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# COMBINED ENDOSCOPIC AND OPEN APPROACH FOR A SALIVARY GLAND CARCINOMA AT THE PTERYGOID REGION

## ABORDAJE COMBINADO EN UN CARCINOMA DE PTÉRIGOIDES DERECHA: NOTA TÉCNICA

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### ABSTRACT

Tumours located in the pterygopalatine and infratemporal fossae are challenging to access, which may compromise oncological results. Both open and endoscopic approaches have been used in the literature, each showing advantages and disadvantages over the other. We report a technical note in a case of a malignant tumor in the pterygopalatine fossae which was excised combining an open transmaxillary approach and an endoscopic transnasal approach. We believe that a combined approach offers more security in the oncological resection, minimizing the aggressivity of the open approach through the endoscopic assistance.

**Keywords:** Combined approach, pterygopalatine fossa, intraoperative navigation, endoscopic approach.

## RESUMEN

Las tumoraciones localizadas en la región pterigopalatina y en la fosa infratemporal son difíciles de acceder, lo que puede comprometer los resultados oncológicos. Existen abordajes abiertos y endoscópicos, cada uno con ventajas e inconvenientes. Presentamos un caso de una tumoración en fosa pterigopalatina que fue extirpada mediante un abordaje combinado endoscópico nasal y abierto transmaxilar. Creemos que ofrecer un abordaje combinado establece la posibilidad de ofrecer mayor seguridad en cuanto a la resección, minimizando la agresividad del abordaje abierto con la asistencia endoscópica.

**Palabras clave:** Abordaje combinado, fosa pterigopalatina, navegación intraoperatoria, abordaje endoscópico.

## INTRODUCTION

Tumours located in the pterygopalatine and infratemporal fossae remain a challenge to surgeons due to its difficult access and complex anatomy. Surgery in these regions is changing thanks to the advances in endoscopic techniques. Despite, accessibility to deep-seated lesions in these regions remains difficult.

Traditionally, extensive anterior (transfacial or transmandibular) and lateral/posterolateral (transcranial) approaches have been used to access the pterygopalatine fossa and infratemporal regions<sup>1</sup>. These approaches offer good exposure; however, they have higher morbidity and complications such as unacceptable scarring and facial numbness may occur.

Over the last decades, there has been a gradual interest in endoscopic techniques applied to the craniofacial region. The endoscopic-assisted surgery to these regions is efficient and safe and offers lower morbidity. The progressively evolving experience has widened indications and greater exposure can be provided with the multi-angled and magnified views. However, many authors have questioned the accessibility of these techniques and its reliability, especially in oncological patients.

To access these areas in one single operation, several authors have recommended the combination of and endoscopic endonasal and sublabial transmaxillary approach<sup>1</sup>, joining advantages of both methods in cases of lesions located in the pterygopalatine and infratemporal fossa.

## **CASE REPORT**

We report the case of a 47-year-old woman who presented with a right retropterygoid mass suggestive of a malignant tumor. MRI showed a retropterygoid mass located between the right medial pterygoid muscle and the lateral nasopharynx wall, measuring 15 x 10 x 17 mm (Figure 1).

Intraoperative navigation assisted-surgery was performed with preoperative 3D surgical planning (Figure 2). A right medial endoscopic maxillectomy was performed by the ENT team, followed by partial resection of the middle turbinate, ethmoidectomy and sphenoidectomy. Then a large maxillary antrostomy is performed to gain access to the posterior region of the sinus. The posterior wall was removed and the mass was localized and confirmed using intraoperative navigation assistance (Figure 3). The infraorbital nerve was visualized, and intraoperative biopsies were sent to discard tumoral infiltration.

Then, an open approach was performed through a vestibular incision in the right gingivobuccal sulcus. The periosteum was elevated, and the anterior maxillary sinus wall exposed. Then, an anterior maxillary wall resection is performed. Through the posterior wall of the maxillary sinus the tumor was reached. The lateral part of the right pterygoid plate and the tumor were removed and sent for anatomopathological exam. The anterior maxillary wall was repositioned and osteosynthesis with a titanium mesh and plates was performed. The mucosa was closed with absorbable sutures and nasal packing on the right side was performed with a merocele with antibiotic ointment. No intraoperative complications occurred.

The nasal packing was removed, and the patient was discharged from hospital 3 days after surgery. She complained of postoperative facial numbness (V2) that recovered in less than 6 months.

Definitive anatomopathological analysis showed a low-grade salivary gland carcinoma (hyalinizing clear cell type) with close surgical margins. The pterygoid plate was found free of disease. The patient received postoperative radiotherapy (Figure 4) shows a coronal plane of the 3 month post-operative MRI, showing complete resection and no radiological persistence of the tumor.

## **Discussion**

The management of lesions in the pterygopalatine and infratemporal fossa remains challenging. These regions host a complex neurovascular anatomy. A profound knowledge of the anatomy of these areas is required when performing surgery safely. In the pre-endoscopic era, the surgical approaches to the pterygopalatine and infratemporal fossa included transmaxillary, maxillary swing and facial translocation procedures<sup>2</sup>. All of these carry risk of significant morbidity, including infraorbital neurovascular bundle injury, chronic maxillary sinusitis, oroantral fistula, facial numbness, epiphora, etc.<sup>3</sup>.

Endoscopic surgery is performed for lesions that extend beyond the paranasal cavities to the infratemporal and pterygopalatine fossa, being indicated not only in cases of inflammatory disease but also for both benign and malignant tumor resections where anatomy is complex and difficult to access<sup>4</sup>. A modified medial maxillectomy is a standard procedure to access the infratemporal and pterygopalatine regions endoscopically. Morbidity is significantly lower compared to open approaches and complications are reduced. Cosmetics and scarring is also more favorable. Nevertheless, it is not exempt of complications, which include dental and ipsilateral palate numbness and lack of emotional tearing<sup>2</sup>. Alar retraction can occur with this approach but is less prominent than when done open<sup>5</sup>.

The endonasal route approach allows minimally invasive through the anteromedial surface to access these areas<sup>6</sup>. Advances in endoscopic endonasal surgery, such as interventional radiology, with preoperative embolization, improved instrumentation, computer-based navigation and hemostatic materials have enabled endoscopic endonasal access to tumors of the pterygopalatine and infratemporal fossa<sup>7</sup>. The

endoscopic approach to these areas is feasible, safe and efficient with a low frequency of complications.

However, several authors have reported several disadvantages of endoscopic surgery such as worse hemostatic control. Its reliability in terms of oncological resection has also been questioned, given the reduced surgical field and more complex manipulation, and difficulties with the access to more lateral lesions have been experienced with this approach. When addressing malignant tumors far lateral in the infratemporal fossa, additional procedure beyond antrostomies are usually required<sup>2</sup>. This is especially important when an oncological resection is performed, since complete resection can be hampered due to difficulties in visualization and handling. Ensuring comfortable maneuverability and easy visualization of the region maximizes the chances of complete resection and surveillance<sup>2</sup>.

However, several studies have demonstrated similar exposure for endoscopic and open approaches. For instance, Xue et al.<sup>8</sup> compared both anterior transmaxillary and endoscopic transnasal approaches on their exposure area and found no difference. Angled instruments and proper training and handling of the endoscope are recommended to maximize maneuverability and optimize results.

The combined transmaxillary and endonasal approach was first popularized by Al-Mefty<sup>9</sup> et al. Theodosopoulos et al.<sup>10</sup> stated that the combined approach allows dissection within the whole pterygopalatine fossa and infratemporal fossa, providing adequate control of vascular structures.

This combined approach has the advantage of an anatomically favorable trajectory through the maxillary sinus<sup>1</sup>. Surgery is less invasive compared to classical open approaches and morbidity and scarring are diminished. The transmaxillary open approach allows greater exposure and surgical field in comparison to pure endoscopic approaches, specially to achieve hemostasis or when an oncological resection is performed, where maneuverability and visibility are essential. Exposure of the pterygopalatine and infratemporal fossa is greater, particularly in lesions located laterally where endoscopic reachability is more difficult. Also, compared to pure endoscopic approaches, it is less complex and technically demanding, since control of hemostasis and manipulation can be assisted through the anterior antrostomy, making surgery easier and safe. We consider that a thorough preoperative evaluation of imaging

exams and intraoperative navigation as well as a surgeon who is trained in the endoscopic approach to these areas are mandatory for successful results.

In conclusion, this combined approach offers advantages of both open and endoscopic approaches and shall be considered when access to the pterygopalatine and infratemporal fossa is required, especially in oncological patients where a pure endoscopic approach might be technically demanding. Large clinical series and further studies are needed to compare this combined approach to classical approaches.

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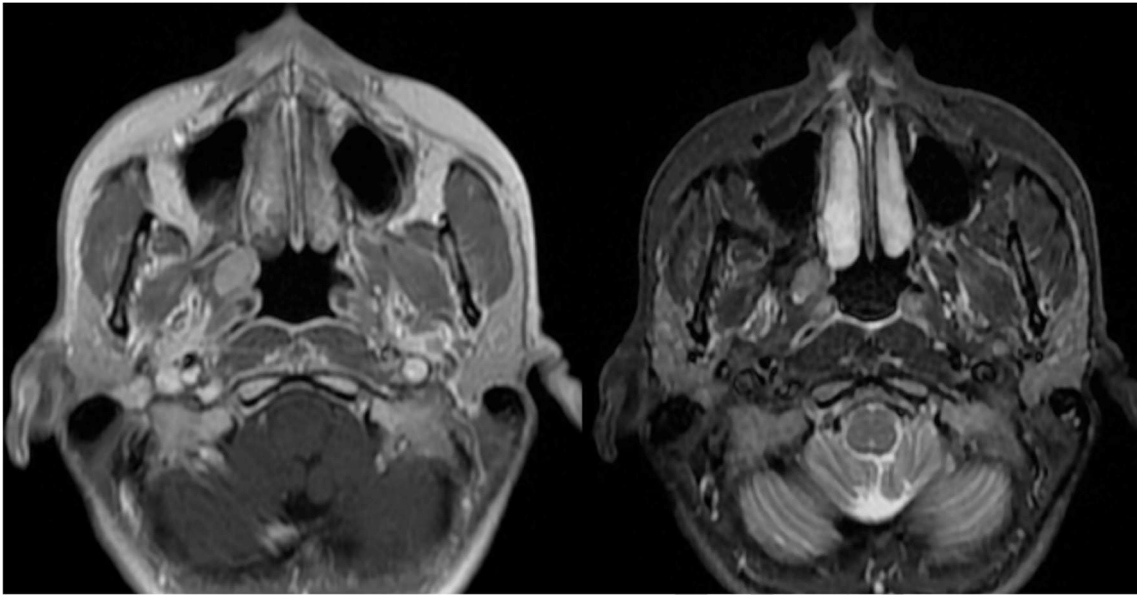
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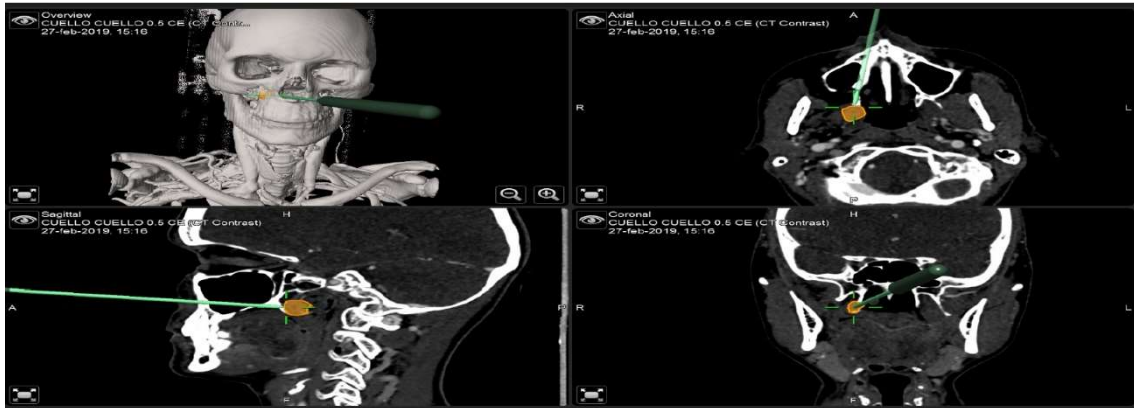


Figure 1. MRI showing a right pterygoid mass.

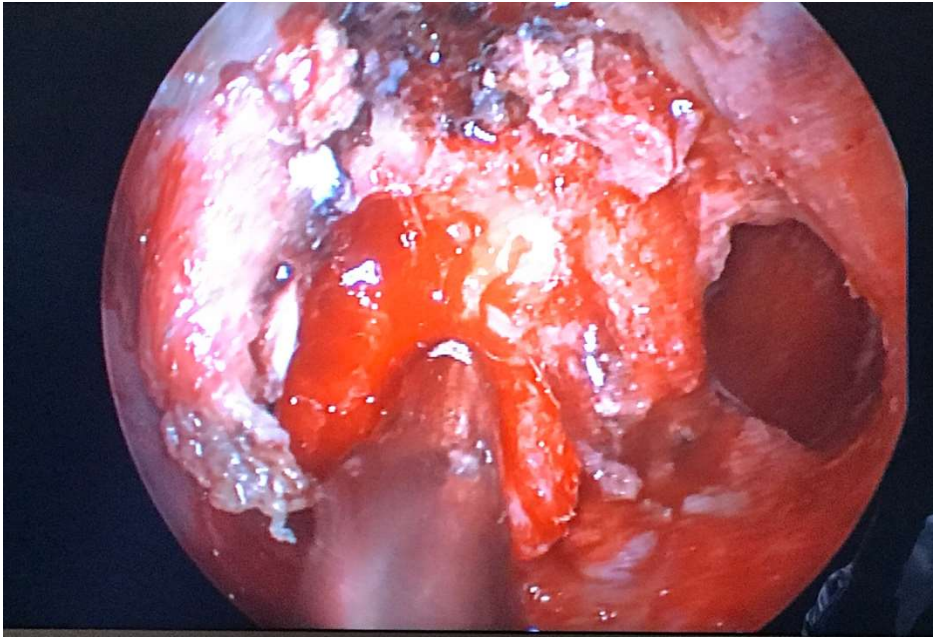


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Figure 2. Intraoperative navigation images. The tumor is colored in orange.

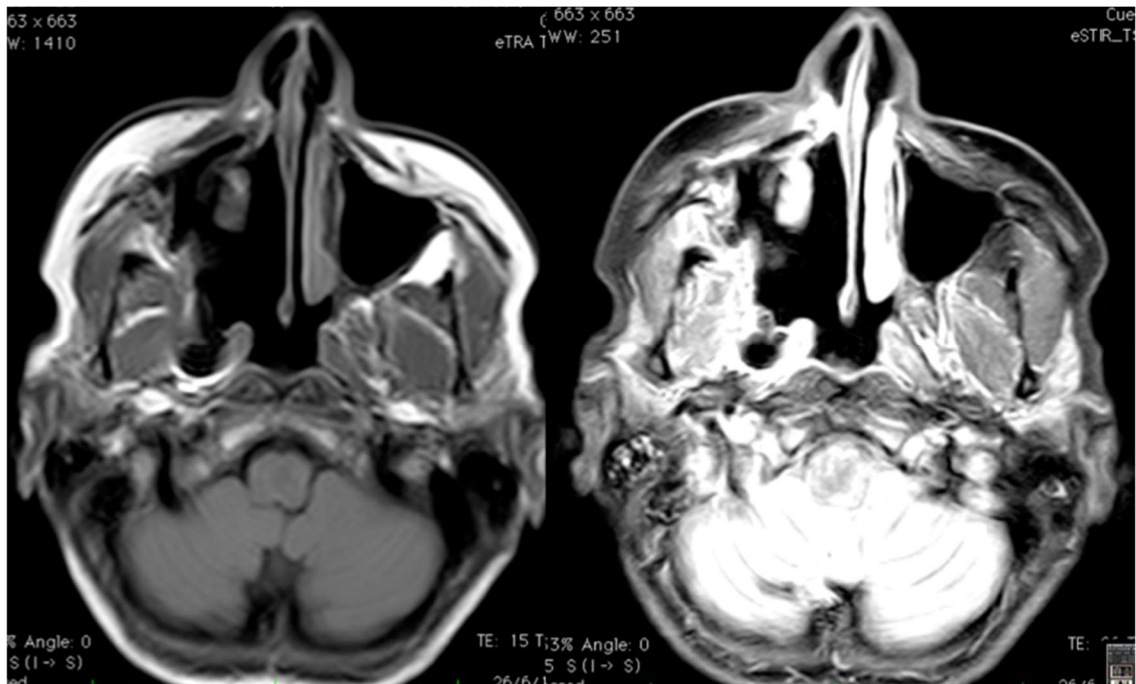


**Figure 3. Endoscopic approach. Resection of the tumor.**



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Figure 4. Postoperative MRI.



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