

Background: An understanding of the mechanism of formation of arachnoid fold around vestibular schwannoma is crucial in preserving the anatomical integrity of 7th nerve.

Method: The author, who has an operative experience of nearly 820 cases of vestibular schwannomas over a period of 19 years, describes the technical pearls for preservation of facial nerve. The essential initial step is peeling of the double layer of arachnoid from the posterior tumor surface. After reduction of the tumor volume, continued dissection of the arachnoid fold toward the brainstem can be achieved without opening the arachnoid over the fifth and lower cranial nerves, which are in separate cisterns.

Results: The key element in successful vestibular schwannoma is understanding that flattened facial and cochlear nerves do not have a arachnoid separating them from the tumor capsule which is essentially the compressed and attenuated perineurium of the vestibular nerve from which tumor has grown. If the tumor cannot be dissected from 7th nerve easily, a sub-perineural dissection is advised.

Conclusion: Acoustic neurinoma surgeons should strive to keep anatomical integrity of 7th nerve even in large acoustic tumors.

Keywords: Perineurium, Subperineural, Seventh nerve, Arachnoid

OP-SB.02-04

Microsurgical Transcanal Transpromontorial Approach for the Removal of Vestibular Schwannomas: A Minimally Invasive Alternative to the Classic Translabyrinthine Approach

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Background: Nowadays, the evolution of the surgical techniques and instrumentations has permitted a widespread diffusion of minimally invasive techniques, especially for skull base surgery. Herein we present the microsurgical transcanal transpromontorial approach (MTTA) in the management of vestibular schwannoma (VS) as an alternative to the classic translabyrinthine approach.

Methods: Between January 2015 and December 2016 at the Verona University Hospital 17 consecutive patients were submitted to MTTA for the removal of VS. The procedure starts with the enlargement of external acoustic meatus in order to reach the tympanic cavity; at this point the anatomical borders of the surgical corridor are represented by the jugular bulb (inferior), the carotid artery (anterior), the facial nerve (superior-posterior). The transpromontorial route finally provide the access to the internal acoustic canal (IAC) that can be circumferentially drilled to reach the CPA.

Results: There were not intraoperative complications. The MTTA provided a good visualization of the IAC and CPA and it provides an excellent corridor especially for VS located inside the IAC with a minimal cisternal component.

Conclusion: Transpromontorial techniques represent a valid option in patients with small VS without serviceable hearing. Compared to the translabyrinthine approach, the MTTA provides a less invasive surgical corridor but with an excellent visualization of the

anatomical boundaries and a good maneuverability and dissection of the tumor from the cranial nerves.

Keywords: Vestibular schwannoma, Microsurgical transcanal transpromontorial approach, Translabyrinthine approach

OP-SB.02-05

Predictive Factors for Preservation of Facial Nerve Function in Vestibular Schwannoma Surgery

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Background: In vestibular schwannoma surgery, the preservation of facial nerve function may limit tumor resection despite use of intraoperative facial nerve monitoring. In Algeria, vestibular schwannoma makes p 05% of all intracranial tumors operated on, 85.5% of which are large and giant.

Method: From Jan 2010 to Dec 2016, 225 VS were operated in our department. The most common presenting symptom was hearing loss (41.66%), gait instability (48.6%) and tinnitus in (34.72%). Facial nerve signs were pathologic in 4.63%. At the time of diagnosis 50 patients had intracranial hypertension with hydrocephalus. All patients were operated in the semi sitting position with opening of the posterior wall of the internal auditory canal and under intraoperative facial nerve monitoring.

Results: Tumor resection was total in 185 patients. Anatomic preservation of facial nerve was the reason for non-total resection in 25 patients. The facial nerve was anatomically preserved in 220 patients. Two years after surgery, the facial nerve function was good in 188 patients. The status and improvements of post-operative facial nerve function depends on 04 factors: Anatomical preservation of the nerve, stimulation threshold, cystic form and the presence of train activity.

Conclusion: The systematic use of intra-operative facial nerve monitoring and retro sigmoid transmeatal approach have allowed us to move from the life preservation era to an era of preservation of function.

Keywords: Facial, Nerve, Function, Vestibular, Schwannoma

OP-SB.02-06

Modern Concepts of Microsurgical Treatment of Large and Giant Vestibular Schwannomas

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Aim: To improve the results of treating large and giant vestibular schwannomas.

Method: A prospective study of surgical treatment of 67 consecutive patients with vestibular schwannomas (VS) during the period from 2011 to 2016. All patients were operated on by the author of the study. The results of treatment were compared with the previous period (2006 - 2010). VSs were removed using the retrosigmoid approach. The function of the facial nerve was analyzed. In addition, English sources on the Internet were analyzed.

Results: Two (3%) patients with medium VS, 12 (17.9%) with moderately large VS, 31 (46.3%) with large VS and 22 (32.8%) with giant VS were operated on. Thus, large and giant schwannomas occurred in 79.1% of cases. Total removal of VS was performed in 59 (88.1%) cases, subtotal in 7 (10.4%), and partial in 1 (1.5%) case. In the study group 2 patients died. Postoperative mortality rate - 3%.

Conclusion: In the surgical series of studies patients with large and giant VSs, which were discovered in 79.1% of cases, predominate. The main objective of VS surgery is a maximum complete removal of the tumor while preserving function of the brain stem, blood vessels and cranial nerves. Application of modern technologies (ultrasound aspiration, trepanation of the internal auditory canal, neuromonitoring of the facial nerve function, preoperative surgery planning based on multimodal operation support) allows to increase radicality of surgeries and to improve functional outputs even for large and giant VSs.

Keywords: Vestibular schwannoma, Large schwannomas, Giant schwannomas, Microsurgical treatment, Results of surgery, Facial nerve function

OP-SB.02-07

Facial Nerve Outcomes in Surgically Treated Large Cystic Vestibular Schwannomas

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Background: There are conflicting data in the literature regarding facial nerve outcomes following resection of large cystic vestibular schwannomas (CVS), with most articles reporting worse facial nerve function with cystic tumors as compared to solid vestibular schwannomas (SVS). In this study, we compared facial nerve outcomes after excision of large cystic versus solid vestibular schwannomas.

Method: This was a retrospective case series at a single institution. Patients with large VS (>2.5 cm) resected between 2006 and 2016 were identified from archived surgical records. CVS consisted of >25% total hyperintense fluid on T2-weighted magnetic resonance imaging. Main outcome measure was facial nerve function measured on the House-Brackmann (HB) scale in the early and late (greater than 1-year) post-operative period.

Results: 36 patients were identified. Rates of gross total resection (GTR) were essentially equivalent for SVS and CVS. Regarding facial nerve outcomes, no significant difference was found in the immediate post-operative period or long term between CVS and SVS groups. Of those having poor function in the immediate post-operative period (\geq HB Grade IV), patients with SVS more often returned to a good outcome (\leq HB Grade III) after one year follow-up compared to those patients with CVS.

Conclusion: There is no difference in facial nerve outcome between cystic versus solid large vestibular schwannomas in the immediate postoperative period. Long-term facial nerve recovery may be worse for patients with CVS.

Keywords: Cystic, Vestibular, Schwannoma, Facial nerve

OP-SB.02-08

Improving Functional Preservation in Acoustic Neuroma Surgery

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Background: Restoration of cranial nerve functions during acoustic neuroma (AN) surgery is important for good outcome. The effects of minimizing the injury period and maximizing the recuperation period were investigated in 89 consecutive patients who underwent retrosigmoid unilateral AN surgery.

Method: Intraoperative cochlear nerve (CN) and facial nerve (FN) functions were evaluated using continuous auditory-evoked dorsal cochlear nucleus action potential (AEDNAP) monitoring and FN root exit zone-elicited compound muscle action potential (FREMAP) monitoring, respectively, and factors affecting same-grade functional preservation were analyzed.

Results: Twenty-three patients underwent standard treatment and investigated the monitoring threshold for functional preservation. Sixty-six patients underwent extended recuperation treatment to assess the effect on recovery of nerve function. Final AEDNAP response, final FREMAP response, and extended recuperation treatment were associated with same-grade functional preservation.

Conclusion: Patients with extended recuperation treatment had significantly better functional preservation.

Keywords: Acoustic neuroma surgery, Continuous direct brainstem auditory-evoked potential monitoring, Functional preservation, Intraoperative extended recuperation treatment

OP-SB.02-09

Excision of Cerebello-Pontine Angle Tumor (Acoustic Neuroma) via Trans-Labyrinthine Approach. A Case Series of First Four Cases in Pakistan

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Background: The article covers the first four cases of CP angle tumor in Pakistan via Trans-labyrinthine approach at Lahore General Hospital, Lahore in a period of 4 months.

Method: All these patients presented in Outdoor department with involvement of VIIIth nerve (Vestibulocochlear) of one side while the VIIth nerve (Facial) was preserved. There was no other deficit except for the involvement of Vth nerve (Trigeminal) in one patient. MRI revealed Grade IV to V lesions in the Cerebello-pontine angle.

Results: Trans-labyrinthine approach was performed in these patients using high speed drill. Facial nerve monitor was used to monitor facial nerve. In all four patients the facial nerve was preserved in the bony canal as well as in the Internal Auditory Canal. Tumor de-bulking was effectively done. Wound was closed after packing with fat and sealing with fibrin glue. Patients were fully alert after surgery with no or minimal deficit. One patient had CSF leak from wound and Lumbar drain had to be passed with complete resolution of leak. One patient had partial weakness of facial nerve which improved over time. None of the patients had basal cranial nerve involvement and were able to take oral feed from 1st post-op day.