

Case Report

Triple flap meatoplasty for acquired meatal atresia

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ABSTRACT

Surgical intervention was undertaken in post-traumatic cartilaginous meatal atresia with an intact tympano-ossicular assembly, utilizing a triple flap meatoplasty, to achieve a wide meatus. The intricacies of the procedure with the late outcome are being discussed.

Keywords: Meatal atresia, Acquired, Flaps, Meatoplasty, Canalplasty

INTRODUCTION

Post traumatic meatal atresia in an adult is an enigma for the otologist. It necessitates multiple surgical interventions to achieve a wide lumen of the cartilaginous and the bony meatus. Atresia of the cartilaginous meatus being more frequent due to mechanical, thermal and chemical trauma, to the protruding pinna, while fractures of the tympanic plate in zygomatico-maxillo-facial trauma lead to atresia of the bony meatus.^{1,2,3} Cartilaginous excision meatoplasty tends to widen the outer third while the 360 degree bony canaloplasty, the inner one third of the serpentine ear canal. The skin flaps are so tailored to carpet the neo-meatus lest they may not prolapse with consequent re-stenosis. We report a patient of cartilaginous meatus atresia and its management.

CASE REPORT

A 21 yr robust individual on maritime duty was an unfortunate victim of an explosive blast. He suffered a temporo-parietal trauma with extradural haematoma and avulsion of his pinna, for which he underwent primary suturing and trephination. On presentation one year later, he had a total closure of his ear canal (Figure 1) with scars of surgical repair on the temporal region.

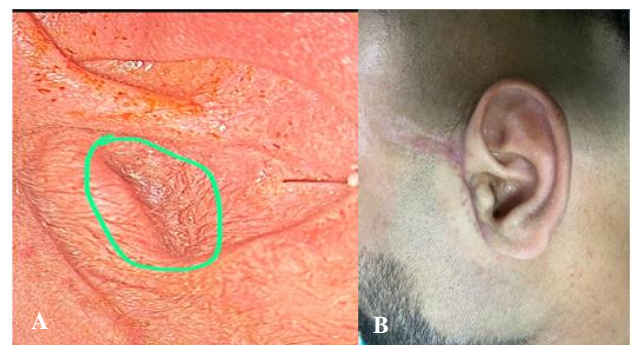


Figure 1 (A and B): Complete atresia of left ear canal (preoperative).

Computed tomographic axial (Figure 2) and coronal (Figure 3) exhibited a soft tissue in the cartilage and bony meatus on the left side with an intact tympanic membrane and the ossicular assembly. Fracture of the anterior tympanic plate and a metallic sharpnel were also noted on this side

His audiological profile revealed a mean pure tone average of 37db on the left side with an air bone gap of 20 db. Hearing threshold on the right side were within normal levels. Facial and vestibular status too was within normal parameters. After due consent he was taken for

exploration of the atresia via the Wilde's post aural approach. The posterior soft tissue of the cartilaginous meatus was reflected forwards and the post meatal flap of the bony meatus was elevated off the bony meatus clockwise from the tympanomastoid to the tympanosquamous suture line i.e., 11 to 7 o'clock via 3 o'clock.

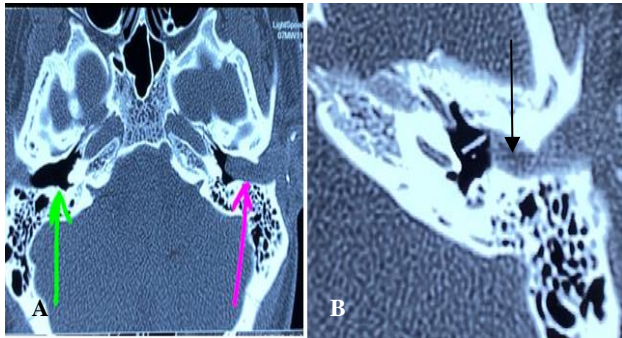


Figure 2: (A) axial computed tomographic pic showing soft tissue in the external auditory meatus on left side. (Green-normal air in right meatus. Pink-soft tissue obliteration of left meatus) (B) coronal computed tomographic pic showing soft tissue in the external auditory meatus on left side (black arrow).

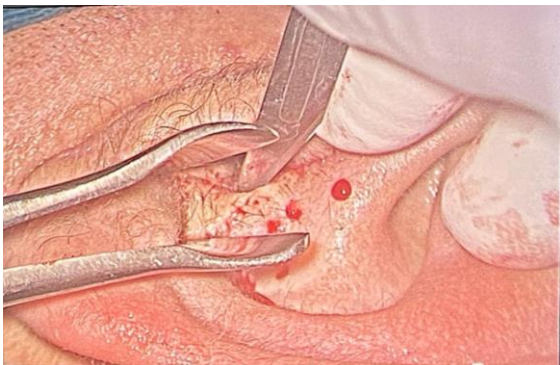


Figure 3: Incision to raise flaps after local infiltration.

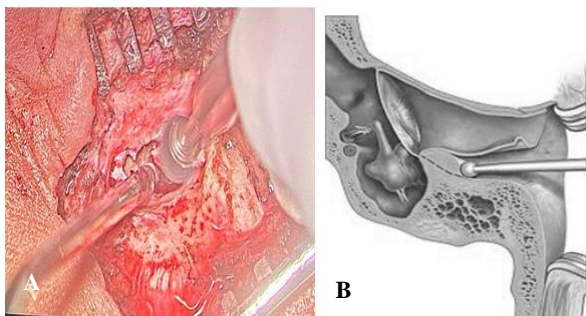


Figure 4 (A and B): Wide bony canaloplasty from 12 to 6 o'clock and schematic diagram to explain canaloplasty.

There was a sudden release of whitish cystic fluid from the bone meatus during flap elevation, due to breach of the thin skin at the junction of cartilaginous and bony

meatus. A wide bony canaloplasty (Figure 4) was completed from 12 to 6 o'clock, to visualise the intact tympanic membrane.

After adrenaline and saline infiltration a semilunar 12 to 7 o'clock incision was given on the skin at the junction of the cymba and the cartilaginous meatus followed by a horizontal incision at 3 o'clock. The superior and inferior flaps were elevated (Figure 5) retracted and fixed to expose the cymba concha. A plane was created between the skin and the cartilage of the post wall of the ear canal. The entire cymbae concha cartilage was removed. The skin of the ear canal was found to be circumferentially adherent. A cylindrical probe was used to dilate the canal and an incision made at 3 o'clock to create superior and inferior flaps of the skin of the bony meatus.

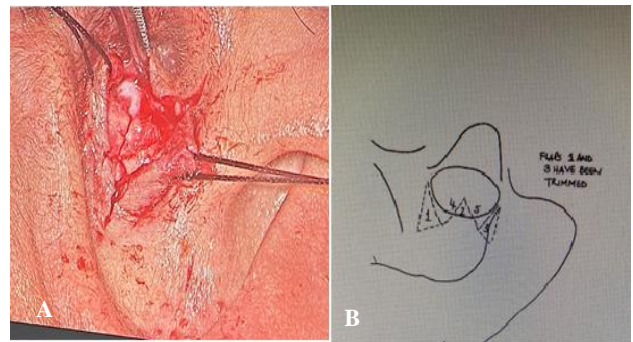


Figure 5 (A and B): Guide sutures used to retract superior, inferior and medial flaps and schematic diagram to show orientation of guide sutures and flaps.

A temporalis fascia graft was spread to line the widened bony meatus. An inferior postaural skin flap (Figure 6) was harvested and rotated to line the post inferior part of the bony meatus. The superior and inferior flaps of the bony and cartilaginous meati lined their respective areas, while this skin paddle the intervening region. Care was taken to shave off the epidermis off the segment which was crossing beneath the skin.

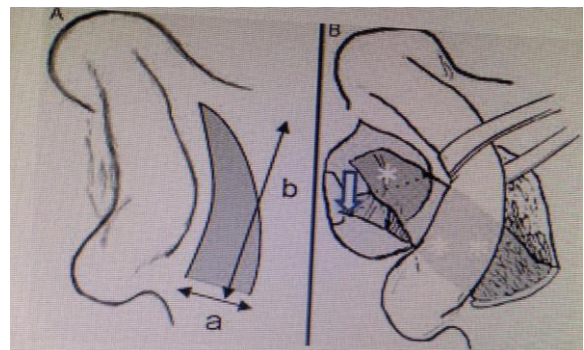


Figure 6: Post aural skin flap schematic representation.

The superior inferior and medial flaps were sutured with vicryl in an inverting manner to the post aural soft

tissues, to fall and line the neo meatus. Antibiotic and saline soaked gelfoams (Figure 7) were used to line and fill the ear canal. To be gradually extracted after 3 weeks. The post operative one month assessment showed well formed neo external auditory canal (Figure 8).

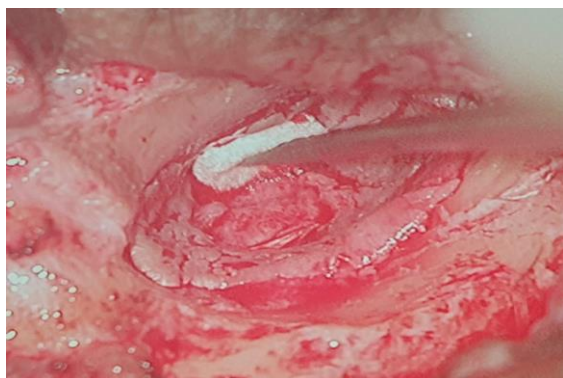


Figure 7: Final patent external auditory canal meatus with gelfoam in situ.

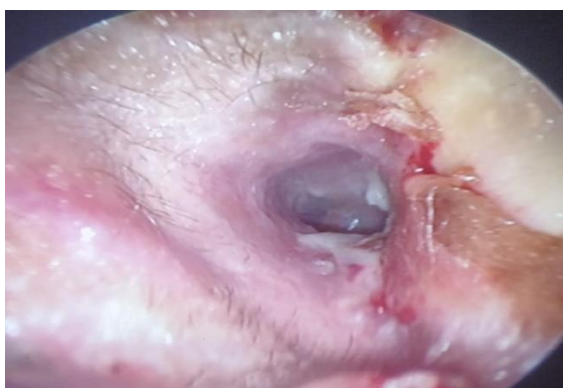


Figure 8: Post op one month neo wide external auditory meatus.

DISCUSSION

External auditory canal atresia surgery is one of the most challenging procedures in otology, mainly due to the difficulty of the technique and the relatively high postoperative complication rates and the need for revision surgery. The main goal of the surgery was to gain functional hearing and to maintain the patency of the reconstructed auditory canal. Techniques described in literature for external auditory canal (EAC) atresia include skin grafts, vascularized temporoparietal fascia with skin grafts, and pedicled/local flaps.⁴⁻⁶ Most of the authors agree that the bare areas of bone should be covered with tissues or lined with skin grafts.^{7,8} In our case too an inferior skin flap was harvested and rotated to line the postero inferior part of the bony meatus while the superior and inferior flaps of the bony and cartilaginous meati lined their respective areas, while this skin paddle the intervening region. For atresioplasty (canaloplasty) anterior and posterior approaches have

been described. However, the anterior approach by Jahrsdoerfer is considered the gold standard.⁹ A wide bony canaloplasty was completed from 12 to 6 o'clock in our case too.

The advantages of this triple flap technique are as follows: (1) the three flaps are easy to design and easy to harvest in the operative field according to the anatomic variation of the patients; (2) the size of the flap can be adjusted according to the canal (3) flap derives from neighboring skin, thus avoiding the color and texture mismatch (4) flaps can cover all the bare bony surfaces.

CONCLUSION

Triple flap meatoplasty is an ideal procedure to achieve a satisfactory anatomical and functional outcome.

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Conflict of interest: None declared

Ethical approval: Not required

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