

How I do it:

The Canterbury technique for canalplasty via an endaural approach in the surgical management of chronic refractory otitis externa

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Abstract

We describe an endaural technique for soft tissue and bony meatoplasty and canalplasty in the surgical management of chronic otitis externa unresponsive to medical treatment and out-patient microsuction. Following analysis of the surgical outcome via a retrospective review of patient records, we would recommend this surgical treatment in this patient group.

Key words: Otitis Externa; Surgical Procedures, Operative

Method

All subjects had persistent otitis externa despite intensive treatment for at least one year using a combination of antibacterial/steroid eardrops, antibacterial/antifungal/steroid ointments (and specific antifungal eardrops if microbiologically indicated) along with frequent out-patient microsuction.

Patients are reviewed in out-patients one week prior to surgery, when microsuction is performed and systemic broad-spectrum antibiotics with antibacterial/steroid combination eardrops are given if the ear is acutely inflamed.

Technique

The patient is positioned for otological surgery and the ear prepared with aqueous Betadine. Two per cent Xylocaine/1:80000 adrenaline is injected into the inferior portion of the incisura angularis in the supratragal region, the posterior superior aspect of the canal. A modified endaural incision is made, commencing in the supratragal region, curving anteriorly through the cartilaginous gap between the posterior aspect of the tragus and keeping close to, and following, the anterior border of the helix. The skin is undermined and a four-pronged sharp self-retaining retractor is inserted.

A wedge of soft tissue is excised down to bone with a size 15 scalpel blade in three single sweeps. First a horizontal incision at the level of the temporal line along the inferior border of the temporalis

muscle. An anterior incision is made at 30 degrees to the vertical sloping back to the anterior convex limit of the external auditory canal. A similar forward-sloping incision is made posteriorly to the level of the posterior convexity of the external auditory canal. This soft tissue wedge is removed en-block via subperiosteal dissection with a small Lemperts elevator exposing the spine of Henle and the anterior canal spine. Minor haemorrhage at this stage is inevitable from posterior branches of the superficial temporal artery and from the vein running at the inferior border of temporalis muscle. This is controlled at this stage with bipolar diathermy. Bleeding is considerably reduced if the wedge excision is performed systematically. The canal skin is elevated in the subperiosteal plane as a sleeve. The skin is thinned with a 15 scalpel blade, paying particular attention to the skin anteriorly and posteriorly. A thin bridge of skin superiorly is thus left intact (Figure 1).

The bony meatus is widened using a diamond burr. The anterior spine is drilled off and drilling continues forward as far as the thickness of the bone of the tympanic ring allows, as a rim of bone is necessary to support soft tissue. Care is taken to avoid opening into the temporo-mandibular joint or mastoid air cells. The canal is enlarged superiorly and posteriorly aiming to double its height and increase the breadth of the bony canal by 50 per cent, if the presence of air cells allows. It is vital that copious saline irrigation is used to avoid areas of devitalized bone. Any bone known to have been

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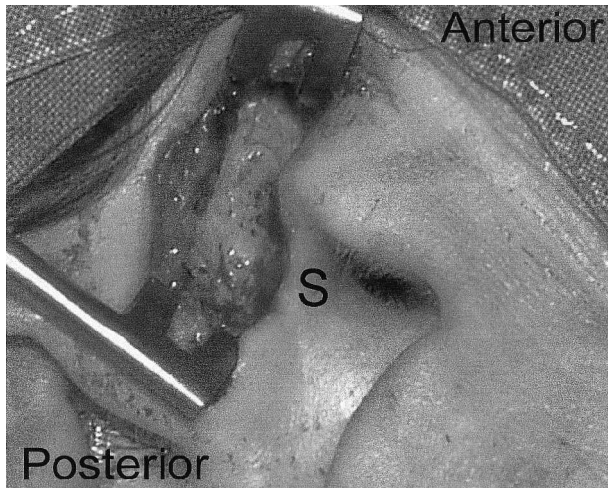


FIG. 1

A skin bridge (S) is retained superiorly during bony and soft tissue dissection.

heated must be removed or healing by in-growth of healthy canal skin will not occur, but will be replaced by persistent granulations and eventual fibrous scarring and stenosis.

Finally, the canal skin bridge is divided antero-superiorly creating anterior and posterior flaps. The posterior flap is larger consisting of approximately two thirds of the total original skin bridge. The external aspect of the flaps are sutured anteriorly and posteriorly with interrupted 4/0 plain catgut sutures (Figure 2) effectively elongating the tragus superiorly (Figure 3).

Usually two or three Merocel™ otowicks are inserted and infused with Sofradex™ drops. The superior aspect of the endural incision is closed exteriorly with a single suture.

An area of superior meatus is therefore left un-epithelialized and this must be lined by smooth living bone.

A large plug of saline moistened cotton wool is placed to fill the entire external meatus and conchal bowl.

The patient is discharged the same day on aminoglycoside/steroid combination eardrops (two drops three times a day). The patient is reviewed at seven to 10 days post-operatively and the otowicks removed. Two further weeks of eardrops twice a day are prescribed, and further out-patient ear toilet is performed at the end of this period. Normally the eardrops are changed to Locorten Vioform™, two drops twice a day for a further month at this time, and the patient is then reviewed at doubling intervals until asymptomatic.

Results

We have operated on 15 patients and a total of 18 ears, eight left and 10 right. Three patients had bilateral surgery. Eight patients were female and seven male, with an average age of 42 years (range 18 to 69 years). The senior author (NDP) carried out 13 of the operations, and a Specialist Registrar five under NDP's supervision.

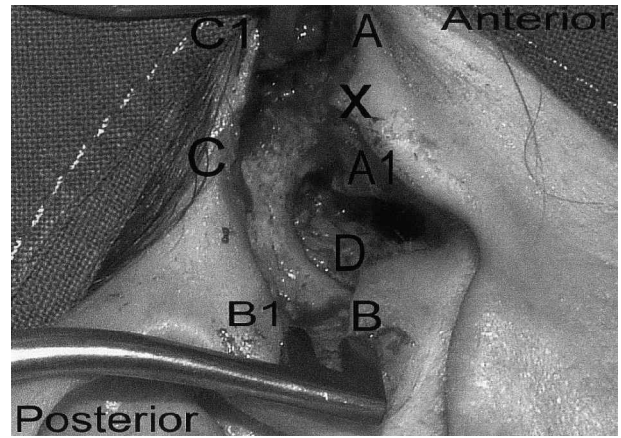


FIG. 2

After division of the skin bridge, the wound is closed (A1 to A, B1 to B) so as to elongate the tragus. C1 to C, upper suture for closure of endural incision (dog ear may need excising). D, posterior skin flap (previously skin of roof of canal). X cut end of tragus.

All 18 ears were operated on for chronic otitis externa, and the average duration of symptoms was seven years (range two to 40 years). Two patients had a local underlying condition (one had exostoses and one had keratosis obturans) and six patients had a general predisposing condition (four had eczema and two had psoriasis). One patient was severely mentally and physically handicapped. The average elapsed time since the operation was 35 months (range eight to 75 months). The average length of follow up is 15 months (range two to 27 months), and in the vast majority of cases this is for the removal of wax or skin debris only, or is due to the patients specific request to remain under review.

Three patients have experienced further infections following surgery requiring treatment by their general practitioner (average two attacks in the last year, range one to four).

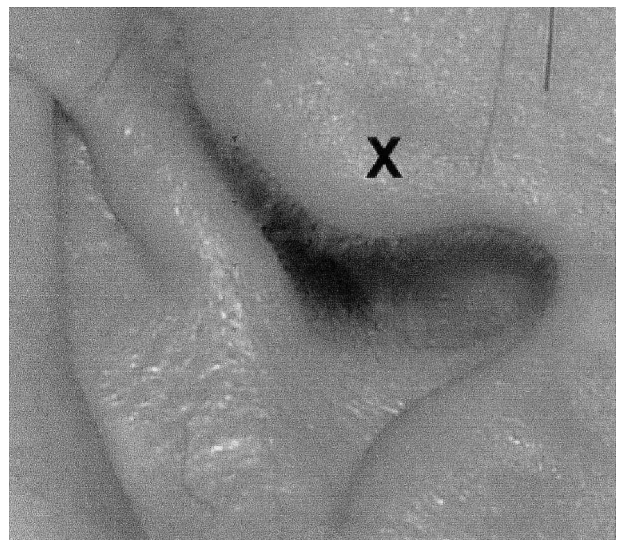


FIG. 3

Post-operative view, the wound has been closed to elongate the tragus (X) and increase the height of the canal more than its width. The tragus remains as a flap cover avoiding caloric irritation and discomfort in cold winds.

Only one patient has required hospital out-patient management in the last year for four attacks of infection; this was in the mentally handicapped patient, who was also the case that required the treatment for four attacks by his GP. The pre-operative condition was severe unremitting infection of both ears and his severe contralateral disease is awaiting surgical treatment.

There was one early complication of surgery, with haemorrhage four hours post-operatively who required diathermy under a further general anaesthetic, with no long-term sequelae. One patient has re-stenosed six months following surgery, but this patient had a previous meatoplasty via a post-aural approach, and had had symptoms for 40 years.

Discussion

Many techniques for canalplasty in the surgical management of chronic otitis externa have been described. The external meatal soft tissue may be excised¹ or more commonly, the area of stenosis removed with the application of local or distant graft tissue for reconstruction. Split skin grafts have been utilized often^{2,3} and various techniques of concho-meatoplasty involving local excision and reconstruction with local transposition skin flaps have also been described.

Martin-Hirsch and Smelt⁴ used a superiorly based conchal skin flap, and Banerjee *et al.*⁵ an inferiorly based posterior flap. Excision of the stenosed segment may also be followed by the application of stents.⁶ More recently Kumar *et al.*⁷ have described resection of the meatal stenosis with a KTP laser. They claimed significant symptomatic improvement in a series of eight patients and an average increase in air conduction threshold of 24 decibels over an average follow-up period of 9.3 months.

Many of these techniques are difficult to perform technically and subject to restenosis with long-term symptomatic recurrence. This has not been the case with the technique described here. Becker and Tos⁸ in their series of 53 ears treated for post-inflammatory acquired atresia used a standard endaural approach in 'several' cases to widen their exposure. They stated that the 'larger denuded bony areas have to be covered by split skin grafts'. Lavy and Fagan⁹ in their review of post-inflammatory acquired atresia of the external auditory meatus also describe split skin grafting, full thickness skin grafting and a variety of skin flaps as ways of correcting the inevitable deficiency resulting from surgical correction. We would only contemplate skin grafts if there is significant stenosis of the deep canal lumen, even then the external canal roof does not require grafting using this technique. In our experience re-epithelialization occurs satisfactorily over time, without early or late re-stenosis.

The senior author (NDP) uses the excellent access afforded by this technique routinely for all tympano-mastoid surgery particularly in the approach to attic-antral disease, and the need for a separate

meatoplasty at the end of the procedure is avoided. In meatoplasty as a sole procedure the degree of benefit is apparent at operation and unlike post-aural procedures the canal does not get shuttered closed by long-term forward migration of the conchal bowl. This endaural procedure effectively borrows meatal aperture by starting the meatus further in than the tragal root, removing the hood commonly present formed by the skin over the incisural dehiscence. Despite this widening the tragus still forms an effective shield against caloric stimulation of the canal avoiding the complaints of otalgia and dizziness arising from this cause. Under the rare circumstances that the access is insufficient, the incision can be extended over the top of the helix post-aurally.

Maintaining the skin bridge intact, until after the soft tissue and bony dissection, facilitates preservation of canal skin flaps while drilling and allows the final position of the incision for laying open of the skin flaps to be made once the new shape of the bony canal has been established.

This procedure is straightforward and quick to perform. It can be performed as a day-case and is well tolerated by patients with minimal early or late complications.

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Mr R. Oakley takes responsibility for the integrity of the content of the paper.

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