

Transmeatal drilling

The maneuver of transmeatal [drilling](#) carries the risk of injuring [inner ear](#) structures, which may cause immediate or delayed [hearing loss](#).

A complete drilling of the posterior wall of [internal auditory canal](#) ACis feasible and allows direct visualization of the [internal auditory canal](#) IAC-fundus without damaging the [semicircular canals](#) ¹⁾.

Look for the safe zone of posterior semicircular canal resection in suboccipital retrosigmoid sinus approach for acoustic neuroma surgery ²⁾.

The [internal auditory canal](#) IAC can be open with a high-speed diamond drill from lateral to medial, opening the canal for 180° of its circumference ³⁾.

Drilling into the [petrous bone](#) of the IAC can expose petrous air cells, which can potentially result in a fistulous tract to the [nasopharynx](#) manifesting as [cerebrospinal fluid rhinorrhea](#).

Azar et al. describe a method of IAC closure using autologous [fat graft](#) and assessed the rates of postoperative [cerebrospinal fluid leakage](#). They performed a retrospective study of 24 consecutive patients who underwent retrosigmoid transmeatal resection who underwent our method of fat graft-assisted IAC closure. They assessed rates of postoperative CSF leak (incisional leak, rhinorrhea, or otorrhea), [pseudomeningocele](#) formation, and occurrence of [meningitis](#). Twenty-four patients (10 males, 14 females) with a mean age of 47years (range 18-84) underwent fat graft-assisted IAC closure. No lumbar drains were used postoperatively. There were no instances of postoperative CSF leak (incisional leak, rhinorrhea, or otorrhea), pseudomeningocele formation, or occurrence of meningitis. There were no graft site complications. Our results demonstrate that autologous fat grafts provide a safe and effective method of IAC defect closure to prevent postoperative CSF leakage after acoustic tumor removal via a retrosigmoid transmeatal approach. The surgical technique and operative nuances are described ⁴⁾.

Case series

One hundred patients operated on for vestibular schwannoma were included in a prospective study. Thin-slice computed tomography was performed before and after surgery and assessed topographic measurements on both the pathological and healthy sides.

The diameter of the internal auditory canal was significantly larger ($P < .001$) in the petrous bones of the affected sides than in the contralateral healthy sides. An average of 5.6 ± 1.8 mm of the internal auditory canal was drilled, and the distance from the medial border of the sigmoid sinus to the drilling line (tangential to the drilled surface of the posterior lip of the internal auditory canal) was 9.8 ± 2.9 mm. A postoperative violation of the vestibular aqueduct (VA) was detected in 41 cases; the VA was intact in 55 cases; and the VA could not be clearly defined in 4 cases. The incidence of VA injury increased with increasing tumor size. In the patient group with good preoperative and postoperative hearing function, a VA injury occurred in 26% of cases, whereas the incidence increased to 67% in preoperatively deaf patients.

Vestibular schwannomas cause significant distortion of the petrous bone anatomy. Detailed preoperative knowledge of the topography is necessary for the preservation of function ⁵⁾.

On a preoperative high-resolution computed tomography scan, a line starting 2 cm lateral to the lateral edge of the sigmoid sinus on the dura mater and directed tangential to the posterior semicircular canal or common crus was identified to intersect the posterior wall of the IAC. Drilling was carried out at a measured angle to the posterior petrous wall for meticulously measured distances, taking the intact posterior lip of the internal auditory meatus as a fixed bony point.

In the 6 cases, the mean length of the posterior wall of the IAC measured on the preoperative high-resolution computed tomography scan was $10.79 \text{ mm} \pm 1.87$. By using the technique, the percentage of total length of the posterior wall of IAC drilled was $75.3\% \pm 20.5\%$. No injury to the posterior semicircular canal or common crus was observed intraoperatively. Total excision was performed in 5 patients, and near-total excision was performed in 1 patient. Functional hearing was preserved in all patients; testing was done 1 month after surgery.

Adequate drilling of the posterior wall of the IAC could be achieved, and tumor excision with hearing preservation was obtained by meticulous intraoperative planning and measurements based on preoperative computed tomography scanning and by keeping the intact posterior lip of the internal auditory meatus as a landmark for safe drilling ⁶⁾.

1)

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