Main Article

Comparative study of hearing improvement in type 1 tympanoplasty with and without canalplasty

H. Vijayendra · C. J. Ittop · R. Sangeetha

Abstract

Introduction Widening of the external auditory canal is called canalplasty. It is an integral part of tympanoplasty, especially in anterior perforations and gives wide surgical access for proper repair.

Materials and methods After elevating tympanomeatal flaps the canal is widened using conical cutting and diamond burrs following which entire tympanic annulus is visible and corresponds to an inverted truncated cone.

Results Canalplasty gives 9 db gain in hearing compared to without canalplasty.

Conclusion Canalplasty gives better visualization, better graft placement and better post-operative care.

Keywords Tympanoplasty · Canalplasty

Canalplasty

The widening of external auditory canal is called Canalplasty. It is an integral part of tympanoplasty. The removal of overhanging canal walls provides complete exposure of the anterior edge of tympanic membrane. Drilling the posterior and inferior walls, widen the bony canal which allows complete visibility of the entire tympanic annulus.

Technique

The Posterior tympanomeatal flap (Fig. 1) is created by making vertical incisions at 6'o clock and 12'o clock positions 5mm lateral to the annulus, and medial ends of these two incisions are joined by a horizontal incision. This flap is elevated from medial to lateral upto the bony-cartilaginous junction. The Superior Tympanomeatal flap (Fig. 2) is created by extending the medial end of

Fig. 1 Showing the schematic posterior tympanomeatal flap

H. Vijayendra · C. J. Ittop · R. Sangeetha
Vijaya ENT care center
No. 1, 9th cross, Margosa Road
Malleswaram
Bangalore - 560 003, India

H. Vijayendra (✉)
E mail: vijayent@blr.vsnl.net.in

12'o clock incision anteriorly upto the 2'o clock position. The Inferior Tympanomeatal flap (Fig. 2) is created by extending the 6'o clock incision anteriorly upto 4' o clock position. All these flaps are joined and elevated along with the annulus following skeletonizing of handle of malleus, wherein the Superior Tympanomeatal and the Posterior Tympanomeatal flaps are joined and secured anteriorly. The external auditory canal is widened with conical cutting and diamond burrs eliminating all bony over hangs particularly in the posterior and inferior part routinely and superiorly when there is prominent Tympano-squamous suture (Fig. 3 & Fig. 4). In case of anterior canal bulge skin is elevated from lateral to medial upto the bony cartilaginous junction 3 mm lateral to the tympanic annulus, then using 3–0 diamond burr anterior canal bulge is shaved

Fig. 2 Showing the schematic superior tympanomeatal flap

Fig. 3 Posterior inferior canal wall bulge

taking care not to expose the temporomandibular joint and the entire tympanic bony annulus is visible with one position of the microscope. The shape of external auditory canal following canalplasty, corresponds to an inverted truncated cone (Fig. 5).

Advantages

- Better visualization – This facilitates placement of graft particularly in the anterior anchoring of graft in sub total perforation.
- Post operative care easier-There will be no problems with the self cleansing mechanism of external auditory canal.
- Better exposure for ossiculoplasty.
- Time gain – The time spent for performing a canalplasty is compensated by the time gained by improved exposure during grafting of tympanic membrane.
- Prevent lateralization of tympanic membrane- One of the causes of a lateralized drum is inaccurate identification of the level of tympanic sulcus as a result of inadequate canalplasty
- Promotes healing.

Malleus exteriorization

In all cases wherein Ossicular chain is intact, Malleus handle is exteriorized. This increases the middle ear space and also the vibrating mechanism of the Tympanic membrane is enhanced and this prevents anterior blunting. The new technique developed by the author is easy, precise and accurate.

After placing the temporalis fascia graft and the tympanomeatal flaps, the Tympanomeatal flap is reflected anteriorly and the lateral process of the malleus is

Fig. 4 Anterior canal wall bulge

Fig. 5 Inverted truncated cone

palpated, using a sharp microscissors the Temporalis is reflected and cut precisely over the malleus upto the tip and the graft slided beneath the malleus and the tympanomeatal flaps reflected back to its original position.

For the right ear, left hand is used to cut the Temporalis fascia graft. There will be good middle ear space routinely in all the cases where malleus exteriorization is done. This to a certain extent will also help in giving better hearing results, compared to when malleus is not exteriorized. With all these features the end result of hearing will be better with canalplasty. This is the main goal of otologists.

Materials and methods

Age and sex ratio of cases

This study comprises of 100 cases of Tympanoplasty type I without canalplasty done prior to 1995, and 100 cases done after 1995 with combined canalplasty and malleus exteriorization. Only cases with large central perforation

Table 1 Age and sex ratio of cases

With	Without	Age	With	Without
70	50	0 – 10	0	0
60	40	10 – 20	13	18
50	30	20 – 30	35	34
40	20	30 – 40	32	35
30	10	40 – 50	16	10
20	0	50 – 60	3	3

Table 2 Audiological evaluation done 3 months post-operatively

with moderate hearing loss was considered. Revision cases and cases with Tympanosclerosis and bony ankylosis was excluded from the study.

Sex ratio of the patients- without canalplasty-65 were males and 35 were females, with canalplasty-56 were males and 44 were females. Maximum number of patients with Canalplasty were in the 3rd decade-35%, without Canalplasty-were in the 4th decade-35%.

Pure tone audiometry was done prior to surgery and 3 months after surgery, where 9 db gain of hearing was reported (Table 2). Air-bone gap only in the speech frequency was considered for the study.

Conclusion

It is human tendency that when we give dry ear next thing they ask for is hearing, by performing canalplasty

we can fulfill the need of giving dry ear & improved hearing.

References

1. Glasscock ME, Gulya AJ (2003) Glasscock-Shambaugh Surgery of the ear. 5th edition chapter 24:269
2. Parisier SC, Bent JP (1999) Canalplasty. *Otolaryngology clinics of North America* 32(3):457–469
3. Levy J, Fagan P, (2001) Canalplasty: review of 100 cases. *Journal of Laryngology and Otology* 115:270–273
4. Ushio M, Takeuchi N (2006) Evaluation of recovery from transient facial palsy following canalplasty and tympanoplasty for the treatment of congenital aural atresia. *Annals of Otology, Rhinology and Laryngology* 115(10):749–753