

# Surgical Techniques Of Retrosigmoid Infralabyrinthine Approach For Jugular Foramen Schwannoma With Moderate Extracranial Extension

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## Abstract

Jugular foramen schwannoma is a challenge for neurosurgeons because of the complex anatomical neurovascular structures in and around the jugular foramen<sup>1-4</sup>. While some authors claimed that the retrosigmoid infralabyrinthine approach is suitable for intracranial tumors without extracranial extension<sup>5</sup> or with limited extension into the jugular foramen<sup>2,3</sup>, we demonstrated the feasibility and flexibility of retrosigmoid infralabyrinthine approach to achieve total resection of jugular foramen schwannoma with moderate extracranial extension.

## Case Introduction

We present a case of a 54-year-old female who developed unsteady gait three months ago. She experienced occasional falling and left-sided tinnitus. Her neurological examinations showed that she had a husky voice. Her Romberg's sign was positive, with a tendency to fall to the left side. Muscle strength and muscle tone in bilateral extremities were normal.

MRI imaging revealed a contrast-enhanced mass in the left cerebellopontine angle - jugular fossa and parapharyngeal space, suggesting a neurogenic tumor. CT scan showed that the jugular foramen was enlarged with signs of bone erosion (Figure 1).

Based on these data, the preoperative diagnosis was Schwannoma, which was later confirmed by pathology test.

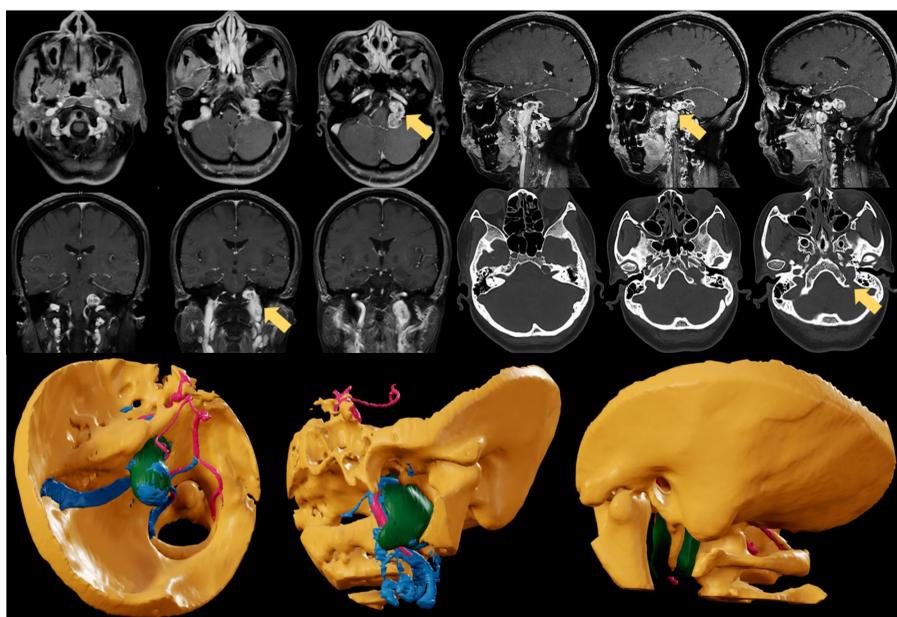


Figure 1. Preoperative imaging and 3D reconstruction of the lesion and adjacent anatomical structure

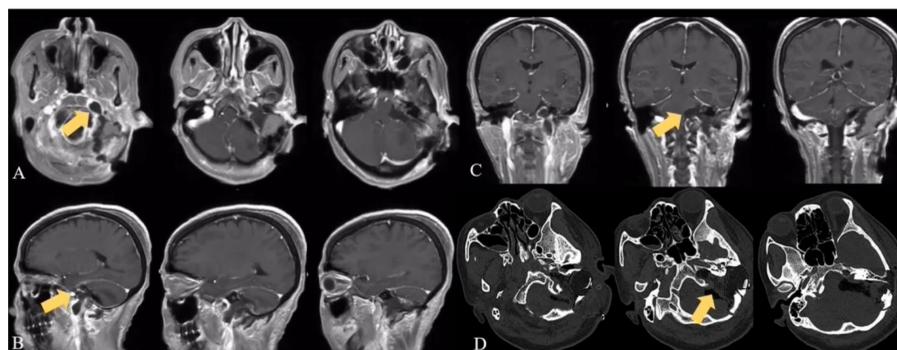


Figure 2. Postoperative imaging

## Surgical Procedure

The patient was positioned supine with head rotated to the right side. A C-shaped incision was made. After opening the tympanic antrum according to Henle's spine, the short crus of the incus could be seen pointing to the location of the Fallopian canal. The facial nerve was confirmed by neuromonitoring. Subsequently, the bony surface of the sigmoid sinus was removed. After separating the sigmoid sinus from the bone, the endolymphatic sac was exposed and sharply dissected.

Further removal of the infra-labyrinthine bone revealed the tumor beneath. The posterolateral bone of the jugular foramen was then removed, and communication between the jugular foramen and the extracranial space was achieved. Neuromonitoring was used to determine whether there are any nerves attached to the surface of the tumor capsule.

The tumor capsule was sharply incised, and total resection of the tumor in the jugular foramen and extracranial space was achieved in a piecemeal fashion using Cavitron Ultrasonic Surgical Aspirator and blunt dissection.

The intracranial portion of the tumor was exposed through the retro-sigmoid approach. The electrophysiological probe identifies the accessory nerve that located ventrally below the tumor. Similarly, after sufficient debulking, the tumor was separated and resected completely from the surrounding neurovascular adhesions using both sharp and blunt dissection. The acoustic-facial bundle was observed at the superior pole of the tumor, while the posterior inferior cerebellar artery, vagus nerve, and accessory nerve were seen at the inferior pole.

The surgical cavity was packed with autologous fat, and the bone flap was repositioned. The muscle, galea, and skin were then sutured in layers. Intraoperative neurophysiological monitoring showed all lower cranial nerves remained intact. Total resection was confirmed with postoperative imaging (Figure 2).

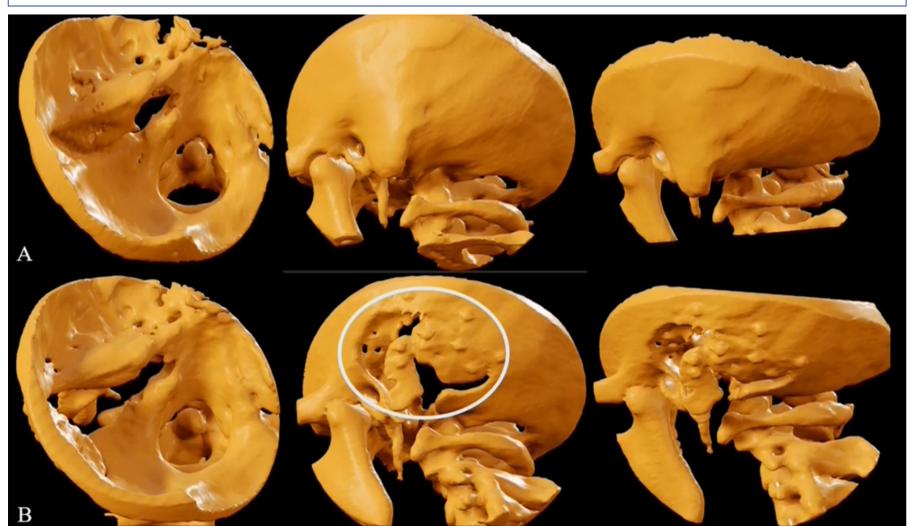


Figure 3. Extent of bone removal

## Conclusions

This approach can be flexibly adapted to jugular foramen schwannoma with moderate extracranial extension. Removal of the bony area between the jugular tubercle and the occipital condyle is crucial to communicating the surgical corridor between the intracranial and extracranial space (Figure 3).

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