

EDITORIAL

LABYRINTHECTOMY

A destructive surgical procedure usually reserved for unserviceable hearing ear. Labyrinthectomy has to be given a second thought as if one may plan for future improvement in hearing but cochlear implant is



Fig. 1: Early cortical mastoidectomy.

successful in majority of cases with excellent speech discrimination. Labyrinthectomy is indicated in cases of Meniere's disease with more than average 60 dB pure tone gap and less than 50 % speech discrimination. In moderate degree of hearing loss with intractable vertigo one has to way between vestibular nerve section where risk of meningitis, cerebrospinal fluid leak and intracranial haemorrhage exists but hearing can be preserved while labyrinthectomy is a safe, elective procedure having a negligible complication rate not more than mastoidectomy. Patient must be explained the complication, facial nerve injury, cerebrospinal fluid leak and persistence of imbalance.

Labyrinthectomy may be performed via transcanal or transmastoid route.

TRANSCANAL LABYRINTHECTOMY

Inner ear is approached via the transmeatal or endomeatal route as in stapedectomy or an tympanotomy.

Initially, two vertical or two lateral incisions are given

for 6 to 8 mm. at 6 °clock and 12 °clock positions, they are joined either by a horizontal or elliptical incision on posterior canal wall or by initial two incision converge to join each other.

Flap which is removed judiciously because left remnant squamous epithelium may result in pearls or cholesteatoma flap is elevated by circular knife or flag (House) knife. If suction is required, it is used on the bone or on circular knife not on the flap. Annulus is elevated either by an elevator or by a sickle knife with sharp edge towards the bone. Once annulus is elevated, the middle ear mucosa is divided by sharp sickle knife. Annulus is further elevated by flag knife first inferiorly upto 12 °clock, taking care not to injure middle ear compartment remembering jugular bulb may be there in the hypotympanum, and superiorly, taking care of chorda tympani nerve, ossicles and facial nerve.

Tuck the reflected tympanomeatal flap anteriorly with a small cotton ball. A gelfoam soaked in 2 percent xylocaine adrenaline is placed in the middle ear cavity



Fig. 2: Thinning of Posterior wall.

specifically taking care of Jacobson's nerve to anaesthetize the medial wall of middle ear.

Stapes and incus are avulsed. All possible neuroepithelium is avulsed by a right angle hook passed

through oval window towards the round window than rotating it upwards.

Author prefers to drill out the bone over the promontory between oval and round window. Now the saccule and utricle are identified. Ampulla of horizontal and superior semicircular canal can be avulsed in



Fig. 3: Posterior Tympanotomy.

majority of cases by right angled hook.

Singular neurectomy if performed adds to the success rate. The surgery is performed by extending the bone work over the round window.

While performing labyrinthectomy one should be careful not to injure the medial wall of vestibule, only lateral wall should be tempered and additionally filling it with gel co-sponge soaked with gentamycin solution improves the success rate.

TRANSMASTOID LABYRINTHECTOMY

A complete labyrinthectomy, that is removal of all three semicircular canals, saccule, utricle can be performed with high success rate but surgeon has to be patient, diligent and comfortable as with three semicircular canals all three segments of facial nerve are at risk. Surgeon should be well versed with anatomy, landmarks of facial nerve, labyrinth and sigmoid sinus hence one should practice thoroughly in temporal bone laboratory.

The lateral and posterior bone over the sigmoid sinus is well thinned out, all cells are removed over the tegmen antrii and sinodural area to have a clear access to retrofacial cells medial to facial nerve to expose the vestibule.

Once the ~~retro~~ mastoidectomy is complete, labyrinth is identified by removing all callous bone over it by 4 mm diamond burr till compact shining bone is

seen and superior and posterior semicircular canals are identified.

Once the horizontal and posterior semicircular canal are identified, when removing the bone over the semicircular canal no pressure should be exerted only diamond drill point should be used, let the bone melt and dissolve under profuse irrigation while drilling note the gradual colour change from yellowish white to bluish gray, familiarity is going to help in live surgery.

While dissecting on the ampulla of superior semicircular canal labyrinthine segment of facial nerve is at risk which is just anterosuperior to it. Horizontal segment of facial nerve is at risk when dissecting the horizontal semicircular canal ampulla which is superior lateral to nerve. Posterior semicircular canal ampulla is medial to mid point of vertical (mastoid) segment of facial nerve. Pyramid forms the anterior wall of facial nerve and second genu, (Pyramidal turn) and becomes posterior lateral to horizontal SCC. Nerve is usually postero medial to annulus hence it is safe to dissect above the annulus in permeatal or transcanal dissection, but near the stylomastoid foramen nerve may become antero lateral to annulus hence may be injured.

Next step is to approach facial recess and do posterior tympanotomy which helps in identification of facial nerve. Facial recess (antrum threshold angle)

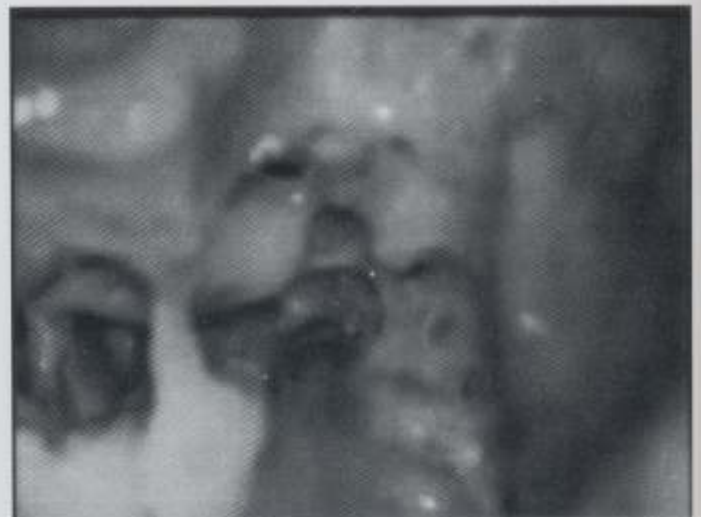


Fig. 4: Wide Superiorly extended posterior tympanotomy

is the triangular space bounded laterally by chorda tympani, medially by facial nerve, superiorly by (incus bridge) fossa incudis, inferiorly an acute angle formed by joining the chorda tympani nerve and facial nerve.

The labyrinthectomy begins from the solid angle that is between the three semicircular canals. The horizontal

semicircular canal 12 to 15 mm long is the first to dissect which is followed anteroposteriorly from ampulla using 3 to 4 mm diamond drill taking care of adjacent structures, superior petrosal sinus and dura superiorly and facial nerve inferomedially, continuous suction irrigation should be used. As one approaches posteriorly, posterior semicircular canal is identified which is followed to antero inferiorly medial to facial nerve, than posterior semicircular canal is followed up to join common crus. Post semicircular canal is vertical, curves backward longest 18-22 mm and ampulla is



Fig.5: Labyrinthectomy with speletonization of facial nerve.

downward opens below the cochlear recess in vestibule. After exposure of the posterior canal one must practice occlusion.

At this level endolymphatic duct should be identified and traced to endolymphatic sac in temporal dissection.

OCCCLUSION OF POST. SEMICIRCULAR CANAL

Canal is drilled in long axis and membranous canal is visible as blue line. Always preserve a thin shell of bone over, injury to membranous canal. Perilymph is absorbed by gelfoam, suction should not be used. If etall suction has to be done only Brackmann type should be used which has got side holes no distal end opening. The bony canal is occluded by the bone shell one each side and canal is closed by bone pate.

Superior semicircular canal is 15-18 mm long also vertical and lies transverse to long axis of petrous temporal bone.

The superior canal ampulla is supero medial to transverse (horizontal) section of facial nerve. The superior semicircular canal is dissected anteriorly to ampullary end, during dissection subarcuate artery

bleeding may be trouble some which should be handled once for all by wide open the arch of superior semicircular canal.

Once all the three semicircular canals and their ampulla are dissected, neuro epithelium excised, facial nerve is skeletonized from horizontal section second genu to vertical segment by using a 3 mm diamond drill point, motion of drill should always be parallel to facial nerve, never perpendicular to nerve with profuse irrigation, with a preferably curved/contra hand piece.

All lateral over hangs should be removed for better visualization of vestibule. Through retrofacial approach by removing all bones between three ampules, one can reach the vestibule and so all neuro epithelium of labyrinth thus can be removed. In vestibule on medial wall bony marking for saccule spherical and utricle (elliptical) along with cribriform area Mike's dot lateral wall of juncture and internal auditory canal can be demarcated. Vestibular aqueduct opens just below the elliptical recess of utricle.

Remember while working in the solid angle surgeon has to be careful not to exert pressure as antero superiorly and antero inferiorly facial nerve may be injured more so in right ear with right handed surgeon, slippage may be prevented by changing the direction of drill from clockwise to anti clockwise. Profuse irrigation is must as facial nerve may also be damaged by tremendous heat generated by diamond burr.

If an incomplete labyrinthectomy is performed result will be total failure of achieving the goal which is eradication of intractable vertigo which may last permanently after incomplete surgery hence all neuroepithelium should be removed including all bony walls of labyrinth except lateral wall of internal auditory canal.

Transmastoid labyrinthectomy can control vertigo in about 90 % cases of Meniere's disease. Patient should be explained that precipitating factor like stress, medical illness (diabetes, hypertension) must be avoided.

Post operative vertigo may last upto weeks but rehabilitation should be started as early as 48 hours and patient may walk unassisted by 4th day, but rehabilitation response is variable in different individuals. Always remember not to injure posterior fossa dura, no postoperative sedative should be given which delays rehabilitation. Vertigo may be relieved in about 90 % cases but less than 50 % return to work.