



Operative Technique

Fat graft-assisted internal auditory canal closure after retrosigmoid transmeatal resection of acoustic neuroma: Technique for prevention of cerebrospinal fluid leakage

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ABSTRACT

The retrosigmoid transmeatal approach remains an important strategy in the surgical management of acoustic neuromas. Gross total resection of acoustic neuromas requires removal of tumor within the cerebellopontine angle as well as tumor involving the internal auditory canal (IAC). 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 (CSF) rhinorrhea. We describe our method of IAC closure using autologous fat graft and assessed the rates of postoperative CSF leakage. We performed a retrospective study of 24 consecutive patients who underwent retrosigmoid transmeatal resection of acoustic neuroma who underwent our method of fat graft-assisted IAC closure. We 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 47 years (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.

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1. Introduction

In the retrosigmoid approach for resection of acoustic neuromas, complete resection of the tumor requires removal of both the cerebellopontine angle tumor and the intracanalicular portion within the internal auditory canal (IAC). Access to the intracanalicular portion requires drilling of the posterior IAC. However, removal of this portion of the posterior IAC exposes petrous bone air cells and presents an opening for cerebrospinal fluid (CSF) leakage, one of the most common postoperative complications in the retrosigmoid approach for acoustic neuroma removal [1–3]. The literature on retrosigmoid approaches that involved drilling the IAC has shown rates of CSF leakage ranging from 0% to 26.7% (incisional, rhinorrhea, and otorrhea), depending on the method of closure [4,5]. Exposed air cells in conjunction with a

non-watertight dural closure allows for the movement of CSF through the exposed petrous air cells, into the middle ear space, and through the Eustachian tube [5–7]. This anatomical communication commonly presents as CSF rhinorrhea and can lead to further complications such as meningitis and often necessitates a repeat surgery to stop the CSF leak [8]. Various techniques of IAC dural closure have been reported including the usage of muscle grafts, fascial grafts, hydroxyapatite, and bone cement [5,9–12]. The purpose of this paper is to describe our autologous fat graft-assisted closure technique of the posterior IAC in the retrosigmoid transmeatal approach for acoustic neuroma removal, and report the incidence of postoperative CSF leakage in a series of 24 consecutive patients.

2. Materials and methods

A retrospective chart review was conducted on all patients who underwent autologous fat graft closure of the IAC defect after

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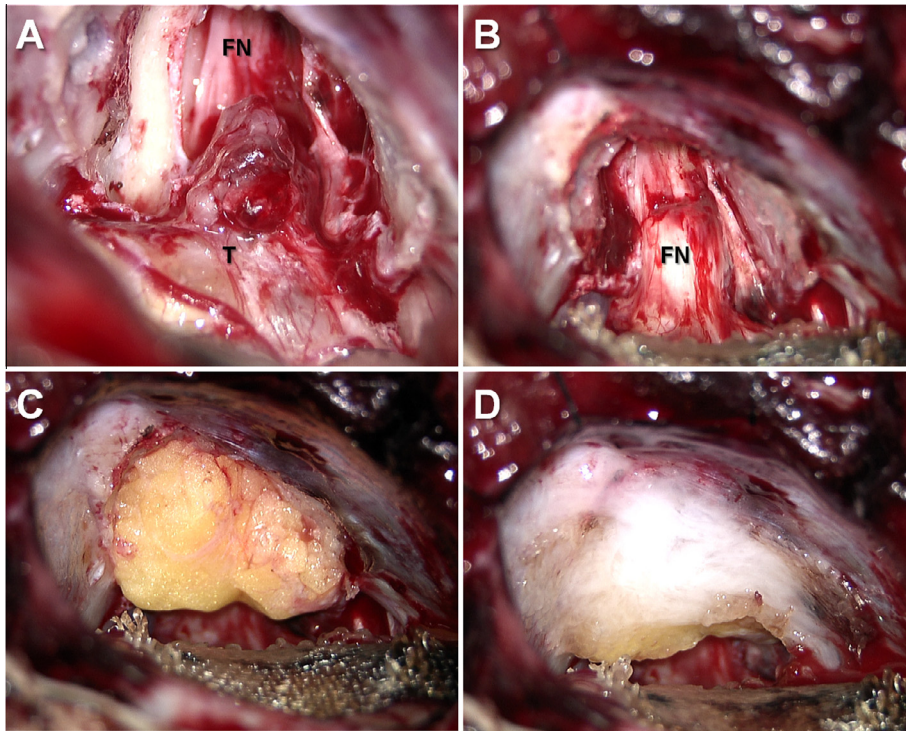


Fig. 1. Intraoperative photographs demonstrating the fat graft assisted internal auditory canal (IAC) closure technique. (A) Right-sided retrosigmoid transmeatal exposure of an acoustic neuroma tumor (T) in the cerebello-pontine angle and IAC after drilling the posterior wall of the IAC with the facial nerve (FN) in close proximity. (B) IAC defect with intact FN after complete tumor removal. (C) Autologous fat graft placement into the IAC defect after sealing off petrous air cells with bone wax. (D) Fat graft is secured in place with a piece of Surgicel (Johnson & Johnson Medical, Piscataway, NJ, USA) and fibrin glue. This figure is available in colour at <http://www.sciencedirect.com/>.

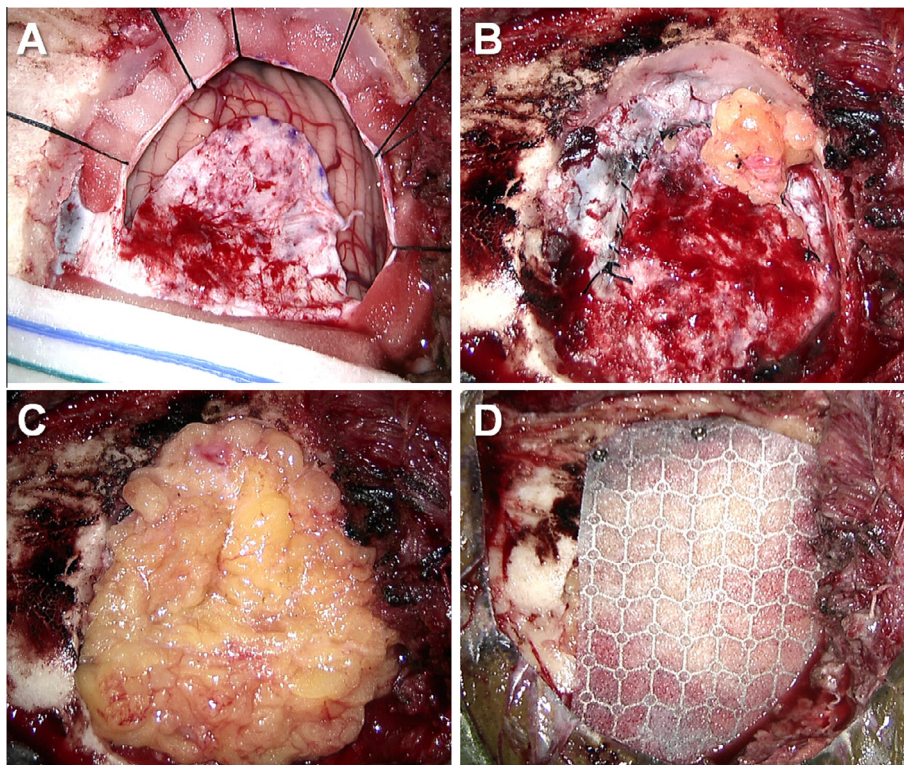


Fig. 2. Intraoperative photographs showing reconstruction of the suboccipital retrosigmoid cranial defect after acoustic neuroma removal. (A) Retrosigmoid dural defect after acoustic neuroma removal. (B) Watertight dural closure is performed and mastoid air cells are occluded with bone wax. A small fat graft was used here to reinforce a pinhole cerebrospinal fluid leak in the dural suture line. (C) Fat graft is placed into the cranial defect over the dural suture line and up against the waxed off mastoid air cells. (D) The cranial defect is reconstructed with a Medpor Titan (Stryker, Kalamazoo, MI, USA) cranioplasty which buttresses the fat graft against the dural suture line. This figure is available in colour at <http://www.sciencedirect.com/>.

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