

## **TRANSCERVICAL APPROACH: IS IT ENOUGH FOR PARAPHARYNGEAL TUMORS EXCISION? A REPORT OF FIVE CASES**

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### **Abstract**

Para pharyngeal space (PPS) masses are uncommon lesions. The complex anatomic relationships and proximity of vital neurovascular structures necessitates careful preoperative evaluation and precise surgical techniques. Various surgical approaches are used to remove these masses. This study explores the utility of transcervical approach as surgical technique to enhance exposure for resecting PPS masses.

Five cases were included in this study with PPS tumor, all had thorough investigations and tumours were completely excised by transcervical approach. One case only had postoperative complication which was haematoma and was explored next day.

In conclusion, transcervical approach is a very good way to treat PPS tumors.

### **Introduction**

Tumors of the parapharyngeal space are rare, accounting less than 1% of all head and neck tumors. Para pharyngeal space tumors may be primary arising from any structure contained within the space or metastatic to the lymphatics within the space or direct extension of tumors from the adjacent spaces. The frequency of benign and malignant tumors is about 80% and 20% respectively. Salivary glands form about 40-50% of all parapharyngeal space tumors followed by a neurogenic origin and the rest are miscellaneous lesions<sup>1-4</sup>.

The parapharyngeal space (PPS) is a potential space lateral to the upper pharynx shaped like an inverted pyramid, extending from the skull base superiorly to the greater corn of the hyoid bone inferiorly. The superior border of the parapharyngeal space (PPS) comprises a small area of the temporal and sphenoid bones. The medial wall is formed by the pharyngobasilar fascia while the lateral wall includes the ramus of the mandible, fascial covering of the deep lobe of the

parotid gland, medial pterygoid and digastrics muscle. The posterior wall is the prevertebral fascia and muscles, while the anterior wall is the pterygomandibular raphe. The fascia from the styloid process to the tensor velopalatini divides the parapharyngeal space (PPS) into an anteromedial compartment (ie, prestyloid) and a posterolateral (ie, poststyloid) compartment. The prestyloid compartment contains the retromandibular portion of the deep lobe of the parotid gland, adipose tissue, and lymph nodes associated with the parotid gland. The poststyloid compartment contains the internal carotid artery, the internal jugular vein, CNS IX- XII, the sympathetic chain, and lymph nodes. One can notice that the superior, lateral and posterior borders of the space are bony so tumors can only expand through the anterior, medial and inferior walls<sup>2,3,5,6</sup>.

A parapharyngeal space tumor commonly present as painless neck mass or bulging of the oropharynx; which causes a lump sensation in the throat. Rarely patients

complain of odynophagia or trismus. Lower cranial neuropathies mostly associated with paraganglioma or malignant tumors<sup>3,7</sup>.

Imaging studies of the parapharyngeal space includes computed tomography (CT) with contrast; magnetic resonance imaging (MRI); angiography and magnetic resonance angiography (MRA). These tests ascertain the site of origin, extent, vascularity of the tumor in addition to their relationship to the great vessels and other neurovascular structures of the neck. The absence of fat planes between the tumor and adjacent structures and the direction in which the tumors display the fat planes help to determine whether the tumor is located in the prestyloid or poststyloid compartment and whether the site of origin is the parotid gland<sup>3,7-9</sup>. Fine needle aspiration (FNA) procedure is recommended for patients with parapharyngeal space masses as an accurate and safety procedure to differentiate benign from malignant lesion<sup>10</sup>. The mainstay of treatment of tumors of the PPS is surgical excision of the tumor. The ideal surgical approach aims to complete excision of the tumor with minimal morbidity. The choice of the surgical approach depend on histology, site and size of the tumor; relationship of the tumor to neurovascular structures and experience of the surgeon<sup>11,12</sup>.

The transoral approach offers a direct route for the extirpation of small tumors of the prestyloid compartment that present as a bulge in the oropharynx and do not extend into the poststyloid compartment. However, this approach affords only limited exposure of the tumor and does not allow for control of the great vessels<sup>12,13</sup>. The transcervico-submaxillary approach provides a direct route to the prestyloid compartment, as well as access to the great vessels of the neck. The exposure provided by this approach may be enhanced by medial

displacement of the tumor toward the pharynx. This maneuver facilitates visualization of the tumor and control of the distal extracranial internal carotid artery. If necessary, transection of the stylomandibular ligament and prognathic dislocation of the mandible widens the exposure by more than 50%. This approach is ideally suited for benign prestyloid tumors of minor salivary gland origin<sup>3</sup>. Transcervical approach is used to excise most of parapharyngeal space masses alone particularly those tumors abating but not involving the skull base, salivary and neurogenic tumors. Whether the tumor is located in prestyloid or poststyloid space doesn't influence the ability to perform a transcervical resection<sup>12</sup>. Transmandibular approaches, both the lateral mandibulotomy approach and the median mandibulotomy transpharyngeal approach provide vessel control and exposure for vascular tumors extending into the skull base or for squamous cell carcinomas of the oropharynx extending into the parapharyngeal space<sup>14,16</sup>. A tracheotomy and primary repair of the mandible are required for all transmandibular approaches. A mandibulectomy is indicated when the tumor has invaded the mandible<sup>14,15</sup>. Transparotid approach provides good exposure for tumors of the poststyloid space; it involves a total parotidectomy and extensive dissection of the facial nerve. This approach is indicated for those tumors that originate in the deep lobe of the parotid gland and extend into the parapharyngeal space<sup>16</sup>. Infratemporal fossa dissection/craniofacial approach, these approaches are reserved for malignant tumors, lesions involving the skull base, or tumors extending into the cranial cavity<sup>12</sup>. Irradiation, as primary treatment, is reserved for patients who have unrespectable tumors, metastatic tumors from distant sites, or lymphoreticular malignancies and for patients who are

poor surgical candidates. Postoperative irradiation is recommended for high-grade malignancies or when wide surgical margins cannot be obtained.

Complications due to surgery range from transient weakness of the marginal mandibular nerve to cranial neuropathies and cerebrovascular accidents<sup>12-16</sup>.

#### Case no.1

A 21 year old male presented with right oropharyngeal swelling of 4 months duration, noticed by the patient on looking at mirror. It increased in size slowly over this period with change in voice which became muffled, associated with right facial and throat pain. The patient also began to complain from a progressive dysphagia to liquid then to solid diet associated with weight loss. Later, he had snoring with desire to sleep at any time with somnolence. He had no fever, no cough and no earache. On examination there was a right oropharyngeal mass posterior to the posterior tonsillar pillar pushing the tonsil anteromedially. Neck examination showed no external cervical swelling with right sided jugulodiaphragmatic lymph node, 1x2 cm in size, mobile, soft and not tender. Neurological examination was within normal. CT-scan showed a well-defined enhanced mass (28 HU), about 6x5x4 cm at the upper right parapharyngeal space, causing marked compression on the postnasal space. There are multiple bilateral anterior cervical lymph nodes; the largest is about 3 cm in diameter. MRI was not done because the patient has claustrophobia. The patient underwent transcervical excision of the mass (fig.1). Histopathological examination revealed admixture of glandular epithelial proliferation with cartilaginous stroma suggestive of benign mixed tumor (pleomorphic adenoma) of the minor salivary gland. The lymph node biopsy showed follicular hyperplasia with no malignant changes. The patient had excellent postoperative course.

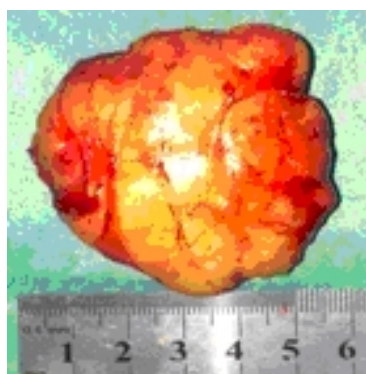


Figure 1: Pleomorphic adenoma of minor salivary gland excised from right parapharyngeal space, Case no. 1

#### Case no. 2

A 56 year old man noticed a painless gradual increasing swelling involving the left side of upper neck which began 4 years back associated with throat discomfort on the same side. There was no history of dysphasia, dyspnoea or fever. The rest of general and systemic examinations were normal. Neck examination showed soft doughy swelling in the left submandibular area. The swelling was not tender with ill-defined border about 3x6 cm in size, non-fluctuant with no bruit or pulsation. Throat examination, showed that left tonsil was pushed medially with mobile soft palate. CT-scan and MRI revealed a non-enhanced left parapharyngeal space mass (7x3.5x3.2) cm in size with fat attenuation (fig.1). Superiorly the mass was extending above the left submandibular gland, passing medially to the medial pterygoid muscle and mandible ending just lateral

to the oropharynx which is indented by it. FNAC report suggests lipoma with presence of adipose tissue. The patient underwent transcervical approach surgery, the mass was excised totally (fig.3). Biopsy revealed lipoma of the left parapharyngeal space. The patient had an uneventful recovery and there has been no recurrence of the mass.



Figure 2: MRI showed a mass in left parapharyngeal space proved as lipoma.



Figure 3: Lipomatous mass excised from the left parapharyngeal space.

### Case no. 3

A 16 year old male presented with 2 months history of painless upper right cervical swelling associated with muffled voice. There was no history of dysphagia, dyspnea, otalgia, fever or cough. Neck examination showed a mass in the upper part of the neck, soft, not tender, mobile, not pulsatile and about 3x4 cm in size. There were no palpable lymph nodes. Throat examination showed asymmetrical bulging of his right soft palate and tonsil, the soft palate is mobile (fig. 4).



Figure 4: Bulging of the right tonsil and soft palate.

Both ears, nose, throat and head examinations were within normal. FNAC raised a suspicion of salivary gland tumor (pleomorphic adenoma). Both CT-scan and MRI revealed a well defined lobulated outline soft tissue mass measuring 7x4x3.5 cm. seems to arise from the deep lobe of the right parotid gland, it enhanced mildly after I.V. contrast (fig.5). The mass caused compression effect on the pharynx, internal jugular and carotid artery with preservation and displacement of parapharyngeal fat. The patient also has two enlarged cervical lymph nodes at right anterior triangle below the mass. The radiological picture is suggestive of pleomorphic adenoma of the deep lobe of the parotid gland. He then underwent transcervical excision of the mass. The final pathological examination revealed a capsulated mass 8x5x5 cm. goes with benign mixed tumor of the parotid gland (pleomorphic adenoma). The lymph node biopsy showed a reactive follicular hyperplasia. There were no complications noted postoperatively.

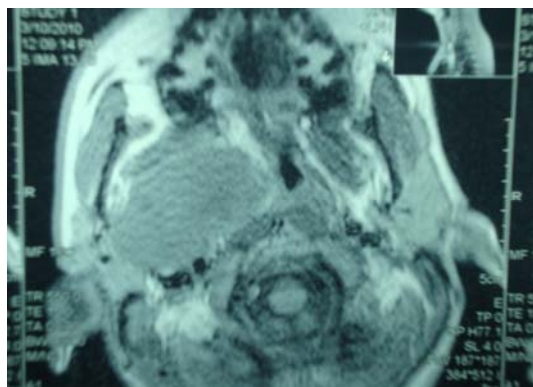


Figure 5: MRI suggestive of pleomorphic adenoma of the deep lobe of the parotid gland.

#### Case no.4

A 28 year old female presented for more than 4 months duration with progressive difficulty in swallowing particularly for solid food associated with right side throat pain radiating to the right ear with sensation of a lump in the right side of the throat. There was no dyspnea or change in voice. She consulted an otolaryngologist who did for her right tonsillectomy, biopsy revealed a feature of reactive follicular hyperplasia with chronic non-specific tonsillitis, no granuloma or malignant cells. The patient's complain became worse after tonsillectomy so she consulted another otolaryngologist who did an examination for her under anesthesia which showed a remnant of right tonsil with a mass pushing the soft palate anteromedially (fig. 6&7). An incision was made behind the posterior faucial pillar, a large fungated mass was found, an incisional biopsy was taken which raise the diagnosis of pleomorphic adenoma. She was referred to Basra General Hospital, ENT clinic for final treatment. MRI revealed a well-defined soft tissue mass arise from the deep lobe of right parotid gland, this mass has hypointense signal on T1, heterogeneous hyperintense signal on T2 with heterogeneous enhancement (fig. 8&9). The picture gives impression of salivary gland tumor (pleomorphic adenoma). She then underwent a transcervical excision of the mass. The final histopathological diagnosis was pleomorphic adenoma of the deep lobe of the parotid gland. The patient had an eventfully post-operative period.



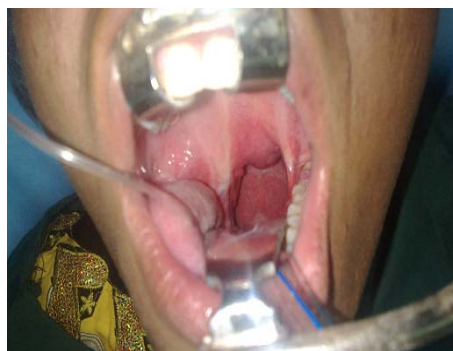


Figure 6: Mass with asymmetrical bulging of the soft palate.



Figure 7: Right tonsillectomy bed with a mass bulging behind the posterior pillar.

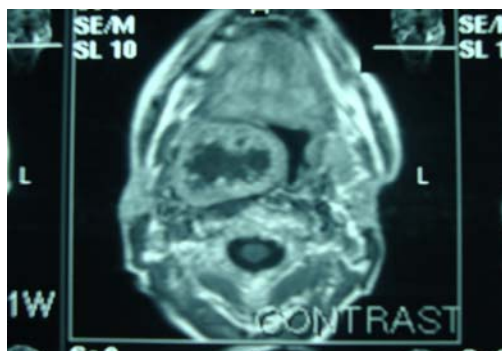


Figure 8: MRI of the right parapharyngeal space with heterogeneous enhancement.

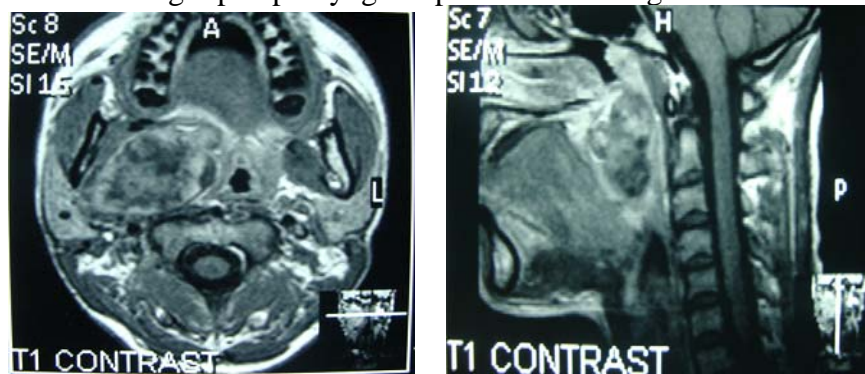


Figure 9: MRI shows a heterogeneous hyperintense signal mass in deep lobe of the right parotid gland.

#### Case no. 5

A 70 year old female had a right sided throat discomfort for about 3 months duration associated with muffled voice. There was no dysphagia or dyspnea. She had a previous history of right inguinal herniorrhaphy 2 months ago. On physical examination, she was found to have a bulging asymmetry of her soft palate and right tonsil. Neck examination

showed no cervical mass or cervical lymphadenopathy. MRI revealed a well-defined right parapharyngeal space mass. Post-contrast study showed a marked heterogeneous enhancement. There was no evidence of lymphadenopathy. Doppler study revealed no vascular abnormalities of the mass. She underwent transcervical excision of the mass. On third post-operative day she developed odynophagia with neck swelling and right throat plugging. Ultrasound was done for her, the result was either fluid collection or hematoma, then she underwent wound exploration, hematoma was found and treated by evacuation with cleaning of the wound, the wound was closed in layers with drain left. Two days later, the drain was removed with no further collection. The final histopathological result was paraganglioma of the parapharyngeal space.

## Discussion

Several surgical approaches have been designed to facilitate removing parapharyngeal space tumors. Consistent with other reports, transverse cervical approach was our favorable technique<sup>3-5,9,17,18</sup>. Transcervical approach for removal of the parapharyngeal space tumors was first described in 1955<sup>19</sup>.

This approach allows access to the parapharyngeal space by either excision or mobilization of the submandibular gland. A skin incision is made, extending from the mastoid tip to the greater cornu of the hyoid bone, 2 cm. below the angle of the mandible (fig. 10).



Figure 10: Transcervical incision 2 cm below the mandible that extend from the mastoid process to the hyoid bone.

A subplatysmal skin flap is then elevated by sharp dissection up to the level of the mandible; the superficial layer of the deep cervical fascia is incised and dissected to expose the anterior belly, intermediate and posterior belly of the digastric muscle. The anterior border of the sternomastoid muscle is also exposed. The fascia overlying the submandibular gland is incised at same line as the skin incision. The facial vessels and the overlying superficial layer of the deep cervical fascia are elevated over the submandibular gland to reflect the facial nerve superiorly thus avoid its injury. The

submandibular gland is sharply dissected and mobilized posteriorly. The hypoglossal and lingual nerves are identified<sup>3-5,9,17,18</sup>. The stylomandibular ligament is dividing to allow anterior displacement of the mandible thus increase exposure of parapharyngeal space by 50%<sup>1,4,6,19,20</sup>. The tail of the parotid gland is elevated with division and ligation of the posterior facial vein to expose the posterior belly of the digastric muscle. The carotid arteries may need to be dissected carefully and retracted laterally with tape to provide a vascular control prior to enter the parapharyngeal

space. The posterior belly of the digastric muscle may need to be divided and retracted posteriorly thus the operative field will expose widely allowing to control all the important structures that leaves and enter the parapharyngeal space. At this stage, the tumor edge is palpable, bluntly dissected by finger or

with a sponge from the alveolar tissue of the parapharyngeal space and excised through the route formed between the mandible laterally, the constrictor muscle medially and the mobilized submandibular gland posteriorly (fig.11 & 12)<sup>3-5,9,12,17-21</sup>.

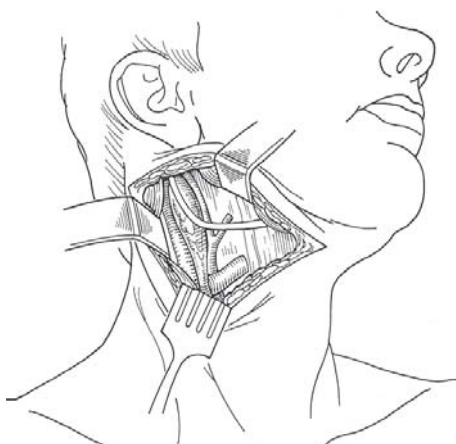


Figure 11: Final exposure field of the transcervical approach, the submanbibular gland is removed for better clarity of the surgical field.

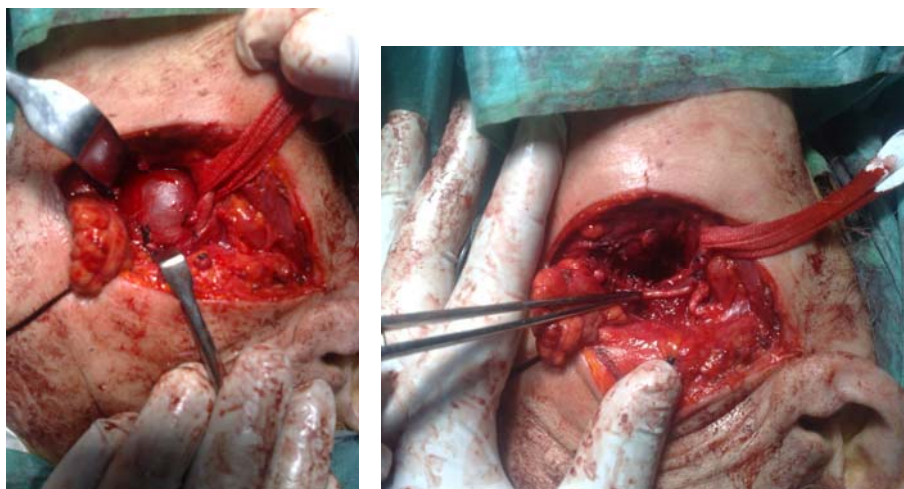


Figure 12: Operative field shows the mobilized submandibular gland posteriorly, the carotid arteries retracted laterally by tape, and the field after mass removal.

The above description is the ideal steps for transcervical approach. This study utilized most of the above steps. The mobilization of the submandibular gland was used in all cases. The tail of the parotid gland was elevated in three cases (no.2, no.3 and no.5). The posterior belly of the digastric muscles were divided in

two cases (no.2 and no.5). In case no.1 and no.2 there was no need to dissect the carotid arteries. In all the cases, stylomandibulotomomy with anterior dislocation of the mandible was needed to expose the surgical field widely. All the patients had an eventful postoperative course apart from case (no.5) who had postoperative hematoma collection and this may be due to the nature of the



disease itself i.e. paraganglioma is associated with more vascularity and need to secure bleeding carefully in its dissection<sup>3,12</sup>. In case no.4 a combination of transcervical approach with pushing the mass orally by an assistance's finger to facilitate the removal of the mass due to difficult dissection secondary to the adhesions that result from previous tonsillectomy and oral biopsy was done, that is in agreement with Cohen et.al<sup>12</sup>.

In conclusion, this article describes the experience at Basrah General Hospital with transcervical approach for excision of parapharyngeal masses. The study reviews rare cases of special interest like pleomorphic adenoma of the minor salivary gland<sup>22</sup> and lipoma of the parapharyngeal space<sup>23</sup>. It is concluded from this study that transcervical approach is quite safe and appropriate way to manage almost nearly all tumors of the parapharyngeal space.

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