Diagnosis and Management of Parapharyngeal Space Tumor
Focus on the Trans Parotid Approach

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ABSTRACT
Parapharyngeal space (PPS) tumors are rare and constitute less than 1% of all head and neck neoplasms. Benign and malignant tumors can arise from various structures of the parapharyngeal space. The PPS is a space deep in the neck, shaped like an inverted pyramid. The parapharyngeal space is bounded medially by the pharyngeal wall, laterally by the deep sheet of the parotid fascia, dorsally by the deep cervical fascia and cervical vertebrae and above by the base of the skull. Parapharyngeal space masses are most commonly benign (80%), salivary gland tumors are mostly pleomorphic adenomas that typically occur in the pre-styloidal space, whereas the schwannomas, which are also found more frequently, arise in the post-styloidal space. Treatment planning for parapharyngeal space tumors requires a good understanding of anatomy and careful evaluation of imaging findings. Management of parapharyngeal tumors is a challenge because of the complex anatomy of the space and the various pathologies encountered. Treatment is generally surgical resection, especially in benign tumors, with various approaches, can be trans-oral, trans parotid, transcervical. Surgeons should choose a surgical approach that can facilitate complete tumor extirpation with minimal morbidity. This article will describe the anatomy, diagnosis, and management of PPS tumors using a trans parotid approach.

Keywords: *Parapharyngeal Space Tumors, Diagnosis, Management, Trans-Parotid.*

1. INTRODUCTION

Primary PPS tumors are rare, comprising about 1% of all head and neck tumors. These tumors are often asymptomatic and may remain undetected for a long time or are sometimes detected as incidental masses during screening for other reasons [1]. This tumor often manifests as a medial displacement of the lateral wall of the oropharynx or a mass in the upper neck. Symptoms are generally related to the position of the tumor. There are various types of primary tumors arising in PPS, and most of them are benign (70-80%). The most common benign tumor was pleomorphic adenoma, followed by paraganglioma [2].

Treatment is generally surgical resection, especially in benign tumors, with various approaches, can be transoral, trans parotid, transcervical. Surgeons should choose a surgical approach that can facilitate complete tumor extirpation with minimal morbidity [3,4]. This article will describe the anatomy, diagnosis, and management of PPS tumors using a trans parotid approach.

2. ANATOMY OF PPS

The PPS is a space shaped like an inverted pyramid, extending from the skull base to the greater horn of hyoid bone. The superior border of the PPS consists of the temporal and sphenoid bones. Anteriorly the PPS is bounded by the pterygomandibular raphe and pterygoid fascia, posteriorly by the cervical vertebrae and prevertebral muscles. It is bounded medially by the pharynx, and laterally by the ramus of the mandible, the medial pterygoid muscle, and the deep lobe of the

parotid gland. Below, the lateral border consists of the fascia of posterior belly of the digastric muscle [5,6].

PPS divides into a prestyloid compartment and a poststyloid compartment by the fascia from the styloid process to the tensor veli palatini. The prestyloid compartment contains the retromandibular portion of the inner lobe of the parotid gland, fat pad, and lymph nodes. The poststyloid compartment contains the internal carotid artery, internal jugular vein, Cranial nerves IX-XII, sympathetic chain, and lymph nodes [3,6].

3. DIAGNOSIS

Symptoms and signs of a PPS tumor are not obvious until the tumor is large enough to be detected. This is due in part to the relatively slow growth of tumors that arise in this area. There are multiple symptoms that may be related to tumors arising within the PPS. Asymptomatic mass, lump in the throat, the fullness of neck or pharynx and cranial nerve deficits, and delay in diagnosis are not uncommon [7].

The most common symptom of a parapharyngeal tumor is dysphagia because the growth of the tumor leads to a narrowing of the pharynx. In a quarter of the cases, an externally visible tumor could be seen, which, however, did not correlate with the extent of the tumor in the pharynx. Hearing loss can occur due to a tube ventilation disorder.

Intraoral and cervical evaluation, including bimanual palpation, allows formulating an initial impression of the extent of the tumor. Tumors of the PPS may be palpable in the parotid gland, the lateral neck, or both areas, as well as in the oropharynx (Figure 1).

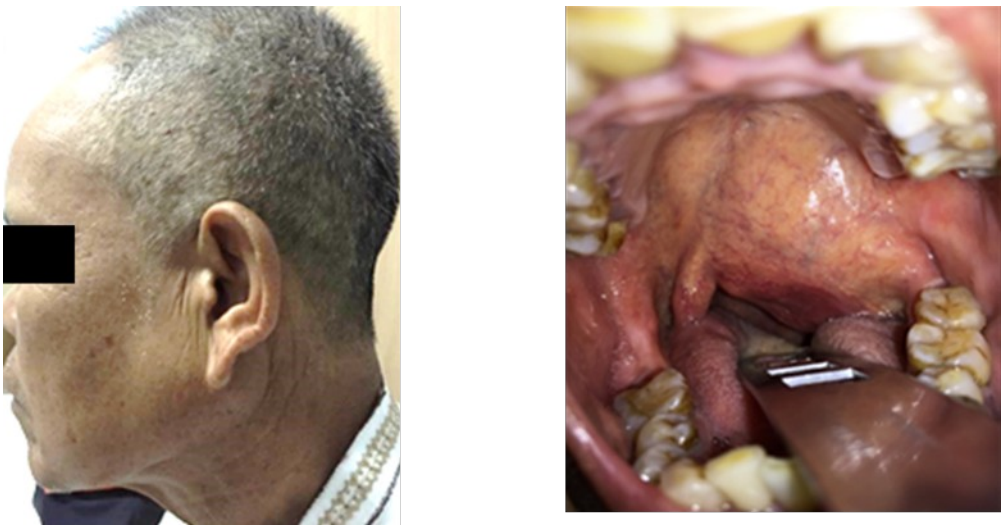

Figure 1 Tumors of the PPS may be palpable in the parotid gland and in the oropharynx (black arrow).

4. IMAGING

Radiological examination is very important in the evaluation of suspected parapharyngeal space tumors. Due to their location, this tumor is difficult to approach directly. Therefore, radiological examination plays a very important role in diagnosis and planning before surgery. Head and neck magnetic resonance imaging (MRI) and computed tomography (CT) with contrast are the most commonly used to diagnose PPS tumor. Computed tomography (CT) scanning and magnetic resonance imaging (MRI) have the same ability to localize the tumor, whether in the prestyloid or

poststyloid space. Both modalities have advantages and disadvantages when compared to each other [8,9]. A CT scan or MRI is usually used as a modality for evaluation of a PPS mass, and, occasionally, only one examination is required. Sometimes, if a vascular tumor is suspected, angiography is required. The distinction between Carotid space and PPS tumors can be made by assessing the direction of displacement of the fat in the PPS (Figure 2).

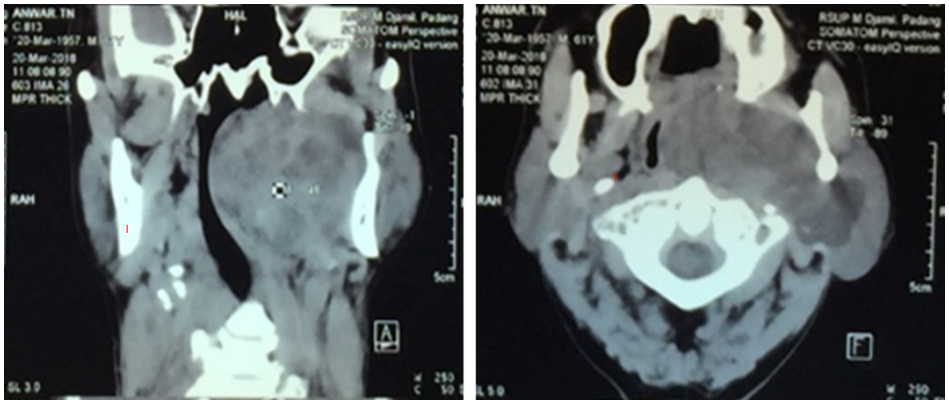

Figure 2 Parapharyngeal fat pad displaced medially (red arrow).

5. FINE NEEDLE ASPIRATION BIOPSY

The use of FNAB for diagnosis is selective, not mandatory, and imaging is usually sufficient to determine the type of tumor in the PPS in most cases. The extent of the operation is rarely altered by the FNAB results [5]. FNAB is avoided when paraganglioma is suspected because of the potential for bleeding.

6. TREATMENT

There are several approaches to PPS surgery. The most common approach is the transcervical and trans parotid approach for tumors in the prestyloid and the combined transparotid-transcervical route for tumors in the poststyloid or for tumors originating in the deep lobe of the parotid gland. The transcervical approach can also be combined with a mandibulotomy [5,6,9,10,11,12].

Currently, transoral robotic surgical excision of PPS tumors is a developing technique. Although robotic surgery is performed in the same way as the transoral approach, there is less injury to the surrounding major neurovascular structures compared to the transoral approach, but this technique is not always available at all centers and is relatively expensive [9].

In this article, we will describe the steps for extirpating PPS tumors using the trans parotid approach. The transparotid approach is used for deep lobe parotid neoplasms that extend to prestyloid PPS. An important step in this approach is the identification and preservation of the main trunk of the facial nerve to allow safe dissection of the tumor medial to the nerve.

The first step is a superficial parotidectomy which is performed to carefully identify, dissect and preserve the facial nerve. In Figure 3, the superficial parotidectomy was completed by dissection of facial nerve branches. It is now quite safe to proceed with tumor removal in PPS because the facial nerve is retracted and protected and is always under sight and remains protected. Using a retractor the main trunk of the facial nerve and its lower part is slowly retracted superiorly above the angle of the mandible to expose the retromandibular region.

Soft tissue and fibrous adhesions in this area are divided (Figure 4). The space created will allow digital dissection of the tumor in the PPS. Careful care must be exercised during this digital dissection. Rough handling can cause tumor rupture and spillage in field surgery. The connective tissue and blood vessels around the tumor were dissected and ligated so that only loose areolar tissue was left around the tumor, which could be removed by digital dissection.

The tumor is mobilized circumferentially and removed through the retromandibular space (Figure 5). Caution should be exercised for complete removal with the delivery of the intact tumor, as the residual tumor may cause local recurrence.

After tumor removal, hemostasis must be secured before closing. The wound was irrigated, and a Penrose

drain was placed, and the wound was closed as usual in two layers.

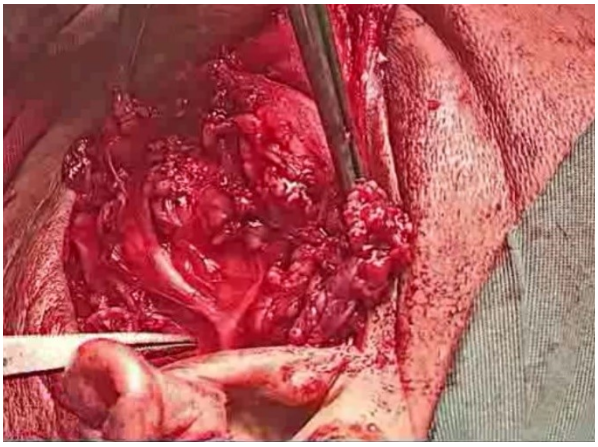

Figure 3 The partial superficial parotidectomy has been completed with dissection main trunk and buccal and lower divisions of the facial nerve (black arrow)

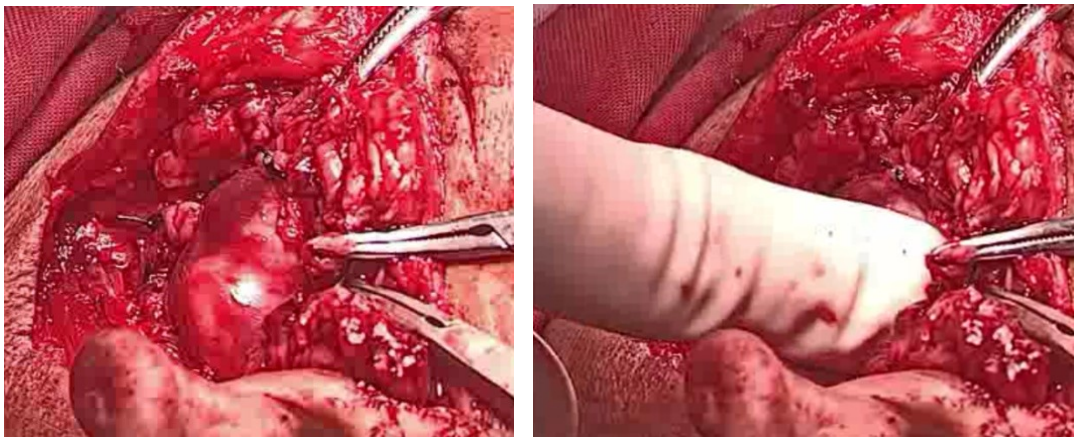

Figure 4 The space created will allow digital dissection of the tumor in the PPS

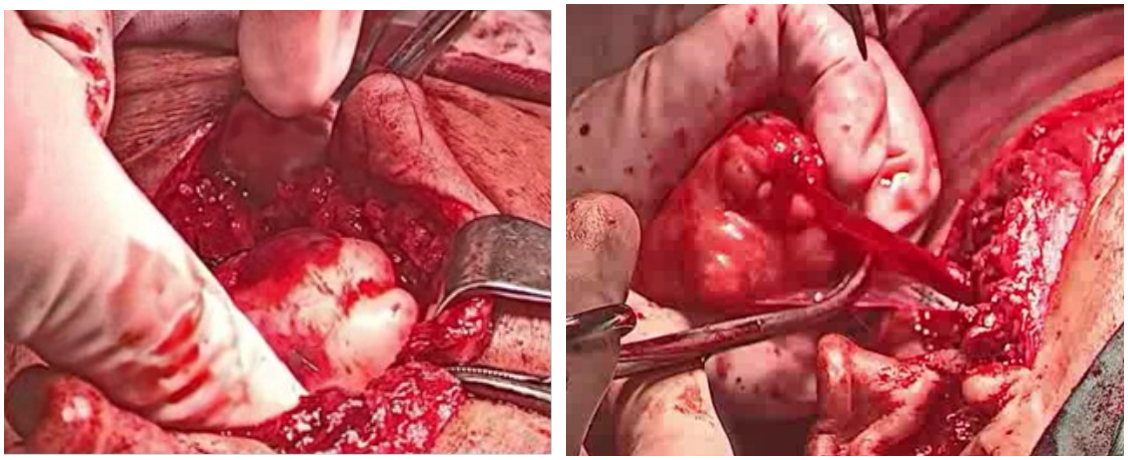

Figure 5 The tumor is mobilized circumferentially and delivered through the retromandibular space

Complications associated with PPS tumor resection include neurovascular injury/sequelae, mandibulotomy complications, tumor recurrence, and first bite syndrome. First bite syndrome as recurrent severe pain in the parotid region with an initial bite that subsides with subsequent chewing [6,9].

7. CONCLUSION

Treatment of patients with parapharyngeal space tumors remains challenging in head and neck surgery. Optimal diagnosis and management of PPS tumors requires a multidisciplinary team approach. A comprehensive history and physical examination with radiology imaging contribute to the ability to diagnose and plan the treatment. Treatment is generally surgical resection. There are several approaches; a surgical approach that can facilitate complete tumor extirpation with minimal morbidity should be chosen.

CONSENT

The figures are own by author and for the publication purpose, author has receive the agreement for publication from the patient.

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