiginous symptom is attributed to the lateral semicircular canal bony dehiscence caused by cholesteatoma. Cholesteatoma sac was able to be removed intraoperatively without further injury to the canal and his symptoms subsequently resolved postoperatively. 

Other reported symptoms of CC in adult include facial nerve palsy, loss of taste and meningitis. Fortunately, CC has a lower incidence of intracranial complications compared to acquired cholesteatoma. HRCT of temporal bone is in valuable to assess location and extend of disease. Typical findings seen are well demarcated soft tissue density, blunting of scutum, erosion of ossicles and tympanic tegmen. Common extradural sites of occurrence are middle ear, mastoid, squamous temporal bone and petrous apex.

Surgery is the mainstay of treatment with the aim of complete eradication of the disease and creation of a safe ear with optimization of hearing as second in priorities. This can be achieved by either canal wall up (CWU) or canal wall down (CWD) mastoidectomy. CWD surgery involves removal of posterior external auditory canal wall to exteriorize middle ear and mastoid cavity, thus, improving visualization intraoperatively. It also facilitates monitoring for recurrence. CWU surgery preserves the external auditory canal wall and confer the benefit of avoiding the need for lifelong ear cleaning and water precautions. However, it is associated with higher rates of residual disease on the virtue of reduced exposure intraoperative and necessitates a second-look procedure. In our case, a CWD mastoidectomy was performed to facilitate total removal of cholesteatoma sac. The choice of surgery should be individualized according to extend of disease and patient’s social factors. Nonetheless, long-term follow-up is of paramount importance regardless of technique to monitor for disease recurrence.

Conclusion:
CC is predominantly a childhood disease; however, adults can present with atypical symptoms. It should be a differential in case where white mass is seen medial to an intact tympanic membrane. Early detection of CC is crucial to prevent its complications.

Declarations:
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Conflict of Interest:
The authors declare that they have no conflict of interest.

Ethical Approval:
This case report was conducted in accordance with the Declaration of Helsinki.
Ethics approval was given by National Medical Research Register of Malaysia under research ID 55872.

**Consent to Participate:**
Informed consent was obtained for all procedures including the publication of all photographs.

**Consent to Publish:**
Additional informed consent was obtained for the publication of data and photographs.

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