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# Bangladesh Journal of Otorhinolaryngology

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# Bangladesh Journal of Otorhinolaryngology

OFFICIAL JOURNAL OF THE SOCIETY OF OTOLARYNGOLOGISTS & HEAD NECK SURGEONS OF BANGLADESH


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# Bangladesh Journal of Otorhinolaryngology

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The Bangladesh Journal of Otorhinolaryngology is published twice in a year, in the month of April and October. The Journal is the official organ of the Society of Otolaryngologists and Head Neck Surgeons of Bangladesh. It publishes original papers, research topics, case reports and review articles of different fields related to Otolaryngology. Papers submitted solely to this Journal will be published after peer review.

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## *Editorial*

# IMRT: Is it superior to formal radiotherapy in the treatment of head neck cancer?

**Introduction:**

Incidence of head and neck cancer is increasing day by day all over the world including Bangladesh. Organ preservation rather than organ sacrifice is more preferable and in this context radiotherapy gradually superseded surgery over the last two decades.

During the last decade Intensity-modulated radiation therapy (IMRT) represents a major evolution in the treatment of head-and-neck cancer, enhancing the therapeutic ratio by increasing the dose delivered to the tumoral volume while reducing that to healthy organs.

In head-and-neck cancer, it is particularly difficult to ensure a good therapeutic ratio, because:

- Tumors are often large and/or poorly radiosensitive, requiring high therapeutic doses, equal to or greater than 70 Gy delivered in 35 fractions over 7 weeks for macroscopic lesions and equal to or greater than 50 Gy delivered in 25 fractions over 5 weeks for microscopic lesions.
- Lesion configuration is often ballistically complex, significantly different from simple geometric forms and
- Many healthy at-risk organs are present within the target areas.

**History:**

From conformal 3D RT to intensity-modulated radiation therapy:

The evolution in RT techniques over the last 30 years began from 2D radiation therapy using coplanar beams, usually in opposing pairs: e.g., right and left lateral in head-and-neck oncology. Dose distribution was calculated without taking account of tissue heterogeneity, simply according to the skin contour of the target volume. Interposing lead caches here and there in the field helped protect sensitive areas, in what was an early attempt at “conformal” RT.

3D RT was developed using CT data, to determine both the anatomic contours of tissues and organs and radiologic density differentials directly applicable in dosimetrics. As CT data were obtained in all slice planes, 3D reconstruction was possible both for tumor volume and extension and neighboring healthy tissue, and for the dose distribution achieved by the selected treatment protocol. Interposing protection within the beam and, later, using the multi-leaf collimators available in modern linear accelerators made 3D conformal RT the standard technique by the turn of the century.

IMRT is an evolution of the above technique,The sharp dose fall-off gradient of this technique permits the administration of a highly conformal and more homogeneous dose to the planning target volume (PTV) than conventional and conformal radiotherapy. This allows better sparing of the organs at risk (*e.g.* parotid glands, submandibular and minor salivary glands, larynx and swallowing structures), leading to a decrease in acute and late side effects.

This may open a window for treatment intensification of radiotherapy alone or

combined with chemotherapy and/or targeted therapy.In addition, the technique allows dose-escalation, with a higher dose per session delivered to the macroscopic tumor than to other irradiated areas.

**Technique**

IMRT uses linear accelerators equipped with multi-leaf collimators with leaf movement controlled by dedicated software. Schematically, two technical solutions are available:

1) A succession of usually five to seven fixed accelerator positions around a circle or arc; so-called "step and shoot" radiation is thus delivered at each position, with intensity modulated by interposition of the collimator leaves;
2) Radiation delivered during rotation through an arc, with continuous intensity modulation, known as "dynamic IMRT" (VMat, Elekta; Rapid' Arc, Varian), which significantly reduces exposure time.

Rationale for intensity-modulated radiation therapy in head-and-neck cancer

IMRT provides three combinable advantages in treatment:

- Relative conservation of healthy tissue;
- Improved tumor coverage;
- And escalation of the dose delivered to the tumor.

Superiority of IMRT over formal radiotherapy in head neck cancer:

Despite of it's efficacy and advantage, the question about it's superiority was still hard to prove. A prospective randomised study, without concurrent chemotherapy, done by Kam et al showed significantly less observer-rated severe xerostomia and a significantly higher stimulated parotid and whole saliva flow rate after IMRT treatment for early stage nasopharyngeal carcinoma than two-dimensional radiotherapy. Very recent, the first phase IIIrandomized controlled trial of head neck cancer patients done by Nutting et al showed significantly less Grade 2 or more xerostomia at 12 and at 18 months in the IMRT arm than the conventional radiotherapy arm, both without concurrent chemotherapy. No differences in acute mucositis or pain scores were found, although the IMRT group suffered from significantly more acute fatigue of Grade 2 or more.

However, a clear survival benefit of IMRT over the more classic three-dimensional conformal radiation therapy has not been proved as yet, and there are some concerns about the theoretically higher risk of induction of secondary cancers by IMRT because of the increased low-dose irradiated volume. IMRT might also lead to unexpected higher toxicity in areas that were not in the classic two-dimensional beam path but that are irradiated in the IMRT set-up, especially in combination with concurrent chemotherapy.

**Conclusion:**

Although the positive impact of this technique on tumor control remains to be proven, salivary function conservation currently makes IMRT the standard treatment in most head-and-neck cancer.

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*Original Article*

# Surgical management of Tympanomastoid Paraganglioma: Experience in BSMMU, Dhaka

**Kanu Lal Saha[1], Md Abul Hasnat Joarder[2], Sampath Chandra Prasad Rao[3], Pran Gopal Datta[4], Harun-Ar-Rashid Talukder[5]**

**Abstract :**

***Objective**: To characterize the clinical presentation, surgical management, and outcomes of a consecutive cases of patients with tympanomastoid paraganglioma (TMP) tumors managed at a single tertiary referral center with 5 years experience.*

***Study Design**: Retrospective review.*

***Setting**: Bangabandhu Sheikh Mujib Medical University, a tertiary referral center in Bangaldesh.*

***Methods**: Between November 2014 and May 2019, 10 patients with histologically confirmed TMP tumor underwent surgical treatment. Tumor stage was described using the Sanna modified Fisch and Mattox's classification system.*

***Results:** Distribution of tumors according to modified Fisch and Mattox classification was as follows: type A2 1 case (10%); B1 2 cases (20%), B2 6 cases (60%) and B3 1 case (10%). Class A2 tumour was safely removed via postauricular-transcanal approach. Two patients with Class B1 tumors were operated on through canal wall up mastoidectomy approach. Six patients including five Class B2 and one Class B3 tumors were managed by canal wall down mastoidectomy approach. One Class B2 underwent a subtotal petrosectomy with blind sac closure of the external auditory canal and middle ear obliteration. Gross total tumor removal was achieved in 9 cases (90%). One patient developed facial weakness (HB grade III) after one week of postoperative period which recovered completely by conservative treatment. No recurrence was noted in follow-up period.*

***Conclusion:** Early diagnosis of tympanomastoid paragangliomas are very rare because of its benign and slow-growing nature. Clinical differentiation between tympanojugular and tympanomastoid paragangliomas are difficult. Surgery is the recommended primary modality of treatment for tympanomastoid paragangliomas with minimum morbidity and recurrence rate.*

**Key words:** *Paraganglioma, Tympanomastoid, Tympanojugular,Glomus, Middle ear tumor.*

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**Introduction:**

Paragangliomas are tumors that arise from proliferation of paraganglionic chief cells derived embryologically from the neural crest and found throughout the body associated with vascular and neuronal adventitia. Paragangliomas of the head and neck accounts for 0.6% of head and neck tumors with most frequent carotid body tumour followed by vagal, tympanojugular and tympanomastoid paraganglioma.[1] Stacy R.Guild first noticed the presence of paraganglionic tissue or glomus formation within the temporal bone.[2] Paragangliomas arise from glomus body along the Jacobson's nerve and Arnold's nerve are known as glomus tympanicum or tympanomastoid paraganglioma(TMP), and those arise from paraganglionic tissue along the adventitia of jugular bulb are known as glomus jugulare or tympanojugular paraganglioma (TJP).[3] The term glomus is a misnomer. Earlier it was believed that the chief cell of glomus or paraganglioma derived from specialized pericytes or from blood vessel walls that are seen in true arteriovenous or glomus complexes which was proved false.[4] So Paraganglioma is being used instead of glomus tumour in the most of current literature. Though rare in incidence tympanic or tympanomastoid paraganglioma is the most common primary neoplasm of middle ear.[5] This tumour confines to middle ear and mastoid compartment without erosion of jugular plate or involvement of jugular bulb. The tumour may be asymptomatic and undiagnosedin very early stage of its origin from tympanic plexus. When the growing tumour touches the umbo, it begins to transmit pulsations to tympanic membrane and patient develops pulsating tinnitus.[6]

The patient usually presents with conductive hearing loss, pulsatile tinnitus and aural fullness in early stage Otoendoscopic or otomicroscopic examination reveals a dark red or purplish pulsatile mass behind the intact tympanic membrane. High resolution CT scan is the investigation of choice for identification of possible tumour origin and its extension to adjacent structures.[5-7] It helps in designing surgical approach before surgery. Surgery is the definitive primary treatment option in most of the cases of tympanomastoid paraganglioma.[5,7,8,9] In the present study we report our experience of surgical treatment of 10 cases of tympanomastoid paraganglioma from Bangabandhu Sheikh Mujib Medical University, Dhaka, Bangladesh. To the best of our knowledge this may be the first reported large series of paraganglioma from a single center in Bangladesh. The authors followed the Modified Fisch and Matttox classification of tympanomastoid paragangliomas for operational definition.

Modified Fisch and Matttox classification of tympanomastoid paragangliomas:

| Class | Description |
|---|---|
| A. | Tumors limited entirely to the middle ear |
| A1 | Tumors completely visible on otoscopic examination |
| A2 | Tumor margins are not visible on otoscopy. Tumor may extend anteriorly up to the Eustachian tube and/or to the posterior mesotympanum |
| B. | Tumors limited to the tympanomastoid segment (middle ear cleft) of the temporal bone |
| B1 | Tumors filling the middle ear with extension into the hypotympanum and tympanic sinus |
| B2 | Tumors filling the middle ear with extension into the mastoid and medially tothe mastoid segment of the facial nerve |
| B3 | Tumors filling the middle ear with extension into the mastoid with erosion of carotid canal |

**Methods:**

The medical records of 10 patients with a diagnosis of Tympanomastoid Paraganglioma (TMP) who were managed at the Bangabandhu Sheikh Mujib Medical University, Dhaka, Bangladesh

between November 2014 and May 2019 were reviewed. Patients age, sex, presenting symptoms and the duration of these symptoms prior to diagnosis, clinical findings, side and site of the tumors were noted.Pre-operative and post-operative Otoendoscopic and or Microscopic findings were documented with photograph and video recording system. Audiological and radiological data were documented and analyzed. All patients underwent preoperative CT scan with iodinate contrast medium and four patients also underwent gadolinium (Gd) enhanced magnetic resonance imaging (MRI) to exclude jugular bulb and carotid involvement.

Urinary vanilylmandelic acid (VMA) was tested in four cases. Pure tone averages (PTA) for airconduction (AC) and bone conduction (BC) were calculated before and after surgery as the mean of 500, 1000, 2000 and 4000 Hz thresholds. The pre-operative and postoperative facial nerve (FN) function was graded according to the House-Brackmann (HB) grading system.[10]

The tumor was staged according to the classification proposed by Sanna known as modified Fisch and Mattox's classification.[7-8] The type of procedure and the operative findings were recorded. Any operative complications, both immediate and delayed, were noted. Follow-up was defined as the period of time from surgery to the most recent office visit.

**Surgical technique**

Controlling bleeding and getting adequate exposure is the prime issue when excision of tympanomastoid paragangliomas is executed. A very good nonstick bipolar diathermy is very useful in this regard. We followed the surgical technique proposed by Mario Sanna.[7] In case of Class A2 tumour the retroauricular-transcanal approach was applied. A transcanal approach was established via a retroauricular incision. The tympanomeatal flap was elevated.The tympanomeatal flap cosists of meatal skin, annulus and tympanic membrane was detached carefully from the bony meatus, the tumor andthe malleus, and preserved in saline solution. This is known as glove finger flap technique. A wide canalplasty was performed after removal of the glove finger flap in order to get complete exposure of the tumor.The technique of tumor removal comprised bipolar coagulation and blunt dissection. The vascular pedicle (inferior tympanic branch of the ascending pharyngeal artery) is coagulated carefull.The temporal fascia was placed under the bony annulus as in the underlay technique after packing the tympanic cavity with gelfoam. The glove finger flap was carefully replaced over the graft adapting it to the enlarged external auditory canal through some radial skinincisions All ossicles were preserved in one case. The incus was removed and repositioned in another case. In case of Class B1 tumour canal wall up mastoidectomy (CWUM) approach was used. Tympanomeatal flap was managed as glove finger flap technique manner. Epitympanotomy was done for better exposure of epitympanum. In case of B2 tumours conventional canal wall down mastoidectomy was performed. In one revision case subtotal petrosectomy with blind sac closure technique was applied. In one Class B3 tumour canal wall mastoidectomy with tympanoplasty was done to preserve hearing

**Results:**

Out of 10 patients with tympanomastoid paraganglioma (TMP) who were managed at BSMMU, a tertiary referral center in Bangladesh ,6 (60%) were female and 4 (40%) were male providing female/male ratio 3:2.The patients ages ranged from 15 to 60 years with mean age of 37.5 years. 6 of the 10(60%) patients were in the age range of 25 to 50 years. The tumour was found in the right ear in 7 cases (70%) and in the left ear in 3 cases (30%). Presenting symptoms ranged from just fullness in the ear to frank bleeding from the ear. Pulsatile tinnitus and hearing loss were the most common symptoms found in all 10 (100%) cases of our patients. 5(50%) of our patients had discharge or fresh bleeding from ear when they

first presented to us suggesting a relatively late presentation with aural polyp or with previous history of biopsy or surgery. A pulsatile reddish mass was seen behind the intact tympanic membrane in 3(30%) of the patients while remaining 7(70%) patients presented with polypoidal pulsatile mass in external auditory canal.(Table II)

**Table I :**

*Presentation and Examination Findings.*

| Finding | n (%) |
|---|---|
| Presenting symptoms | |
| Pulsatile tinnitus | 10 (100) |
| Subjective hearing loss | 10 (100) |
| Aural fullness | 10 (100) |
| Bleeding /Otorrhea | 6(60) |
| Facial paralysis | 0 (0) |
| Asymptomatic | 0 (0) |
| Examination findings | |
| Pulsatile mass with intact tympanic membrane | 3(30) |
| Violation of tympanic membrane | 7 (70) |

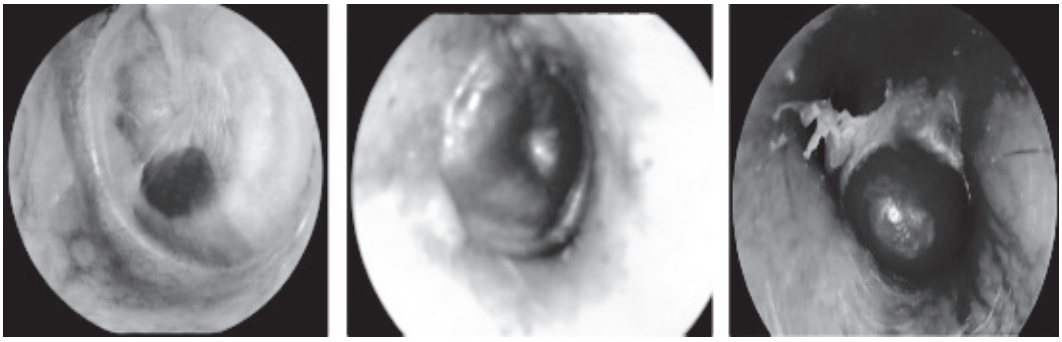
The right was involved in 7(70%) patients and the left ear in the other 3(30%).None of the patients had symptoms or signs that can be attributed to either neurosecretory tumor or involvement of facial cranial nerve or lower cranial nerves. Tumors was classified according to modified Fisch and Mattox's classificationas follows: A2 1 (10%) case, B1 2(20%),B2 6(60%) cases and B31(10%) case. (Table III).

**Table II :**

*Baseline Population Characteristics.*

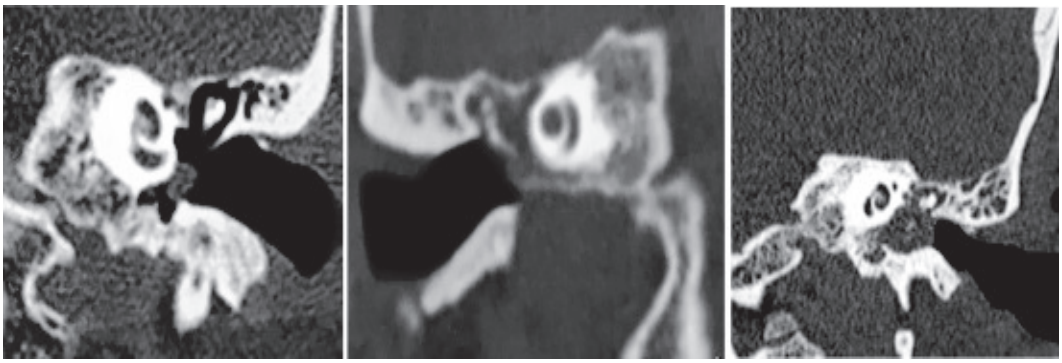
| Characteristic | Mean (Range) or n (%) |
|---|---|
| Age at diagnosis, years | 37.5 (15 - 60) |
| Female sex | 6 (60) |
| Male | 4(40) |
| Malignant | 0 (0) |
| Secretory | 0(0) |
| Primary or recurrent disease | |
| Primary | 8 (80) |
| Recurrent | 2 (20) |
| Right-sided laterality | 7 (70) |
| Tumor type (stage) | |
| A2 | 1(10) |
| B1 | 2(20) |
| B2 | 6 (60) |
| B3 | 1(10) |

Eight patients underwent a primary operation and 2 patients presented with a recurrent tumor operated on elsewhere by a canal wall down mastoidectomy. The retroauricular-transcanal approach was applied for one patient with a tumour confined to middle ear (Class A2). A canal wall up mastoidectomy (CWUM) was used in two patients (Class B1). Total ossicular chain was maintained in two cases. Stapes suprastructure was preserved in two cases where in one case ossiculoplasty was done with repositioned autologous incus and other case with conchal cartilage. Six patients (Class B2) required canal wall down procedure. One patient underwent a s subtotal petrosectomy with blind sac closure of the external auditory canal and middle ear obliteration.

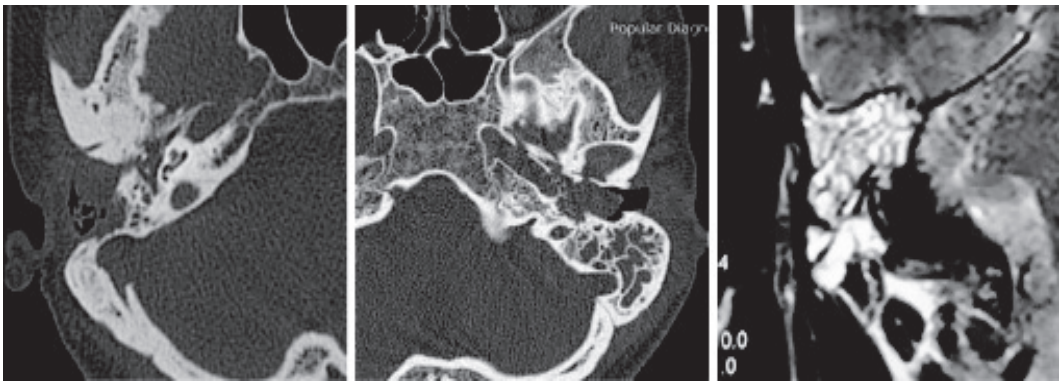


a. Class A2 tumour b. Class B1 tumour c. Class B2 tumour

**Fig. 1 (a,b,c) :** *Otoendoscopic findings of different classes of Tympanomastoid Paraganglioma tumours*



A.Class A2 tumour B.Class B1 tumor C. Class B2 tumour



D.Class B2 tumour E. Class B3 tumour F. MRI of Class B1 tumour

**Fig. 2:** *Computed tomography(CT) scans illustrating the different classes of tympanomastoid paraganglioma according to Sanna modified Fisch-Mattox classification.A,B,C –Coronal CT and C,D –Axial CT,F-MRI to see involvement of jugular bulb*

Gross tumor removal was achieved in 9 cases. Small residual tissue around the carotid canal in was left in one case. (Table III)

**Table III :**
*Operative Details*

| Detail | n (%) |
|---|---|
| Surgical approach | |
| Postauricur-transcanal approach | 1 (10) |
| CWU Mastoidectomy | 2(20) |
| CWD Mastoidectomy | 6(60) |
| STP with MEO | 1(10) |
| Extent of resection | |
| Gross total | 9 (90) |
| Near total | 1 (10) |

Abbreviations: CWD, canal wall down; CWU, canal wall up; STP with MEO Subtotal petrosectomy with middle ear obliteration

Postoperative complications were noted in 3(30%) cases. One patient developed facial weakness (HB grade III) after one week of postoperative period which recovered completely by conservative treatment with steroid and antibiotic over next three weeks. Non healing granulation tissue was seen anterior quadrant of middle ear in a case of radical mastoidectomy after 8 months of surgery. Examination under general anesthesia revealed a piece of bone wax in Eustachian tube area which was removed along with adjoining granulation tissue. Dry and epithelialized middle ear and mastoid cavity was found in follow up visit after one month. Another patient of CWUM developed pars tensa retraction pocket Cholesteatoma after 3 years of surgery. The case was managed by Canal wall down (CWD) mastoidectomy, and a dry and healthy well epithelialized middle ear mastoid cavity was achieved.

Pre-operative and post-operative hearing were analyzed. In pre-operative pure tone audiometry 5(50%) patients had moderate conductive hearing loss, 2(20%) severe mixed hearing loss and 3(30%) patients profound sensorineural hearing loss. Out of five conductive hearing loss cases three noticed improved hearing and two did not do post-operative audiometry.

**Discussion:**

Tympanomastoid paragangliomas (TMP) are slow-growing vascular middle ear mass. Because of its indolent nature, diagnosis is usually delayed until it reaches in significant size. Though it is benign in nature, it invades the adjoining bone through haversian systems and air cells.[4,6,11] Pulsatile tinnitus (75-83%) and hearing loss (73-80%) are the most common presenting complaints of TMP patients in majority of reported literature.[4-8.11] In our series 100% patients (10/10) presented with pulsatile tinnitus and hearing loss. A female preponderance of more than 90% with female/male ratio of 9:1 is reported in maximum literature.[5,7,8,12] There were 6(60%) females and 4(40%) males with female/male ratio of 3;2 in our series. The mean age at diagnosis was 37.5 years in this study which is dissimilar with other studies where mean age was 51- 56.2 years[5, 11,13,15].

Presence of a pulsatile reddish mass behind the intact tympanic membrane is the characteristic finding of tympanic paraganglioma. This finding is seen when tumour is confined to middle ear. When the tumour extends to external ear canal as polypoidal mass or if there is previous history of biopsy or surgery other differential diagnosis including inflammatory polyp, aberrant internal carotid artery ,high jugular bulb, haemangioma, facial nerve neuroma etc. should be kept in mind. In this series 3

patients had pulsatile mass behind intact tympanic membrane and other 7 patients presented with pulsatile polypoidal mass in external ear canal. Unless the clear margin around the tumour is visible on otoendoscopy or microscopy, differentiation of tympanic paraganglioma from jugular paraganglioma is clinically impossible.[6, 11, 14]

A slight left sided predominance (515-56.2%) was noted in some reported series [7,15] and right sided in other studies.[5,11] In our study it is predominantly lateralized to right (70%).

Histopathology is the confirmatory for diagnosis of paraganglioma but preoperative biopsy iscontraindicated.[5-8,11,14] In 8(80%) of our primary case preoperative biopsy was not performed.

Neurosecretory function is a very rare entity in tympanomastoid paraganglioma. Historically, preoperative venous sampling was encouraged in all cases to avoid inadvertent situation during operation.[11] In study of 115 cases of tympanic paragangliomas, only one tumour was associated with catecholamine secretion in a patient who had history of refractory hypertension[13]. In another large series of 133 such tumours, no single secretory lesion or intraoperative unwanted cardiovascular crisis was reported.[15] Soroutine preoperative biochemical analysis and urinary VMA were not advocated in most literature in absence of high risk factors such as, younger age at presentation (<40 years),male sex, family history of disease, signs and symptoms of multicentric disease.[5,8,11,13] Out of 10 cases, urinary VMA was tested in 4 cases(40%). None of them was positive for secretory function.

Pure tone audiometry may reveal conductive, mixed or sensorineural hearing loss depending upon the involvement of middle ear or inner ear. In a study of 18 cases[14] it was reported conductive hearing loss 9(50%), mixed hearing loss 3(30%) and severe to profound sensorineural hearing loss in 4(40%) cases. In our series conductive, mixed and sensorineural hearing loss are 50%, 20% and 30% respectively. Out of five conductive hearing loss cases three noticed improved hearing and two did not do post-operative audiometry.

High resolution CT scan with contrast is an essential imaging tool for diagnosis and extension of tumour to surrounding vital structures including jugular bulb, carotid artery and facial nerve. Differentiation of tympanomastoid paraganglioma from jugular paraganglioma is of critical element for preoperative surgical planning as latter requires quite different surgical approach – Infratemporal Fossa Type A (IFTA).[5,7] If there is a thin plate of bone or air between tumour and jugular bulb, it confirms the confinement of tumour in the middle ear.[7,8,16] CT scan can help to rule out other less common conditions such as high-riding jugular bulb ,an aberrant internal carotid artery, invasive intracranial tumors, encephalocele, endolymphatic sac tumors centered on the posterior petrous face, or facial nerve schwannomas ,facial nerve haemangioma with a dilated fallopian cana.[I13] If the tumour mass in the middle ear reveals a soft tissue density surrounded by air in CT scan, no further imaging is necessary.[5,16] Gadolinium-DTPA enhanced Magnetic Resonance Imaging(MRI) is necessary if rhe tumour involves the hypotympanum or suspected erosion of jugular bulb,carotid canal.[5,7,8,11,16] In our series CT scan was done in all 10(100%) cases and MRI was done in 4(40%) patients to see carotid and jugular bulb involvement. Angiography is not recommended for tympanomastoid paraganglioma.[5,7,8,11] We did not advice angiogram in any of our patients.

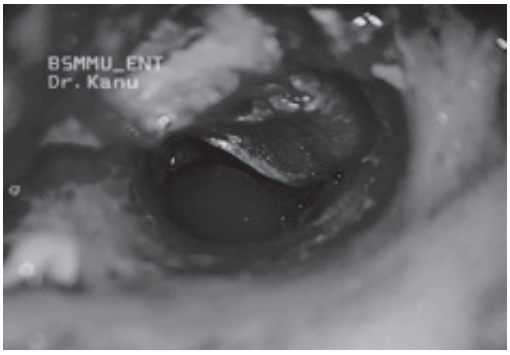
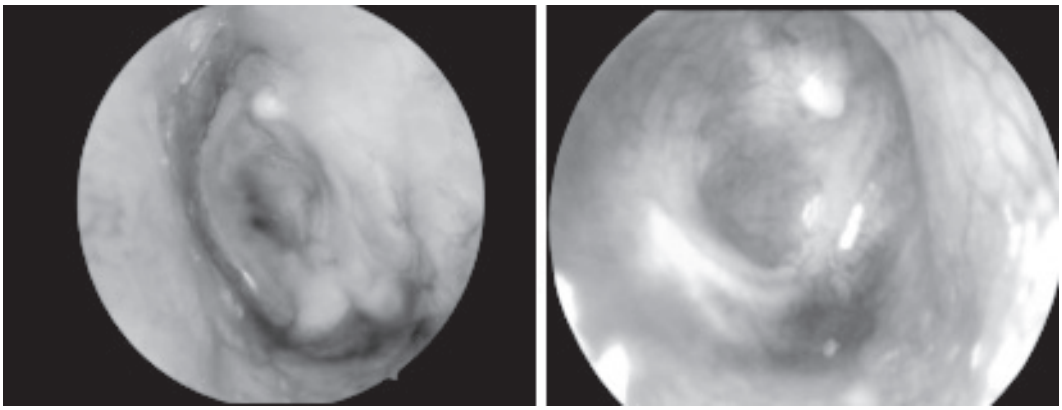



**Fig. 3:** *Peroperatve picture*

workup. According to proposed algorithm followed at Gruppo Otologico one Class A2 case was managed by postauricular transcanal-transcanal approach(PA-TCA), two cases Class B1tumours were excised through canal wall up( CWU) mastoidectomy . In this study five (50%) tumours (Class B2) including one revision were managed by canal wall down mastoidectomy and one by subtotal petrosectomy due to difficult exposure and bleeding although algorithm proposed canal wall up mastoidectomy with



a. Class A2 tumour post-op b. Class B1 tumour post- op

**Fig. 4 a(,b):** *Otoendoscopic post op follow up findings of Tympanomastoidparaganglioma tumour*

Total surgical resection is the only curative treatment of tympanomastoid paraganglioma except few unwanted situations.[5,7,8,11,15] With advancement of modern microsurgical technique and neuroimaging ,total removal of tumour is possible with minimum or no postoperative sequelae.[8,11] The TMP tumours are staged preoperatively for selecting appropriate surgical approach. There are different staging systems -Fisch-Mattox, Glasscock-Jackson and Sanna modified Fisch-Mattrox for tympanic and paraganglioma.[11] We have followed Sanna modified Fisch-Mattrox classification for staging and preoperative posterior tympanotomy and subfacial recess tympanotomy for B2 tumous. In a study 44% of patients with B2 tumours had to manage with subtotal pretosectomy.[8] Usually B3 tumours need subtotal petrosectomy(STP) with middle ear obliteration(MEO).[7,8] One B3 tumour in our series underwent canal wall down mastoidectomy with type III tympanoplasty to preserve or improve hearing. In this case the preoperative conductive hearing loss was improved in postoperative period.

Literature reported that complete resection of tympanomastoid paragangliomas was possible in 94-100% of Class A and B

tumours with 0% to 5% recurrence rate.[5,7,17] In our series total tumour removal was achieved in 9 (80%) cases. Seven(70%) cases are in regular follow up, three lost to follow up after one year of surgery and on recurrence has been detected.

Raditherapy has been suggested as primary alternative to surgery in tympanic paraganliomas some few studies.[18,19,20] Most authors agreed that radiotherapy is not recommended in tympanomastoid paragangliomas limited to middle ear and mastoid rather it may develop osteo-radionecrosis, stenosis of external ear canal, radiation induced neoplasm.[5,7,8,11-14,17] Wait and scan or radiotherapy may be an alternative option in recurrent or residual tumor , patients with risks for general anesthesia and in elderly patients.[5,7,8,11,21,22]

**Conclusion:**

Early diagnosis of tympanomastoid paragangliomas are very rare because of its benign and slow-growing nature. Clinical differentiation between tympanojugular and tympanomastoid paragangliomas are difficult as both have same clinical findings of reddish pulsatile mass and tinnitus. High resolution CT scan of temporal bone is the investigation of choice for preoperative evaluation, staging and selecting definitive surgical approach. MRI is reserved for selective cases of suspicion of jugular bulb and/or carotid artery involvement. Surgery is the recommended primary modality of treatment for tympanomastoid paragangliomas with minimum morbidity and recurrence rate.

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*Original Article*

# Ultrasonographic Evaluation of Solitary Thyroid Nodule with Histopathological Comparison

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**Abstract:**

***Background:*** *Thyroid gland is the largest gland of the body which secretes thyroid hormones named $T_3$ & $T_4$. Incidence of solitary thyroid nodule is common in Bangladesh.*

***Objectives:*** *To validate the ultrasonography evaluation of solitary thyroid nodule comparing with histopathological diagnosis.*

***Methodology:*** *This cross sectional study enrolled 75 patients of age range between 14 to 72 years during July 2016 to June 2018 and the study was carried out in the department of Radiology & Imaging of Ultrasonography evaluation was finally compared with histopathological diagnosis which was considered as gold standard.*

***Results:*** *Among 75 patients are included in this study the age ranged between 14 to 72 years. Majority of the patients 37 (49.3%) were found between 31 to 40 years. 65 (86.3%) were female & 10 (13.3%) were male. All patients were presents with thyroid swelling. In USG findings Microcalcifications were present 9 (12%) in benign & 5(6.7%) in malignant cases. Presence of Halo were in all benign cases 14 (18.7%). Comet tail sign were in 5 (6.7%) in benign & 3 (4%) in malignant cases. Histological nodular goiter were 57 (76%), Follicular adenoma 8 (10.7%), Thyroditis 5 (6.7%) and Papillary carcinoma 4 (5.3%), Follicular Carcinoma 1 (1.3%).*

***Conclusion:*** *This cross sectional study was carried out with an aim to determine the usefulness of ultrasonogram diagnosis of solitary thyroid nodule compared with histopathology findings. As the validity test results are higher, it can be concluded that the ultrasonogram is a useful diagnostic modality in the evaluation of solitary thyroid nodule.*

***Keywords:*** *Ultrasonography, Solitary thyroid nodule.*

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## Introduction:

Thyroid is the largest endocrine gland of the body which secretes thyroid hormone named $T_3$ and $T_4$. This 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 organs and organ systems.[1]

The gland is affected by pathological lesion of varied morphology, which can be divided into two types which shows the diffuse pattern and that produce nodules. Diffuse thyroid lesions are mostly associated with non-neoplastic lesions affecting the gland.

Nodular lesions comprise disorders that consist of non-neoplastic nodules as well as benign and malignant.[2]

Thyroid nodules (TN) 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 women.[3] According to the American Thyroid Association (ATA) Guidelines, a thyroid nodule (TN) is a discrete lesion within the thyroid gland that is radiologically distinct from the surrounding thyroid parenchyma. Nonpalpable nodules are often found when patients undergo diagnostic imaging such as ultrasonography and computed tomography of the chest and neck. For these incidentalomas, current guidelines recommend the same diagnostic strategy that is recommended for palpable nodules.[4,5] Although the risk of malignancy in any given solitary nodule (less than 1 cm) is small, thyroid cancer must be considered in the differential diagnosis. But despite benign in nature of this nodule it is stressful for the patients being diagnosed as a case of solitary thyroid nodule.[6,7]

Statistics evidence showed that palpable thyroid nodules occur in 4–8% of the population and in 13-67% nodules found incidentally during ultrasound (US).[8] And about 5% of the clinically apparent thyroid nodules are malignant, while nonpalpable nodules have the same risk of malignancy as palpable nodules of the same size.[9] In Whickham survey from England palpable thyroid nodule noted in 0.8% of male and 3% of female.10 These figures present only tip iceberg, because when ultrasonography is done in patients with clinically apparent normal thyroid, nodule is detected 30-50% of adult gland. In the Framingham study, the lifetime risk of developing a thyroid nodule was estimated to be 5-10%. The author found that more than two thirds of the nodules are solitary.[11] Actually, the proportion of malignant nodules becomes higher which reaches 5–15%.[12,13] Some of this increase may be due to advances in diagnostic tools, including high-resolution ultrasonography and computed tomography, allowing for greater detection of thyroid nodules, which may not have been detected before However, important changes in the intrinsic characteristics of the general population are also assumed to be involved.[14,15]

Thyroid nodule is also common in Bangladesh. The retrospective study done among the thyroid patients attending the thyroid clinic running jointly by the Institute of Nuclear Medicine (INM) and Institute of Post-Graduate Medicine and Research (IPGM&R), shows that about 32.67% of thyroid patients present with solitary thyroid.[16] Solitary nodules consists of a heterogeneous group of disorders such as colloid nodules, adenomas, thyroiditis and simple cysts. More recent studies have indicated that majority of the thyroid nodules are truly tumors and of clonal origin.[17] Solitary Thyroid Nodules (STN) are common but malignancy is rare, only 5-6% of STN are malignant. However thyroid carcinoma is common malignancy of the endocrine system. Thyroid cancer accounts for 1.5% of all cancers, Malignancy may arise from follicular epithelial cells as papillary (70-80%), follicular (10%) and anaplastic carcinoma (5%), from parafollicular (C-cell) as medullary carcinoma of thyroid (5-10%) and others as lymphoma and secondary from kidneys, breast, lungs, upper gastro intestinal tract and larynx (5%). All are common in females, except medullary carcinoma which occur equally in both sexes.[18]

The critical issue is to determine whether it is benign or malignant. The presence of malignant nodule would necessitate primary surgical therapies whereas a benign nodule can be managed conservatively. For that, thyroid nodule always present diagnostic problems in all age groups as because when all palpable nodules are resected, cancers

are diagnosed only in 10% cases[19]. Although a significant amount of patients suffering from thyroid.

**Methods:**

This cross-sectional study was carried out in the department of Radiology and Imaging of Sir Salimullah Medical College and Mitford Hospital, Dhaka total 75 patients who were referred to Radiology and Imaging department by E.N.T department of Sir Salimullah Medical College and Mitford Hospital, Dhaka as a clinically suspected solitary thyroid nodule for USG of neck, during the period July 2016 to June 2018. Prior to the commencement of this study, the research protocol was approved by the Institutional Review Board of SSMC. Dhaka. It was assured that all information and records would be kept confidential and the procedure would be helpful for both the pathologist and the patients in the making rational approach of the case management.

**Results:**

Among 75 patients included in this study the age ranged between 14-72 years. Mean age was 37.02±10.67 (mean±SD) years. Majority of the patients (49.3%) were found between 31- 40 years. Six (8%) patients were found below 20 years of age. There were male 10 (13.3%) and female 65 (86.7%)

**Table I :**
*Age distribution of the study participants (n=75)*

| Age in years | Frequency | Percentage (%) | Mean±SD |
|---|---|---|---|
| <20 | 6 | 8.0 | |
| 21-30 | 10 | 13.33 | |
| 31-40 | 37 | 49.34 | 37.02±10.67 |
| 41-50 | 15 | 20 | |
| 51-60 | 6 | 8.0 | |
| >60 | 1 | 1.33 | |
| Total | 75 | 100.0 | |

Maximum (49.3%) participants of this study belonged to age group 31 to 40 years followed by 20.0% belonged to 41 to 50 years, 13.3% within 21 to 30 years, 8% within 51 to 60 years and below 20 years. Only 1.3% of each was belonged to extreme age group that is more than 60 years. Mean (±SD) age of the participants was 37.02±10.67 and all participants were within 14 to 72 years age range.

**Table II :**
*Sex distribution of study participants (n=75)*

| Sex | Frequency | Percentage (%) |
|---|---|---|
| Male | 10 | 13.3 |
| Female | 65 | 86.7 |
| Total | 75 | 100.0 |

Out of all participants, 13.3% were male and 86.7% were female. Male and female ratio was 1:6.5.

**Table III :**
*Distribution of Presenting Complaints (n=75)*

| Presenting Complaints | Frequency | Percent |
|---|---|---|
| Thyroid swelling | 75 | 100 |
| Pain* | 09 | 12 |
| Dysphagia* | 06 | 08 |
| Hoarseness of voice* | 05 | 6.7 |

*multiple response or features along with thyroid swelling

Table shows the different presenting complaints of the participants and all the participants had complaint of thyroid swelling

(100%) followed by in decreasing order by pain (12%), dysphagia (8%) and hoarseness of voice (6.7%).

**Table IV :**
*Distribution of local examination findings of the participants (n=75)*

| Local Examination | Frequency (n) | Percent (%) |
|---|---|---|
| Size of the thyroid gland | | |
| • Enlarged | 75 | 100.0 |
| Consistency | | |
| • Soft | 22 | 29.3 |
| • Firm | 45 | 60.0 |
| • Hard | 8 | 10.7 |
| Tenderness | | |
| • Tender | 09 | 12.0 |
| • Non-tender | 66 | 88.0 |
| Move with deglutition | 75 | 100.0 |
| Any palpable cervical lymph nodes | 8 | 10.7 |

**Table V** :
*Distribution of the ultrasound findings of the thyroid gland (n=75)*

| Ultrasound finding | Frequency | Percent |
|---|---|---|
| Position of the nodule | | |
| • Right lobe | 51 | 68.0 |
| • Left lobe | 24 | 32.0 |
| Margins of nodule | | |
| • Regular | 68 | 90.7 |
| • Irregular | 07 | 9.3 |
| Micro calcification | 14 | 18.7 |
| Presence of Halo | 14 | 18.7 |
| Comet tail sign | 08 | 10.7 |
| Ultrasound findings consistent with | | |
| • Benign | 68 | 90.7 |
| • Malignant | 07 | 9.3 |

**Table VI :**
*USG findings of benign and malignant solitary thyroid nodule (n=75)*

| Ultrasound findings | Benign (n=68) n (%) | Malignant (n=7) n (%) | Total (n=75) n (%) |
|---|---|---|---|
| Position of the nodule | | | |
| • Right lobe | 46 (61.3) | 5 (6.6) | 51 (68.0) |
| • Left lobe | 22 (29.3) | 2 (2.6) | 24 (32.0) |
| Margins of nodule | | | |
| • Regular | 65 (86.7) | 3 (4.0) | 68 (90.7) |
| • Irregular | 3 (4.0) | 4 (5.3) | 7 (9.3) |
| Micro calcification | 9 (12.0) | 5 (6.7) | 14 (18.7) |
| Presence of Halo | 14 (18.7) | 0 (0) | 14 (18.7) |
| Comet tail sign | 5 (6.7) | 3 (4.0) | 8 (10.7) |

**Table VII**
*Distribution of the respondents by histopathological findings (n=75)*

| Histopathological findings | Frequency | Percent |
|---|---|---|
| Benign | 70 | 93.3 |
| • Nodular goiter | 57 | 76 |
| • Thyroiditis | 5 | 6.7 |
| • Follicular adenoma | 8 | 10.7 |
| Malignant | 5 | 6.7 |
| • Papillary | 4 | 5.3 |
| • Follicular | 1 | 1.3 |

**Table VIII:**
*Comparison of ultrasound evaluation with histopathological diagnosis of thyroid nodule (n=75)*

| USG findings | Histopathological diagnosis Benign | Malignant | Total |
|---|---|---|---|
| Benign | 67 (TP) | 1 (FP) | 68 |
| Malignant | 3 (FN) | 4 (TN) | 7 |
| Total | 70 | 5 | 75 |

TP = True positive; FP = False positive; FN = False negative; TN = True negative

Among 67 cases, were diagnosed as having benign nodule by USG and confirmed by histopathological evaluation. They were true positive. One case was diagnosed as having benign by USG which came out to be malignant in histopathological examination. They were false positive. USG diagnosed 7 cases as malignant. Histopathology revealed 3 of them as benign and 4 of them as malignant. They were false negative and true negative respectively.

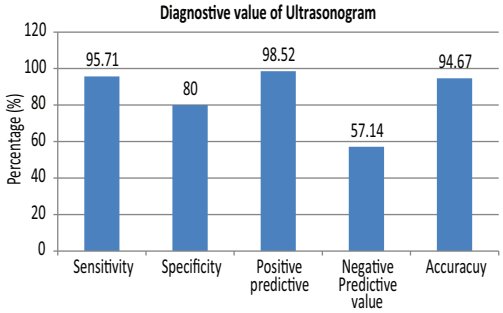


**Fig. 7:** *Diagnostic value of ultrasonogram in the differentiation of thyroid nodule*

Sensitivity of USG in differentiation of thyroid nodule was 95.71%, specificity 80%, positive predictive value (PPV) 98.52%, negative predictive value (NPV) 57.14% and accuracy 94.7%.

**Discussion:**

Total 75 patients of thyroid enlargement were included in the study. Mean age of the study participants was 37.02 ±10.67 years ranging from 14-72 years. Majority patients (49.34%) belonged to age group 31 – 40 years. This is concordant with the findings of other studies involving solitary thyroid nodule done in Bangladesh by Khan *et al.*[20] and Akhter et al.[21] Khan et al.[20] in their study found that out of 118 patients 54 were aged between 30 – 40 years. Akhtar et al.[21] and her team found 42% patients belonging to age group 31 – 40 years.

Majority patients were female in this study constituting 86.7% of the study population. The ratio between male and female of the study group was 1: 6.5. Similarly, Akhter et al.[21] found a male-female ratio of 1:7.3 in their study and Khan et al.[20] found a male-female ratio of 1:3.15 in the 30 -40 year age group in their study. Other age group also had more than double females than males in the study by Khan et al.[20] and colleagues.

Local examination of 75 patients showed that all of the patients had thyroid swelling (100%) which moves with deglutition, 12% had pain, 8% had dysphagia and 6.7% had hoarseness of voice. Khan et al.[20] found swelling in the neck 100% cases, dysphagia in 1.69% cases and hoarseness of voice in 0.85% cases, which is similar to this study.

Consistency of the nodules was firm in majority cases (60%), soft 29.3% cases, and hard 10.7% cases. Similarly Rahimi *et al.*[22] found 63.8% benign nodules as soft and cystic and 36.2% of them being solid (hard).

In the present study 68% nodules were in the right lobe and 32% were in the left lobe. Khan et al.[20] also found right lobe to be the prominent site (55%) cases along with left lobe in 50% cases.

Margin of the nodules were regular in 90.7% cases and irregular in 9.3% cases. Rahimi et al.[22] enlisted a similar picture where 96.9% of the benign nodules were regular and 3.1% were irregular.

Ultrasound findings were consistent with benign nodule in 90.7% cases and with malignant nodule in 9.3% cases. In comparison Teja et al.[23] found 68.3% benign and 31.7% malignant nodule in ultrasonography of thyroid nodules.

Out of 75 cases of present study, 95.6% benign tumor had regular and 4.4% had irregular margin and 42.9% malignant nodule had regular and 57.1% had irregular margin. Thapa.[24] showed that 95% benign nodule had with well-defined margin and 90% of malignant nodule had poorly defined margin. Result of this study is lower than Thapa's[24] findings in case of malignancy but higher than Rahimi's[22] findings. Rahimi, *et al*.[22] found 57.1% malignant nodules having regular and 42.9% having irregular margin.

In this study revealed 12.0% benign and 6.7% malignant nodule had mico-calcification. Cappelli *et al.*[25] In a study we found that the microcalcifications were significantly more frequent in malignant lesions than in benign nodules (72.2 vs 28.7%). This is similar to the findings of this study. Thapa.[24] showed that among the various sonographic features micro-calcification had the highest accuracy (76.0%) for the diagnosis of malignant lesion. Out of 82 benign lesions, calcification was present in 20 cases in their study and among them 65.0% were microcalcification.

In the present study out of all, 93.3% had benign and 6.7% had malignant lesion on histopathologic evaluation. In. Martínek *et al.*[26] series 77.0% were benign and 23.0% were malignant in the histopathology of the resected thyroid nodules, which is comparable with findings of this study. Nggada *et al.*[27] also found 73.9% benign cases and 26.1% malignant cases in their series and Teja *et al.*[23] found 68.3% benign and 31.7% malignant cases. Compared to other studies the present study found more benign cases.

In the present study out of all benign nodule 10.7% were follicular adenoma, 6.7% thyroiditis, and 76 nodular goiter in histopathology and among malignant lesions 6.7% were papillary carcinoma and 1.3% were follicullar carcinoma. In comparison Akhtar *et al.*[21] Khan *et al*.[20] found 24% cases of follicular adenoma and 12% cases of papillary carcinoma. Khan et al.[20] found 44% colloid nodule, 2.54% thyroiditis and 12.71% papillary carcinoma.

Out of 75 patients halo sign was present in 18.7% cases and all of this nodules were benign. In Thapa,[24] series all found 25.8% of benign cases had thin peripheral halo.

In the present study the sensitivity of USG to diagnose benign thyroid nodule was 95.71%, specificity 80%, positive predictive value 98.2% negative predictive value 57.14% and accuracy 94.7%. In a study Stacul *et al.*[28] correlated the diagnosis of thyroid nodules with histopathological findings and found the similar results our study sensitivity, specificity and PPV, NPV and overall accuracy values of the grey scale ultrasound of their series were 46%,73%, 34%, 82% and 67% respectively, for solitary thyroid nodules. One hundred twenty patients undergone thyroid surgery for thyroid nodules or goiter were examined by preoperative ultrasound and fine needle aspiration cytology by Watters *et al.*[29] In their study they found in the determination of type of lesion ultrasound had sensitively, specificity, and PPV of 74%, 83% and 51% respectively, that is also consistent with our study.

**Conclusion:**

This cross sectional study was carried out with an aim to determine the usefulness of ultrasonogram diagnosis of solitary thyroid nodule was compared with histopathology findings. As the validity test results are higher,

thus it is evident that the USG useful diagnostic modality in the evaluation of solitary thyroid nodule.

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*Original Article*

# Hearing Status after Stapedotomy in Otosclerotic Patients

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***Abstract:***

*Otosclerosis is the most frequent cause of conductive hearing loss in patients with intact tympanic membrane. It can be treated by surgery with various techniques. Because of limited manipulation and comparably similar results, stapedotomy at present is preferred over other surgical techniques by most surgeons. Here we present the operative results of 35 otosclerotic patients who underwent stapedotomy between January 2009 - October 2010 in the department of Otolaryngology- Head & Neck Surgery of Bangabandhu Sheikh Mujib Medical University, Dhaka Medical College Hospital and Shahid Suhrawardhy medical college & hospital, Dhaka. The aim of this study was to evaluate the hearing results following stapedotomy in otosclerosis surgery. The average air-bone gap of patients improved significantly to 21.74 dB after operation. Other hearing parameters of patients (including air conduction, bone conduction, speech discrimination score, and tinnitus) also improved. No patient experienced persistent vertigo after the operation and pre operative tinnitus resolved in 12 out of 22 patients. Stapedotomy is a safe and effective modality for improving conductive hearing loss in otosclerotic patients.*

**Introduction:**

Otosclerosis is the most common etiology of conductive hearing loss with an intact tympanic membrane in 15-50 years old patients.[1] This is a disorder of bone which is absolutely confined to otic capsule of the temporal bone.[2] It causes conductive or mixed hearing loss as well as sensorineural hearing loss.

Surgical correction of conductive hearing loss in otosclerosis is one of the most successful procedures in otology. Surgical management requires replacement of all or part of the fixed stapes with or without footplate. Since Shea introduced the procedure of stapedectomy in 1958, much different prosthesis has become available [3]. At present the Teflon piston is the most widely used prosthesis for reconstruction of the ossicular chain in cases of otosclerosis. The initial surgical technique of removal of the complete stapes footplate (stapedectomy) has been altered in the so called small fenestra method.[4] This trend reflects the thoughts that the limited opening of the vestibule carries a reduced risk of damage

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to the inner ear.[5] Some surgeons have reported better closure of the air bone gap at higher frequencies and better post operative speech discrimination scores (SDS) with small fenestra technique (stapedotomy) compared with stapedectomy.[6]

There are several factors which influence the surgical outcome after stapedotomy. Literature advocates good outcome with few complications in hands of expert otologists. Stapedotomy has been suggested over stapedectomy to protect the damage to the inner ear and also to improve the long term hearing.

Regardless of the technique, it is anticipated that hearing level in otosclerotic patients should improve after surgery in approximately 90% of the cases. Less than 1% of the cases should have severe sensorineural hearing impairment following surgery.[7]

Historically closure of the air bone gap (ABG) is considered to be the main measure of success for stapes surgery. ABG closure was calculated by comparing post operative pure tone audiometry thresholds for air conduction with pre operative bone conduction thresholds at 3 frequencies (0.5, 1 & 2 KHz). Early reports on large series of stapedotomies demonstrated excellent results, with ABG closure of 10 dB or more in greater than 90% of the patients.[8,9] A review of recent studies that included higher frequencies for ABG calculation demonstrated that ABG closure to within 10 dB was achieved in 62 to 94 per cent of patients in recent comparable studies (See Table).

In Bangladesh, the incidence of otosclerosis is underdiagnosed as all the cases do not manifest clinically. The patient is relatively unaware of his/ her deafness until it reaches handicap level. Progressive otosclerosis does not associate with earache or discharge, which is a major symptom of ear disease that drives the patient to his physician. Moreover female population is affected twice who is shy to reveal their shortness of hearing and seek attention of her family regarding proper treatment. This study was performed with an intend to see the hearing result of stapedotomy in respect of age, sex and preoperative hearing of the patients.[10]

Conductive hearing loss arising from otosclerosis is a burden to the individual and also to the family and entire society. Surgical attempt to correct the immobile footplate of stapes is relatively new in our country; few otologic surgeons are doing this operation. Among the learners this operation has gained much popularity considering patient's hearing improvement, often observed per operatively.

There are very few studies regarding outcome of stapes surgery in our country. The aim of the present study was to evaluate the effectiveness of this surgery in management of conductive hearing loss due to otosclerosis in Bangladesh. Results were reviewed regarding hearing improvement and incidence of complications on the background of scientific research methodology. It may guide the future researchers working in this field.

**Objectives:**

1. To find out the improvement of hearing following stapedotomy in otosclerosis patients.
2. To find out hearing gain in relation to preoperative air-bone gap.

**Methods:**

Type of study : Cross sectional study

Period of study : January 2009 - October 2010

Place of study: Patients were collected from Department of ENT & Head Neck Surgery of Bangabandhu Sheikh Mujib Medical University, Dhaka Medical College Hospital and Shahid Suhrawardhy medical college & hospital, Dhaka.

**Study population**: **All patients of otosclerosis managed by stapedotomy.**

Sample size: 35

**Inclusion criteria:**

1. Patient with clinical otosclerosis having conductive or mixed type of hearing loss (>30 dB)
2. Good air bone gap >25dB.

**Exclusion criteria:**

1) Patients with cochlear otosclerosis where sensorineural component was involved (AB gap < 15dB).
2) Conductive hearing loss > 70dB
3) Conductive hearing loss with intact TM due to OME- diagnosed by impedance & PTA, ossicular fixation/ disruption- by impedence audiometry.
4) Otosclerosis patients with diabetes mellitus & hypertension
5) Otosclerosis involving only hearing ear
6) Tympanosclerotic change in middle ear

**Data collection**

1. Data was collected from patients admitted in the hospitals in a constructed data collection sheet through personal meeting and formatted questionnaire.
2. Preoperative PTA and SRT were recorded to confirm the diagnosis of clinical otosclerosis.
3. Post operative PTA to see hearing results.

**Method of sampling**

All consecutive cases of stapes surgery were evaluated properly by detailed history taking, clinical examination and investigations. On examination of the ear condition of the pinna, preauricular region, post auricular region and external auditory canal were noted. On otoscopy, the tympanic membrane condition was noted. Tuning fork test, test for facial nerve integrity were performed in every case. Then through examination of the nose and throat was carried out.

Hearing impairment was assessed by pure tone audiometry with or without masking. X-ray para nasal sinuses and soft tissue nasopharynx were also done for younger patients to exclude OME.

Majority of the patents were operated under general anaesthesia and rest under local anaesthesia. In all cases, per meatal approach was used. Teflon piston of different diameter was used as prosthetic material. Footplate was preserved in all cases. In patients with bilateral otosclerosis operation was performed in one ear.

Patients were followed up postoperatively for 3 months and after that as per required. During follow-up period condition of the external auditory canal and tympanic membrane was noted. Surgical outcome of the stapedotomy was measured on the basis of subjective improvement of hearing, postoperative hearing gain by PTA, outcome of tinnitus, any relevant complications.

**Analysis of data & presentation of results**

Hearing gain was assessed by closure of air-bone gap [10]. For testing the hypothesis, closure of air bone gaps were studied in two groups ≤30 dB and >30 dB on the basis of preoperative PTA. All air bone gaps >30 dB were considered as wide AB gap and All air bone gaps ≤30 dB were considered as

narrow AB gap (Table- XVII). Then, closure of air bone gap between two groups measured statistically. All data were compiled, checked and verified thoroughly to reduce the inconsistency. The numerical data obtained were compiled and analyzed using standard statistical tests using scientific calculator and SPSS (ver.15). The results presented in the forms of tables and graphs.

**Results:**

**Table I :**

*Distribution of patients by age (n = 35)*

| Age group (years) | Male | Female | Total | Percentage (%) |
|---|---|---|---|---|
| 15- 20 | 02 | 02 | 04 | 11.42 |
| 21- 30 | 15 | 04 | 19 | 54.28 |
| 31- 40 | 07 | 02 | 09 | 25.71 |
| 41- 50 | 03 | 0 | 03 | 8.57 |
| Total | 27 | 08 | 35 | 100 |

**Table II :**

*Distribution of patients according to clinical feature (n=35)*

| Symptoms | No. of patients | Percentage (%) |
|---|---|---|
| Progressive hearing loss | 35 | 100 |
| Tinnitus | 22 | 54.54 |
| Vertigo | 3 | 8.57 |

Table-III all patients (100%) presented with progressive hearing loss, 54.54% with tinnitus and 8.57% with vertigo.

**Table III :**

*Distribution of patients according to duration of hearing loss (n=35)*

| Duration of hearing loss | No. of patients | Percentage (%) |
|---|---|---|
| Less than 2 years | 12 | 34.28 |
| 2-5 years | 16 | 45.71 |
| 5-10 years | 07 | 20 |

**Table IV :**

*Distribution of patients according to tympanic membrane findings (n=35)*

| State of tympanic membrane | No. of patients | Percentage (%) |
|---|---|---|
| Normal | 32 | 91.42 |
| Retracted/ thin | 2 | 5.71 |
| Thick/ tympanosclerosis | 1 | 2.86 |
| Total | 35 | 100 |

**Table V :**

*Distribution of patients according to condition of the chorda tympani during operation (n = 35)*

| Condition of Chorda tympani | No. of patients | Percentage (%) |
|---|---|---|
| Preserved | 31 | 88.57 |
| Cut | 03 | 8.57 |
| Severed | 01 | 2.86 |

**Table VI :**

*Difficult situations faced during surgery (n = 35)*

| Special situations | Number of patients | Percentage (%) |
|---|---|---|
| Narrow external auditory canal | 07 | 20 |
| Obliterative footplate | 04 | 11.43 |
| Overhanging facial nerve | 02 | 5.71 |
| Perilymph flooding/gushing | 01 | 2.85 |
| Haemorrhage in the labyrinth | 01 | 2.85 |

**Table VII :**

*Distribution of perforation of footplate during surgery (n = 35)*

| Perforation of footplate | Number of patients | Percentage (%) |
|---|---|---|
| Hand perforator | 29 | 82.85 |
| Micro drill | 06 | 17.14 |
| Total | 35 | 100 |

**Table VIII :**

*Distribution of preoperative and postoperative hearing threshold (n=35)*

| PTA | Air conduction threshold Mean (dB) | Bone conduction threshold Mean (dB) |
|---|---|---|
| Preoperative | 59.86 | 24.42 |
| Postoperative | 40.39 | 18.65 |

**Table IX :**

*Distribution of outcome of hearing following surgery (n=35)*

| Hearing status | No. of patient | Percentage (%) |
|---|---|---|
| Hearing gain | 31 | 88.57 |
| Same as before/ no gain | 03 | 8.57 |
| Worsened | 01 | 2.86 |

**Table X :**

*Distribution of air bone gap ≤ 30 dB & >30 dB*

| Air-Bone gap | ≤30 dB | > 30 dB |
|---|---|---|
| Preoperative air bone gap (mean dB) | 25.37 | 38.95 |
| Postoperative air bone gap closure (mean dB) | 16.75 | 23.05 |

Table XVIII shows that mean preoperative air-bone gap was 25.37 dB and 38.95 dB; mean postoperative air bone gap was 16.75 dB and 23.05 dB in two groups (d" 30 dB & >30 dB). Closure of air bone gap between two group was not statistically significant (p = 0.0706, t = 1.8687, SE = 3.371).

Table XIX shows that 62.85% patients had tinnitus preoperatively and 34.28% patients improved, 22.85% had tinnitus as before the operation.

**Table XI :**
*Tinnitus following surgery (n=22)*

| Tinnitus status | No. of patient | Percentage (%) |
|---|---|---|
| Preoperative | 22 | 62.85 |
| Improved | 12 | 34.28 |
| Same as before | 08 | 22.85 |
| Worsened | 02 | 5.71 |

**Table XII :**
*Hearing results in otosclerosis patients treated by stapedotomy (n = 35)*

| Parameter | Hearing status | | | *P* value |
|---|---|---|---|---|
| | Pre operative | Post operative | Improvement | |
| AC | 59.86 dB | 40.39 dB | 19.47 dB | 0.001 |
| BC | 24.42 dB | 18.65 dB | 5.77 dB | 0.001 |
| ABG | 35.44 dB | 21.74 dB | 13.70 dB | 0.001 |
| Tinnitus | 62.85% | 28.57% | 34.28% | 0.01 |

**Discussion:**

A prospective study was carried out from January 2009 to October 2010 at the Department of Otolaryngology- Head & Neck Surgery, BSMMU, with the aim to assess the results of surgical outcome following stapedotomy. This study was done over a limited period of time, with a short follow up and small number of cases. The facts and figures mentioned here may vary from large series. It may have some value in reflecting facts regarding patient's benefit of hearing as well as how we are doing.

Age of the patients ranged form 15 to 50 years. The commonest age group was of 21-30 years (54.28%). Next common group was 31-40 years (21.71%). This resembles to findings of Gray [11] & Smyth.[12]

Almost all studies shows, clinical otosclerosis is more frequent in female with approximate male-female ratio of 1:2.[13] In our series, majority of the patients were male (77.15%) with a male-female ratio 3.5:1. This reflects that female patients are under-treated in our country. Majority of the patients were students (42.86%) which resemble a Bangladeshi series.

Progressive hearing loss (100%) and tinnitus (60%) were the major symptoms of this series. Few patients presented with vertigo (14.28%). This findings are similar to Gray,[11] Smyth,[12] and Katjenmayer.[14]

In the present study, 45.71% patients had hearing loss for 2-5 years and 34.28% had hearing loss <2 years. Tympanic membrane was normal in most of cases (91.42%). Smyth[12] also found normal tympanic membrane in most of his cases. In tuning fork test, Rinne was negative in all cases (100%). Weber lateralized to deafer ear in

32 cases and central in 3 cases. Absolute bone conduction was equal in all 35 cases. This confirms the clinical diagnosis of otosclerosis.[15,16]

Upon exposure of tympanomeatal flap middle ear mucosa was found normal in majority (94.28%) of cases. Mucosal adhesion and tympanosclerosis found in 2 cases (5.12%). This correspondes to the findings of Causse & Causse.[17]

In majority of patients, chorda tympani was preserved in 30 cases (85.71%) after releasing. It was deliberately cut in 3 cases (8.57%) and accidentally severed in 1 case (2.86%). Although literature advocated preservation of chorda tympani in all cases.[18]

Per operative findings revealed obliterative otosclerosis in 4 cases (11.43%), overhanging facial nerve in 2 cases (5.71%), and escape of perilymph gushing in 2 cases (5.71%). This findings are similar to Ozgirgin [19], and Gersdorff.[20]

Perforation of footplate was done by hand perforator (peak) in 29 cases (82.85%) and micro-drill in 6 cases (17.14%). In all cases Teflon piston prosthesis (TPP) was used which is popular, available and retains for long duration .[21] Stapedius tendon was cut in all cases. Sealing of the footplate was done by fat goblets from the ear lobule in 21 cases (60%). Gilli,[16] also advocated using autologus fat.

Surgical outcome was measured on the basis of post operative hearing gain. Hearing improvement was obtained in 31 cases (88.57%), no improvement in 3 cases (8.57%), and worsened in 1 case (2.86%). This correspondes to the House.[22]

Success, defined as closure of air-bone gap <10-15 dB, as recommended by most of the authors i.e. Vincent *et al*,[23] Quaranta *et al*,[24] unfortunately, was not obtainable in most of our patients. Closure of post operative air bone gap was 21.74 dB in this series. Preoperative air bone gap was 35.44 dB. Difference between two group was statistically significant by paired t-test (p=0.001, SE= 1.5, x'=14.69). However, post operative air-bone gap <25 dB was considered acceptable by some of the authors.[16]

All air bone gaps >30 dB were considered as wide AB gap (Table- XVIII). Closure of air bone gaps were studied in two group dŠ 30 dB and >30 dB. Closure between two groups was tested by unpaired t test and found not statistically significant (p = 0.0706, t = 1.8687, SE = 3.371); though most of the authors suggest closure of air bone gap to be more in wide air bone gap.[10,18]

Sensorineural hearing loss and permanent vertigo are rare following stapes surgery,[1,2] it remains a serious side effect when occurs. In our series none of the patients suffered from total loss of hearing or persistent vertigo. In one case (2.86%) hearing deteriorated and in 3 cases (8.57%) no improvement of hearing observed. Many authors preferred stapedotomy to stapedectomy as there is lesser manipulation of the footplate i.e. the inner ear.[22]

Surgery has an unpredictable effect on tinnitus and it may worsen after operation.[25] In our study, 22 (62.85%) patients had tinnitus preoperatively. Of them, 12 (34.28%) patients' tinnitus improved; in 8 (22.85%) patients tinnitus was same as before operation and in 2 (5.71%) patients tinnitus increased.[20,26]

As the study was performed over a short period of time with a small number of cases, the results vary considerably from large series. It demonstrates some successful hearing results with low complication rate.

There are few studies regarding outcome of stapes surgery in our country. It may help the future researchers giving a guideline working in this field.

**Conclusion:**

Stapedotomy is a safe and effective treatment for conductive hearing loss in otosclerosis patients. With regard to good results and relative safety of the procedure, it may be offered to otosclerotic patients instead of wearing hearing aids for long terms that has its own limitations. Success in otosclerosis surgery does not depend on extent of hearing loss. Experience of the surgeon plays a major role in the results of stapes surgery. Patients with moderate hearing loss improved to normal hearing. Other patients with severe hearing loss gained improvement to a moderate loss, allowing more benefit from use of a hearing aid and achieving an important discriminatory improvement.

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*Original Article*

# Relationship of Preoperative Hearing loss with Peroperative Ossicular Discontinuity in Chronic Otitis Media

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**Abstract:**

***Background:*** *Chronic Otitis Media (COM) is a common disease in our country. COM with or without cholesteatoma may lead to ossicular discontinuity. However, the discontinuity of the ossicular chain is usually confirmed during operation. The purpose of the study was to find out the correlation between preoperative hearing loss and the status of ossicular chain at surgery.*

***Methods:*** *This cross-sectional study was conducted in the department of otolaryngology-Head & neck surgery, Bangabandhu Sheikh Mujib Medical University from January 2013 to June 2014. At least 113 patients of COM were selected as per inclusion and exclusion criteria. Relevant data were collected in a predesigned data collection sheet and analyzed with standard statistical method. Statistically significant inferred for P value <0.05. No groups whose ability to give voluntary informed consent questionable was not included. No potential risks exist in designed this study.*

***Results:*** *Out of 34 patients with mild degree of hearing loss 31(39.7%) had intact ossicular chain whereas discontinuity was seen in 3(8.6%) cases, 37 patients with moderate degree of hearing loss 16(45.7%) had ossicular discontinuity. Among 23 patients with moderate to severe degree of hearing loss 14(17.9%) had intact ossicular chain whereas ossicular discontinuity was found 9(25.7%), 9 patients of severe degree of hearing loss 7(20%) had ossicular discontinuity. Cases with moderate and severe degree of hearing loss had significant ossicular discontinuity (p<0.05). Air-bone gap > 40 dB was found in 60% cases of ossicular discontinuity, followed by air bone gap 31-40 dB(17.14%), 21-30 dB(14.29%) and 11-20 dB( 8.57%) respectively. So ossicular discontinuity was in higher air-bone gap group and it was statistically significant (p<0.001).*

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***Conclusion:*** *COM with or without cholesteatoma may cause ossicular disconnection.. If preoperative information can be gathered to determine whether or not the ossicular chain is intact, the patient can be managed better in ossiculoplasty.*

***Key words:*** *COM, non-cholesteatoma COM, ossicular discontinuity, hearing loss, A-B gap, Per-operative.*

**Introduction:**

Chronic otitis media (COM) with or without cholesteatoma is a common condition in Otorhinolaryngology. It is more prevalent in developing countries. In Bangladesh prevalence of COM is 6.2%.[1]

Chronic otitis media with or without cholesteatoma may cause ossicular chain erosion.[2] Among ossicles in the middle ear, the long process of the incus and stapes suprastructure are most frequently affected in COM.[3,4,5,6,7] The propensity for ossicular erosion is more prevalent in COM with cholesteatoma ears than non-cholesteatoma COM.[3,7,8]

In non-cholesteatoma COM adherence of perforation edges adhering to the promontory may confine the granulation tissues and inflammatory products in a small, dead space, therefore inducing further ossicular discontinuity.[9,10,11]

Pathologies that interrupt the ossicular chain result in much hearing loss. Complete disruption of the ossicular chain can result in a 60 dB hearing loss.[12]

The difference in the thresholds of air and bone conduction (A-B gap) is a measure of the degree of conductive deafness. The air conduction threshold and air -bone gap in patients with ossicular discontinuity are higher than that in patients with ossicular continuity.

Per-operative assessment is the gold standard method of confirmation of the discontinuity of the ossicular chain. But it would be of great help if we can predict it before surgery.

A wide air bone gap at higher frequencies (i.e. > 30 dB at 2 kHz and > 40 dB at 4 kHz) suggests presence of ossicular discontinuity. So, subjects with a high chance of ossicular discontinuity as assessed by pure tone audiometry should undergo exploration of the ossicular chain with reconstruction when possible.[13, 14]

High resolution computed tomography scan can help to define the middle ear ossicles and identify discontinuity.[7] It is not a confirmatory pre-operative investigation. This is not a routine for patients with chronic otitis media, especially those without cholesteatoma.

The status of the ossicular chain is important when selecting the type of intervention and also to establish the prognosis. Surgery is the treatment of choice for COM. Successful operation is to obtain a permanently dry ear and close the perforation and restore or improve hearing depending upon the pathology. If the ossicular discontinuity is predicted before surgery, it allows the surgeon to know the possibility of performing an ossiculoplasty. Additionally, sufficient explanation and more accurate information regarding the status of the ossicular chain, the probability of performing an ossiculoplasty and the possible surgical complications and results can be provided to the patient. In this study relationship of preoperative hearing loss with peroperative ossicular chain discontinuity in chronic otitis media has been assessed

**Methods:**

This is an observational type of cross-sectional study conducted in the department

of otolaryngology-Head & neck surgery, Bangabandhu Sheikh Mujib Medical University from January 2013 to June 2014. At least 113 patients of COM were selected as per inclusion and exclusion criteria. Inclusion criteria were: a) All patients of COM who were admitted during study period into department of Otolaryngology-Head & Neck Surgery in BSMMU, b)Patient was agreed for undergoing surgery offered to him/ her, c)Patient gave consent for the study upon him/ her, d)Patient came for regular follow up and comply with the medical advice and exclusion criteria: were a)Patient who had previously undergone ear surgery, previous radiation treatment to head and neck, b) Patients with congenital cholesteatoma, c)Age less than 4 & more than 60 years, d)Profound hearing loss , e)Patient did not give consent for study upon him/ her and f)Patients with ear canal obstruction, intracranial complication and ossicular fixation. All patients with a clinical diagnosis of COM underwent a detailed clinical examination including otoscopic and microscopic examination and all findings were recorded, and Audiological evaluation was done by pure tone audiogram. All patients underwent tympanoplasty with or without mastoidectomy under general anesthesia. Pure Tone Audiometry (PTA), Air-Bone gap, presence of Cholesteatoma, presence of granulation tissue was used as outcome variables. All patients were operated by regular otology surgeons and intraoperative findings of ossicular discontinuity with related features were noted. Then the findings were recorded and relationship between the pre-operative and per-operative ossicular discontinuity with PTA and Air bone gap was find out.

**Type of sampling:** Purposive, non-random sampling.

**Data collection technique:**

Relevant data were collected in a predesigned data collection sheet for each of the patient with chronic otitis media. Diagnosis was made by history, clinical, otoscopic, microscopic examination and radiological investigation and peroperative findings.

**Analysis of data:**

Data were processed manually and analyzed with the help of SPSS (Statistical package for social sciences) Version 19.0. Quantitative data were expressed as mean and standard deviation and comparison were done by student "t" test. Qualitative data were expressed as frequency and percentage comparisons were carried by chi-square ($X^2$) test. Other statistical test was done whenever it is necessary. A probability value (p) of less than 0.05 was considered to indicate statistical significance.

**Results:**

**Table I:**

*Age group distribution of the patients (n=113)*

| Age in years | Number | Percentage (%) |
|---|---|---|
| 5-15 | 15 | 13.27 |
| 16-30 | 77 | 68.14 |
| 31-45 | 12 | 10.62 |
| 46-60 | 09 | 7.96 |
| Total | 113 | 100.00 |
| Mean ±SD | 23.79(±10.33) | 7-53 years |

**Table II:**

*Distribution of symptoms among study patients (n=113)*

| Symptoms | Number | Percentage(%) |
|---|---|---|
| Ear discharge | 113 | 100 |
| Hearing impairment | 86 | 76.11 |
| Earache | 11 | 9.73 |
| Vertigo | 01 | 0.88 |
| Headache | 03 | 2.65 |

**Table III :**
*Distribution of site of perforation among patients (n=113)*

| | Number | Percentage |
|---|---|---|
| Central | 82 | 72.57 |
| Attic | 23 | 20.35 |
| Marginal | 08 | 07.08 |
| Total | 113 | 100.00 |

**Table IV :**
*Distribution of granulation tissues and cholesteatoma among study population (n=113)*

| | Number | Percentage |
|---|---|---|
| Granulation Tissue | 25 | 22.12 |
| Cholesteatoma | 32 | 28.32 |

**Table V :**
*Relation between preoperative degree of hearing loss with per operative Ossicular discontinuity (n=113)*

| Degree of hearing loss | Status of Ossicular chain | | |
|---|---|---|---|
| | Intact n (%) | Discontinuity n (%) | p value |
| Normal (n=10) | 10(12.8) | — | 0.02* |
| Mild(n=34) | 31(39.7) | 03(8.6) | 0.001* |
| Moderate (n=37) | 21(26.9) | 16(45.7) | 0.04* |
| Moderately severe (n=23) | 14(17.9) | 09(25.7) | 0.36 |
| Severe (n=09) | 02(2.7) | 07(20.0) | 0.003* |
| Total | 78(100) | 35(100) | |

* significant

**Table VI :**
*Relation between pre-operative air bone gap with per operative ossicular discontinuity (n=113)*

| Air bone gap | Status of ossicular chain | | | |
|---|---|---|---|---|
| (dB) | Intact | Discontinuity | Total | P value |
| 0-10 (dB) | — | — | — | — |
| 11-20(dB) | 10(12.82) | 03(8.57) | 13 | 0.38 |
| 21-30(dB) | 47(60.25) | 05(14.29) | 52 | 0.001* |
| 31-40(dB) | 13(16.67) | 06(17.14) | 19 | 0.95 |
| > 40(dB) | 08(16.67) | 21(60.0) | 29 | <0.001* |
| Total | 78(100) | 35(100) | 113 | |

**Table VII :**

*Relation between perforation edge with ossicular discontinuity (n=81)*

| Perforation Edge | Status of Ossicular chain | | Total | p value |
|---|---|---|---|---|
| | Intact | Discontinuity | | |
| Attached | 1(6.7) | 14(93.3) | 15(100) | <0.001 |
| Free | 65(98.48) | 01(1.52) | 66(100) | |
| Total | 66(81.48) | 15(18.51) | 81(100) | |

**Table VIII :**

*Relation between cholesteatoma with per-operative status of osicullar chain (n=32)*

| Cholesteatoma | Status of ossicular chain | | |
|---|---|---|---|
| | Intact n(%) | Discontinuity n(%) | P value |
| Present | 04(12.5) | 28(87.5) | <0.001 |

Table VII shows that perforation edge attached to promontory where ossicular discontinuity was 93.3% and perforation edge free to promontory was 6.7%. Perforation edge attached to promontory was higher in ossicular discontinuity which was highly statistically significant (p<0.001).

**Discussion:**

Ossicular discontinuity is the long-standing sequelae of Chronic Otitis Media (COM) with or without cholesteatoma. The discontinuity of the ossicular chain can be assumed before surgery by analyzing pre-operative audiological and imaging findings. But it is usually confirmed during operation.

This study showed 77(68.14%) of the study population were in the age group 16-30 years, followed by 13.27% in 5-15 years, age group between 31-45 years of age was 10.62% and age group between 46-60 years was 7.96%. Majority of the study population were in the age group 16-30 years. Mean age was 23.79(±10.33) years. This is near to similar findings was found in a study where mean age was 29.78 (±13.09) and the number of cases in the 16–25 years age group was 77 (51.33%).[4]

The present study showed that male was 59% and female was 41%. Male female ratio was 1.45: 1. Male were clearly majority in number. In different studies, it was shown that COM affected more male than female.[15,16,17,18] This might be due to increase prevalence of COM among the male or it might be simple reflection of overall high male attendance in hospital.

In this study 113 patients (100%) presented with otorrhoea followed by hearing impairment 86(76.11%), earache 11(9.73%), vertigo 01(0.88%) and headache 03(2.65%). Most of the patients presented with more than one symptom. Commonest presenting complaint was history of ear discharge and hearing impairment. These results are comparable to the studies done by other authors.[19,20]

In this study, discharge from right ear was 41(36.28%), and from left ear 55(48.67%) and discharge from both ears was 17 (15.04%). That is dissimilar to another study.[4]

In current study, presence of central perforation was the commonest finding which was 82(72.57%), followed by

23(20.35%) were attic and 08(7.08%) were marginal. This finding was correlated with study of Srinivas et al.[21]

In present study, out of 34 patients with mild degree of hearing loss, 31(39.7%) had intact ossicular chain whereas discontinuity was seen in 3(8.6%) cases. Out of 37 patients with moderate degree of hearing loss, 16(45.7%) had ossicular discontinuity. Out of 23 patients with moderate to severe degree of hearing loss, 14(17.9%) had intact ossicular chain whereas ossicular discontinuity was found 9(25.7%). Out of 09 patients of severe degree of hearing loss, 7(20%) had seen in ossicular discontinuity. Cases with moderate and severe degree of hearing loss had significant ossicular discontinuity ($p<0.05$). These findings are consistent with results of other study.[22]

In this study, majority of ossicular discontinuity (60%) was seen when average air bone gap was > 40 dB, this was followed by air bone gap between 31-40 dB were 17.14%, 21-30 dB were 14.29% and 11-20 dB were 8.57% respectively. That means if air bone gap is greater, ossicular discontinuity is more ($p<0.001$) and statistically highly significant. This is similar to Jung et al. study.[23]

In this study, when the perforation edge was attached to promontory then ossicular discontinuity was 93.3% and if perforation edge is free to promontory, the rate of ossicular discontinuity was 6.7%. Perforation edge attached to promontory was higher in ossicular discontinuity which was highly statistically significant ($p<0.001$). This was correlated with findings of other studies.[10,22,23]

In current study, out of 25 granulation tissues cases, ossicular discontinuity was found in 21(84%) and intact ossicular chain was found in 4(16%). That was statistically significant ($p<0.01$).

Out of 32 cholesteatoma cases, ossicular discontinuity was found in 28(87.5%) and intact ossicular chain was found in 4(12.5%). That was also statistically significant ($p<0.001$). Another study[13] showed that with the presence of cholesteatoma, the chance of ossicular chain discontinuity was 88%.

Wide air bone gap suggests presence of ossicular chain discontinuity. So, in preoperative pure tone audiometry with higher air-bone gap or increased conductive threshold exploration of the ossicular chain with possible reconstruction is suggested on subjects with a high chance of ossicular chain discontinuity. The presence of cholesteatoma and granulation tissues warrants ossicular chain exploration.

**Conclusion:**

COM with or without cholesteatoma may cause ossicular disconnection. Pure tone audiometric (PTA) threshold is significantly greater in moderate and severe hearing loss group with ossicular discontinuity. Majority ossicular discontinuity found when average air bone gap > 40 dB. Greater the air bone gap, the conductive hearing loss is more; number of ossicular discontinuity is also more. Ossicular discontinuity was also found more in cases where there is attachment of perforation edge to promontory, granulation tissues and presence of cholesteatoma. If preoperative information can be gathered to determine whether or not the ossicular chain is intact, the patient can be better informed, counseled for ossiculoplasty before surgery.

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*Original Article*

# Prevalence of Metastatic Neck Nodes

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**Abstract:**

***Background:*** *Head and neck cancers include cancers of the lips, mouth, nasal cavity, paranasal sinuses, pharynx and larynx. Most of these cancers are squamous cell carcinomas (SCCs). The presence of metastatic cervical lymphadenopathy is of particular importance as with every single nodal metastasis, survival of the patient is reduced by one half.*

***Objective:*** *To see the prevalence of metastatic neck node.*

***Methods:*** *The prospective cross-sectional clinical study was carried out in the Department of ENT and Head Neck Surgery, Combined Military Hospital, Dhaka during March'2018 to March, 2019. All 100 patients were included in this study and were treated at the Department of Otolaryngology of Combined Military Hospital, Dhaka*

***Results:*** *Total 26 cases were found parotid among them 8(30.8%) in metastatic neck node and 18(69.2%) in without metastatic neck node. Total 10 cases were found paranasal sinuses among them 1(10.0%) in metastatic neck node and 9(90.0%) in without metastatic neck node. Which were statistically significant ($p<0.05$) between two groups.*

***Conclusion:*** *In this study observed that majority of metastatic neck node were found pyriform fossa, supraglottic larynx, base of tongue which were 68.2%, 68%, 77.8% respectively. In oral cavity and parotid site also found 48.1% and 30.8% metastatic neck node.*

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## Introduction:

Head and neck cancers include cancers of the lips, mouth, nasal cavity, paranasal sinuses, pharynx and larynx. Most of these cancers are squamous cell carcinomas (SCCs) and they usually metastasized locally to the cervical lymph nodes.[1] Oral cancer is the sixth most common cause of cancer-related deaths worldwide.[2] In the sub-continent scenario oral cancer is the second most common cancer. The presence of metastatic cervical lymphadenopathy is of particular importance as with every single nodal metastasis, survival of the patient is reduced by one half.[3] Thus regional metastasis is one of the most important

factors in the prognosis and treatment planning of patients with head and neck squamous cell carcinomas.[3,4] The inaccuracies in clinical examination have been well documented and the diagnostic imaging modalities have been shown to have superior diagnostic accuracy in detecting occult nodal metastasis.[5,6]

Most commonly used tumour node and metastasis (TNM) classification system fails to define the exact size and measurements of the tumor including diameter, length, width, area, volume and tumor thickness [7] and the clinical issues related to it.[8] The prevalence of patients with distant metastases was equal for men and women (both 14%; p51.0).[9] We conducted this study to determine the prevalence of lymph nodes metastasis among patients who had head and neck cancers.

**Methods:**

The prospective cross-sectional clinical study was carried out in the Department of ENT and Head Neck Surgery, Combined Military Hospital, Dhaka during March'2018 to March,2019. All 100 patients were included in this study and were treated at the Department of Otolaryngology of Combined Military Hospital, Dhaka. In this study performed bilateral neck dissection including the level V area for cN0 and cN+ cases with primary tumor (over T3) resection to pathologically evaluate the rate of level V metastases on bilateral sides. During level V dissection of cN0 cases, we carefully preserved the cervical nerves and the SAN and did not experience any severe complication of nerve damage. Since 2007 we have performed bilateral neck dissection only for cN2c cases and have spared the level V area for cN0 cases, according to National Comprehensive Cancer Network (NCCN) guidelines. Clinical and pathological reports of these 162 patients were retrospectively reviewed. All lymph nodes were separated from neck dissection tissue for histopathological examination. The prevalence and distribution of neck LNM were determined level by level for each primary site according to the results of the pathological analysis. The prevalence of pathological metastasis to level V lymph nodes on the ipsilateral and contralateral sides was investigated in all cases. Several predictive risk factors for level V metastasis were also evaluated such as age, sex, primary site, T stage, N stage, degree of pathological differentiation and lymph node status of other levels (levels I–IV). Statistical analysis was performed using Fisher's exact probability test (SPSS ver-23). p values of $< 0.05$ were considered statistically significant.

**Results:**

Majority (55.0%) patients were male, mean age was found 56.1±14.7 years, 82(82.0%) patients were ipsilareral of metastatic, 48(48.0%) were moderate tumor, 40(40.0%) patients had pT stage 1, 77(77.0%) had pN stage N0, 31(31.0%) were neck dissection and 21(21.0%) were positive margin (Table -I). Total 26 cases were found parotid among them 8(30.8%) in metastatic neck node and 18(69.2%) in without metastatic neck node. Total 10 cases were found paranasal sinuses among them 1(10.0%) in metastatic neck node and 9(90.0%) in without metastatic neck node. Which were statistically significant ($p<0.05$) between two groups (Table-II).

**Table-I**

*Demographic and clinical characteristics of the study patients*

| | Number of patients | Percentage |
|---|---|---|
| Sex | | |
| Male | 55 | 55.0 |
| Female | 45 | 45.0 |
| Mean age (years) | 56.1 | ±14.7 |
| Side of metastatic | | |
| Ipsilareral | 82 | 82.0 |
| Contralateral | 18 | 18.0 |
| Tumor differentiation | | |
| Unknown | 2 | 2.0 |
| Poor | 7 | 7.0 |
| Moderate | 48 | 48.0 |
| Well | 43 | 43.0 |
| pT classification | | |
| $T^1$ | 28 | 28.0 |
| $T^2$ | 40 | 40.0 |
| $T^3$ | 19 | 19.0 |
| $T^4$ | 13 | 13.0 |
| pN classification | | |
| N0 | 77 | 77.0 |
| N1 | 16 | 16.0 |
| N2a | 3 | 3.0 |
| N2b | 3 | 3.0 |
| N2c | 1 | 1.0 |
| N3 | 0 | 0.0 |
| Neck dissection | | |
| Yes | 31 | 31.0 |
| No | 69 | 69.0 |
| Margin status | | |
| Positive | 21 | 21.0 |
| Negative | 79 | 79.0 |

**Table II :**
*Association between primary site with metastatic neck node and without metastatic neck node*

| Primary site | N | Metastatic neck node | Without metastatic neck node | P value |
|---|---|---|---|---|
| Oral cavity | 108 | 52 (48.1%) | 56 (51.9%) | 0.570$^{ns}$ |
| Parotid | 26 | 8 (30.8%) | 18 (69.2%) | 0.036$^{s}$ |
| Pyiform fossa | 22 | 15 (68.2%) | 7 (31.8%) | 0.071$^{ns}$ |
| Supraglottic larynx | 25 | 17 (68.0%) | 8 (32.0%) | 0.054$^{ns}$ |
| Base of tongue | 9 | 7 (77.8%) | 2 (22.2%) | 0.088$^{ns}$ |
| Paranasal sinuses | 10 | 1 (10.0%) | 9 (90.0%) | 0.009$^{s}$ |

s= significant, ns= significant
p value reached from chi square test

**Discussion:**

In present study observe that Majority (55.0%) patients were male, mean age was found 56.1±14.7 years, 82(82.0%) patients were ipsilareral of metastatic, 48(48.0%) were moderate tumor, 40(40.0%) patients had pT stage 1, 77(77.0%) had pN stage N0, 31(31.0%) were neck dissection and 21(21.0%) were positive margin. Amit et al.[10] observed that the study was comprised of 140 men (52%) and 130 women (48%), with a median age of 56 years (range, 20–88 years). Preoperative clinical and radiological workup revealed ipsilateral nodal metastases in 44 patients (16%), consisting of 33 in levels I to III and 11 in levels IV to V (all on the ipsilateral side). Kainuma et al[11] reported the mean age of the subjects (total, 162; 134 (82.7%) males and 28 (17.3%) females) at the time of treatment was 64.8 years (range 33–82 years). In total, 301 neck dissections (ipsilateral side, n = 162; contralateral side, n = 139) were performed in this study. Most of these studies[12,13,14] made no distinction between neck dissection on the contralateral side and ipsilateral side. Punhani et al.[2] the age of the patients in the study ranged from 37-84 years with a mean age of 60 years. There were 15 male and 9 female patients. There were 15 cases of well-differentiated squamous cell carcinoma, 7 cases of moderately differentiated carcinoma and 2 cases of poorly differentiated carcinoma. On MR examination, 5 cases got upgraded from T2 to T3, 2 patients from T3 to T4 while only one patient was downgraded from T2 to T1 after MR examination. On imaging the lymph nodes, 5 cases got upgraded from N0 to N1 while 1 case was upgraded from N2a to N2b as noticed on MR images. Al Zahrani et al.[1] reported 57 patients between 16 and 80 years with a mean of 55.9 ± 16.7 years. Twenty (6%) patients were positive for level IIb lymph node metastasis. Three of them (3/20) were isolated and (17/20) were accompaniedby other positive neck levels lymph nodes.[15]

In this study observed that total 26 cases were found parotid among them 8(30.8%) in metastatic neck node and 18(69.2%) in without metastatic neck node. Total 10 cases were found paranasal sinuses among them 1(10.0%) in metastatic neck node and 9(90.0%) in without metastatic neck node.

Which were statistically significant (p<0.05) between two groups. Amit et al.[10] reported The primary tumor sites were minor salivary glands of the oral cavity in 148 patients (55%), parotid gland in 54 (20%), submandibular glands in 39 (14%), sublingual glands in 12 (4%), sinonasal salivary glands in 25 (9%), and larynx in 2 (1%). The overall rate of occult nodal metastases among patients who underwent elective neck dissection was 17% (39 of 226 patients). Subgroup analysis revealed that the highest incidence rates of occult nodal metastases were in patients with oral cavity tumors (22%; 25 of 116), and in those with cancer of the paranasal sinuses (16%; 4/24). The lowest incidence of occult neck metastases was in patients with major salivary gland tumors (12%; 10/85); p = 0.2. In head and neck squamous cell carcinoma, an elective neck dissection is indicated if the probability of occult cervical metastases is above 15% to 20%.[16] Kainuma et al.[11] reported The most common primary site was the oral cavity (n = 51, 31.5%), followed by the larynx (n = 48, 29.6%), hypopharynx (n = 39, 24.1%), and oropharynx (n = 24, 14.8%). According to primary cancer site in patients with LNM on the ipsilateral side was as follows: larynx (2/48, 4.2%), hypopharynx (4/39, 10.3%), oropharynx (4/24, 16.7%), and oral cavity (1/51, 2.0%). When considering only pN+ cases of metastasis to other levels (levels I–IV), the rate of level V metastasis was found to be 8.3% (8/96). Level V involvement was found in only three patients (3/66, 4.5%) in whom no metastasis to other levels was detected. Punhani et al.[2] observed that size, staging and lymph node metastasis are important determinants of prognosis as well as survival for oral carcinoma.[3]As described by the previous researchers also,[3,17] the presence of lymph node metastasis in the neck of the patients with cancers of head and neck region is an important prognostic determinant in staging cancers and in treatment planning for such patients. Al Zahrani et al.[1] reported most of the tumors were located in the oral cavity, 43 (75.4%) followed by the larynx 7 (12.3%).

**Conclusion:**

In this study observed that majority of metastatic neck node were found pyriform fossa, supraglottic larynx, base of tongue which were 68.2%, 68%, 77.8% respectively. In oral cavity and parotid site also found 48.1% and 30.8% metastatic neck node.

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*Original Article*

# Transcanal Endoscopic Approach to the Mastoid Segment of Facial Nerve and the Role of the Pyramidal Eminence as a Landmark

**Sheikh Shawkat Kamal**

**Abstract:**

***Objectives:*** *To study the feasibility of approaches in addressing the mastoid segment of facial nerve through transcanal route exclusively under endoscopic guidance and to verify the usefulness of the pyramidal eminence as a landmark.*

***Study design:*** *The prospective experimental study*

***Setting:*** *"Transcanal endoscopic temporal bone dissection lab" situated in the Surgiscope hospital, Chittagong, Bangladesh.*

***Materials:*** *4 (Four) cadaveric temporal bones.*

***Interventions:*** *Two pure transcanal endoscopic approaches were applied to excavate the mastoid segment of facial nerve. In anterior-medial approach, the dissection was progressed from medial to the lateral direction through the retrotympanum focusing the anterior-medial side of the mastoid segment of facial nerve. Whereas in anterior-lateral approach, the dissection was progressed from lateral to the medial direction through the posterior canal wall focusing the anterior-lateral side of the mastoid segment of facial nerve. In both approaches, the pyramidal eminence was considered as an anatomical landmark to navigate the dissection for the excavation of the mastoid segment of facial nerve.*

***Main outcome measures:*** *The efficacy of each approach in respect of the complete excavation of the mastoid segment of facial nerve and the worthiness of the pyramidal eminence as the landmark for navigating the dissection.*

***Results:*** *In both transcanal endoscopic approaches, the entire mastoid segment of facial nerve could be exposed successfully. But in anterior-medial approach, the chorda tympani nerve was needed to be sacrificed. The search of the mastoid segment of facial nerve with the guidance of the pyramidal eminence was observed as effective and safe.*

***Conclusion:*** *The entire mastoid segment of facial nerve could be successfully addressed through transcanal route under pure endoscopic guidance. The pyramidal eminence has appeared as an important landmark for such endeavor.*

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## Introduction:

To avail the benefits of theminimally invasive surgeryoffered by the endoscope, many middle ear surgeries that were previously performed under the microscopeare nowbeing addressed purely under

endoscopic guidance.Recently practised transcanal endoscopic surgery for the lesions of the tympanic part of the facial nerve is a good example of such attempt.[1,2] Switching from microscope to endoscope for approaching to the tympanic part of facial nerve has beenproved to be least morbid.Moreover,attempt to the lesions of other territories of the fallopian canal such as geniculate ganglion and the proximal part of mastoid segment of facial nervehad also been done with success through transcanal route exclusively under endoscopic guidance.[3,4]

The approach to the entire mastoid segment of the facial nerve has still remained under the domain of microscopic mastoid surgery. In this standpoint, transcanal endoscopic approach to the entire mastoid segment of facial nerve could be a novel surgical attempt. Unlike the tympanic segment of facial nerve, the mastoid segment is not readily approachable as it remains entirely hidden.

The fallopian canal of the mastoid segment of facial nerve extends from the second genu down to stylomastoid foramen of the temporal bone having almost a vertical course of 15.4 ± 2.14 mm long.[5] The second genu and the adjacent small part of the mastoid segment are confined in the posterior wall of the retrotympanum. After leaving the retrotympanum in between the posterior wall of the external auditory canal and the horizontal semicircular canal, it goes down along the anterior wall of the mastoid process towards the stylomastoid foramen. Near the second genu, it is closely related with the horizontal semicircular canal and the pyramidal eminence. The distance between the ampular end of the horizontal semicircular canal and the second genu is 2 ± 0.5mm[6]. The second genu lies just posterior-lateral to the pyramidal eminence. Some vital structures come in close relation to the passage of the mastoid segment of facial nerve. The sinus tympani and the posterior semicircular canal come to its posterior-medial side whereas the perifacial mastoid cells, part of the mastoid antrum and the sigmoid sinus come to its posterior lateral side. The anterior-lateral aspect of the mastoid segment of facial nerve is entirely covered by the bony tympanic annulus and by the posterior bony canal wall. As the mastoid segment of the facial nerve leaves the retrotympanum, it crosses the ring of the bony tympanic annulus from medial to lateral direction. This crossing point is the site where the tympanic annulus becomes very close to the mastoid part of facial nerve and it is roughly at the 9 o'clock and 3 o'clock position of the ring of the annulus in right and left ear respectively. According to Nicoleta Mãru et. al.this distance was 0.85mm.[6] The distance from the posterior bony canal wall to mastoid segment of facial nerve appeared 2.9 ± 1.1 mm in the CT image of the well pneumatized mastoid bone.[7]

Since the mastoid segment of facial nerve has close anatomical relation with posterior bony canal wall and the retrotympanum, so any dissection either passing through the posterior bony canal wall or causing wide exposure of the retrotympanum was expected to expose the area of the mastoid segment of facial nerve. This had also been noticed that the pyramidal eminence asthe solid landmark of the second genu of facial nerve could be used to guide the dissection necessary for excavation of the mastoid segment of facial nerve. With these predictions, two approaches were tailored

and attempted to excavate the mastoid segment of facial nerve through transcanal route on the cadaveric temporal bones. The first approach was the anterior-medial approach where the dissection was entirely directed from medial to the lateral direction focusing the anterior medial side of the mastoid segment of facial nerve. The second approach was the anterior-lateral approach where after a preceding exploratory dissection to find out the base of the pyramidal eminence,the main dissection was directed from lateral to the medial direction focusing the anterior lateral side of the mastoid segment of facial nerve. In both approaches, the exploratory dissection progressed gradually along a vertical plane imagined from the base of the pyramidal eminence to excavate the mastoid segment of facial nerve. The present study elaborately depicted the procedures, viability and efficacy of these two attempted approaches.

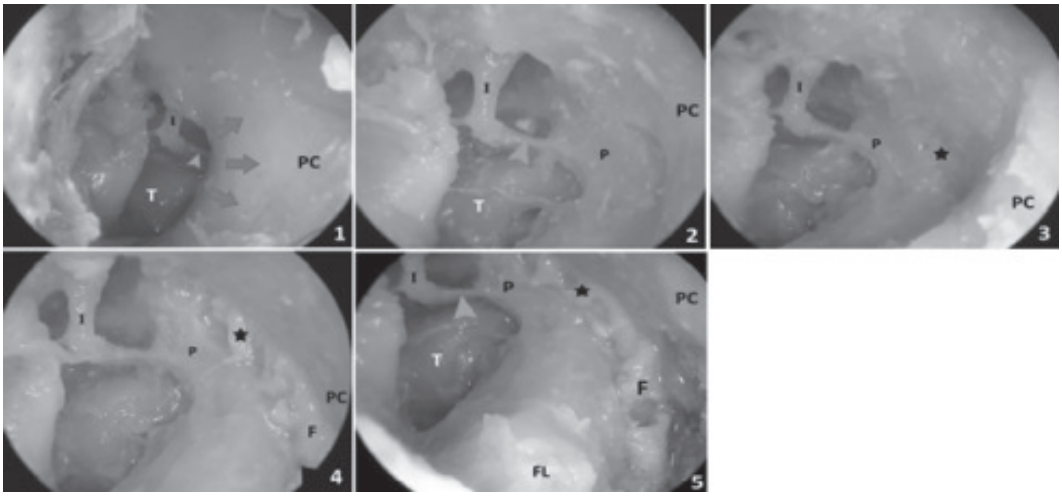
**Materials and Methods:**

This prospective study was conducted during the period of April'2018 in the "transcanal endoscopic temporal bone dissection lab" situated in the Surgiscope Hospital, Chittagong, Bangladesh. Total 4 (four)adult disarticulated cadaveric temporal bones,well preserved in saturated salt solution were included in this study out of which two were right ear and two were left ear.

$0^0$, 4mm diameter, 18 cm long endoscope was used.Full HD integrated imaging system (iONE Guangzhou, China) was used for video endoscopy and recording. Drilling was done with micromotor (Strong model, Saeshin Precision IND. CO. Korea). 1.8 mm and 3.1 mm cutting round burr were mostly used for the bony dissection. 1.8 mm diamond burr was used to thin out the bone near the fallopian canal of facial nerve.The cadaveric temporal bone was attached to the temporal bone holder in such away that the tip of mastoid was facing the right side of thesurgeon in case of right temporal bone and left the side of thesurgeon in case of left temporal bone. The bone was tiltedtowards the surgeon so that, the external auditory canal andthe surgeon's eye vision were in the same axis.

All the procedures were done through transcanal route exclusively under endoscopic view while holding the endoscope by non-dominant hand and conducting all instrumentations by dominant hand.For convenient and effective transcanal endoscopic drilling of bone, proceduresinvolving a shortly timed drilling with cutting burr then irrigation with saline water followed by suction clearancehave been done in a sequential order.[8]

In the beginning, an incision was given in the meatal skin about 15mm posterior from the tympanic annulus to elevate a wide anteriorly based tympanomeatal flap. Itultimatelyexposed the tympanum, scutum and about 15mm of the adjacent posterior canal wall. The chorda tympani nerve was partially detached from its bony passage near tympanic annulus and adjacent few millimeters of the posterior canal wall to facilitate its preservation during dissection. Up to thisstep,above procedures were common for both approaches. Rests of the procedures for individual approaches were mentioned below under separate headings.




1. Planning of the dissection for retrotympanotomy.
2. After retrotympanotomy, complete exposure of the pyramidal eminence up to its base.
3. Excavation of the nerve sheath of second genu at the base of the pyramidal eminence.
4. Gradual exposure of the mastoid part of facial nerve by dissection along the imaginary vertical plane descending from the second genu towards the floor of the external auditory canal.
5. View of the mastoid segment of facial nerve after its complete excavation through anterior medial approach.

**Abbreviations & Symbols:-**

**Green arrow head**=the stapedius tendon, Red arrows = the direction of dissection for retrotympanotomy,

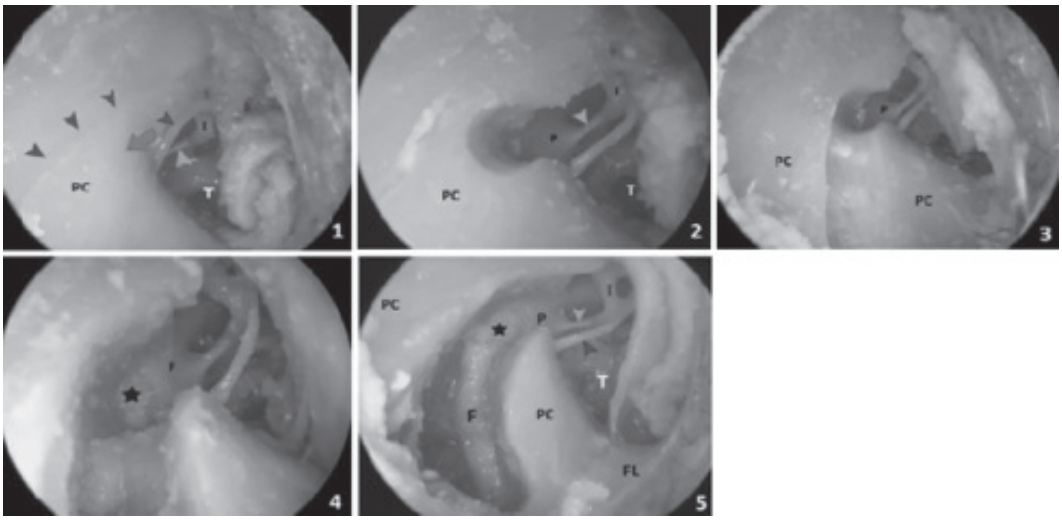
**Black Star :** =the exposed nerve sheath of the second genu, **PC** = the posterior canal wall, **I** = the long process of incus, **T**= the tympanic cavity, **P** = the pyramidal eminence, **F** = the mastoid segment of facial nerve, **FL** = the floor of the external auditory canal.

Figure A: Chronological pictures of the transcanal endoscopic anterior-medial approach to the mastoid segment of facial nerve in left ear.

**Anterior-medial approach: [Figure A]**

All the dissections were done from medial to the lateral direction in a retrograde fashion focusing the anterior-medial side of the mastoid segment of facial nerve. Two cadaveric temporal bones (one left ear and one right ear) were subjected for this approach. With cutting burr, the tympanic annulus and the posterior canal wall lateral to the retrotympanum were dissected out (retrotympanotomy) to facilitate the viewof the pyramidal eminence in the posterior wall of retrotympanum. The chorda tympani nerve was transected to extend this initial bony dissectionfurther posterior in order toget the clear view of the base of pyramidal eminence. The bone at the base of the pyramidal eminence was thinned out with diamond burr and later was dissected out with House micro-curette to expose the nerve sheath of second genu.A vertical plane descending from this exposed second genu towards the floor of the external auditory canal was imagined to guide the next

dissection towards the location of the unexposed mastoid segment of facial nerve. With cutting burr, bony dissection was carried out along this imaginary vertical plane. Care was taken to stay away from the unnecessary disruption of the mastoid air cells by avoiding dissection more posterior-laterally. When this dissection reached near to the location of the unexposed mastoid segment of facial nerve, the remaining bone along this vertical plane was thinned with diamond burr.Later this thin bone was dissected out with House micro-curette to expose the nerve sheath of the mastoid segment of facial nerve.




1. Planning of the dissection to expose the pyramidal eminence.
2. Exposure of the pyramidal eminence.
3. The progressive dissection on the posterior canal wall along the imaginary vertical plane descending from the base of the pyramidal eminence towards the floor of the external auditory canal.
4. Excavation of the nerve sheath of second genu at the base of the pyramidal eminence.
5. View of the mastoid segment of facial nerve after its complete excavation through anterior-lateral approach.

**Abbreviations & Symbols:-**
**Green arrow head**=the stapedius tendon,
**Blue arrow head** =the chorda tympani Nerve, **B**
**lack arrow head** =the tympanomastoid suture line,
**Red arrow**=the direction of dissection to expose the pyramidal eminence,
**Black star** =the exposed nerve sheath of the second genu.
**PC** = the posterior canal wall, **I** = the long process of incus.
**T**= the tympanic cavity, **P** = the pyramidal eminence,**F** = the mastoid segment of facial nerve,
**FL** = the floor of the external auditory canal.

**Figure B:** *Chronological pictures of the transcanal endoscopic anterior-lateral approach to the mastoid segment of facial nerve in the right ear.*

**Anterior-lateral approach: [Figure B]**

Two cadaveric temporal bones (one left ear and one right ear) were subjected for this approach.Initially, with cutting burr, a partial retrotympanotomy was done under the tympanomastoid suture line to clearly expose the base of pyramidal eminence. A vertical plane on the posterior canal wall descending from the base of pyramidal eminence towards the floor of the external auditory canal was imagined to guide the next dissection towards the location of the unexposed mastoid segment of facial nerve. Then with cutting burr, bony dissection was carried out along this imaginary vertical plane on the posterior canal wall in an antegrade fashion. The dissection progressed gradually from above to downward.Carewas taken to stay away from the unnecessary disruption of the mastoid air cells by avoiding dissectionmore posterior-laterally. The bone at the base of the pyramidal eminence was thinned out with diamond burr. Later this thin bone was dissected out with House micro-curette to expose the nerve sheath of second genu. The remaining bone over the unexposed mastoid segment of the facial nerve along the vertical plane was further thinned with diamond burr.Later this thin bone was dissected out with House micro-curate to expose the nerve sheath of the mastoid segment of facial nerve.

Any disruption of the mastoid antrum/ mastoid periantral cells through either of these two approaches was also carefully scrutinized at the end of the dissection.

**Results:**

In all cases, the entire mastoid segment could be excavated successfully through these two transcanal endoscopic approaches. Although in anterior-medial approach, the chorda tympani nerve was sacrificed intentionally to complete the necessary dissection. Conversely, in anterior-lateral approach, the chorda tympani nerve could bepreserved successfully.

Thevertical plane imaginedon the posterior canal wall from the base of the pyramidal eminence always guided the dissection effectively towards the actual location of the mastoid segment of facial nerve. The initial exposure of the nerve sheath of the second genu also helped tonavigate the dissection confidently and safely for the excavation of the mastoid segment of facial nerve.

No disruption of the mastoid antrum/ mastoid periantral cells was seen in any case involving either of these two approaches. Only a few mastoid cells near the stylomastoid foramen end of the nerve were seen exposed in both approaches.

**Discussions:**

Besides the success of excavation of the entire mastoid segment of facial nerve through either of these two transcanal endoscopic approaches, few additional facts have also been observed in this study. It has been evident that all the procedures involved in these two approaches could be done easily by using $0^0$endoscope. The necessity of the angled endoscope was not felt at all in any step of the procedure. The issue of conservation of the chorda tympani nerve was the major differentiating point in the outcome of these two approaches. In anterior-medial approach, the chorda tympani nerve was needed to be sacrificed for the sake of completing the required dissection whereas, in anterior-later approach, this nerve could be preserved successfully. The vertical plane imagined on the posterior canal wall from the base of the pyramidal eminence was felt very much essential to guide the dissection safely towards the location of the mastoid segment of facial nerve. The pyramidal eminence

appeared as the only solid landmark to plan thisimaginary vertical plane on the posterior canal wall. So in absence of the pyramidal eminence either by disease or by congenital error, successful transcanal endoscopic approach to the mastoid segment of facial nerve would be difficult.As the mastoid segment of facial nerve descends along the anterior wall of the mastoid process, so there was a risk of disruption of the mastoid antrum/ mastoid periantral cells while approaching to this segment. Apart from the exposure of few mastoid cells near the nerve, it has been observed that a careful dissection along the vertical plane could effectively preserve almost entire mastoid system.

While approaching through transcanal route, two other vital issues were also kept in concerned that might bring variation in the verticalfigure of the descending mastoid segment of facial nerve. The first issue was the effect of angular variation of the second genu on the location of the distal portion of mastoid segment. The angle at the second genu between the mastoid part and the tympanic part of facial nerve is ranging from $92^{o}$ to $125^{0}$. So in presence of the obtusesecond genu, the distal mastoid segment could have appeared at a more posterior lateral position then its presumedvertical position. But this effect of angular variation of the second genu was least observed in this study since the mastoid segment was viewed from the lateral position rather from the true anterior position.The second issue was the effect of sway of the descending mastoid segment in respect of the sagital plane either to medial or to lateral. In one Indian study, the descending course of the mastoid segment was found swayed either to medial or to lateral in 40% of their cases and in rest 60% cases, it remained in the vertical plane without any sway.[5] So if this sway does happen then the part of the mastoid segment near the stylomastoid foramen would appear either superficial or deep in comparison to the proximal part near the second genu. Considering this fact, here, the dissection was planned to proceedgradually from the upper consistent end to the lower inconsistent end of the mastoid segment of facial nerve.

Three relevant works have been identified in the medical literature that involvedtranscanal endoscopic exposure of the mastoid segment of facial nerve. In Wick C et al work,while dealing with avascular malformation involving the proximal part of the mastoid segment of facial nerve, the involved part of the mastoid segment was seen excised successfully through transcanal endoscopic anterior-medial approach after sacrificing the chorda tympani nerve. A good pictorial view of the excavated mastoid segment of facial nerve through transcanal route was found in L. Presutti et al work.[9] Butthe details of such dissection were not mentioned there. In author's own previous work, the mastoid segment of facial nerve had also been exposed through the transcanal endoscopic mastoidectomy approach.[10] But the major difference with presentstudy is that here, the mastoid system was almost entirely preserved.

It has been clearly evident in this study thatthe entire mastoid segment of the facial nerve could be excavated effectively through the transcanal endoscopic approach.In comparison to its traditional counterpart- the postauricularmastoidectomy approach, this transcanal approach could preserve the mastoid system and avoid postauricular incision. With this minimal invasive character, the transcanal endoscopic approach has opened a new horizon of addressing any part of the tympanomastoid segment of facial nerve starting from the geniculate ganglion to stylomastoid foramen.

Further clinical application of such approach would substantiate this fact.

**Conclusions:**

Like the tympanic part of facial nerve, the entire mastoid segment of facial nerve could be successfully approached through the transcanal route purely under endoscopic guidance. For such approach, the pyramidal eminence has played a vital role to navigate the required bony dissection.

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*Original Article*

# Effect of Diabetes Mellitus on Hearing

**Uzzal Chandra Ghosh[1], Md. Abu Yusuf Fakir[2], Husne Qumer Osmany[3], Dipankar Lodh[4], Md. Zahirul Islam[5], Mohammad Nazrul Islam[6]**

**Abstract:**

***Background:*** *Diabetes mellitus (DM) is a chronic systemic disease characterized by hyperglycemia due to absolute or relative deficiency of insulin and affects several systems including hearing. It was evidenced that hearing loss is twice as common in people with diabetes in comparison to other non-diabetic individuals. Although there is no epidemiological information are available in Bangladesh, but it can assume that the number would not be less.*

***Methods****: This study was a hospital based case-control study conducted at department of ENT & department of Endocrinology for 1.5 year following approval of the protocol. Total 110 people (55 cases and 55 controls) were selected and analysed in this study. All the patients were divided into two groups: Group A (all patients with Diabetes) and Group B (persons without diabetes). For analysis group A were considered as case and group B were as control. Written informed consent was taken from all case and control subjects. A detailed history taking including hearing loss, duration, onset, associated symptoms & diabetes duration, treatment were obtained from the subject. A detailed ENT examination including otoscopic examination and tuning fork test were also conducted for each patient. Moreover, audiometric assessment-PTA, blood investigation-RBS, HbA1C, & renal parameters like blood urea & serum creatinine were tested in each cases. Data analysis was done in the statistical program Statistical Package for Social Science (SPSS) version 16.0.*

***Results:*** *Out of total 55 patients in each group, mean age of Diabetic and non-diabetic were 46.78±8.02 SD and 46.72±8.09 SD (years) with slight female predominance (45.5% vs 54.5% in diabetic group and 49.1% vs 50.9% in non-diabetic group). In group A, majority (80%) of*

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*the cases had type 2 DM and rest of the cases had type 1 DM. Sensori- neural hearing loss was significantly higher in case group than non-diabetic control (43.6% vs 7.3%, p<.001). Majority of the subjects with SNHL had two-sided hearing problem (75%) and hearing difficulty was two sided in 70.8% diabetic patients and 100% non-diabetic controls which was not related with severity of the problem (p>.05).*

***Conclusion:*** *SNHL is more prevalent in diabetic individuals and was associated with duration of DM and blood glucose level.*

***Key Words:*** *Sensorineural Hearing Loss, DM, Pure tone audiometry, HbA1c*

**Introduction:**

Diabetes Mellitus is a clinical syndrome characterized by hyperglycemia due to absolute or relative deficiency of insulin. Prevalence of sensorineural hearing loss in type 2 diabetes mellitus was 80%.[1] Another study showed prevalence rate of 66%.[2] Diabetes and sensorineural hearing loss among non-elderly people was 45%.[3] Diabetes is usually classified as being of type 1 & type-2. In type-1 diabetes, the beta cells of pancreas no longer make insulin. In type-2 diabetes, pancreas continues to make insulin but a cellular impairment in sensitivity to insulin results in raised blood glucose levels. The pathophysiological explanation for diabetes related hearing loss is speculative. Diabetic neuropathies affect peripheral sensation & various autonomic functions.[2,4] The pathological changes that accompany diabetes may similarly cause injury to the vasculature or the neural system of the inner ear. So the pathogenic effects of diabetes on the ear can be grouped into neuropathic, angiopathic and a combination of the two. The tissue effects of diabetes are thought to be related to the polyol pathway, where glucose is reduced to the sorbitol. Sorbitol accumulation is implicated in neuropathy by causing a decrease in myoinositol content, abnormal phosphoinositide metabolism & a decrease in Na+/k+ ATPase activity.[2]

Histopathological evidence of vascular or neurological involvement obtained from autopsied patients with diabetes includes sclerosis of the internal auditory artery, thicker vessel walls of the stria vascularis & of the basilar membrane, demyelination of the cochlear nerve and atrophy of spiral ganglion.[5] Loss of outer hair cells has also been observed among patients with diabetes.[6]

As per American Diabetes Association, the rate of hearing loss is 30% higher in diabetic patient than in those with normal blood glucose. The association between maternal inherited diabetes & deafness and mitochondrial DNA (mt DNA) mutations is well recognized. Several mutations have been associated with this phenotype including the m.3243A>G & m14709T>C point mutations. The association is so strong with m.3243A>G thought to account for up to 1% of diabetes and 0.3% of deafness.[7]

Sensorineural hearing loss accounts for about 90% of all hearing loss. It is found in 23% of the population older than 65 years of age. The term sensorineural is used to indicate that there is either a cochlear or an eight nerve lesion. Sensorineural deafness is more common in patients with diabetes than nondiabetic and severity of hearing loss seemed to correlate with progression of disease as reflected in serum creatinine. This

may have been due to micro-angiopathic disease in the inner ear.[8] The diagnosis of sensorineural pattern of hearing loss is made through audiometry which shows a significant hearing loss without the air bone gap. In other words, air conduction is equal to bone conduction. According to WHO and Nelson *et al.,* global prevalence of disabling hearing loss in adults was 16%, which may vary from 7% to 21% in various sub-regions of the world, and was attributable mainly due to occupational noise.[9] Considering the scarcity of the literature in this topics in our country context, this case-control study was designed to find the prevalence of sensorineural hearing loss in diabetic patients & to study the association of hearing loss with diabetes.

**Methods:**

This is a case-control study and was conducted at Department of Otolaryngology-Head & Neck Surgery and Department of Endocrinology, Dhaka Medical College Hospital, Dhaka from January 2017 to June 2018. Total 55 patients will be included in the study. 55 cases and 55 controls were included by Purposive sampling. All the diabetic patients attending in Endocrinology department & patients and their attendants without ear problem in ENT department, DMCH were considered as study population. Patients aged below 60 years of age, without any other possible cause of hearing loss were included in the study. Persons with any other possible cause of hard of hearing such as tympanic membrane perforation, secretory otitis media, otosclerosis, otitis media, sudden/repeated exposure to noise without adequate protection, trauma to the head or neck, and ototoxicity were considered for exclusion criteria. After taking history and completing relevant clinical examination, all the subjects were included and divided into two groups (Group A: Diabetic persons; Group B: Non-diabetic persons). PTA were accomplished in both group of the patients and all test were done by 'AC 33 Audiometer' (Interacoustics, Denmark). All the data were recorded in a structured questionnaire. Statistical analysis were done with the help of Microsoft Excel and Statistical Package for the Social Sciences (SPSS) software version 16.0.

**Results:**

**Table I**

*Duration of diabetes and HbA1c profile of diabetic patients (n=55)*

| Variable | Type 1 DM(n=11) | Type 2 DM (n=44) | Total(n=55) |
|---|---|---|---|
| | Mean ± SD | Mean ± SD | Mean ± SD |
| Duration of diabetes (years) | 8.54 ± 3.98 | 6.61 ± 3.24 | 7.0 ± 3.45 |
| HbA1c (%) | 7.55 ± 0.85 | 7.20 ± 0.64 | 7.27 ± 0.69 |

Mean duration of diabetes of all patients was 7.0±3.45 years. Type 1 DM patients had higher mean duration of diabetes than type 2 DM patients (8.54±3.98 vs 6.61±3.24). Mean HbA1c of type 1, type 2 and all diabetic patients were respectively 7.55±0.85, 7.20±0.64 and 7.27±0.69.

**Table II :**
*Prevalence of SNHL among study population (n=110)*

| Presence of SNHL | Diabetic (n=55) n(%) | Non-diabetic (n=55) n(%) | Total (n=110) n(%) | *p* value* |
|---|---|---|---|---|
| Present | 24 (43.6) | 4 (7.3) | 28 (25.5) | <.001 |
| Not Present | 31 (56.4) | 51 (92.7) | 82 (74.5) | |

* *p* determined by Chi-Square test

Sensory neural hearing loss was present in 43.6% diabetic patients and 7.3% non-diabetic controls. The difference was statistically significant (p<.001).

**Table III :**
*Distribution of SNHL types among study population (n=36)*

| SNHL type | Diabetic (n=24) n(%) | Non-diabetic (n=12) n(%) | Total (n=36) n(%) | *p* value* |
|---|---|---|---|---|
| One sided | 7 (29.2) | 0 | 7 (25) | .212 |
| Two sided | 17 (70.8) | 4 (100) | 21 (75) | |

* *p* determined by Chi-Square test

Majority of the subjects with SNHL had two sided hearing problem (75%) Hearing difficulty was two sided in 70.8% diabetic patients and 100% non-diabetic controls. The difference was statistically non-significant (p>.05).

**Table IV :**
*SNHL severity among study population (n=110)*

| SNHL severity | Diabetic (n=24) n(%) | Non-diabetic (n=12) n(%) | Total (n=36) n(%) | *p* value* |
|---|---|---|---|---|
| Mild | 14 (58.3) | 4 (100) | 18 (64.3) | .11 |
| Moderate | 10 (41.7) | 0 | 10 (35.7) | |

* *p* determined by Chi-Square test

SNHL severity was mild in 58.3% diabetic and 100% non-diabetic subjects and severe in 41.7% diabetic. The difference was not statistically significant (p>.05).

**Table V :**
*Association of SNHL with diabetes related characteristics among patients with DM*

| Variable | DM duration (years) Mean ± SD | HbA1c level (%) Mean ± SD |
|---|---|---|
| Presence of SNHL | | |
| Present | 9.91±2.3 | 7.88±0.49 |
| Not present | 4.74±2.3 | 6.79±0.37 |
| | p* = <.001 | p* = <.001 |

**p* determined by Student's *t* test

Presence of SNHL was significantly associated with longer duration of diabetes and higher HbA1c level (p<.001).

**Table VI :**
*Association of SNHL type with diabetes related characteristics among patients with DM*

| Variable | DM duration (years) Mean ± SD | HbA1c level (%) Mean ± SD |
|---|---|---|
| SNHL type | | |
| One sided | 8.42±1.81 | 7.70±0.61 |
| Two sided | 10.52±2.23 | 7.96±0.44 |
| | p* = .03 | p*= .24 |

**p* determined by Student's *t* test

Two sided SNHL was associated significantly with higher duration of diabetes (p<.05). No association between SNHL type and HbA1c level was noted.

**Table VII :**
*Association of SNHL severity with diabetes related characteristics among patients with DM*

| Variable | DM duration (years) Mean ± SD | HbA1c level (%) Mean ± SD |
|---|---|---|
| SNHL severity | | |
| Mild | 9.28±2.52 | 7.81±0.54 |
| Moderate | 10.80±1.68 | 7.99±0.42 |
| | p* = .11 | p* = .40 |

**p* determined by Student's *t* test

SNHL severity was associated with higher duration of diabetes and higher level of HbA1c level. But the association was not statistically significant (p>.05).

Among diabetic patients SNHL was significantly more common in them who had diabetes for more than 10 years (p<0.05). So occurrence SNHL was associated with duration of DM.

**Table VIII :**
*Frequency of SNHL in relation to DM duration*

| Variable | SNHL | | *p* value* |
|---|---|---|---|
| | Present (n=24) | Not present (n=31) | |
| DM duration (years) | | | |
| 0 - 5 | 4 | 17 | 0.001 |
| 6 – 10 | 7 | 10 | |
| > 10 | 13 | 5 | |

**Table IX :**
*Comparison of SNHL type and severity among patients with DM by type*

| Variable | DM type | | *p* value* |
|---|---|---|---|
| | Type 1 n(%) | Type 2 n(%) | |
| Presence of SNHL | | | |
| Present | 7 (63.6) | 17 (38.6) | .13 |
| Not present | 4 (36.4) | 27 (61.4) | |
| SNHL type | | | |
| One sided | 1 (14.3) | 6 (35.3) | .30 |
| Two sided | 6 (85.7) | 11 (64.7) | |
| SNHL severity | | | |
| Mild | 3 (42.9) | 11 (64.7) | .32 |
| Moderate | 4 (57.1) | 6 (35.3) | |

No significant association between type of diabetes mellitus and SNHL type and severity was noted in this study (p>.05).

**Discussion:**

Association between diabetes mellitus and hearing loss has been debated since it was first reported by Jordao in 1857.[10] However, there is controversy regarding the etiopathogenesis of hearing loss, as some researchers support that it develops due to neuropathy, others say it is due to angiopathy, or even a combination of both. Yet, some researchers believe diabetes mellitus and hearing loss are part of a genetic syndrome. An extensive bibliographic review to determine whether there is cause-effect relationship between diabetes mellitus and hearing loss has been conducted by Maia and de Campos.[11] They concluded that there is still a great deal of controversy. The present case control study was designed to explore the association between hearing loss and diabetes mellitus to add to that endeavor. Total 110 subjects were enrolled in this study. Among them 55 cases had diabetes mellitus (DM) and another 55 age and sex matched non-diabetic controls were taken. Patients' sex was matched with controls in the current study to diminish its confounding role.[12]

Mean age of the cases were 46.78 ± 8.02 years and majority belonged to age group 51 - 60 years. This was affected by study design. As patients aged more than 60 years were excluded from the study to minimize the effect of age related hearing loss as a confounding factor. Also patients with co-morbid disease like HTN, chronic kidney disease, with history of ototoxic drug use, with smoking and tobacco chewing habit were excluded to control for factors affecting hearing. Cigarette smoking has been linked to hearing loss in a large epidemiological study by Cruickshanks *et al.*[13] HTN has also been found to be associated with hearing loss.[14] Use of ototoxic drug, chronic exposure to occupation noise had also been explored as possible associates in hearing loss by Helzner *et al.*[12]

Of all majority subjects were females (52.7%). Among diabetic patients, 54.5% were females and non diabetic control, 50.9% were females.

Among all patients majority completed high school (50%) followed by intermediate (22.9%). Patients completing graduation and

post-grad only constituted 10.9% study population. This could be linked to awareness of the importance of diabetes control among higher educated people. As this group is more likely to control their diabetes as well as consult physician as soon as any complication arise they are less likely to develop long term complication like SNHL. This could have been the reason for lower prevalence of higher education group in this study.

In this study a significant association between DM and sensorineural hearing loss (SNHL) was found (p<.05). This is similar to the findings reported by Mozaffari *et al.* in Iran.[3] Their findings showed a relationship between some aspects of SNHL and DM. This is also similar to findings reported by Kakarlapudi, Sawyer and Staecker, in the United States.[15]

Most previous surveys on this subject have been carried out among patients of all ages, whereas this study was performed only in non-elderly subjects aged < 60 years. Mozaffari *et al.* conducted a similar study among non-elderly individuals entitled "Diabetes mellitus and sensorineural hearing loss among non-elderly people" and found higher proportion of hearing loss among middle aged diabetic patients than non-diabetic patients.[3] Sakuta *et al.* reported a statistically significant higher prevalence of hearing loss among diabetic middle-age men in comparison to non-diabetic middle-aged men (60.2% vs 45.2%, p=0.006).[16]

DM had no statistically significant correlation with the severity of SNHL, suggesting that DM only may act as an initiating factor and that the progression of hearing loss is related to other features. Presence of SNHL was significantly associated with higher HbA1c level (p<.001). This implies that glycaemic control was associated with the occurrence of SNHL. But, severity of SNHL was not found to be associated with glycaemic control. In comparison, Mozaffari *et al.* (2010) found no association between glycaemic control with occurrence and severity of hearing loss.[3] They found that FBG level was higher in diabetic patients with SNHL (175.3 versus 157.7 mg/dL) and the proportion with SNHL was higher among subjects with uncontrolled DM (55.9% versus 44.1%), but these differences were not statistically significant. Therefore they suggested that glucose metabolism may not be the most important issue in the development of SNHL and perhaps only acts as an aggravating factor. But, this study disagree with that suggestion as occurrence of SNHL has been found to associated with poor glycaemic control.

The insulin level of patients were not measured in this study, but it has been reported that neither insulin resistance nor decreased insulin secretion are association with SNHL.[11]

Twenty percent cases in this study had type 1 DM and 80% had type 2 diabetes. No association was found between SNHL occurrence, type and severity; and type of DM. Despite the small number of patients with type 1 DM in the current study, these patients were more likely to have a moderate grade of SNHL than patients with type 2 DM. However, there was no significant correlation. This is also supported by the findings of Mozaffari *et al.*[3] They found no significant association between SNHL occurrence and type of DM. But, in contrast to this study, they found a significant relationship between severity of SNHL and DM. They found that type 1 DM was associated with severe SNHL then type 2 DM. *Dalton et al.* showed a higher incidence of hearing loss among diabetic subjects compared with a control group, but they

reported no significant association between hearing loss and DM type 2.[17]

It was also found that duration of DM were associated with occurrence and type of SNHL. Therefore, the role of DM progression and ageing on hearing loss should be considered more carefully.[18] In the current study the severity of SNHL was found higher among patients with longer duration of diabetes but there association was not significant (P = .11). This suggests that the role of disease progression should be investigated more precisely.

Among diabetic patients, sensorineural hearing loss was significantly more common in them who had diabetes for more than 10 years ($p<0.05$).

This study showed that hearing loss can be considered to be a consequence of diabetes. Therefore, a metabolic assessment may be useful for patients presenting with hearing loss. Also, routine screening for hearing loss in diabetic patients may also be helpful to diminish comorbidities among these patients, with a consequent improvement in their quality of life. Determining the cause of SNHL in diabetic patients may lead to development of better treatment options for both conditions.

**Conclusion:**

Sensorineural hearing loss is more common in diabetic individuals with an average age of forty to sixty years. It is more common in diabetes individuals who had longer duration of diabetes and less controlled blood sugar level. It was seen that about half of the diabetic patients had been suffering from SNHL which was about 7% of the non-diabetic patients. Whereas presence or absence of SNHL and involvement of unilateral or bilateral hearing loss were associated with duration of diabetes but this difference were note associated with age and gender variation. However, this study findings should be used with cautions as this study was confined into a tertiary level hospital and therefore, larger cohort is suggested to finalize the comment.

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*Case Report*

# Kikuchi's Disease: A Case Report

**Md. Saiful Alam[1], Rumana Rahim[2], Afroza Suraya Majumder[3], M Alamgir Chowdhury[4]**

**Abstract:**

*A 30-year-old female attended in August 2019, presented with painful swelling in right upper neck and fever for 20 days. Biochemical and microbiological tests, and imaging studies were all inconclusive. Histopathology of the affected lymph nodes revealed consistent with Kikuchi's disease. The Patient was treated properly and complete remission occurred within few weeks. It is a self-limiting idiopathic disease which can mimic several serious conditions such as TB, lymphoma, infectious mononucleosis and others.*

***Key words:*** *Kikuchi disease, cervical lymphadenopathy.*

**Introduction:**

Kikuchi's Disease (KD) is an idiopathic, rare, self-limiting, benign condition of necrotizing histiocytic lymphadenitis.

It is first described in Japan in 1972,[1] which mainly occurs in East-Asia. Some cases are reported in America and Europe. It is mainly a disease of young adults (mean age, 20-30 years), female predominant.[2] Diagnosis of Kikuchi disease relies on histopathology and microscopic examination of lymph nodes.

With proper treatment and surgical procedure if needed, patient can completely cure. Lymphadenopathy often resolves over few weeks to 6 months. Recurrence rate is about only 3%.[3] Mortality is extremely rare. Awareness of this disorder will help to prevent misdiagnosis and inappropriate treatment as it is strongly associated with autoimmune disorders like hashimoto's thyroiditis or systemic lupus erythematous (SLE) and mimic lymphoma, TB etc.[4]

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**Case presentation:**

A 30-year-old female presented with painful swelling in right neck and fever for 20 days in the ENT department in August 2019. There was no weight loss, no previous history of tuberculosis or contact with tuberculosis. Clinical Examinations revealed right sided palpable, oval, mobile and tender-cervical lymphadenopathy, larger node being the right anterior triangle of neck which was measured about 4 x 3 cm, other enlarged nodes were on right posterior cervical region. Lymph nodes were not palpable in other parts of the body. On admission, the patient was febrile to 102° F. She was normotensive, nondiabetic. Routine hematological parameters like complete blood count, hemoglobin, peripheral blood film was within normal limits. X-ray chest revealed no

abnormalities. Day after admission, the patient underwent excisional cervical lymph node biopsy under general anesthesia. Lymph nodes from right anterior and posterior chain of cervical group were completely removed and sent for histopathology. The histopathology revealed area of karyorrhectic debris and focal proliferation of histiocytes, small focus of necrosis and scattered fibrin deposits are presents concluding acute necrotizing lymphadenitis or Kikuchi's disease (Figure 1).

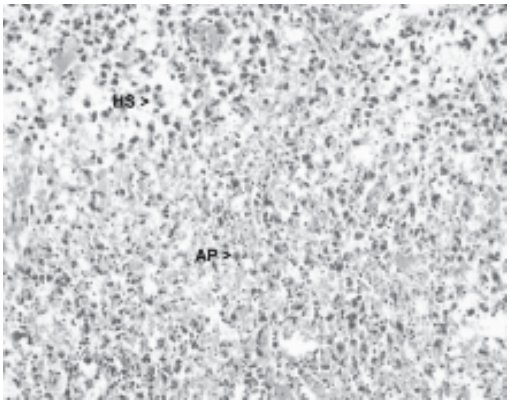


**Figure 1**: *Photomicrograph of lymph node showing focal proliferation of histiocytes, scattered fibrin deposits.*

Patient was discharged with advices and follow up schedule.

At last follow-up she reports no symptoms, remains well and there are no abnormalities on clinical examination.

**Discussion:**

Kikuchi's disease, known as necrotizing histiocytic lymphadenitis is a rare, idiopathic cause of lymphadenopathy that may be difficult to differentiate from other causes of lymphadenopathy such as mononucleosis, tuberculosis and lymphoma.

The most common clinical presentation is fever and cervical lymphadenopathy in a previously healthy young female. Less frequent presentations are malaise, weight loss, rash, arthritis, fatigue and hepatosplenomegaly, although there are case reports in the literature of more serious presentations such as meningitis, polymyositis and acute cerebellar syndromes[5]. In our case there was only fever and cervical lymphadenopathy.

The clinical presentation and the usually self-limited course suggest an immune response to an infectious agent. Numerous inciting infectious agents have been proposed, including EBV, HHV 6 and 8, HIV and parvovirus B19.[6] We didn't do any virological tests because of patient's poor financial condition.

Histopathological examination of involved lymph nodes is necessary to make a definitive diagnosis and to exclude other such as lymphoma and hematologic malignancies. Microscopic examination of the node revealed area of karyorrhectic debris and focal proliferation of histiocytes, small focus of necrosis and scattered fibrin deposits.

Laboratory studies are mostly non-specific. Leukopenia is common; however, the majority of the patient have a normal Complete Blood Cell count. Erythrocyte sedimentation Rate (ESR) also tends to be elevated in most patients and there may also be abnormalities in liver enzymes and an elevated LDH. In our case, only ESR was elevated and other hematological reports were normal.

Symptomatic and supportive treatment is usually adequate.[7] If the lymph nodes are large and painful, its better to excise the lymph nodes and sent for histopathology.

A complete history, physical examinations and appropriate investigations are necessary for the diagnosis of Kikuchi's disease.

Regular monitoring of the patient is important for checking new development of other autoimmune diseases.[8]

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