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Tear in the Tympanomeatal Flap in Tympanoplasty does it Matter?

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Abstract

Objective: Our message with this paper, mainly to the learners and inexperienced ear surgeons is that: A torn tympanomeatal flap does not need abandoning the procedure; it can be repaired by approximation or with the help of temporalis fascia graft placement over the bare area of the bony canal. Tears in the tympanomeatal flap can occur as linear, buttonhole or separation of flap from the annulus when difficulty is encountered in elevation of the annulus. Most commonly tears occur in the hand of inexperienced otologic surgeons but can also occur in experienced hands.

Study Design: Prospective case series.

Methods and Results: Seventy (70) cases of Type I tympanoplasty by the underlay technique were studied prospectively during a period of 18 months. (Tympanomeatal flap elevation is essential in placing the graft). Fourteen (14) cases had tear in the tympanomeatal flap. Six (6) of these had small tears like linear or button holes which did not need any repair. Eight (8) cases had large tears, that were repaired by the help of temporalis fascia graft covering the perforation as well as the tear in the tympanomeatal flap. However, while replacing the flap at the conclusion of the procedure, care must be taken to avoid unfolding of the margins of the tear.

Keywords: Tear; Tympanomeatal flap; Temporalis fascia

Abbreviations

T-Flap: Tymapanomeatal Flap; TMF: Tympanomeatal Flap

Introduction

Wullstein and Zollner introduced the concept of tympanoplasty in the field of chronic ear diseases.

- Lempert originally designed tympanomeatal flap for his tympanosympathectomy operation.
- Later adopted by Rosen for operation on the stapes. The concept of placing the graft under the drum remnant was set forth by Shea and Tabb in 1960's. Their procedures were identical but they employed vein as a graft material. The technique was same as in stapedectomy to raise the endomeatal ap and place the graft under it.
- Maurice Sourdille innovation of using tympanomeatal ap for tympanoplasty was the starting point of new era of modern tympanoplasty [1-4]. Since then, tympanomeatal aps have been useful in underlay tympanoplasty and other Otologic surgery. The elevated tympanomeatal ap allows access for a number of middle ear procedures like repair of TM or perilymph fistula, ossiculoplasty, remove growths such as cholesteatoma and glomus tumor [5-12].

Balkany in 2003 named these flaps with some minor variations:

- Standard Flaps
- Stapedectomy Flap
- Congenital Cholesteatoma Flap
- Glomus tympanicum Flap [5]

Tears in Tympanomeatal flap do occur while elevating the flap. Most commonly tears occur in the hand of inexperienced Otologic surgeons but can also occur in experienced hands [8-10]. A

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varieties of materials like skin, fascia, perichondrium, vein and fat are used to repair the tympanomeatal flap tear defect [9]. So as to increase the surgical success of tympanoplsty.

With the above reference, we designed a prospective study to see whether the tear which usually occurs during elevation of the flap really matters or not? This study is first of its kind in the literature to guide the inexperience ear surgeon.

Material and Methods

A Prospective study for a period of 18 months from July 2014 till December 2015.

Done in Buraidah Central Hospital, Buraidah KSA Patient data included:

1. Age
2. Sex
3. Audiogram
4. Significant medical problems

- All ears were dry 3 to 4 weeks prior surgery.
- Patients age range from 15 to 55 years.
- All cases underwent audiological evaluation before surgery
- 70 cases of CSOM who underwent type I tympanoplasty by underlay technique were studied during this period.

Inclusion criteria

- CSOM of safe type with medium size; kidney shape, subtotal or total perforation.

Exclusion criteria

- CSOM with cholesteatoma/polyp/granulation
- Marginal perforation
- Small perforation which can be dealt with permeatal approach.

All cases underwent the procedure through post-aural approach with underlay overlay tympanoplasty type I technique.

Total 14 cases: had tear in the tympanomeatal flap, during elevating the flap.

6 Cases: Had small tears linear or button-hole type, which did not need any repair healed spontaneously. Only gel-foam piece was kept over the tear.

8 Cases: Had large tears that were repaired by the help of TMF graft covering the perforation as well as the tear below the tympanomeatal flap, the torn flap was approximated over the graft and gelfoam was kept over it so as to stabilize it.

ONE Case: Had a very thin tympanomeatal flap where elevation was difficult and nearly had total tear in the flap. This was corrected by large TMF covering the bare area of the bone totally in the EAC.

Results

6 cases: With small linear and button-hole tear healed spontaneously without any repair.

7 cases: With large tear healed with delayed process, after correcting the tear with temporalis fascia, out of which 1 case had posterior perforation in long term follow up.

1 case: With nearly total tear healed completely with the TMF graft, it took some more time to heal as compared to the above cases. Failure rate was 7.2% out of 14 tears.

Discussion

Elevation of Tympanomeatal flap (T- flap) is an important step in underlay tympanoplasty. Raising the T- flap is the state-of-the-art knowledge. The goal of elevation T-flap is to expose the middle ear with elevation tympanic membrane and mobilize the skin from the groove without damaging it so that middle ear can be extraordinarily exposed [1-6]. Concept of underlay tympanoplasty after elevation of T-flap was set forth by Shea and Fabb in 1960. Innovation of using tympanomeatal flap in tympanoplasty by Maurice Sourdille gave a new turn to tympanoplastic procedure [2]. Tears in TM- flap can occur while elevating the flap at different sites:

1. Oblique tympanomastoid suture line.
2. Elevation of at the annulus where the tear is very common in experienced hands also.
3. Tear can occur while drilling with cutting burrs in the canal Tears in the TM-flap may occur in following ways:

i. A linear or button perforation may occur in the skin flap.

ii. The skin flap may separate from the tympanic annulus [8-10]. This usually occurs in inferior location and is due to failure to elevate the tympanic annulus from its sulcus [10-12]. Tears in the TM-flap or Tympanic membrane that occurs during elevation of the flap and drum should be repaired at the completion of the procedure. Repair of the tears in the T–flap is simple but meticulous.

Linear and button hole tears need no repair, care must be taken to avoid unfolding the margins of tears while replacing the flap so the healing is not hampered [10].

Smaller tear near the annulus requires no repair if it is approximated properly while replacing the flap [13]. Tears in the TM-flap can be repaired by different materials like fat, vein, perichondrium and temporalis fascia graft [8,11]. It depends upon which material is readily available for repair. During stapedectomy fat and perichondrium are used very commonly. During tympanoplasty temporalis fascia graft is used very commonly as its access is at the same incisional site [6,12].

Today TMF has become very common in the repair of tear in TM-flap during tympanoplastic procedure.

It has been shown by experience that TM-flap tear can be avoided by never taking the knife of the bone surface.

If one always keeps the knife on the bone surface one can develop the separation/elevation on a relatively broad front. Secondly never allow soft tissue beneath the knife. A broad front of dissection recommended when elevating the TM flap and releasing incisions should be made as needed in order to avoid TM flap tears with these precautions one can avoid perforation or tearing the TM flap [8-13].

Conclusion

We conclude that tears in the T-flap are not hazardous events; they should be handled carefully with patience and repaired by a proper technique at the end of the procedure.

Different materials like fat, vein, perichondrium and, Temporalis fascia grafts can be used in repair process the study was aimed to give message, mainly to the learners and inexperienced otological surgeons:

A torn tympanomeatal flap does not need abandoning the procedure; it can be repaired by approximation or with the help of temporalis fascia graft placement over the bare area of the bony canal.

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