Long-term results and technology-assisted presigmoid retrolabyrinthine approach for the treatment of vestibular schwannomas: our experience

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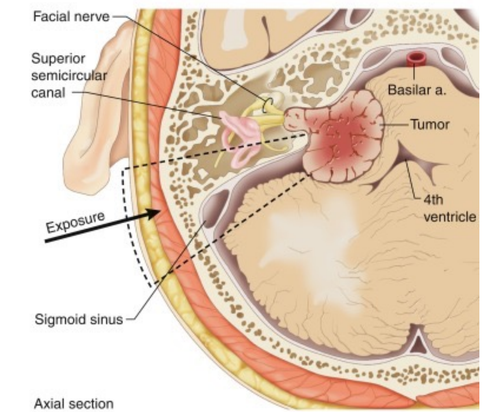
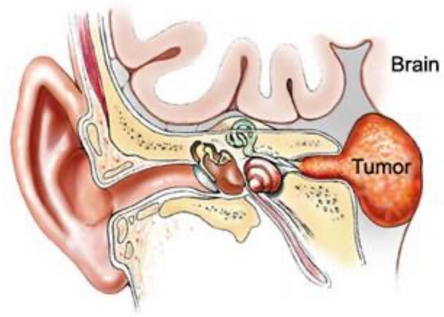
Introduction

Treatment of vestibular schwannomas presents many controversial aspects, starting from the surgical indication to the selection of the best surgical approach. Microsurgery has to be competitive with radiosurgery to providing the best chances of function preservation and complete tumor removal. The two most commonly used surgical approaches are: retrosigmoid suboccipital and presigmoid translabyrinthine. We report our long-term experience by using the endoscopy-assisted presigmoid retrolabyrinthine approach (EAPRA) and the recent technical adjunct: exoscope and piezosurgery.





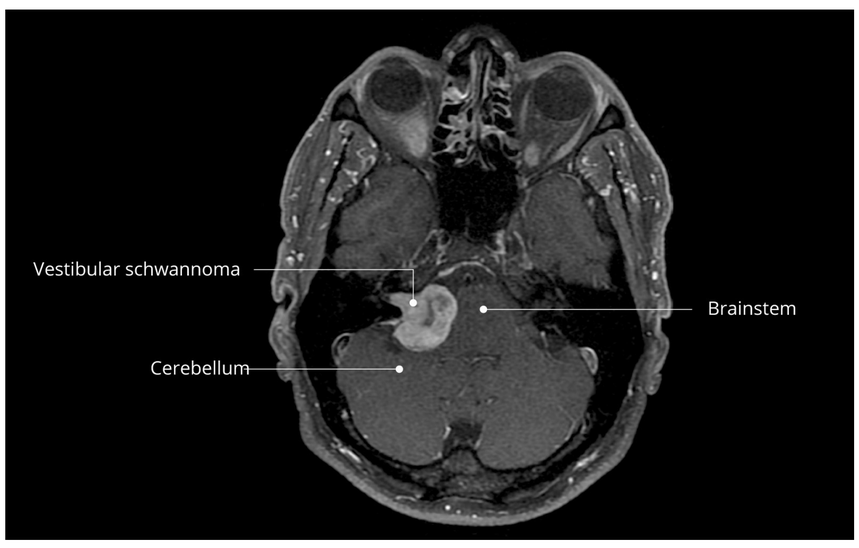
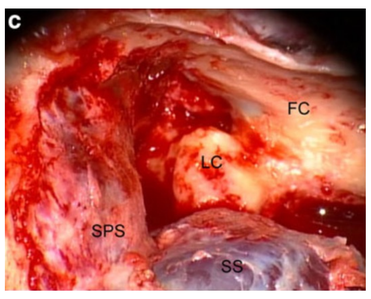


Figure. Example of vestibular schwannoma in MRI scan.

Methods

We selected 30 patients affected by large sporadic vestibular schwannomas (max diameter >3 cm) surgically treated by EAPRA. Exoscope-assisted approach was used in 3 cases and in 10 patients “cosmetic” mastoidectomy and craniotomy was performed with the use of piezo-electric device.



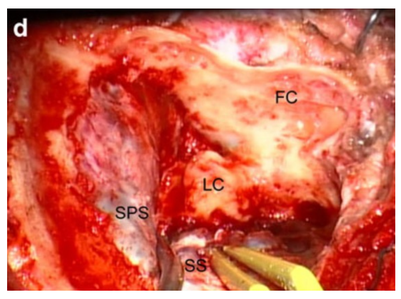


Figure c-d. skeletonization of the sigmoid sinus down to the jugular bulb allows its mobilization. [LC Labyrinthine complex, FC fallopian canal, SS sigmoid sinus, SPS superior petrosal sinus, SW schwannoma}

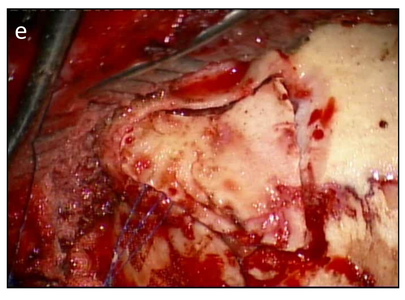


Figure e. Preservation of the outer cortical bone layer of the mastoid for later closure of the craniotomy and muscles reconstruction

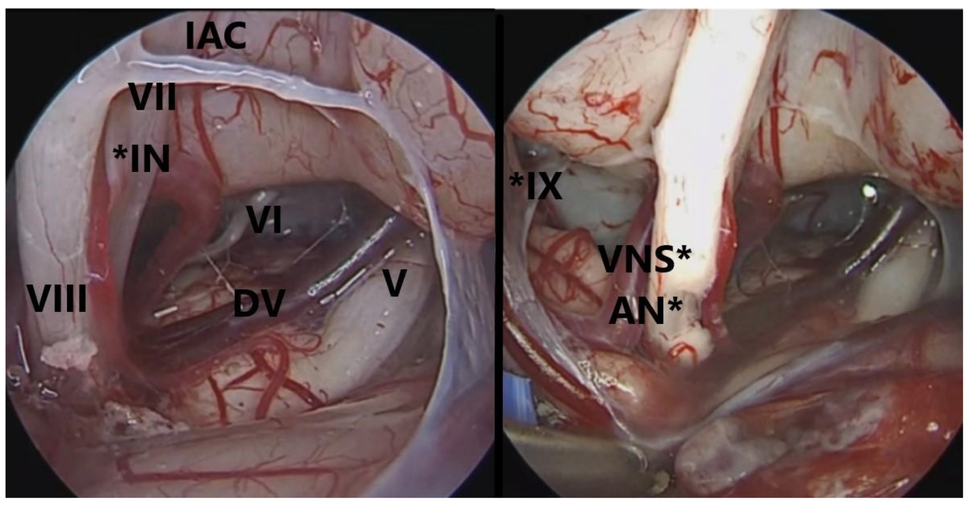


Figure. Endoscopic view of the cerebello-pontine angle showing key anatomy (**left**) and vestibular stumps ((**right**), VNS*) after vestibular neurectomy with cochlear nerve preservation (AN*) and showing the close relationships between vestibular nerve and the cochlear and facial nerve. IAC: internal auditory canal; *IN: intermediate nerve; DV: Dandy veins; VNS*: vestibular nerve stump; AN*: auditory or cochlear nerve; *IX: Glossopharyngeal nerve.

Results

In 26 out of 30 patients was achieved a complete tumor resection. In 2 cases was observed post-operative transient facial nerve function impairment or worsening, and hearing deterioration in only 1 patient. No threatening complications occurred after surgery, and the length of hospitalization was usually less than 7 days. In the patients treated by using the exoscope a complete resection of the schwannoma was obtained in 2, without any additional complications or limitations in the maneuverability, but the exoscope not replacing the enlargement and the possibility “to look around the corner” provided by the endoscopic view.

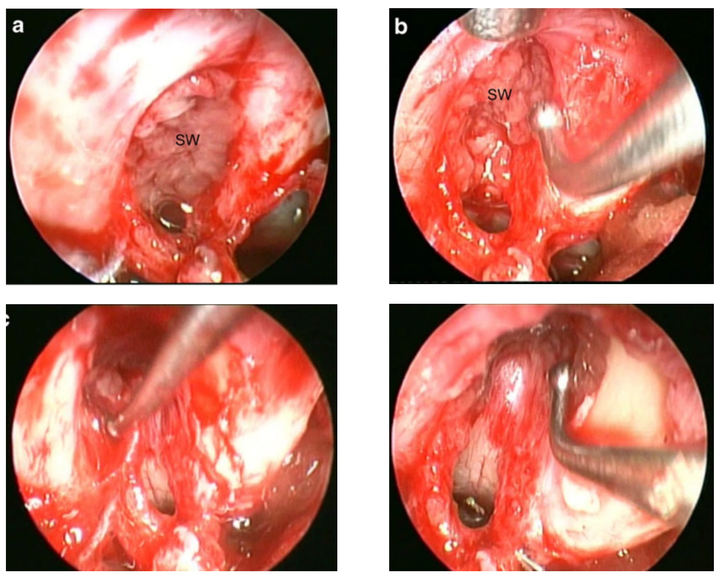
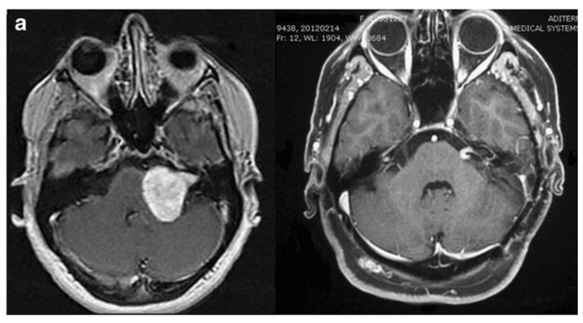


Figure a-b. Residual schwannoma in the internal acustic canal after the resection of its cisternal portion under microscopic view

Figure c-d. Endoscopy-assisted removal of the last tumor nodule with decompression

Conclusions

The EAPRA can potentially provide a major and more direct, lateral to medial working angle, approach to the anatomical region of interest and internal acoustic meatus, direct access to the cerebello-pontine angle along with labyrinthine complex preservation, conserving hearing function and, allowing a potentially minimal cerebellar retraction. Endoscopic assistance is a crucial adjunct in the presigmoid retrolabyrinthine approach because it ensures complete visualization of the intracanalicular portion of the schwannoma. In our experience, also the use of the exoscope can help in improving visualization of the surgical field. The application of piezoelectric drill to craniotomies bordering or involving the sinuses appeared safe and also improved a cosmetic and functional reconstruction.



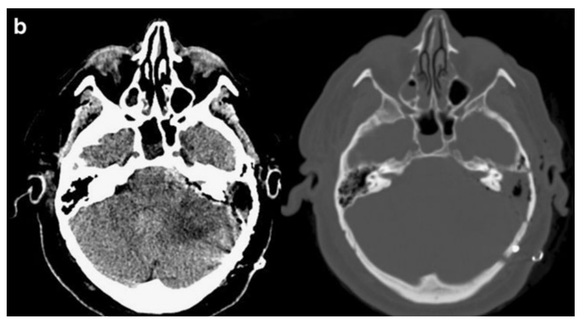


Figure a. Pre- and post-operative MRI images of a large, left-side vestibular schwannoma
treated by a presigmoid retrolabyrinthine approach.

Figure b. Immediate post-operative CT scan

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