AREOLAR FASCIA WITH AND WITHOUT CONCHAL CARTILAGE IN TYMPANOPLASTY

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ABSTRACT

This retrospective study included 110 patients operated for chronic tympanic membrane perforations in the period between 1998 and 2004. Areolar fascia was used for central (small and medium sized) and posterior perforations (60 patients). Conchal cartilage was used in conjunction with areolar fascia for large, subtotal and anterior perforations (50 patients). The surgical success rates for areolar and fascia-cartilage graft groups were 90% and 91.6% respectively. There was significant improvement of air conduction levels after tympanoplasty for both groups. A significant improvement in air bone gap (ABG) was noted at each frequency in both groups.

These findings revealed the overall gains of 15.3 dB for the fascia group and 12.6 dB for the cartilage-fascia group. ABG closure to within 20 dB was encountered in 51 (85%) patients of the fascia group whereas this was achieved in 41 (82%) patients of the cartilage-fascia group. Study showed that areolar fascia has comparable success rate to the standard temporali muscle fascia. The present study has shown that cartilage tympanoplasty did not adversely affect hearing result

Key words: areolar fascia, cartilage tympanoplasty

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in the operative field, and have similar biomechanical properties as temporalis fascia. The areolar connective tissue superficial to the temporalis fascia fulfills all of these requirements and provides an excellent graft source.

Aim Of The Work
To assess the efficiency of areolar fascia graft with and without conchal cartilage for management of chronic tympanic membrane perforations.

PATIENTS AND METHODS
Retrospective analysis of all patients operated for chronic tympanic membrane ear perforations by a single surgeon (Y.W.K) at Mansoura University Hospital and Saudi German Hospital, between 1998 and 2004.

Data extracted included the following: age; length of follow-up in months; preoperative diagnosis; details of surgical procedure; time to complete epithelization in weeks; and residual perforation, or any other complications or need for additional therapies. Areolar fascia was used for central (small and medium sized) and posterior perforations. Conchal cartilage was used in conjunction with areolar fascia for large, subtotal and anterior perforations.

Surgical technique:
Operations were done under local anesthesia with lidocaine 2% with 1:50,000 epinephrine delivered with dental syringe. A rim of tissue is removed from the perforation edge to de-epithelialize and encourage migration of the mucosal layer and epithelium.

Vertical canal incisions are made at the 12- and 6-o’clock positions. The 6-o’clock incision can be extended right up to the annulus. The 12-o’clock incision is made down to a few millimeters above the annulus to preserve blood supply when anterior canal skin is used as the superiorly based flap. A posterior tympanomeatal flap is elevated, and ossicles are evaluated.

The postauricular approach was used. The incision was deepened carefully to reach and not cut thru the areolar fascia. The Freer dissector was used to expose a large area of
population was divided into 2 groups on the basis of grafting material: Areolar fascia group (60 patients) or areolar fascia with conchal cartilage group (50 patients). The average age was 24 years (range 15 - 56, median 36). There were 62 males (56%) and 48 females (43%). Length of follow-up ranged from 12 to 62 months, with an average length of 32 months. 85.4% (94 patients) were done under local anesthesia. General anesthesia was used in non-cooperative patients or those who refuse local anesthesia.

The surgical success rates for areolar and fascia-cartilage graft groups were 90% and 91.6% respectively. Postoperative infection was directly involved in most of the cases of surgical failure. The average time for complete epithelization was 3.7 and 5.6 weeks for both areolar fascia and areolar-cartilage groups respectively. Post-operative otitis media (in successful cases) were recorded in only two cases (one in each group).

Table (1) shows the significant improvement of air conduction levels at 4 frequencies (0.5, 1, 2, and 4 kHz) after tympanoplasty for both groups.

Figure (1) shows the mean air bone gap in both groups. The mean preoperative air-bone gap was 20.5, 21.2 for areolar and areolar-cartilage groups respectively. Mean post operative A-B gap was 9.2; 8.9 for both groups respectively.

Preoperative air conduction thresholds at 4 frequencies (0.5, 1, 2, and 4 kHz) for the areolar fascia group were 39.5 dB, 32.5 dB, 27.8 dB, and 28.0 dB, respectively. Preoperative means of air conduction thresholds for the fascia-cartilage group were as follows: 41.3 dB, 33.6 dB, 29.5 dB, 30 dB (Figure 2).

Postoperative air conduction thresholds at 4 frequencies (0.5, 1, 2, and 4 kHz) for the areolar fascia group were 22.5 dB, 17.5 dB, 14.5 dB, and 13.2 dB, respectively. Postoperative means of air conduction thresholds for the fascia-cartilage group were as follows: 25.3 dB, 19 dB, 18.2 dB, and 17.3 dB (Figure 3).

A significant improvement in ABG was noted at each frequency in both groups.

The overall mean pre and postopera-
Figure (1) Mean pre and postoperative ABG in both groups

Figure 2: Frequency specific mean pre operative AC thresholds (dB) in both group
DISCUSSION

Although a number of alternate materials for tympanic membrane grafting have been proposed, none have proven as dependable as temporalis fascia. Skin, perichondrium, vein grafts, and a variety of homograftic and allograftic materials have been attempted but none have proven superior to temporalis fascia. The aim of this study was to assess the efficiency of areolar fascia (as a grafting material) alone and in combination with cartilage graft. It was not aimed at comparing both groups in the study as the indications for the use of either graft were different.

Areolar connective tissue is a distinct fascial layer located immediately superficial to the temporalis fascia. It is a thin layer of reticulated fibers that is easily identified during the harvest of temporalis fascia. Although less substantial than temporalis fascia, it is nonetheless an excellent graft material. In addition to containing abundant collagen and reticular fibers, the areolar connective tissue houses the fibroblasts and macrophages necessary for proper graft incorporation. This study showed that areolar fascia has comparable success rate and hearing results to the standard temporalis muscle fascia. Numerous authors have reported its success in the adult population. Glasscock 9 reported surgical success rates of 96% and 91% for underlay and overlay tympanoplasty, respectively. He also noted that harvest of this layer was relatively bloodless and technically easy to perform. In addition to its convenient location in the operative field, ample material was available for repair of extensive perforations. It has been also used with good results in pediatric population.10 Our experience with areolar fascia for more than ten years for grafting of tympanic membrane perforation was very rewarding. It was also used during canal wall down mastoidectomy to cover the mastoid bone. The healing was noted to be fast. Incorporation of the graft was noted to be completed after one month of the operation.

Cartilage has been proved to be well tolerated by the middle ear and to survive for long periods.11, 12 It is nourished largely by diffusion and becomes well incorporated in the tym


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استخدام لقافة النسيج الضام الفجوى مع (ويدون) غضروف صوان الأذن في عمليات ترقيع طيبة الأذن

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اشتملت هذه الدراسة الاستعمادية على مائة وعشرة مرضى أجريت لهم عمليات ترقيع طيبة الأذن وذلك لوجود ثقب مزمن بها.

وقد استخدمت لقافة النسيج الضام الفجوى في حالات الثقب المركزي (الصغير والمتوسط الحجم) والثقب الخلفي وذلك في (50) مريض (ال مجموعة الأولى) وقد استخدم غضروف صوان الأذن مع لقافة النسيج الضام الفجوى في حالات ثقب الطبة الكبيرة والفصل والأمامي وذلك في (50) مريض (المجموعة الثانية) وقد كانت نسبة نجاح العملية في المجموعة الأولى (10) % وفي المجموعة الثانية (19) % وقد كان هناك تحسن ملحوظ في فجوة التوصيل الهوائي والعظمي في كل الترددات في المجموعتين.

وقد أظهرت النتائج زيادة في التوصيل الهوائي قدماها (15) ديسبيل في المجموعة الأولى و (12) ديسبيل في المجموعة الثانية كما بنت النتائج علقة بفجوة التوصيل الهوائي والعظمي إلى ما دون ديسبيل في المريض (85) % وفي المريض المجموعة الأولى وفي 41 مريض (82) % من مرضى المجموعة الثانية.

وقد أظهرت النتائج نسب نجاح مماثلة مما أن استخدام غضروف صوان الأذن لم يؤثر سلبياً على نتائج السمع في هذه العمليات.

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