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RESEARCH ARTICLE

MYRINGOPLASTY OUR EXPERIENCE – A CLINICAL STUDY.

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ABSTRACT:

Myringoplasty is the closure of the perforation of pars tensa of the tympanic membrane[1], when myringoplasty is combined with ossicular reconstruction is called tympanoplasty[2]. It restores hearing loss in certain cases of tinnitus, the chances of re-infection and persistent ear discharge is less after surgery. The graft material most commonly used for surgery is temporalis fascia, cartilage and perichondrium are also used. In this article we are describing the level of hearing improvement, closure of perforation and complications during surgery and post-operative period in relation to myringoplasty of 1000 cases in our series.

KEYWORDS : Hearing, Perforation, Myringoplasty, Tympanic Membrane, Temporalis fascia.

INTRODUCTION

The goals of myringoplasty and tympanoplasty are to achieve a dry, self cleaning ear while preserving or restoring hearing. Myringoplasty is the closure of the perforation of the tympanic membrane, when it is combined with ossicular reconstruction it is called tympanoplasty, myringoplasty was introduced by berthold[3], was further developed by wullestein [4] and Zoellner[5]. The graft material most commonly used for the surgery is temporalis fascia, other grafts used are, vein graft and tragal perichondrium.

Figure No. 1 Normal Tympanic Membrane.

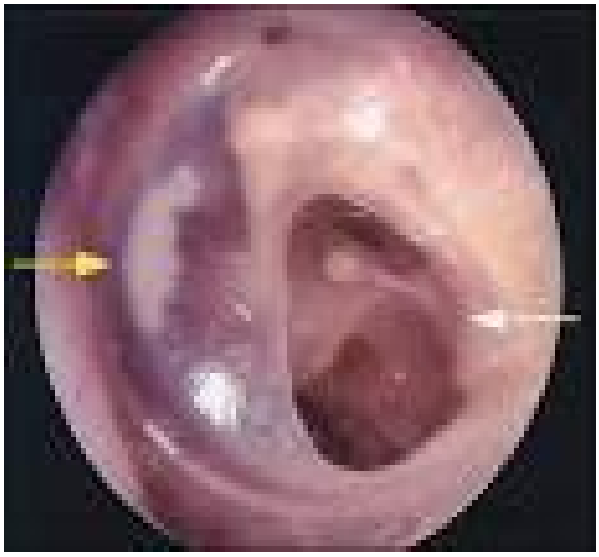


Figure No.2 Perforation in pars tensa.

PRE-OPERATIVE ASSESSMENT :

OTOMICROSCOPY :

1. Both the site and size of the perforation determine the surgical approach and surgical technique. Micro perforations may have a higher failure rate than larger perforations, anterior perforations will have more chances of residual perforations and high failure rate.

2. To know the status of the middle ear mucosa.

3. To know the status of the contralateral ear.

4. To know medialisation of the handle of the malleus.

AUDIOMETRY : Audiometric evaluation is necessary and includes tuning fork testing by the surgeon, and audiometry should done recently, (with in the preceding 03months) correlate the size of the perforation with audiogram, particularly the air-bone gap. If the air-bone gap is greater than 30db, than an ossiculoplasty may be required.

EUSTACHIAN TUBE FUNCTION: Successful myringoplasty depends on ventilation of the middle ear and mastoid, which in turn effects the final position of reconstructed tympanic membrane. The Eustachian tube function can be assessed by following methods.

* CT Scan.

* Tympanometry.

* Valsalva manoeuvre.

The most common causes of perforated ear drum are.

A. Acute ear infection (Brust ear drum)
B. After grommet insertion.
C. Truma (Slapping over the ear, explosion).
D. Chronic ear disease.

Contraindications for Myringoplasty

* Children below 03 years

* Active ear discharge.

* Otitis externa.

* When the other ear is dead.

SURGICAL TECHNIQUE : There are a vide range of techniques of myringoplasty that are described in the literature. These includes, underlay technique[6] Overlay technique[7] "Swinging door" technique [8], Gelfilm sandwich technique[9], triple 'c' technique [10] double breasting technique [11] Laser assisted 'spot welding' technique [12] and fascial pegging technique[13].

The two most common techniques for positioning the graft relative to the remnant of both the tympanic membrane and tympanic annulus are the underlay technique and the overlay technique[14].

UNDERLAY TECHNIQUE. (Medial grafting) The underlay technique is widely used and relatively simple to perform as the graft is placed entirely medial to the remaining drum and malleus.

Advantages :

a. Avoids complications of tympanic membrane lateralization and blunting.

b. Ideal for small and easily visualized perforations.

c. Less time consuming.

Disadvantages :

a. Reduction in volume of the middle ear space.

b. Less visualization of anterior meatal recess.

OVERLAY TECHNIQUE: (Lateral grafting) The overlay technique is more challenging and typically reserved for total perforations, anterior perforations or failed underlay technique. In this technique the graft is placed lateral to the annulus and any remaining fibrous middle layer after the squamous layer has to be carefully removed.

Advantages.

a. Excellent exposure of the anterior meatal recess.

b. No reduction in the middle ear space.

Disadvantages.

a. Blunting of the anterior meatal recess.

b. Lateralisation of the graft.

c. Iatrogenic Cholesteatoma.

d. Delayed healing.

However there is still uncertainty above prognostic factors in myringoplasty and there are significant variations in the reported success rates for achieving an intact tympanic membrane after surgery.

SURGICAL APPROACHES : There are three approaches may be used depending up on the site and size of the perforation and also surgeon's choice.

A: Post aural approach.

B: Endaural approach.

C: Transcanal approach.

Post aural approach : In this, the incision is made close to the hairline with subcutenaous tissue and pinna reflected anteriorly, it is favoured in anterior perforations.

End aural approach : In this approach entails making an incision between the tragus and helix. It is a good approach to use for posterior perforations.

Trans canal approach : In this approach the ear operation is performed through an ear speculum placed in the external ear canal, in this approach exposure is limited, it is used in repairing of traumatic perforation or in cases where there is a wide ear canal with posterior perforation.

COMPLICATIONS : The complications associated with myringoplasty are usually the result of two factors.

1. Surgical accidents.

2. Extent of destruction caused by the disease process.

Injury to the chorda tympani nerve results in disturbances of sensation of the tongue, this typically results when the chorda is desiccated, stretched or divided, may remain symptomatic for 3-5 months or occasionally have permanent dysfunction.

Postoperative infections are a complication and can be due to poor aseptic technique, or to the presence of bacteria in the middle ear at the time of surgery. Graft failure is a complication often associated with post operative infection.

Chondritis is rare but can be a significant problem, this can occur if the vertical incision is carried too far laterally into the conchal cartilage.

Sensorineural hearing loss and vertigo are rare, this results in excessive manipulation or trauma to the ossicular chain that may be transmitted to the inner ear. Some complications have to do with the type of technique employed.

MATERIALS AND METHODS: This retrospective study is an analysis of records of 1000 patient who underwent myringoplasty in the department of Otorhinolaryngology, Govt. ENT Hospital/Osmania Medical College, Hyderabad. From May 1999 to December 2008 (nearly 10 years) and January 2012 to February 2015 (03years), Total in 13 years 1000 patients have been operated by corresponding author, all the patients were followed up to one year post operative period, the clinical data analyzed and presenting this paper.

PATIENT CRITERIA SELECTED FOR THIS STUDY.

1. The patients having dry central perforation for at least 6 weeks.

2. All cases of Cholesteatoma, Tympanosclerosis cases were excluded.

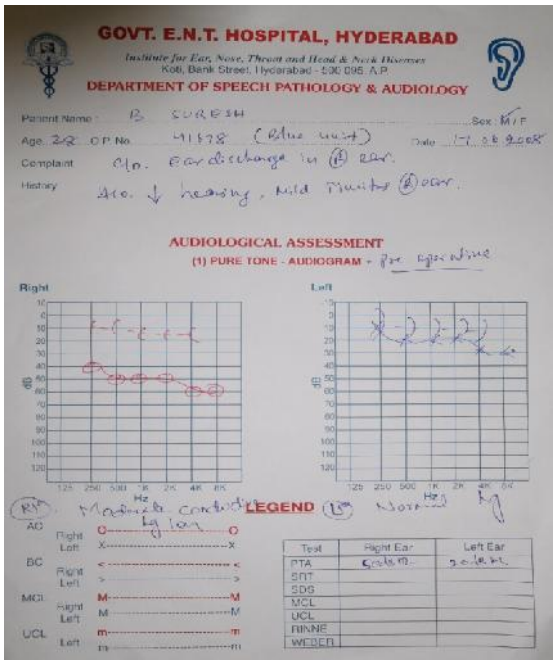
3. Children < 06 years excluded.

4. Patients having focus of infection in the Nose, Sinuses or throat and also having sensorineural hearing loss were excluded.

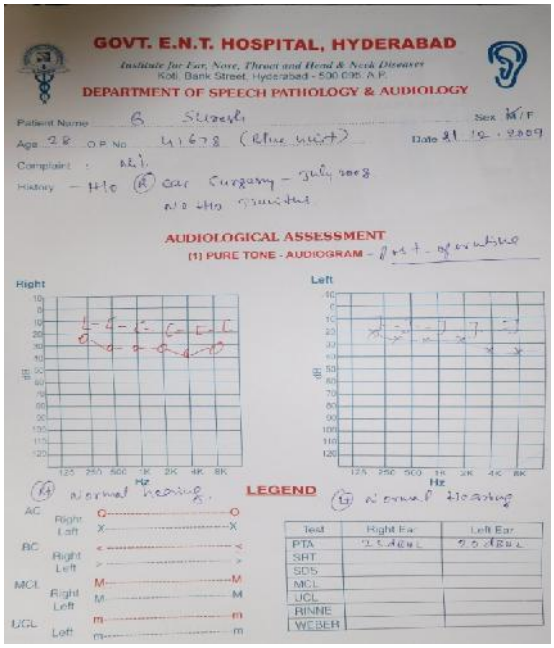
5. The age group of 12 years to 58years patient were included in this study.

A through history and clinical examination of ear, nose and throat was carried out. Ear examination under microscope, Tuning fork Tests, Radiological test (X-ray mastoids), Laboratory investigations and hearing function test (Pure tone audiometry) were also performed.

Figure No. 3 X-Ray Mastoid.



PTA Pre operative.



PTA Post operative.

Figure No. 4 PTA (Pure Tone Audiogram)

In 82% patients myringoplasty was performed under local anaesthesia and 28% (mostly children and un cooperative adults) the surgery was performed under general anaesthesisa. In 86% cases surgery was done through post auricular approach and 14% cases were operated through, endaural approach by using temporalis fascia graft in all cases. 93% surgeries were done with underlay technique and 07% of cases were done overlay technique as there was big and sub-total perforation was present.

RESULTS.

Closure of Perforation :

In our study the graft uptake rate was 96% (960 cases of the 1000 patients) and of the 40 patients with graft failure, these were 18 cases of large perforation, 15 case of inferior quadrant perforations and 07 cases sub-Total perforation, (Post operatively). The results in terms of graft uptake were compared using chi-squre test. The total 1000 patients were underwent myringoplasty, the median age was 24 years, the females were more effected by CSOM than male, the (R) ear most commonly effected with medium central perforation is the most common presentation in our study.

Residual perforations do occur and frustrate the surgeon and patient. Ideally all myringoplasty efforts result in an intact tympanic membrane, the grafting in a clean, dry ear with normal Eustachian tube function should be successful. Failure due to the technical error, infection complications are often amenable to revision surgery and patient with poor Eustachian tube function and recurrent otorrhoea may require a revision tympano mastoidectomy.

Hearing Improvement : There are many anatomic and technical factors responsible for post operative hearing results.

1. The mucosal status of the middle ear.
2. The presence of the manubrium mallei.
3. Tympanic membrane perforation < 50% of the drum surface performed significantly better than larger ones.

In our study the hearing improved in 840 patients (84%) out of the 1000 patients with the post- operative AB gap changing to <10dB in 650 patients between 11 and 20dB in 148 patients and > 20dB in - 42 patients.

COMPLICATIONS :

Intra operative complications were only few

- ✓ 06% cases – Injury to chorda tympani.
- ✓ 04% cases – Accidental dislocation of ossicles.

Post – operative complications :

- 03% cases – Wound gaping .
- 01% cases – Reduced hearing with Tinnitus.
- 0.01% cases – Pericondritis.
- 02% cases – Post operative facial peresis – recovered after 24 hours.

The aim of this study is to analyse the difference in the success rate of the different techniques and approaches by using tymporalis fascia graft and enumerate the complications during surgery and post operative period.

DISCUSSION :-

Myringoplasty is the surgical procedure in which the reconstructive process is limited to repairing tympanic membrane perforation, the main objective of myringopasty has traditionally been the closure of tympanic membrane perforation to prevent chronic infections and to make the ear safe[15], consequently the second objective is to improve the hearing loss which resulted due to perforation of tympanic membrane. There are two techniques underlay and overlay to do myringoplasty. The ideal reconstructive material should obtain a thin, conically shaped, vibrating membrane replacing the original ear drum in order to prevent infections and restore or improve hearing. There is still no consensus about the optimal technique, which is often employed on the basis of the surgeon's preference and skills and not on the type of the tympanic membrane perforation[16].

Surgery of the tympanic membrane dates back as far as the 17th century, in 1640 when Marcus Benzer[17] described the first attempt at repair of a tympanic membrane perforation with a pig's bladder. In 1878 Berthold termed Myringoplasty. Wullestein and Zoellner were who introduced the operating microscope into surgery in 1953, they used heterotropic skin-split and full thickness graft, used the term tympanoplasty. In 1961, storrs reported a series of patients in which temporalis fascia was used as on outer surface graft, House (1961), Sheehy (1967) and Glasscock further developed and refined techniques used for lateral graft tympanoplasty which are the same technique used today, the frist medial graft tympanoplasty was performed by shea (1957).

The various grafts used were as follows:

- 1956 – Fascia-lata by Zoellner
- 1956 – Periosteum – Bocca
- 1958 -59 – Temporalis Fascia – Ortegren
- 1960 – Vein –Shea
- 1961 – Temporalis Fascia – Heermann.
- 1962 – Fatty tissue – Ringenberg.
- 1964 – Tragal perichondrium – Goodwill
- 1969 – Subentanous tissue – sale.

Over the past three decades temporalis fascia has been the most commonly used graft material in myringoplasty operations. The patients included in our study were divided into two groups depending upon the technique utilized.

* Group I – (Overlay technique group).
* Group II – (Underlay Technique group).

It was observed that there was no statistically significant difference between these two groups in terms of age distribution, duration of disease, cause of disease and gender vice distribution.

In this study, the outcome in terms of graft uptake was lightly better in the underlay technique (93.5%) as compared to the overlay technique (88.9%), which was similar to those reported in literature by CronettoDelatorree[18] and Mishra[19]. Glasscock[20] have reported a 91% success rate using the overlay technique and a 96% success rate with the underlay technique. Anderson[21] have reported a 97% success rate in overlay myringoplasty surgeries. The results achieved by Glasscock and Anderson were slightly better than those of the present study.

Patient selection may have had a role in the high success rate in the present study, better results achieved with underlay technique may probably due to less surgical manipulation and faster healing process the complication rate in the present study was quite low.

In this study both techniques were associated with significant improvement in hearing with both achieving statistically significant results when the mean pre-operative AB gap was compared to the mean post operative AB gap for each group, the underlay technique appeared to achieve a slightly higher gain than the overlay technique.

CONCLUSSION :

Myringoplasty is a safe and effective technique to improve the quality of life of the patients, avoiding continuous ear infections. The development of antibiotics, use of the operating microscope and the creativity and work of numerous surgeons has made myringoplasty a successful operation. It is our belief that to achieve the best results a well trained ear surgeon must be familiar with both underlay and overlay techniques, which should be employed based on the site of perforation and the surgeons preference. Underlay technique of myringoplasty is a simple, technically easier to perform and takes less time as compared to overlay technique, therefore underlay technique of myringoplasty should be widely used, but the overlay technique should be performed in cases of anterior quadrant perforations.

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