Mastoid skin island flap: A simple technique for conchal defect reconstruction

O Antonyshyn MD FRCSC

Division of Plastic Surgery, Sunnybrook Health Science Centre, Toronto, Ontario

O Antonyshyn. Mastoid skin island flap: A simple technique for conchal defect reconstruction. *Can J Plast Surg* 1993;1(3):137-140. Conchal defects resulting from tumour excision can pose a difficult reconstructive problem. These defects generally involve the entire concha and occasionally extend to the external auditory canal. Under these circumstances, skin graft reconstruction is unsuitable. A simple technique of conchal reconstruction using a mastoid skin island flap is described. The flap provides a reliable one-stage reconstruction of the concha and posterior conchal wall.

Key Words: *Concha reconstruction, Mastoid flap*

Lambeau cutané mastoïdien en îlot: technique simple pour la reconstruction du cornet

RÉSUMÉ : Les déformations du cornet qui résultent de l'excision d'une tumeur posent un problème de reconstruction. Ces défauts affectent généralement tout le cornet et, à l'occasion, atteignent aussi le canal auditif externe. Dans ces conditions, la greffe cutanée de reconstruction ne convient pas. Une technique simple de reconstruction du cornet à l'aide d'un lambeau cutané mastoïdien en îlot est décrite ici. Le lambeau permet une reconstruction fiable du cornet et de sa paroi postérieure et s'effectue en une seule étape.

The repair of conchal defects poses a difficult problem which has inspired a multitude of surgical techniques. Such defects can vary considerably in magnitude and in the involvement of adjacent anatomical sites (Figure 1). Tumour resection generally results in a defect which includes the cartilage and anterior skin of the entire concha, but can on occasion extend further to involve the external auditory canal, the root of the helix and the mastoid periosteum. The reconstructive requirements, therefore, vary accordingly.

Free split or full thickness skin grafts are usually employed in the resurfacing of minor conchal defects. This frequently results in an excessively deep concha, due to the lack of underlying cartilage, or a difference in skin pigmentation. In larger defects, particularly those extending to the root of the helix or midportion of the antihelix, skin graft contracture distorts the external ear, diminishing the overall size and pulling the ear forward on itself (1). When the external auditory canal is involved, graft contracture frequently results in meatal stenosis. Finally, resection of mastoid periosteum or the perichondrium of the cartilaginous canal in the deep aspect of the concha may be necessitated by tumour excision, creating an unfavourable graft recipient site.

Well vascularized full thickness skin is therefore preferred in the reconstruction of larger or more complex conchal defects. This paper describes a simple and reliable reconstructive technique, employing a postauricular island ad-

vancement flap. This procedure permits immediate one-stage reconstruction of virtually all conchal defects, regardless of size or depth.

SURGICAL TECHNIQUE

A pattern of the conchal defect is first taken and transferred to the postauricular region. The flap is then outlined on the hairless skin over the mastoid, with the anterior margin lying in the sulcus of the cephalo-auricular junction (Figure 2). The lower limit of the skin island is the mastoid tip, while the upper border should not extend beyond the temporal line. In selected cases, where the defect extends to the external auditory canal or further, the flap can be extended distally onto the cranial surface of the auricle.

After the flap has been outlined, the margin is incised through the full thickness of skin down to the subcutaneous tissue. When the distal extension of the flap is employed, the skin on the cranial aspect of the auricle is sharply elevated in a plane superficial to the perichondrium (Figure 3). However, all vascular connections between the mastoid skin and underlying subcutaneous tissue remain intact. The skin island is therefore based on a large subcutaneous pedicle.

With the auricle turned forward, a full thickness incision is made in the cephalo-auricular junction through to the posterior conchal wall, along the full width of the defect. This opens a direct communication between the conchal defect and the postauricular region. The island flap is advanced through the opening into the concha and secured to the anterior margin of the defect (Figure 4). In most cases, there is no need for further undermining or dissection of the subcutaneous pedicle.

Correspondence and reprints: Dr O Antonyshyn, Division of Plastic Surgery, Sunnybrook HSC, 2075 Bayview Avenue, Toronto, Ontario M4N 3M5

Figure 1) Conchal defect. **Left** Basal cell carcinoma in the concha of the right ear. **Right** Conchal defect following excision of the tumour

Figure 2) Schematic diagram illustrating the design of the mastoid skin island flap. A distal extension of the flap is outlined on the cranial surface of the auricle

Figure 3) Schematic diagram illustrating flap elevation. The mastoid skin island is maintained on a subcutaneous pedicle, while the distal extension of the flap is elevated superficially to perichondrium on the cranial surface of the ear

To permit primary closure of the concha-mastoid fistula, the skin is sharply elevated for a distance of 1 to 2 mm along the border of the flap. The ear is returned to its anatomical position, behind the skin island. The skin along the margin of the defect is sutured to the conchal wall. Skin on the cranial aspect of the ear is fixed to retroauricular skin, leaving no residual donor defect (Figure 5).

DISCUSSION

The use of regional head and neck flaps for conchal reconstruction is well documented in the literature. Hairless skin posterior to the cephaloauricular junction can be elevated as a transposition flap based inferiorly (1) or superiorly (2).

Battle (3) described a skin flap raised in the retroauricular sulcus, with a superior or inferior pedicle depending on the side of the defect. A posteriorly based advancement flap, comprising mastoid skin and extending distally onto the cephalic surface of the ear, was introduced by Gingrass and Pickrell (4) for reconstruction of the external auditory canal.

All of these techniques employ postauricular skin flaps, which are tunnelled through a hiatus in the cephaloauricular junction directly into the concha. The resulting conchomastoid fistula is left open, so as not to compromise vascular perfusion of the skin pedicle. Reconstruction of the posterior conchal wall is delayed for two to three weeks, at which time the pedicle is divided and the flap is inset. To obviate the need

Figure 4) Flap advancement into the defect. **Left** Through a full thickness incision in the cephalo-auricular junction into the posterior conchal wall, the mastoid flap is advanced directly into the defect. **Middle** Forceps indicate the anterior margin of the flap within the concha. **Right** Schematic diagram of flap advancement

Figure 5) Flap inset. **Left** Schematic diagram of flap inset and donor site closure. **Middle** Immediate postoperative result. **Right** Long term result. Note absence of ear constriction or shape deformity

for a second procedure, Schramm and Myers (5) advocated de-epithelialization of the skin pedicle and immediate closure of the fistula.

A myocutaneous flap for conchal reconstruction was first described in 1982 by Koopmann and Coulthard (6). The posterior auricularis muscle was elevated with an overlying skin island and rotated into the concha. A vascular basis for this flap was later elucidated by Krespi et al (7). The auricular branch of the posterior auricular artery was found to be an anatomically consistent pedicle entering the muscle on its inferomedial surface. When widely undermined and mobilized on its vascular pedicle, the myocutaneous flap permits one-stage reconstruction of large defects of the concha, scapha and lower pole of the ear. However, this is a more complex procedure requiring considerable dissection. The authors further caution against the use of this flap following mastoid or parotid surgery, or trauma to the external carotid artery, where the blood supply may have been interrupted.

The use of a mastoid skin island based on a subcutaneous

pedicle was first described by Webster in 1944 (8,9). This technique was employed in enlarging a constricted conchal cavity. Rather than mobilizing the flap, the position of the auricle itself was changed by shifting the posterior conchal wall posteriorly to incorporate the retroauricular skin. The mastoid skin island flap has also been described by Ortiz Monasterio (personal communication) as a primary means of resurfacing conchal donor site defects following harvesting of composite grafts for congenital ear reconstruction.

The mastoid skin island flap described in this paper similarly employs a subcutaneous pedicle to vascularize a postauricular skin island. The flap is advanced directly into the concha with a minimum of dissection, and permits immediate one-stage reconstruction of the conchal defect and posterior conchal wall. There is no residual fistula or donor site defect.

This procedure provides a simple and expedient method of conchal reconstruction, which can be performed under local anesthesia on an out-patient basis. We use the mastoid skin

island flap in the resurfacing of all conchal defects regardless of size or location. The skin island is reliably vascularized, augments the contour depression of the concha and provides an excellent colour match, while preserving the form of the external ear.

REFERENCES

1. Owens N. An effective method for closing defects of the external auditory canal. *Plast Reconstr Surg* 1959;23:381.
 2. Bouisson P. De l'amputation du pavillon de l'oreille; Étude chirurgicale. *Gas Med de Paris* 1870;25:320. (Described in Barsky AJ, Principles and Practice of Plastic Surgery. Baltimore: Williams and Wilkins Co, 1950:207.)
 3. Battle R. *Plastic Surgery*. Washington: Butterworth, 1964:216.
 4. Gingrass RP, Pickrell KL. Techniques for closure of conchal and external auditory canal defects. *Plast Reconstr Surg* 1968;41:568.
 5. Schramm VL, Myers EN. Reconstruction of conchal defects. *Laryngoscope* 1968;88:1868.
 6. Koopman CF, Coulthard SW. A postauricular muscle-skin flap for conchal defects. *Laryngoscope* 1982;91:596.
 7. Krespi Y, Ries WR, Shugar JMA, Sisson GA. Auricular reconstruction with postauricular myocutaneous flap. *Otolaryngology - Head Neck Surg* 1983;91:193-6.
 8. Webster JP. Some procedures for the correction of ear deformities. Presented at the American Society of Plastic Reconstructive Surgery 13th Annual Meeting, 1944.
 9. Tanzer RC. An analysis of ear reconstruction. *Plastic Reconstr Surg* 1963;31:16.
-
-