

ORIGINAL ARTICLE

Tumor Characteristics and Surgical Outcomes in Parapharyngeal Space Neoplasms

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ABSTRACT

Background: Parapharyngeal space tumors are rare, mostly benign, and often present with neck swelling, intraoral bulge, or dysphagia. Surgery, usually via the transcervical approach, is the main treatment, with cranial nerve injury as the most common complication. In Bangladesh, outcomes are generally favorable, though larger studies are needed. **Methods & Materials:** This observational research involved patients with tumors in the parapharyngeal space who had surgery at Otolaryngology-Head & Neck Surgery Department of a tertiary care hospital in Bangladesh from January 2024 to December 2024. Information regarding demographics, tumor features, surgical methods, complications, recurrence rates, and length of hospital stay was gathered. Tumors were categorized as prestyloid or poststyloid, and their size was evaluated through imaging. Surgical results and histopathological findings were evaluated, with data presented as percentages or mean $\pm$ SD. **Results:** 30 patients with parapharyngeal space tumors were studied, with a mean age of 45.6 ± 12.3 years; most were 30–50 years (46.7%) and male (60%). Common symptoms included neck swelling (43.3%), dysphagia (40%), and pain (26.7%). Most tumors were benign (76.7%), averaging 4.8 ± 1.6 cm, located in the prestyloid (60%) or poststyloid (40%) regions. The transcervical approach was used in 60% of cases, achieving complete resection in 86.7%, with intra- and postoperative complications in 16.7% and 20%, respectively. Recurrence occurred in 6.7%, mean hospital stay was 5.2 ± 1.8 days, and pleomorphic adenoma (46.7%) was the most common histology. **Conclusion:** Parapharyngeal space tumors are rare, mostly benign, and present with neck swelling or dysphagia. Surgical excision, usually transcervical, is effective with low recurrence and acceptable complications, with pleomorphic adenoma being the most common tumor.

Keywords: Parapharyngeal Space Neoplasms, Tumor Characteristics, Surgical Outcomes, Post-Operative Complications.

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INTRODUCTION

The parapharyngeal space lies in the suprahyoid neck beside the pharynx, divided into prestyloid and poststyloid compartments by the tensor veli palatini and styloid process [1]. Parapharyngeal space (PPS) tumors are rare, accounting for about 0.5% of head and neck tumors. Over 70 histological types exist, with roughly 80% benign and 20% malignant [2]. Consequently, tumors in this region pose significant challenges in preoperative evaluation and in selecting an appropriate surgical approach [3].

Benign salivary gland tumors, particularly pleomorphic adenoma of the deep lobe of the parotid gland, are the most common prestyloid lesions [4]. Poststyloid tumors are predominantly neurogenic, including schwannomas and paragangliomas [5]. Surgical excision remains the mainstay of treatment for parapharyngeal space tumors, with the choice of surgical approach tailored to tumor size, anatomical location, histology, and involvement of adjacent neurovascular structures. The transcervical approach is the most commonly employed, whereas more extensive or combined approaches are generally reserved for large, deeply located, or malignant lesions [6]. Global studies show that parapharyngeal space

tumors are rare and mostly benign, with pleomorphic adenoma being the most common type. Most patients present with a neck or intraoral mass, and surgical resection is the primary treatment in the majority of cases [5]. Most parapharyngeal space tumors are benign, commonly pleomorphic adenomas. Transcervical surgery is preferred, with vagus nerve injury as the main complication, and benign tumors show better long-term outcomes than malignant ones [7]. Clinical presentation is often non-specific, including neck swelling, intraoral bulge, foreign body sensation, dysphagia or pain, and many tumors are found at a substantial size due to delayed diagnosis [8]. Imaging with MRI and contrast CT is essential for preoperative planning and enables assessment of tumor extent, relation to major vessels and nerves, and assists in choosing the surgical approach [9].

Surgical excision remains the primary treatment modality for PSNs. Most studies describe the transcervical approach as the most common route, often supplemented by transparotid or other approaches in selected cases of deeper extension or larger tumors, to achieve adequate exposure and control of neurovascular structures with minimal morbidity [10]. Postoperative morbidity frequently involves cranial nerve

deficits, especially facial, vagal, or hypoglossal nerve dysfunction, which may be transient or permanent depending on tumor type and surgical complexity [9]. Alternative or combined approaches—such as transmandibular or transoral routes—are used selectively based on tumor size, location relative to anatomic compartments, and histologic characteristics to balance exposure and morbidity [11].

Parapharyngeal space tumors in Bangladesh are rare and mostly benign. A study result found 77% benign tumors, mainly pleomorphic adenoma and neurogenic tumors, presenting mostly as painless neck swelling, with surgical resection via the transcervical approach yielding good outcomes [12]. Another study reported 91% benign tumors, mostly of salivary or neurogenic origin, and emphasized that CT and FNAC aid preoperative planning for successful surgery with minimal complications [13].

Bangladeshi studies on parapharyngeal tumors are limited by small, single-center cohorts, lack of long-term outcomes, and minimal data on advanced surgical techniques or functional results, highlighting the need for larger, multicenter research. Therefore, this study aims to evaluate the clinicopathological features, surgical management, and outcomes of parapharyngeal space tumors in Bangladesh to provide more comprehensive data and address these gaps.

METHODS & MATERIALS

Study settings: This observational study took place at Otolaryngology-Head & Neck Surgery Department of a tertiary care hospital in Bangladesh from January 2024 to December 2024. Patients with tumors in the parapharyngeal space (PPS) who received surgical treatment were included. Exclusion criteria included incomplete medical documentation, previous surgery at a different facility, or follow-up duration of less than 6 months.

Data Collection: Demographic information (age, sex), clinical presentation (symptoms, duration), tumor attributes (size, location, histological examination), surgical method,

intraoperative observations, postoperative issues, recurrence, and length of hospital stay were obtained from hospital records. The tumor location was categorized as prestyloid or poststyloid, while size was evaluated through preoperative imaging (CT or MRI)

Surgical Management: The selected surgical method (transcervical, transparotid, transmandibular, or combined) was based on the size, position, and neurovascular involvement of the tumor. Tumor resection, whether complete or incomplete, was documented, along with complications occurring during and after the operation.

Histopathological Examination: Resected specimens were analyzed to identify tumor type, benign or malignant nature, and differentiation.

Outcome Measures: Key outcomes comprised the rate of complete resection, complications after surgery, recurrence of tumors, and duration of hospital stay. Secondary outcomes comprised the relationship between tumor type, size, and location and the chosen surgical method and complications.

Statistical Analysis: Data analysis was conducted using SPSS. Categorical variables were represented by frequencies and percentages, while continuous variables were expressed as mean $\pm$ standard deviation (SD)

RESULTS

A total of 30 patients with parapharyngeal space tumors were included in the study.

Demographic characteristics

In table I shows the mean age of the patients was 45.6 ± 12.3 years, with the majority belonging to the 30–50-year age group (46.7%), followed by those aged over 50 years (33.3%). Patients aged below 30 years constituted 20.0% of the study population. Males were more frequently affected (60.0%) than females (40.0%).

Table – I: Demographic Characteristics of Patients (n = 30)

Variable	Category	Frequency (n)	Percentage (%)
Age (years)	Mean $\pm$ SD	45.6 $\pm$ 12.3	-
	<30	6	20.0
	30–50	14	46.7
	>50	10	33.3
Sex	Male	18	60.0
	Female	12	40.0

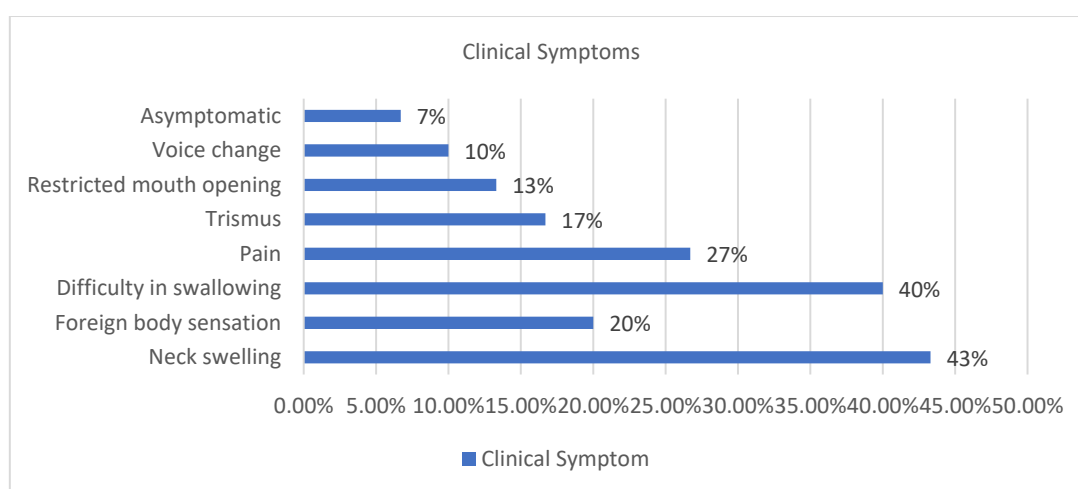


Figure – 1: Clinical Symptoms of Patients with Parapharyngeal Space Tumors

Clinical presentation

Figure 1 shows neck swelling was the most common presenting symptom, observed in 43.3% of patients, followed by difficulty in swallowing (40.0%) and pain (26.7%). A foreign body sensation in the throat was reported by 20.0% of patients. Trismus and restricted mouth opening were present in 16.7% and 13.3% of cases, respectively, while voice change was observed in 10.0%. Notably, 6.7% of patients were asymptomatic and were diagnosed incidentally.

Tumor characteristics

Table II presents most tumors were benign (76.7%), while 23.3% were malignant. The mean tumor size was 4.8 ± 1.6 cm, with the majority measuring between 3 and 5 cm (60.0%). Tumors smaller than 3 cm accounted for 13.3%, whereas those larger than 5 cm accounted for 26.7% of cases. Regarding location, 60.0% of tumors were located in the prestyloid compartment, and 40.0% in the poststyloid compartment of the parapharyngeal space.

Table – II: Tumor Characteristics (n = 30)

Characteristic	Category	Frequency (n)	Percentage (%)
Tumor Type	Benign	23	76.7
	Malignant	7	23.3
Tumor Size (cm)	Mean $\pm$ SD	4.8 ± 1.6	-
	<3cm	4	13.3
	3-5cm	18	60.0
	>5cm	8	26.7
Location in PPS*	Prestyloid	18	60.0
	Poststyloid	12	40.0

*PPS = Parapharyngeal Space

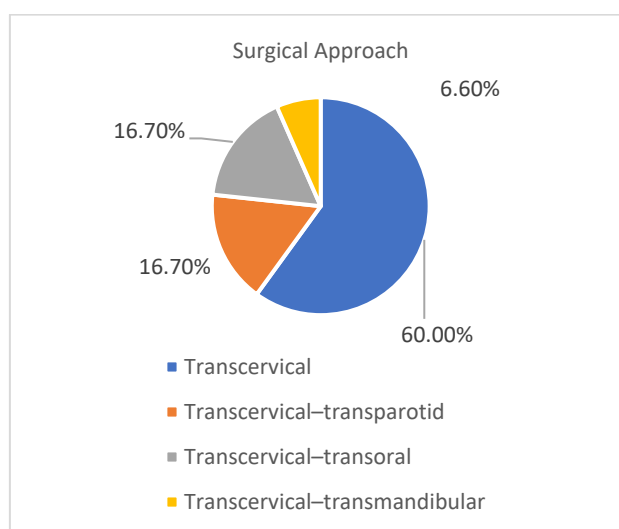


Figure II: Surgical Approaches (n = 30)

Surgical approaches

The most frequently employed surgical approach was the transcervical route, used in 60.0% of cases. Combined approaches included transcervical-transparotid and transcervical-transoral, each used in 16.7% of patients. The transcervical-transmandibular approach was required in 6.6% of cases (Figure II).

Surgical outcomes

Table III shows complete tumor resection was achieved in 86.7% of patients, while 13.3% had incomplete excision. Intraoperative complications occurred in 16.7%, and postoperative complications were observed in 20.0% of cases. Tumor recurrence within 6–12 months was documented in 6.7% of patients. The mean postoperative hospital stay was 5.2 ± 1.8 days.

Table – III: Surgical Outcomes (n = 30)

Outcome	Frequency (n)	Percentage (%)
Complete Resection	26	86.7
Incomplete Resection	4	13.3
Intraoperative Complications	5	16.7
Postoperative Complications	6	20.0
Recurrence (6–12 months)	2	6.7
Hospital Stay (days)	Mean $\pm$ SD	5.2 ± 1.8

Postoperative complications

Table IV presents most patients (80.0%) experienced no postoperative complications. The most common complication

was cranial nerve palsy (10.0%), followed by lower lip palsy (6.7%). Wound infection and facial nerve weakness were each observed in 3.3% of patients.

Table – IV: Postoperative Complications (n = 30)

Complication	Frequency (n)	Percentage (%)
Cranial nerve palsy	3	10.0
Lower lip palsy	2	6.7
Wound infection	1	3.3
Facial nerve weakness	1	3.3
No complication	24	80.0

Histopathological findings

Table V presents the most common histopathological diagnosis was pleomorphic adenoma (46.7%), followed by

schwannoma (16.7%) and paraganglioma (13.3%). Mucoepidermoid carcinoma accounted for 10.0% of tumors. Lipoma and other rare tumors each comprised 6.7% of cases.

Table – V: Histopathological Distribution (n = 30)

Tumor Type	Frequency (n)	Percentage (%)
Pleomorphic adenoma	14	46.7
Schwannoma	5	16.7
Paraganglioma	4	13.3
Mucoepidermoid carcinoma	3	10.0
Lipoma	2	6.7
Others	2	6.7

DISCUSSION

In our result of 30 patients, the average age was 45.6 ± 12.3 years, primarily between 30–50 years (46.7%), with a higher male representation (60%). Zhi et al. (2009) documented comparable results in 102 patients, averaging 44 ± 11 years old, with 48% aged 30–50 years, and 58% being male, reaffirming that tumors in the parapharyngeal space primarily impact middle-aged individuals with a minor male predominance [14].

In our study, the predominant symptoms included neck swelling (43.3%), difficulty swallowing (40%), pain (26.7%), and a sensation of a foreign body (20%), while trismus (16.7%), limited mouth opening (13.3%), and voice alteration (10%) were observed less frequently. Jiang et al. (2023) found comparable results in 177 patients, with neck swelling (45%), dysphagia (38%), pain (25%), and the sensation of a foreign body (22%), reinforcing that parapharyngeal space tumors frequently exhibit nonspecific mass-related symptoms [15].

In our present study, 76.7% of PPS tumors were non-cancerous, averaging 4.8 ± 1.6 cm in size, predominantly measuring 3–5 cm (60%), and 60% were situated in the prestyloid compartment. Galli et al. (2023) found comparable results in 98 patients: 75% benign, average size 4.6 ± 1.5 cm, 62% between 3–5 cm, and 61% prestyloid, reinforcing the prevalence of benign, moderate-sized tumors in the prestyloid area [8].

In our study, the transcervical method was utilized most frequently at 60%, while combined methods (transcervical-transparotid/transoral) accounted for 16.7%, and transcervical-transmandibular was used in 6.6% of instances. Bozza et al. (2009) found comparable results in 12 patients, where 58% had a transcervical approach, 25% used combined methods, and 17% underwent transcervical-transmandibular, verifying that tumor size and position influence the surgical method, and that the transcervical approach continues to be the main technique for PPS tumors, while combined or extended methods are allocated for larger or more complicated lesions [3].

In our study, complete surgical excision was achieved in 86.7% of cases, comparable to previously reported outcomes. Kuet et al. demonstrated high rates of successful tumor

removal in their systematic review, particularly for benign lesions, while emphasizing the technical challenges posed by the complex PPS anatomy [7]. Similar results were reported by Ijichi and Murakami, who highlighted the importance of careful preoperative assessment and tailored surgical planning [1].

The intraoperative (16.7%) and postoperative (20%) complication rates in our series fall within the ranges reported in earlier studies, where complications were mainly related to neurovascular involvement [1,7]. Zhu et al. noted a declining trend in complication rates and shorter hospital stays in more recent series, reflecting advances in imaging, surgical techniques, and perioperative care [16]. The recurrence rate of 6.7% in our cohort aligns with existing evidence indicating that recurrence is uncommon following complete excision and is often associated with incomplete resection or malignant disease [16].

In our investigation, 80% did not have any postoperative complications. The most frequent complications included cranial nerve palsy (10%), lower lip palsy (6.7%), along with wound infection and facial nerve weakness, each occurring in 3.3% of instances. These results are consistent with Kuet et al. (2014), who examined 1,293 PPS tumor cases and found cranial nerve injury in 12.7%, marginal mandibular nerve palsy in 7%, wound-related complications in 3%, and a majority of patients (77%) experienced an uncomplicated recovery, confirming that neurological issues are the primary postoperative risk, though overall morbidity stays low [7].

In our study, the most prevalent tumor was pleomorphic adenoma at 46.7%, followed by schwannoma at 16.7% and paraganglioma at 13.3%, with mucoepidermoid carcinoma comprising 10%. Dimitrijevic et al. (2010) also found pleomorphic adenoma (~45%), schwannoma (~15%), and paraganglioma (~12%) in 61 PPS tumors, verifying that benign salivary gland tumors are the most common PPS neoplasms, whereas malignant tumors occur less often [17]. Similar histopathological distributions were observed in regional studies, including those by Salam et al. and Khanam et al., where pleomorphic adenoma was identified as the

predominant tumor type, with schwannoma being the most frequent neurogenic lesion [18,19].

CONCLUSION

Parapharyngeal space tumors are rare and predominantly benign, most commonly presenting with neck swelling, dysphagia, or pain. Surgical excision, primarily via the transcervical approach, achieves high rates of complete resection with low recurrence and acceptable complication rates. Pleomorphic adenoma is the most frequent histopathology, and overall outcomes are favorable. Careful preoperative assessment and surgical planning are essential to minimize complications and optimize recovery.

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