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COMPLICATION OF MYRINGOPLASTY

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ABSTRACT
Objectives: Anon randomized clinical trial study carried out to assess complications of myringoplasty **Background:** Myringoplasty is a surgical procedure used to repair a perforation in the tympanic membrane. Various surgical techniques and graft materials are in practice. Most common indications are to prevent further infection of the ear and to improve hearing. **Methods**: Nonrandomized clinical trial study was carried out on 61 ears with chronic tympanic membrane perforations, who underwent myringoplasty for the period from September 2010 to July 2012 at Otolaryngology Department, Al-Jamhory Teaching Hospital in Mosul, Iraq. All cases operated under general anesthesia. Post aural approach was performed, using autologous temporalis fascia or conchal cartilage grafts by underlay technique. **Results:** The study was performed on 61 ears of 59 patients with chronic tympanic membrane perforations, 31(52.54%) were males and 28(47.45%) were females. The mean age of the patients was 27.18 years. Chorda tympani nerve injury most common complication in 30 ears (49.18%) followed by Graft failure in our patients occurs in 8 ears (13.11%) and there is direct relation to the size of perforation.Graft infection occurs in 4(8.16%) cases of cartilage myringoplasty. Auricular hematoma occur in concha of 3(6.122%) ears of cartilage myringoplasty. Sensorineural hearing loss occur in 1(2.04%) ear of cartilage myringoplasty.

KEYWORD: Myringoplasty, Complications.

INTRODUCTION

Perforations of the tympanic membrane primarily results from middle ear infections, trauma or iatrogenic causes. The literature suggests that up to 80 percent of these perforations undergo spontaneous closure.[1] Myringoplasty is the term used to describe the surgical repair of a perforated tympanic membrane. The three principal indications for myringoplasty are (1) recurrent otorrhea (2) desire to swim without having to waterproof the ear and (3) to improve a conductive hearing loss resulting from a non-healing perforation of the tympanic membrane. Attempts to close perforations of the tympanic membrane date back to the sixteenth century. However, it was not until 1878 that successful closure of the tympanic membrane was achieved.[2] Myringoplasty has gone through many changes in techniques and grafting materials. A successful myringoplasty controls recurrent infection, improves hearing. However, there is still uncertainty about the prognostic factors in myringoplasty and there are also significant. Variations in the reported success rates of achieving an intact tympanic membrane after surgery. The current literature reports variable success rates for closure of the tympanic membrane 60-99 per cent in adult and 35-94 per cent in children[3] factors that increase in risk of complications myringoplasty include: Patient-Related Risk Factors, young age (especially <8 years)Smoking, poor Eustachian tube function, immunocompromised status (e.g., diabetes, HIV, corticosteroid use),allergic rhinitis or chronic sinusitis, history of recurrent upper respiratory infections (URIs).

Ear and Disease-Related Risk Factors :Active ear infection at the time of surgery, chronic otorrhea (persistent ear discharge), large or subtotal tympanic membrane perforation, presence of cholesteatoma, Ossicular chain damage or erosion, poor middle ear aeration or mastoid sclerosis ,adhesive or atelectatic.

RESULTS

This study included 61ears of 59 patients with chronic tympanic membrane perforations, were 2 cases had

bilateral myringoplasty. Age and sex distribution the age of our patients was 13-55 years with a mean of 27.18 years. Thirty-one patients 52.54% were males and 28 patients 47.45% were females. (Figure 1) and (figure 2).

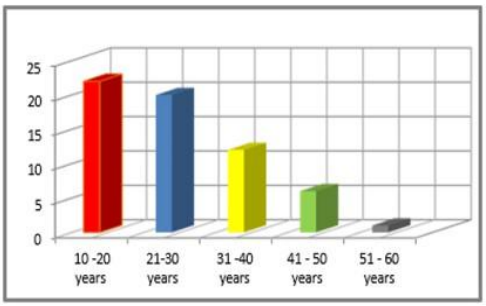

Figure 1: Age Distribution.

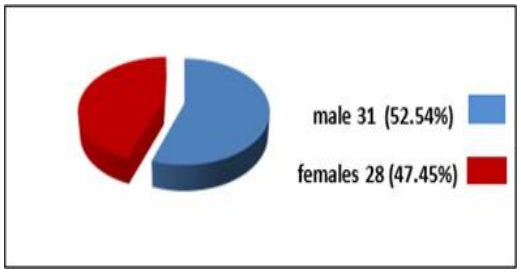

Figure 2: Sex Distribution.

Size of tympanic membrane perforation Nineteen ears 31.147% had medium size perforations whereas forty-two ears 68.85% had large size perforations as in (Table1)

Table 1: Size of perforation.

size of perforation	No.	%
medium size	19	31.147%
large size	42	68.85%
Total ears	61	100%

Temporalis fascia grafts were used in 12 ears 19.67% whereas 49 ears 80.33% were treated by conchal cartilage grafts. (Table 2) Type of graft used in procedure.

Table 2: Type of Graft used.

Type of graft	No.	Percentage
Temporalis fascia	12	19.67%
Conchal cartilage	49	80.33 %
Total	61	100%

Complications of the myringoplasty

Table 3: A. Complications of the fascia myringoplasty.

Complications of fascia myringoplasty	NO.	%
Chorda tympani nerve injury	4	33.33 %
Graft failure	5	41.66%
Graft infection	1	8.33 %

Table 4: Complications of the cartilage myringoplasty.

Complications cartilage of myringoplasty	NO.	%
Chorda tympani nerve injury	26	53,06 %
Graft failure	3	6.12%
Graft infection	4	8.16 %
Auricular haematoma	3	6.122 %
SNHL	1	2.04%

Chorda tympani nerve injury

Complications observed in our patients during the period of follow up are shown in table (3,4) The most common one was chorda tympani nerve injury. Chorda tympani nerve injury in our patients occur more in cartilage myringoplasty 26 ears (53,06%) than in fascia myringoplasty 4 ears (33.33%). However, 20 cases (66.6%) were asymptomatic, and 10 cases (33.3%) producing symptoms in ipsilateral side. Fortunately, 8 out of 10 symptomatic cases were temporary and only 2 out of 10 symptomatic cases had permanent unilateral taste changes.

Graft failure

Graft failure in our patients occurs in 8 ears (13.11%). The graft failure in fascia groups was 5 (41.42%), whereas in cartilage group 3(8.57%).

Table 5: Graft failure distributions in relation to graft material.

Type of Graft	Total .NO	Failure. NO	%	Success %
Fascia Groups	12	5	41.42	58.33
cartilage groups	49	3	8.57	93.88

Table 6: Graft failure distributions in relation to graft material and size of perforation.

Variable		Medium size No. %	Large size No.%	Total No.%
Fascia group	No.	5 (26.3)	7 (16.6%)	12
	failure	0	5 (71.42%)	5(41.42%)
Cartilage group	No.	14	35	49
	failure	0	3(8.57%)	3(8.57%)
Total No.		19	42	61

(Table6) shows that 7(16.6%) out of 42 large size perforations, fascia graft was used.

Five(71.42%) of them were failed and only two (28.57%) cases were succeeded. All cases of graft failure occur in large size perforations 8(19.04%), whereas no grafts failure occur in medium size perforations.

Graft infection

Graft infection occurs in 4(8.16%) cases of cartilage myringoplasty, three of them occurs after 3 weeks postoperatively and one of them occur after 2 months. Only one case occurs in fascia myringoplasty(Table 3,4)

Auricular hematoma

Accumulation of blood at site of harvested cartilage occur in concha of 3(6.122%) ears of cartilage myringoplasty (Table 4)

Sensorineural hearing loss

Sensorineural hearing loss occur in 1(2.04%) ear of cartilage myringoplasty, notice at first postoperative day diagnosed by Weber test and Pure tone audiometry was done to confirm the diagnosis. (Table 4).

DISCUSSION

Complications of myringoplasty

Chorda tympani nerve (CTN) injury

The chiiorda tympani nerve (CTN) has important functions, namely two components: pre-ganglionic secretomotor fibers to the submandibular ganglion for supply to Submandibular and sublingual salivary glands; and fibers carrying the taste sensation from the anterior two thirds of the tongue. Because CTN is between the ossicular bones and is in close proximity to the tympanic membrane, it is not always easy for otolaryngologists to preserve this nerve during middle-ear operations. During middle-ear surgery, the CTN is typically exposed. It is subject to considerable surgical stress by stretch, injury, or dryness, or it is directly sectioned to facilitate the surgical approach to the ossicles. Accordingly, middle ear surgery has been reported to cause lesions of gustatory system, producing symptoms such as dysgeusia, hypogeusia, or ageusia. These postoperative gustatory affections are believed to be transitory, although long-lasting dysgeusia have been observed. Glossopharyngeal nerve is normally inhibited by the CTN in the taste network. This inhibition is abolished when CTN is damaged, which can serve as a compensatory mechanism to taste loss. Because of this complex network injury to any one of these nerves is unlikely to produce a significant or permanent in taste sensation.[7]

Change in taste on the ipsilateral side of the tongue, and taste disturbance results when the chorda tympani nerve is stretched or divided. Patients may remain symptomatic for 4 to 6 months. In some cases, this results in permanent dysfunction.[4]

In our study Chorda tympani nerve was injured in 26(53,06%) cartilage myringoplasties while in fascia myringoplasties it was 4(33.33%). All cases were diagnosed during surgery, however during follow up, we notice 20 cases (66.6%) are a symptomatic, and 10 cases (33.3%) producing symptoms such as change in taste or metallic test. Fortunately, 8 out of 10 symptomatic cases were temporary and only 2 out of 10 symptomatic cases had permanent unilateral taste disturbance.

Sham E.H et al, study the rate of chorda tympani nerve injury in post myringoplasty. The methods used were measuring taste thresholds using electrogustometer to map taste threshold on the anterior two-third of the tongue on the operated side with the non-operated side as the control.

Reading is taken when the subject experiences sour/metallic taste. Results showed 50% of patients had elevated threshold levels suggestive of CTN injury. However, none of the patients reported subjective taste loss. This study concludes that the prevalence rate of CTN injury in post myringoplasty patients is about 50% but this is not associated with altered taste sensation.[7]

Requesting consent from patients for myringoplasty operation, it is important to mention the incidence and prognosis of possible complications associated with chorda tympani nerve injury.[8]

Graft failure

Overall graft failure in our study occurs in 8 (13.11%) ears. Graft failure in fascia groups was 5(41.42%) ears, whereas in cartilage group 3(8.57%) ears. All grafts failure occurs in large size perforations.

In general, many factors implicated in graft failure, the main one is the size of perforations, large size perforations including (total and subtotal), had less tympanic membrane remnant margins to supports the grafts in addition to difficulty in repairing such perforations made large size perforations has more risk of graft failure. Second factor is the site of perforations (anterior superior perforations) have more incidence of graft failure, due to the more limited visualization of the anterior part of the eardrum, and limited access to these perforations.[5],[6] Type of graft used, temporalis fascia has higher failure rate than conchal cartilage, poor tubal function, faulty undersurface grafting technique will often result in graft failure.[9]

Other factors may result in graft failure; infection in middle ear, mastoid, nose and nasopharynx, should treated before doing myringoplasty. while deviated nasal septum, nasal polyp and sinusitis should be treated surgically to get successful myringoplasty.[10]

In our study we used temporalis fascia to repair 7 cases of large size perforations, 5(71.42%) of them failed to take graft, actually choosing the type of graft made according to criteria that mentioned previously in addition to surgeon preference.

Black J.H, Wormald P.J.[28] studied 25 subtotal perforations, underwent fascia myringoplasty, 15 (60 %) of cases were succeeded and 10 (40%) were failed, which comparable to our study.

Mani L et al[36] studied 100 myringoplasty in central dry perforations of tubotympanic variety of CSOM. age range of patients was from 15 years to 45 years temporalis fascia was used as graft materials in all cases. The surgical failure in 16 cases (16%) was characterized by evidence of graft failure, re-perforation and anterior blunting at the last follow up visit. graft failure occurred during the first 4 weeks in 6 of 10 cases.

Graft infection

Graft infection occurs in 4(8.16%) cases of cartilage myringoplasty, 3 of them occurs after 3 weeks postoperatively and one of them occur after 2 months. Only one case occur in fascia myringoplasty. All of them treated successfully with antibiotics, with no graft rejection. Poor aseptic technique or the presence of bacteria in the ear at the time of surgery can cause graft failure as a result of graft infection.[9]

Auricular hematoma

Accumulation of blood at site of harvested cartilage in the concha of 3(6.122%) of cartilage myringoplasty, notice at first postoperative day. all cases treated by aspiration via wide pore needle under local anesthesia with pressure dressing in addition to systemic antibiotics. all these cases were successful to take grafts.

Sensorineural hearing loss

Sensorineural hearing loss occur in 1(2.04%) of cartilage myringoplasty, notice soon postoperatively after full recovery from general anesthesia diagnosed by Weber test. Pure tone audiometry was done to confirmed diagnosis which shows SNHL.

Redaelli D.Z et al, evaluate the risk of inner ear dysfunction following surgery. they reported that mixed hearing loss is frequently associated with chronic otitis media, and the severity of sensorineural hearing loss is related to the duration of middle ear disease. Surgical treatment may associate with impairment of inner ear function due to surgical trauma or complications such as iatrogenic infection

Noise intensity is higher with larger diameter and cutting burrs, a 125-dB intensity created by a 2.3-mm cutting burr applied to the ossicular chain. Rotation speed and drilling site do not appear to significantly influence noise levels. In addition to noise, temporal bone vibration during drilling may damage the cochlea, particularly at higher frequencies.

Noise level produced by suctioning during mastoid surgery may reach 107 dB. When suctioning into the external ear canal the intensity is proportional to the size of the suction tube and reaches 138 dB with a 9- French tube, and that postoperative bone thresholds were significantly impaired at 4 kHz when the external ear canal was drilled. Dissection should be conducted by slow movements parallel to the malleus, which should be immobilized with the suction tube; these precautions should reduce inner ear trauma.

Suction and drilling should be used sparingly with frequent pauses. Only small suction tubes should be used when suctioning in the external ear canal.[11]

CONCLUSIONS

Complications of myringoplasty were infrequent apart from injury to chorda tympani nerve.

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