



ISSN: 0976-3031

Available Online at <http://www.recentscientific.com>

CODEN: IJRSFP (USA)

International Journal of Recent Scientific Research
Vol. 9, Issue, 4(F), pp. 26078-26082, April, 2018

**International Journal of
Recent Scientific
Research**

DOI: 10.24327/IJRSR

Research Article

MANDIBULAR SWING APPROACH FOR PARAPHARYNGEAL TUMOR REVISITED- A RARE CASE SERIES

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DOI: <http://dx.doi.org/10.24327/ijrsr.2018.0904.1987>

ARTICLE INFO

Article History:

Received 5th January, 2018
Received in revised form 20th
February, 2018
Accepted 8th March, 2018
Published online 28th April, 2018

Key Words:

Parapharyngeal tumor; Mandibular
Swing; Morbidity

ABSTRACT

Parapharyngeal space tumours are rare and account for 0.5% of all head and neck tumours. Of these, 80% being benign. Most common tumours are salivary gland neoplasms, arising from deep lobe of parotid or minor salivary gland rests, followed by neurogenic tumours such as schwannomas and paragangliomas of poststyloid compartment. Surgery is the mainstay of treatment for parapharyngeal tumours. Surgery of PPS tumors requires adequate exposure to identify and protect the anatomic vital structures. Several surgical approaches to PPS are described including transcervical, transcervical-transparotid, transcervical- transmandibular (Mandibular swing) and transoral approaches.

The purpose of this rare case series is to share our experience with various approaches for parapharyngeal tumours. And use of Mandibular swing as a novel approach for parapharyngeal tumour exposure and disease clearance.

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INTRODUCTION

Parapharyngeal space(PPS), is an inverted pyramid shaped suprahyoid neck space, as the name implies lies along side of pharynx. Parapharyngeal space tumours are rare and account for 0.5% of all head and neck tumours^{1,2}. Of these, 80% being benign³. Most common tumours are salivary gland neoplasms, arising from deep lobe of parotid or minor salivary gland rests, followed by neurogenic tumours such as schwannomas and paragangliomas of poststyloid compartment. Surgery is the mainstay of treatment for parapharyngeal tumours. Being a “potential” space consisting of major blood vessels, the cranial nerves, several multidirectional muscles, mandible and skullbase, PPS as such is narrow and difficult to approach.^{2,4,5} Surgery of PPS tumors requires adequate exposure to identify and protect the anatomic vital structures. Several surgical approaches to PPS are described including transcervical, transcervical-transparotid, transcervical- transmandibular and transoral approaches(Mandibular swing)⁴.

The purpose of this study is to express our experience with various approaches for parapharyngeal tumours, and utility of mandibular swing approach for parapharyngeal space exposure

MATERIALS AND METHODS

This retrospective study of ten patients with parapharyngeal tumours who underwent surgery in our department during period December 2014 -January 2018.

Following data collected: Preoperative symptoms and signs. Radiological findings based on CT / MR imaging. All patients underwent fine needle aspiration cytology preoperatively either from neck swelling / intraoral swelling. Location and extent of tumour on imaging was the main assessment step deciding upon the surgical approach to be used.

Surgical approach was decided based on size, location, close proximity to vital structures based on imaging, proximity to skull base. Four patients underwent surgery by transcervical approach, five by transmandibular, one by transoral approach. Perioperative course and complications were noted.

RESULTS

This study includes ten patients (3 male; 7 female) who underwent surgery for parapharyngeal mass excision between December 2014- January 2018. Mean age at presentation in

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males was 48 years (27-68 years), in females was 49.1 years (31-66 years)

Most common presenting complaint was neck mass (50%), followed by pharyngeal swelling (30%). One patient with lower cranial nerve palsies presented with hoarseness and nasal regurgitation (10%), while one patient was incidentally found (10%) to have a parapharyngeal mass on PET scan for follow up of carcinoma breast. Average duration of symptoms was 11.5 months, ranging from 3 months - 2 years. Most common sign was pharyngeal swelling (100%) followed by neck mass (60%). Other symptoms and signs enlisted in Table No.1 & Table No.2.

Table No.1 Presenting symptoms of parapharyngeal masses

Presenting symptom	Number of cases with symptom (percentage)
Neck mass	5 (50%)
Pharyngeal swelling	3 (30%)
Neck pain	2 (20%)
Dysphagia	2 (20%)
Hoarseness , Regurgitation (9,10 palsy)	1 (10%)
Dyspnea	1 (10%)
Hard of hearing	1 (10%)
Asymptomatic	1 (10%)

Table No.2 Signs of parapharyngeal masses

Sign	Number of cases with sign (percentage)
Pharyngeal swelling	10 (100%)
Neck mass	6 (60%)
Hoarseness , Regurgitation (9,10 palsy)	1 (10%)
Conductive hearing loss (Eustachian tube dysfunction)	1 (10%)

Preoperative fine needle aspiration cytology (FNAC) done for all ten cases, which revealed six (60%) pleomorphic adenoma (one recurrent), four schwannoma (40%). As per imaging(CT/MRI), most common prestyloid tumour was pleomorphic adenoma(6 out of 8), two of which had dumb-bell shape with widening of stylomandibular tunnel. Two schwannomas each located in prestyloid and poststyloid compartment.

All ten patients underwent surgical excision under general anaesthesia. Five patients underwent excision by mandibular swing approach, four by transcervical approach, one by transoral approach.

Out of six pleomorphic adenoma, three noted to arise from deep lobe of parotid (50%), three believed to be from minor salivary gland rests (50%). Out of neurogenic tumours, two noted to be hypoglossal schwannomas and one vagal schwannoma, one sympathetic nerve(Table No.3).

Table No.3 Histology and origin of tumour

Pleomorphic adenoma- total 6 cases	Schwannoma - total 4 cases
Deep lobe of parotid - 3	Hypoglossal nerve- 2
Minor salivary glands/ ectopic salivary tissue - 3	Vagal - 1
	Sympathetic trunk - 1

Average blood loss for transmandibular approach was 400ml. Oral feeds were started on transmandibular approach on postoperative day five. Postoperative parameters and

complications are compared between transmandibular approach and transcervical/transoral approach. (Table.No.4 & 5)

Table No.4 Comparison of postoperative parameters of transmandibular approach with other approaches

Parameter	Transmandibular approach (Mandibular swing)	Transcervical/ Transoral approach
Average blood loss	400 ml	200 ml
Average postoperative stay	8 days	5 days
Orals started on	Postoperative day five	Day of surgery

Table No. 5 Postoperative complications

Event	Number of patient having that complication (out of 10)
Marginal mandibular palsy	2
Postoperative seroma	2
Surgical site infection (late)	1
Vagal nerve palsy	1
Hypoglossal palsy	1
Horner's syndrome	1

No recurrence of tumour noted in any of ten cases on average follow up period of 16 months.

DISCUSSION

Parapharyngeal space, potential neck space bounded medially by constrictor muscle and pharyngobasilar fascia, laterally by ramus of mandible, superiorly by skull base, inferiorly pointing to apex at the level of hyoid bone. This potential space is divided by fascia of tensor veli palati muscle running from styloid process to pterygoid plates, into prestyloid space and poststyloid space.

Parapharyngeal space tumours are rare and account for 0.5% of all head and neck tumours.^{1,2} Of these, 80% being benign.³ About 70 histologic varieties have been described in literature.⁶ All the cases included in the present study were benign (100%). 6 cases were pleomorphic adenoma(60%), 4 schwannoma (40%).

The tumors must grow to at least 2.5 to 3.0 cm before a mass can be detected clinically.⁷ Generally asymptomatic due to slow growth in potential deep neck space till they present as neck mass or oropharyngeal swelling as they grow along path of least resistance, neurogenic tumours may present with symptoms of cranial nerve palsies such as regurgitation, voice change, dysphagia etc

Imaging is vital in diagnosis and management of parapharyngeal space tumours. Preoperative diagnosis can be obtained by Fine needle aspiration cytology (FNAC) of neck or intraoral mass, best advised to do after imaging. Contrast enhanced computed tomography (CT) provides detailed extent of tumour, vascularity, relation to neurovascular structures and skullbase. Assignment of the tumor to the prestyloid or poststyloid compartment depending on its localization provides a potential diagnosis.^{4,8-10} Angiography is done in selective cases when vagal paraganglioma or carotid body tumours are suspected or for highly enhancing lesion.⁷ Magnetic resonance(MR) imaging is better than CT in showing the relationship of neck masses to adjacent muscles and soft

tissues, distinguishing tumour origin, due to better soft tissue delineation.¹¹

Surgery is the mainstay of treatment for parapharyngeal tumours. Choice of approach is chosen based on considering size, location, relation to skullbase, neurovascular structures.

Transoral approach, despite poor visualisation of structures in parapharyngeal space, can be considered for well-selected cases with no hypervascularity, no expectation of malignancy, sharply demarcated from surrounding tissues, separated medially from major vessels, and non-dumbbell shaped and good results have been reported.¹² This approach is chosen for one such case, schwannoma of size 3x3cm well circumscribed lesion in soft palate, underwent excision via transoral endoscope assisted excision. Better visualisation and magnification of parapharyngeal space is aided by use of endoscope in the present study. No recurrence noted over three year follow up period. Advantage of this approach is that there is no external scar.

Transcervical approach is the most commonly used approach for parapharyngeal tumours.^{8,25} Best applied for tumours located in inferior aspect of parapharyngeal space. Neck crease incision is given two finger breadths below mandible from mastoid tip till hyoid bone. Subplatysmal flaps raised while preserving marginal nerve. Better access to the PPS is expedited by the removal of the submandibular gland and division of the digastric muscle, styloid process, stylomandibular ligament.^{2,13} We preferred to remove submandibular gland for access to PPS as described by Malone et al.¹⁴ Removal of submandibular gland gave better exposure to parapharyngeal space from anteroinferior aspect. However, division of other structures was not necessary in the present study. Care taken to preserve hypoglossal and lingual nerve. Advantage of this approach is that it avoids dissection of facial nerve for deep lobe tumours of parotid.

Transmandibular approach was advised for malignant parapharyngeal masses, large recurrent tumours as per previous studies.^{4,8} In the present study, Transmandibular approach was applied tumours having the bulk of swelling in oropharynx causing extreme deviation of lateral pharyngeal wall rather than as neck swelling (Table No.1). Transmandibular approach was done for five cases with such finding, which also had close proximity to skull base and neurovascular bundle recurrent tumours, (Figure No.2) one case with inadequate exposure through transcervical route. Transcervical incision is converted into lip split incision and mandible is exposed. A variety of osteotomies have been described in literature such as straight, step, or angled osteotomies in body,¹⁵⁻¹⁷ angle,¹⁸⁻²⁰ ramus,²¹⁻²³ or parasymphiseal/symphiseal⁷ region of mandible. In our case series, paramedian mandibulotomy was preferred, distal to mental foramen so as to preserve to inferior alveolar nerve. Midline mandibulotomy is avoided as it requires division of genioglossus & results in unstable fracture segments. Paramedian mandibulotomy osteotomy in stair step pattern was preferred for better occlusion, to prevent unstable fractured segments and malunion. Prior to osteotomy, site of osteotomy is marked and drillholes are made for miniplates (Figure No.3). Lipsplit incision extended along floor of mouth on to palatoglossal arch, following which mandibular swing is done laterally to expose parapharyngeal space (Figure No.4). Tumour is excised, osteotomy fixed using titanium miniplates

and skin closed. One patient underwent elective tracheostomy for transmandibular approach, who was decannulated postoperative day ten.

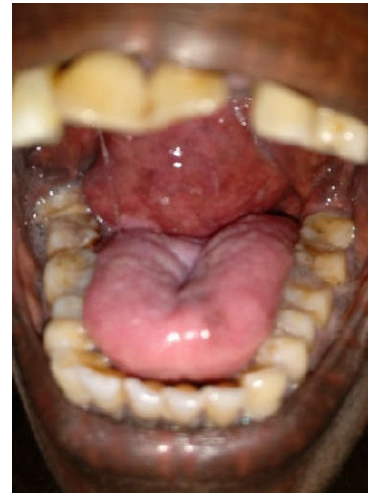


Figure No. 1 Pleomorphic adenoma arising from right parotid deep lobe displacing lateral pharyngeal wall, leaving minimal oropharyngeal airway.



Figure No. 2 CT Coronal view showing right parapharyngeal mass abutting skullbase, compressing great vessels.



Figure No.3 paramedian mandibulotomy approach for parapharyngeal pleomorphic adenoma excision. Drill holes made prior to osteotomy

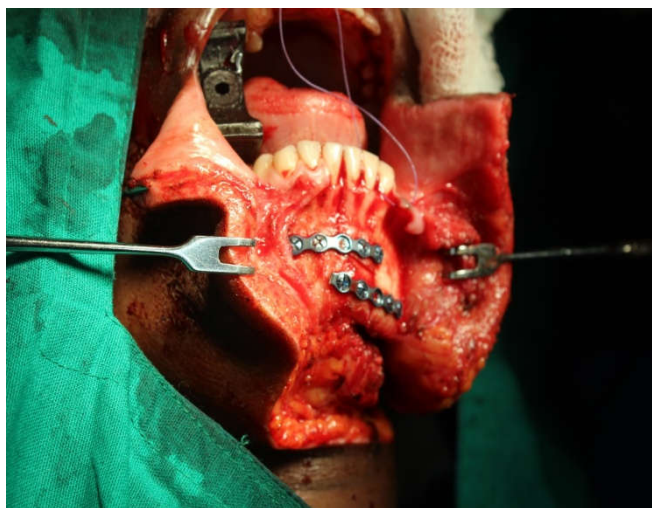


Figure No. 4 Mandibulotomy refixed with titanium miniplates.

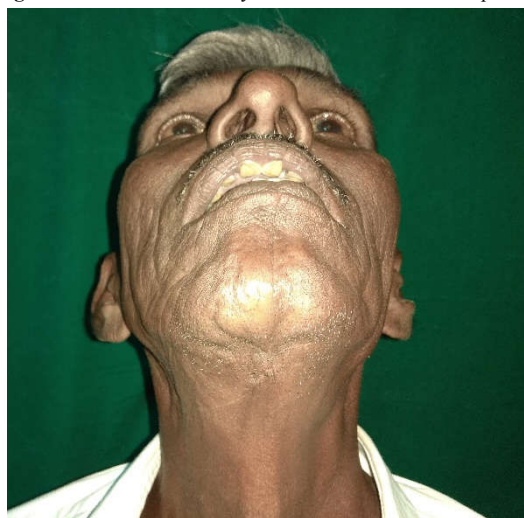


Figure No. 5 Postoperative scar for Mandibular swing approach.

Most common complication noted in our case series is marginal mandibular palsy(20%), postoperative seroma(20%). Marginal mandibular nerve is vulnerable to injury due to close relation to mandible during surgery and facial nerve lesions are most frequently noted postoperative complication as per previous studies.⁴ None of our patients had frey's syndrome, total facial nerve palsy, first bite syndrome that are common with deep lobe parotid tumours. Most frequent postoperative complication in poststyloid tumours was cranial nerve palsy,⁸ usually the cranial nerve bearing the tumour. Most common nerve palsy noted was of cranial nerve X.²⁴ In present study, one patient developed vagal nerve palsy postoperatively secondary to large jugular schwannoma arising from vagus. Postoperatively patient developed aspiration which was gradually overcome by temporary nasogastric tube feeds and speech and swallowing therapy. One patient developed horner's syndrome secondary to surgery for schwannoma arising from sympathetic plexus while one developed hypoglossal palsy.

Transmandibular approach had given excellent exposure to superior aspect of parapharyngeal space, accessible from anterior and medial aspect providing greater control over neurovascular structures. Dissection of facial nerve avoided in large/ recurrent pleomorphic adenoma by transmandibular approach. Carrau et al and few other authors have secured a

tracheostomy for all patients undergoing transmandibular approach,²⁵⁻²⁷ which was not necessary in present study. On planned tracheostomy was done who was decannulated on postoperative day ten. Paramedian midline mandibulotomy avoids division for genioglossus, which is capable of significant airway compromise. One patient has postoperative site infection, while two had seroma, that resolved on intraoral aspiration through suture line. No other complications such non-union/ malocclusion occur. With minimal morbidity as compared to transcervical approach, transmandibular approach gives better exposure of parapharyngeal space, greater neurovascular control, with acceptable esthetic outcome too.(Figure No. 5)

CONCLUSION

Parapharyngeal tumours are rare, have diverse histology and symptomology and are treated by surgery. Various surgical approaches have been described for excision. One has to be familiar with each of these approaches so as to apply for exposure of tumours of varying size and location. We recommend mandibular swing approach not only malignancy but also large/ recurrent benign tumours where the bulk of the tumour growth is into oropharynx rather as neck swelling, and as an alternative approach for tumours with inadequate exposure by transcervical approach. Paramedian stair step mandibulotomy is our preferred osteotomy for minimal morbidity and better occlusion. With precise surgical technique, when appropriately chosen for selective cases of parapharyngeal masses, mandibular swing approach gives best exposure of parapharyngeal space with minimal morbidity and cosmetic disturbance

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How to cite this article:

Snigdha Elaprolu *et al.* 2018, Mandibular Swing Approach For Parapharyngeal Tumor Revisited-A Rare Case Series. *Int J Recent Sci Res.* 9(4), pp. 26078-26082. DOI: <http://dx.doi.org/10.24327/ijrsr.2018.0904.1987>
