

BRIEF COMMUNICATION

## Middle Fossa Approach: Applications in Temporal Bone Lesions<sup>☆</sup>



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### KEYWORDS

Middle fossa approach;  
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Hearing preservation;  
Cholesteatoma;  
Epidermoid tumour;  
Cholesterol granuloma

**Abstract** The middle fossa approach is a surgical technique that is very useful for lateral skull base surgery. However, it is true that it has limited surgical indications and implementation due to its technical complexity.

We present our experience in 10 patients in whom the middle fossa approach was the treatment of choice because of the extent of the injury and complexity of the lesion or process.

Despite the complexity of the cases, there was no mortality associated with surgery. Postoperative complications were found in 2 patients who presented an epidural haematoma and a cortico-subcortical haematoma. Hearing function was preserved in 5 patients out of the 7 who had adequate hearing at the time of surgery. House/Brackmann I-II facial nerve function was achieved in 8 patients; the remaining 2 had no deterioration of the nerve function. In 9 out of 10 patients, the surgery achieved complete solution of the lesion.

The middle fossa approach is a safe and reliable surgical technique. It gives us great control and exposure of different skull base processes. We consider its knowledge of great importance, because it may be the only viable surgical alternative in some specific patients. That is the reason why it is important to learn this approach and know about it in our specialty.

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**PALABRAS CLAVE**

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auditiva;  
Colesteatoma;  
Tumor epidermoide;  
Granuloma  
de colesterol

**Abordaje por fosa media, aplicaciones en lesiones del hueso temporal**

**Resumen** El abordaje por fosa media es una técnica quirúrgica de gran utilidad en la cirugía de base de cráneo lateral. Si bien es cierto, que por sus restringidas indicaciones así como por su complejidad técnica ha tenido una implantación limitada.

Presentamos nuestra experiencia en 10 pacientes en los cuales por gran complejidad del proceso, la situación o la extensión de la lesión, el abordaje por fosa media fue el tratamiento de elección.

A pesar de la gran complejidad de los casos no hubo ningún caso de mortalidad asociada a la cirugía. De la morbilidad registrada destacar un hematoma epidural y un hematoma córtico-subcortical. La función auditiva se preservó en 5 pacientes de los 7 pacientes que presentan audición en el momento de la cirugía. En 8 pacientes se logró una función facial House/Brackmann I-II y en los 2 restantes no hubo empeoramiento de la misma función. En 9 de los 10 pacientes se realizó una cirugía resolutive de la patología.

El abordaje por fosa media es una técnica quirúrgica segura y fiable. Nos proporciona un gran control y exposición de los diferentes procesos patológicos de la base de cráneo. Consideramos de gran importancia su conocimiento, pues en determinados pacientes puede ser la única alternativa viable y resolutive, de ahí la importancia de difundir este abordaje en nuestra especialidad.

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**Introduction**

Since William House described the middle fossa approach in 1961<sup>1</sup> several diverse modifications have been presented to expand on it. In 1986 House and Hitselberger reported the middle fossa approach as a means of access to the skull base medial and superior to the internal auditory canal in cases of CPA tumours and the extended middle fossa approach for tumours involving the petrous apex and clivus.<sup>2</sup> However, the absence of stable references in the surface area of the temporal bone, determine that this be one of the most difficult neuro-otological approaches to dominate.<sup>3</sup>

This approach and its modifications may be classified in accordance with its extension into several anatomical regions. The standard middle fossa approach leads to control of the IAC, with the possibility of hearing preservation. The extended middle fossa or Kawase approach enables access to the anterior cerebellopontine angle, petrous apex, and upper clivus.<sup>4,5</sup> This approach therefore becomes an extremely useful tool in certain lesions of the temporal bone.<sup>5</sup>

**Material and Methods**

We carried out a retrospective review of middle fossa approaches over 5 years between 2008 and 2012, for the treatment of different temporal bone tumours, with both a single approach or part of combined transpetrous approaches. Vestibular schwannoma surgery used for hearing application was excluded from this review.

We analysed patient variables such as age and gender, type of temporal bone pathology, history of previous

surgery, size and location of the tumour, and clinical presentation symptoms. With regard to surgery, we analysed the type of surgical approach, the presence of intraoperative complications, early and late postoperative complications, and functional auditory and facial outcome in addition to the resolution of the pathology and follow-up time.

All the patients were operated on by the author, under general anaesthesia and with intraoperative administration of antibiotics and diuretics. Intraoperative facial nerve monitoring in all surgery was conducted using NIM II (Medtronic®). The patient was in a supine position with lateralisation of the head at 70°–80° and fixture using Mayfield cranial stabilisation. Preauricular cutaneous incision was made in the sign of an inverted question mark (extended preauricular temporal region to approximately 7 cm). Dissection of the musculocutaneous flap took place and it was pushed back towards the fronto-orbitary region. Drilled 5-5 craniotomy was performed. Dissection and stripping of the dura mater of the temporal bone to obtain the selected surgical site took place. Retraction of the temporal lobe was maintained using the Leyla retractor and malleable metallic spatulas. An extended approach was made when needed, with the Kawase triangle (Figs. 1–3). Repair of the bony defect of the temporal bone, if required, carried out with a temporal muscle pediculated flap or positioning of the intracranial titanium mesh covered with an autologous fat graft (Fig. 3). Repair of the cerebrospinal fluid fistula was carried out by sealing with fat without the need for lumbar draining.

Hearing function was assessed using the American Academy of Otorhinolaryngology-Head and Neck Surgery<sup>6</sup> guide and the facial function was assessed with the House Brackmann scale comparing the preoperative and postoperative function at 3 months.

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