

SURGICAL STRATEGY IN THE TRANSCERVICAL APPROACH OF THE PARAPHARYNGEAL TUMORS IN AERONAUTICAL MILITARY PERSONNEL

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***Abstract:** The parapharyngeal space is an anatomic region that may present various forms of tumoral masses, different by histology, extension and location. For ENT aeromedical examiner, deciding the most proper surgical approach in this treatment may be difficult. The authors analyze diagnostic and treatment criteria used for parapharyngeal space tumors and review the surgical techniques used. Transcervical approach is evaluated.*

***Keywords:** transcervical, mandibulotomy, parapharyngeal space, surgical approach.*

INTRODUCTION

The anatomy of the parapharyngeal space is well known. It has the shape of a pyramid, based upward to the base of the skull, with the top oriented to the hyoid bone's great horn. The pyramid is divided into two separate regions. Anteriorly, the *presyloid* region consists of the deep lobe of the parotid gland, internal maxillary artery, inferior alveolar nerve, lingual, auriculo-temporal and fat. Posteriorly, the *retrostyloid* region includes the neurovascular package of the neck with the internal carotid artery, internal jugular vein, cranial nerves glossopharyngeal, vagus, accessory, hypoglossal and cervical sympathetic chain. These two regions are separated by the styloid bouquet of Riolan. [1] Parapharyngeal space tumors are masses located near the pharynx, that do not originate in the pharyngeal wall. These tumoral masses are rare, representing less than 1% of all head and neck malignancies. More than 80% of the parapharyngeal space tumors are benign, 20% are malign.

The origin of tumors is variable and may arise from any element content at this level either glandular, mesenchyme or nerve tissue, vascular or lymphatic tissue. [2]

Usually, considering the anatomic component of the two regions of the parapharyngeal space, tumoral differential diagnostic may be suggested by tumor location.

The most usual tumors found in the prestyloid region are pleomorphic adenoma of the parotid, inflammatory lymphatic nodes, metastatic lymph nodes, lymphoma, ectopic thyroid. In the retrostyloid region we usually expect to find paragangliomas, schwannomas, solitary fibrous tumors.

MATERIAL AND METHODS

The authors review the most usual techniques used for parapharyngeal space approach, considering tumoral histology, location, dimensions.

Preoperative imaging evaluation including CT with or without contrast, MRI, angiography with contrast and histopathology, corroborated with clinical and functional aspects are decisional factors in choosing the most suitable surgical approach of parapharyngeal space tumors.

Patient follow-up after a month after surgery is conducted.

CLINICAL DIAGNOSIS

Small size parapharyngeal space tumors may not be symptomatic, or can cause headache, paralysis of the cranial nerves. Large tumoral masses in this region can cause head and neck deformity and asymmetry, dysphagia, difficulty breathing, voice alteration, altered aspect of the oropharynx, with pharyngeal wall bulging medially and pushing medially and anteriorly the tonsillar lodge.

INVESTIGATIONS

Endoscopy To evaluate the deformation occurred due to a parapharyngeal mass, endoscopic examination is performed by first intention.

Thus, by direct visualization using 0, 30 and 70 degrees rods, transnasally and transorally, or a flexible fiberscope, tumor extension in the nasopharynx is assessed and also the effect on naso- and oropharyngeal respiratory passage, oropharyngeal region deformation and extension in hypopharyngeal region are investigated.

Imaging examination Routine imaging examination include cervical CT and MRI, which obtain complementary data.

These can be completed by angiography. These methods of investigation evaluates tumor size, location accurate, relations with local anatomical elements, the appearance of the tumor tissue, vasculature, benign or malignant elements, local invasion and extension.

Prior to biopsy, these investigations contribute to the differential diagnosis. Imaging data obtained have important role in risk assessment and in determining surgical therapeutic management.

CT scanning determines the location of the tumoral mass, relation with bony anatomic elements and the parotid gland.

When contrast enhanced, computed tomography scanning evaluates the relation with blood vessels.

In some cases, CT scanning offers sufficient information to suggest an accurate diagnosis.

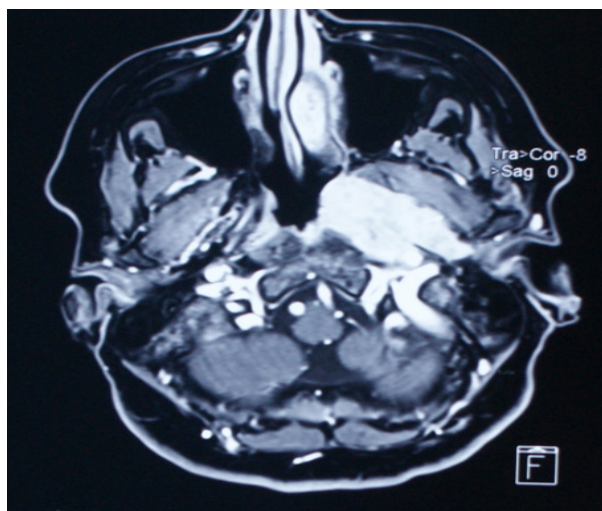


Fig. 1. CT coronal view of a large posterior parapharyngeal mass

Magnetic resonance imaging is useful for evaluating soft tissue and differentiate between tumor tissue and healthy tissue. Relationship to blood vessels is better assessed by this method. Also parapharyngeal extension intracranial tumor can be assessed by MRI.[3]

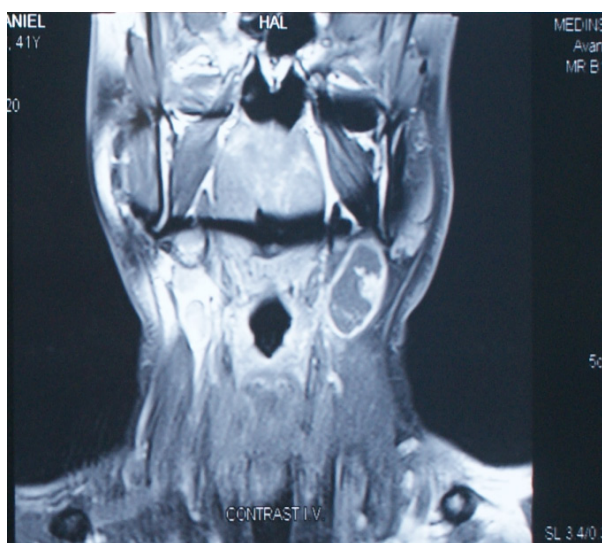


Fig. 2. Contrast enhanced IRM view

Carotid angiography analyzes vascular lesion and tumoral vasculature, determines whether the carotid artery is involved with tumor and evaluates the risk of carotid artery ligation during surgery. Also, angiography is useful in differential diagnosis of neurogenic tumors. [4,5]



Fig. 3. Angiographic evaluation of head and neck vascularity on a parapharyngeal tumor case

Biopsy Biopsy should be performed before surgery in cases when imagistic examination is not suggestive of benign or malign nature of the tumoral mass.

The methods of obtaining tissue samples for histopathological examination include: fine needle aspiration cytology (FNAC) blind or radiologically guided, incisional biosy used in non-operative cases and complete surgical excision, having diagnostic and therapeutic purposes [6].

Discussions Surgical management of parapharyngeal space tumoral masses raises difficulty due to the large variety of vital elements found in this region.

After careful evaluation of tumor characteristics on imagistic exams, biopsy results and evaluation of possible risks, the most suited approach is proposed.

Transoral approach The transoral approach has been described for the removal of small, benign tumors that originate in the prestyloidparapharyngealspace and manifest oropharyngealy. The technique is associated with limited exposure, inability to visualize the great vessels, and an increased risk of facial nerve injury and tumor rupture. Endoscopic transnasal and transoral intraoperative control widens surgical indication of this approach to larger tumors [7, 8].

The advantages of transoral approach include the absence of cervical scar, of mandibular osteotomies, avoiding facial nerve lesion, the diminished risk of fistulas and wound infection.

This technique is more easily accepted by the patient, offers a wide enough operatory field for the safe and complete excision of a large benign tumor mass.

The transoral approach may be combined with an external approach in order to access lesions with significant involvement of the oropharynx.

External surgical approach of parapharyngeal space tumors Classically, parapharyngeal space tumors are addressed externally.

Variants include surgical transcervical approach, transparotid approach and mixed transcervical-transparotid approach.

These procedures may be associated with: mandibulotomy, submandibular gland excision and digastric muscle section for optimal enlargement surgical field.

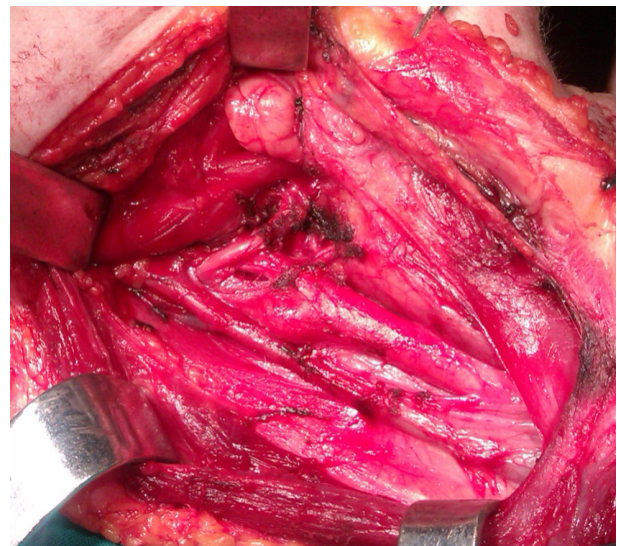


Fig. 4. Cervical lodge dissection to approach the parapharyngeal space. Submandibular gland and digastric muscle are in place.

Transcervical submandibular approach The patient is placed in lateral hyperextension.

The first step of the surgical intervention is to identify and then mobilize or completely remove of the submandibular gland.

In transcervical approach submandibular incision is curved, of about 4-5 cm, about 2 cm below the mandible [9],

extending from the mastoid tip to the greater cornu of the hyoid bone [10], near the anterior border of the sternocleidomastoid muscle [9].

Careful dissection of anatomic superficial plans is performed, with identification and preservation of the mandibular branch of the facial nerve. A facial nerve monitor for safe dissection is recommended. Facial artery and vein are identified, can be retracted laterally or ligated and sectioned. Submandibular gland is discovered, dissected and mobilized anteriorly.

Depending on the need to enlarge the surgical field, in the case of a parapharyngeal space tumor located profound, submandibular gland excision may be necessary [11,12]. Also, mandible is retracted posteriorly [10]. At this point, a large parapharyngeal space tumor becomes easily visible in the operative field, covered by digastric muscle and hypoglossal nerve, and in close proximity to the lingual nerve and the submandibular duct [2].

During dissection, the surgeon palpates and delineates the tumoral mass. Transcervical blunt dissection is performed digitally.

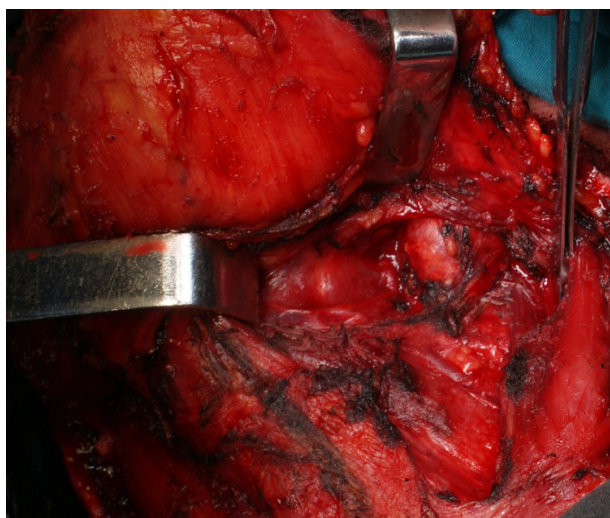


Fig. 5. Tumoral mass discovered under digastric muscle.

The section is not necessary. When a wider surgical field is necessary and when tumor resection can not be performed completely, the digastric muscle section is required. The two sectioned ends of the muscle are preserved. Unless a case of a malignant tumor that infiltrates the muscle, at the end of the intervention, after complete ablation of the tumor, the digastric muscle is sutured back.

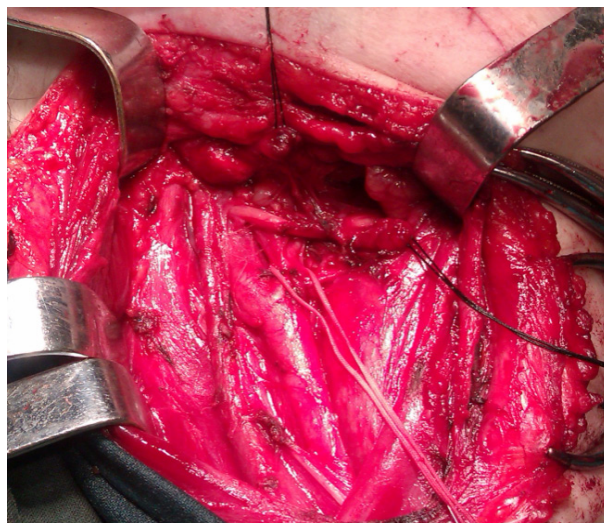


Fig. 5. Digastric muscle section enhances the surgical view

Transcervical transparotid approach Most deep lobe parotid tumors are removed by transparotid approach [13,14]. In this situation, incision is S-shaped or Y-shaped, anterior to the tragus, extended around the earlobe and inferiorly parallel with the mandibular vertical branch.

The edges of the incision are split using small retractors. The superficial lobe of the parotid gland is separated from the sternocleidomastoid muscle insertion and gently pulled anteriorly and above, while tragus cartilage is pulled back.

At this level the posterior belly of the digastric muscle posterior is discovered. Parotid duct is ligated. Dissection is performed with great care not to damage the facial nerve trunk and branches.

Using dissection microscope and facial nerve monitor is recommended. At this point, parapharyngeal space tumor can be surgically addressed. In cases in which pathological examination reveals a benign tumor the usual surgical technique is superficial parotidectomy with facial nerve preservation.

When a large parapharyngeal tumor is involved, transparotid approach is not sufficient to ensure a good view of all vital elements located in the surgical field and in tumor close proximity.

In these situations, the combined transcervical-transparotid technique is used for gaining optimal access and for minimizing the risk of intraoperative nerve or vascular injury.

Mandibulotomy Especially in cases of malignant invasive tumors or extensive, but also in large benign tumors, for better access [15,16] different techniques of mandibulotomy may be necessary.

Midline mandibulotomy, anterior to the mental nerve, associated with labiotomy and intraoral incision, combined with a transcervical or transcervical-transparotid approach enlarges the exposure. [17, 18,19].

However, subdislocation of the temporal-mandibular articulation, the need of thacheotomy and nasogastric feeding tube, along with cosmetic inconvenient of labiotomy makes this technique is not widely used. The transcervical-transmandibular approach with double osteotomy (midline and the condyle of the mandible [20], associated with application of a rigid mini-plate fixation, for osteosynthesis, provides good control of tumour extension towards the skull base [17].

CONCLUSIONS

There are a wide variety of surgical techniques that can be discussed for optimal management of parapharyngeal space tumors in aeronautical military personnel.

A patient tailored diagnosis and treatment protocol is the best way to preserve the flying aptitude.

Transcervical approach associated with submandibular gland resection may be adequate for complete removal of such tumors, with minimal damage to the anatomic region.

In particular cases the transcervical technique may be modified and extended in various ways, adapted to the needs of complete resection and intraoperative safety.

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