



*Case Report*

# ENDOSCOPIC ASSISTED TRANSCERVICAL-TRANSPAROTID APPROACH FOR PARAPHARYNGEAL GIANT TUMOR: A CASE REPORT.

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## ABSTRACT

Parapharyngeal space (PPS) is an anatomical complex area of the neck that extends from the skull base to the hyoid bone level. Tumors arising from this space are a heterogeneous group of neoplasm, indeed more than 70 different histological types have been described. This is a case report of a 48-year-old man with a giant tumor of PPS. It has been removed using a transcervical-transparotid route. The use of the endoscope helped the surgeon to reach the deepest and highest part of the PPS, identify a residual of tumor and remove it. The endoscope should be considered a crucial part of the surgical armamentarium in the approach of PPS masses in some cases. In fact, it assists the surgeon on thoroughly examining the PPS in all its extension. Furthermore, the endoscope in this case avoided other and more invasive approaches, reducing associated comorbidities.

## INTRODUCTION

Parapharyngeal space (PPS) is an anatomical complex area of the neck that extends from the skull base to the hyoid bone level. Tumors arising from this space are a heterogeneous group of neoplasm, indeed more than 70 different histological types have been described. They represent 0,5% of the head and neck neoplasms: 82% of them are benign tumors, 18% are malignant (1). The most frequent tumors arise from salivary gland (45%) and nerves (41%), but also rare neoplasms are described such as teratomas, cystic hygromas, rhabdomyosarcomas or chondrosarcomas (2).

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Surgery represents the first choice of treatment. Optimal approach varies in relation to the characteristics of the neoplasms and patients, and to surgeon's experience. The main surgical approaches are: transcervical or transcervical-transparotid route with mandibulotomy in selected case as recurrency, malignancy or huge size of the lesion; mininvasive transcervical endoscopic route; transoral endoscopy or robotic surgery; transnasal access to the upper part of the PPS; microdebrider assisted cavitation or intracapsular enucleation reserved for schwannomas; in some cases, a combination of different techniques may be used (3).

Due to all those characteristics of PPS and its tumors, surgical treatment and histological diagnosis could be challenging even for expert surgeons and pathologists.

## CASE REPORT

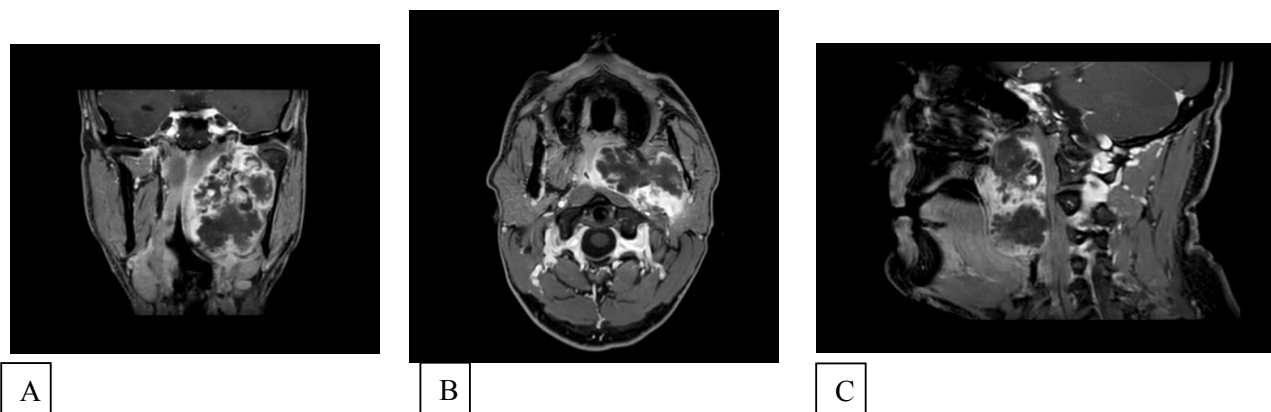
### *Pre-operative assessment*

We present a case of a 48-year-old man who came to the emergency room with a 2-months history of dysphonia and dysphagia. On physical examination it was evident a large neck mass of the left parotid region extended along the lateral cervical region and a prominent medialisation of the same-side lateral wall of the oropharynx. Videoendoscopy revealed a submucosal mass occupying the nasopharynx, descending along the left lateral wall of the pharynx and reaching the pharyngeal-epiglottic fold. A TC scan and an MRI (Fig.1) were performed. MRI showed a voluminous solid expansive neoplasm (7x4x7.5 cm) in the left parapharyngeal/masticatory spaces reaching cranially the nasopharynx, without a clear plane of cleavage towards the left medial ptergoid muscle and inferiorly touching the left submandibular salivary gland, without a clear plane of cleavage. The findings suggested a parotid origin of the lesion; the tumor presented heterogeneous enhancement after contrast injection. There were no gross lymphadenopathies identified in the laterocervical area. A fine-needle aspiration was executed, but the cytological examination was inconclusive, without evidence of any malignant cells. Considering dimensions and extension of the mass the surgeon's initial early decision was to proceed with a transcervical-transparotid route.

### *Surgical procedure*

Nerve Integrity Monitor (NIM) for facial nerve was used. A Blair modified incision was performed and the skin flap elevated. The following structures were identified and preserved: the anterior margin of the sternocleidomastoid muscle and the posterior belly of the digastric muscle, the internal jugular vein, the spinal accessory nerve, the hypoglossal nerve and the external carotid artery.

After identification of the cartilaginous pointer, the common trunk of the VII cranial nerve was identified; its main branches have been followed and spared (Fig. 2A). The superficial lobe of parotid gland has been also spared. After excision of the deep lobe of the parotid gland, the PPS has been reached and the giant mass exposed. Thus, it has been gently freed and removed by finger dissection (Fig. 2B). At this point the neoplasm seemed to have been completely

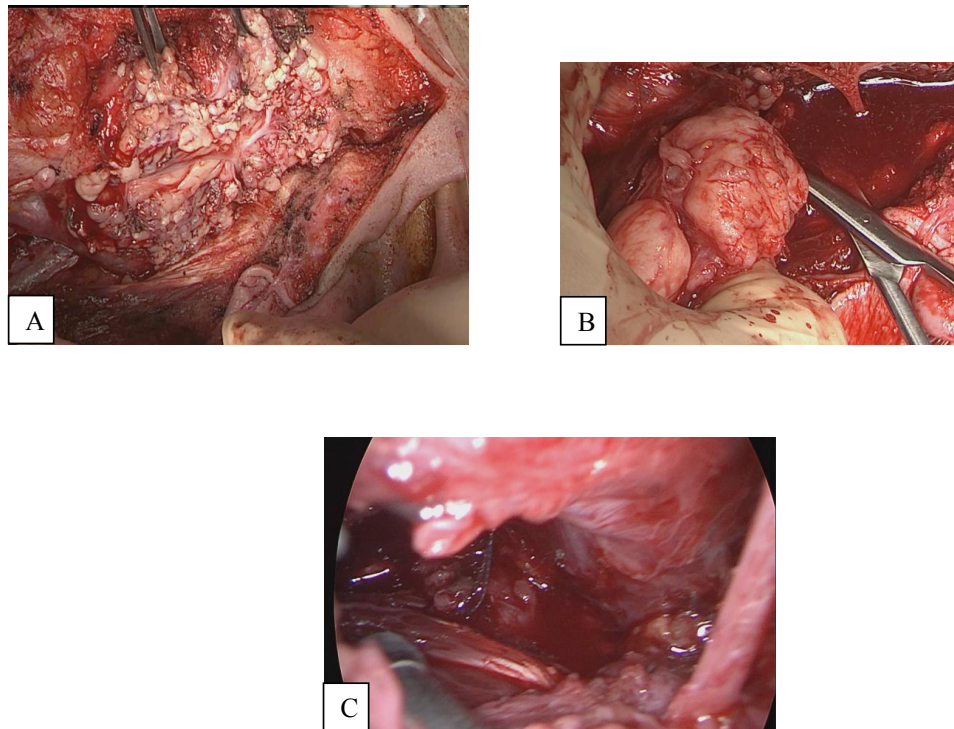


**Fig. 1.** MRI. A) coronal plane; B) axial plane; C) sagittal plane.

removed. An endoscopic check of the surgical field was performed: a small residual of tumor was seen at the most cranial and medial part of the PPS. (Fig. 2C) So, it was completely removed under endoscopic view (Fig. 3).

#### *Post-operative evaluation*

The postoperative period was uneventful. No cranial nerves palsy occurred. Three days after surgery the cervical drainage was removed and 5 days after surgery the patient was discharged. No signs of recurrence were noted at follow-up MRI after 6 months.



**Fig. 2.** *Surgical steps. A) identification of facial nerve; B) tumor dissection; C) endoscopic view of residual of tumor.*



**Fig. 3.** *Surgical specimen.*

## DISCUSSION

The complex anatomy of the PPS makes the management of tumors of this area a challenge when it comes to choosing the most suitable surgical approach. Anatomically, the PPS is a crucial area since it contains important structures as: cranial nerves IX, X, XI and XII, the internal jugular vein (IGV), the carotid artery with its bifurcation, the internal maxillary artery, the ascending pharyngeal artery and the venous plexus. This tricky space can be anatomically divided by the styloid fascia into anterolateral (pre-styloid) compartment, and a posteromedial (post-styloid) compartment. So, approaching the PPS, the surgery must not only aim at removing the tumor but to do so without compromising the nervous function (2, 4).

The surgical approach to giant lesions could be demanding when the neoplasm reaches the masticatory space, skull base or overcome the median line through the prevertebral space. Different surgical approaches have been described. In each case the choice of the best surgical strategy should be guided by the size, the position, the radiological aspects of the lesion, and the cytological/histological results.

The most common surgical technique to the PPS is the transcervical approach that provides a wide exposure of the superficial area of the PPS. In case of a benign tumor arising from the deep parotid gland lobe, the superficial lobe can be spared. This guarantees a better aesthetic result for the patient and provides an anatomical covering that protects the facial nerve, this is known as the transcervical-transparotid approach.

In selected cases mandibulotomy can be required in addition to a transcervical approach when a wider view of the PPS is required. These cases include malignancy, recurrency, lesions with a high vascular pattern or involvement of major neck vessels.

Recently some authors have proposed a minimally invasive transcervical approach using the endoscope through a small incision performed below the mandibular angle, at the level of the digastric muscle. According to Pilolli et al. (5), risk. However, is safe and allows a better visualization of the surgical plane of cleavage and a reduction of the bleeding risk, however it is not suitable for giant masses (larger than 7 cm in its widest dimension) and not recommended in malignant neoplasms (6).

Exclusive transoral approaches have caused even more debate. This technique is limited by a narrow access to the PPS and consequently causes a more challenging identification of neurovascular structures and a higher risk of surgical complications. The introduction of the new technologies as endoscopy and transoral robotic surgery (TORS) have improved the use of this technique by amplifying the surgeon's field of vision and as such reducing the percentage of intraoperative and postoperative complications. However, this approach is not suitable if the lesion extends laterally or encases a major vascular structure (3). The TORS usually implies an intraoperative fragmentation of the tumors, in particular for prestyloid lesions in more cases than the transcervical procedures (7, 8).

More recently a transnasal endoscopic access has been described. This approach passes through the infratemporal fossa and uses the Eustachian tube as an essential landmark. Excisions of lesion en-bloc have been described. Nevertheless, the indications for an exclusive transnasal procedure are very limited (9).

In alternative, transoral and transnasal approaches can be combined with a transcervical approach when the mass invades masticatory muscle space, the pterygopalatine fossa, or reaches the postero-lateral wall of the pharynx, and the upper part of PPS (10). In our case the excision of the neoplasm was performed with a transcervical transparotid approach combined with the use of endoscopy via the transcervical surgical skin incision.

Considering the characteristics of the mass the exclusive transoral or transnasal approach would not be feasible as this approach provides best the exposure only of the superomedial PPS (11). In addition, a combined transoral/transcervical could be an option when approaching this mass but would clearly convey an increased risk of an oral fistula and spreading of neck infection. On the other hand, a minimally invasive transcervical surgery would not be appropriate primarily due to the mass size but also given the extension to the masticatory space and nasopharynx without a clear plane of cleavage to the medial pterygoid muscle.

The transcervical-transparotid approach was chosen owing to the need for a wider exposure of the PPS and considering the absence of pathological tissue in the superficial lobe of the parotid gland, showed by the MRI and TC exams. Yet the exclusive transcervical technique seemed to be insufficient to guarantee a complete mass excision since the surgeon is

‘blind’ to the deeper and upper area of the PPS. To overcome this limitation, after a near total removal of the neoplasm, we used a 0° optic endoscope to examine this region. As described above, with this technique we were able to uncover a residual macroscopic portion of the tumor located in the upper part of the PPS and thus perform a complete excision of the tumor that appeared adherent to the nasopharynx postero-lateral wall. Another aspect of this case was the challenging histopathological diagnosis.

Over 70 different types of tumors have been described arising from the structures content in the PPS, and most of them are rare neoplasms. The most frequent source is the parotid gland (pleomorphic adenomas, adenoidocystic carcinomas), but also nerves (e.g., neuromas, paragangliomas or neurofibromas), vessels (e.g., hemangioma or aneurysms) and other tissues (e.g., meningiomas, condrosarcomas, rhabdomyosarcomas) could be the origin of the tumors.

Due to the variety of histological types also the histological analysis could be challenging as in the case reported. Indeed, the first histological response from our hospital’s anatomopathological unit deposed for Teratoma with immature heterologous component; due to the rarity of this diagnosis a second opinion was requested to the Brescia hospital’s anatomopathological unit and the definitive diagnosis of Pleomorphic Adenoma with extensive squamous metaplasia was defined without evidence of squamous cell carcinoma.

## CONCLUSIONS

The endoscope should be considered a crucial part of the surgical armamentarium in the approach of PPS masses. The endoscope in transcervical approach to PPS allows not only a magnification of the anatomical structures but also assists the surgeon on thoroughly examining the PPS in all its extension. Furthermore, the endoscope avoided the combination of techniques that might create a communication between the cervical soft tissue and the aereo-digestive tract, reducing associated comorbidities.

## Declarations:

*Conflict of interest:* The authors have no financial relationship to disclose.

*Sponsorships:* None.

*Ethical approval:* All procedures performed in studies involving human participants conformed to the ethical standards of the Institutional and/or National Research Commission and the 1964 Declaration of Helsinki and its subsequent amendments or comparable ethical standards. The Clinical Trials Ethics Committee of the Provinces of Verona and Rovigo exempted this study from its approval. All authors read and approved the manuscript.

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