**Scholars Journal of Applied Medical Sciences**
Abbreviated Key Title: Sch J App Med Sci
ISSN 2347-954X (Print) | ISSN 2320-6691 (Online)
Journal homepage: https://saspublishers.com

OPEN ACCESS

ENT

# Surgical Management of Primary Parapharyngeal Space Tumors in 30 Patients in A Tertiary Care Hospital

Dr. Miraj Ahmed[1*], Dr. Mazharul Alam Siddique[2], Dr. Md. Mominur Islam[3], Dr. Ashraful Alam[4], Dr. Mohammad Nuruzzaman[5], Dr. Debopran Roy[6]

[1]Dr. Miraj Ahmed, Assistant Professor, Department of ENT & Head-Neck Surgery, Mymensingh Medical College Hospital, Mymensingh, Bangladesh
[2]Dr. Mazharul Alam Siddique, Associate Professor, Department of ENT, Mymensingh Medical College, Mymensingh, Bangladesh
[3]Dr. Md. Mominur Islam, Junior Consultant, Department of ENT, Mymensingh Medical College Hospital, Mymensingh, Bangladesh
[4]Dr. Ashraful Alam, Registrar, Department of ENT & Head Neck Surgery, Mymensingh Medical College Hospital, Mymensingh, Bangladesh
[5]Dr. Mohammad Nuruzzaman, Assistant Professor, Department of ENT, Mymensingh Medical College, Mymensingh, Bangladesh
[6]Dr. Debopran Roy, MS, Department of ENT, Mymensingh Medical College, Mymensingh, Bangladesh

**DOI:** https://doi.org/10.36347/sjams.2025.v13i01.001 | **Received:** 09.11.2024 | **Accepted:** 17.12.2024 | **Published:** 03.01.2025

***Corresponding author:** Dr. Miraj Ahmed
Assistant Professor, Department of ENT & Head-Neck Surgery, Mymensingh Medical College Hospital, Mymensingh, Bangladesh

**Abstract** **Original Research Article**

***Background:*** The parapharyngeal space (PPS) is a deep compartment of the neck, making the surgical management of primary tumors in this area complex and challenging due to its anatomical location, close to vital structures like the carotid artery, internal jugular vein, cranial nerves, and skull base. ***Objectives:*** The aim of the study was to evaluate the surgical management of primary parapharyngeal space tumors in 30 patients in a tertiary care hospital. ***Methods:*** This cross-sectional study was carried out in the ENT & Head-Neck Surgery, Mymensingh medical college hospital, Mymensingh, during January 2023 to December 2023. A total of 30 patients participated in the study. Statistical analyses of the results were obtained by using window-based Microsoft Excel and Statistical Packages for Social Sciences (SPSS-24). ***Results:*** The age distribution of the study population revealed that 16.66% of the patients were between the ages of 20 and 30. Furthermore, 36.66% were between the ages of 30 and 40, with 23.33% falling between the ages of 40 and 50. The majority 18 (60%) were male, while 12 (40%) were female. According to the primary symptoms, 43.33% of patients had intraoral mass, 36.66% had dysphagia, 16.66% had ear fullness, 13.33% had obstructive sleep apnea, 10.0% had hoarseness, and 3.33% had tongue deviation. ***Conclusion:*** Surgical resection is the main treatment for PPS tumors, with relatively low rates of recurrence and death. For superior PPS tumors, the surgical navigation system can substantially shorten the operative duration and is more suitable for larger tumors.

**Keywords:** parapharyngeal space (PPS), Anatomical location, Surgical resection and Tumors.



## INTRODUCTION

Primary tumors of the parapharyngeal space (PPS), an inverted pyramid-shaped region lateral to the pharynx that extends from the base of the skull to the larger cornu of the hyoid bone, account for just 1.5% of head and neck cancer [1]. However, the histology of these tumors varies; 70 types have been reported [2]. Parapharyngeal space tumors (PSTs) may remain unnoticed for a long time and may eventually be identified by mistake, because the symptoms are numerous and may fail to draw the patient's attention [3].

Parapharyngeal space (PPS) tumors are uncommon, accounting for only 0.5% of all head and neck tumors and exhibiting an intriguingly varied histology [4]. It is also worth noting that many of the tumors seen in PPS are not primary PPS disease, but rather metastatic or directly spreading cancers from surrounding regions. The primary PPS tumor can arise in either the prestyloid or the poststyloid compartments, which are divided by fascia between the styloid process and the tensor veli palatini muscle [5]. Salivary gland tumors, lipomas, lymphomas, and, on rare occasions, neurogenic tumors are the most prevalent prestyloid cancers. The poststyloid compartment, on the other hand, contains the internal jugular vein, carotid artery, vagus nerve, and sympathetic plexus, hence the majority of tumors there are neurogenic. Most PPS tumors are benign, with only 10 to 20% of them becoming malignant [6]. PPS tumors are difficult to control.

Currently, surgery with a properly chosen approach is the primary modality of treatment, whereas radiotherapy is used to handle unresectable tumors, as an adjuvant treatment, or in patients who are at high risk of cranial nerve injury during surgery [7].

The styloid process and the tensor vascular styloid fascia typically divide the PPS into two compartments: the pre-styloid compartment contains mostly fat with some ectopic salivary tissue, and the post-styloid compartment contains the internal carotid artery, internal jugular vein, lower cranial nerves, sympathetic nerve chain, and lymph nodes [8]. Tumors can develop from any of these structures, resulting in a wide range of neoplasms in this anatomical region; the majority are benign. Complementary imaging examinations, particularly computerized tomography (CT) and magnetic resonance imaging (MRI), are suggested imaging techniques, and surgery is performed using the information obtained from these diagnostic modalities [9]. Surgery necessitates appropriate exposure to detect and protect critical anatomical structures. PSTs are commonly resected using transcervical or transcervical-transparotid surgical techniques [10].

## METHODOLOGY

This cross-sectional study was carried out in the Department of ENT & Head-Neck Surgery, Mymensingh Medical College Hospital, Mymensingh, during January 2023 to December 2023. A total of 30 patients were participated in the study and both patients were male and female. After taking consent and matching eligibility criteria, data were collected from patients on variables of interest using the predesigned structured questionnaire by interview, observation. Statistical analyses of the results were obtained by using window-based Microsoft Excel and Statistical Packages for Social Sciences (SPSS-24).

## RESULTS

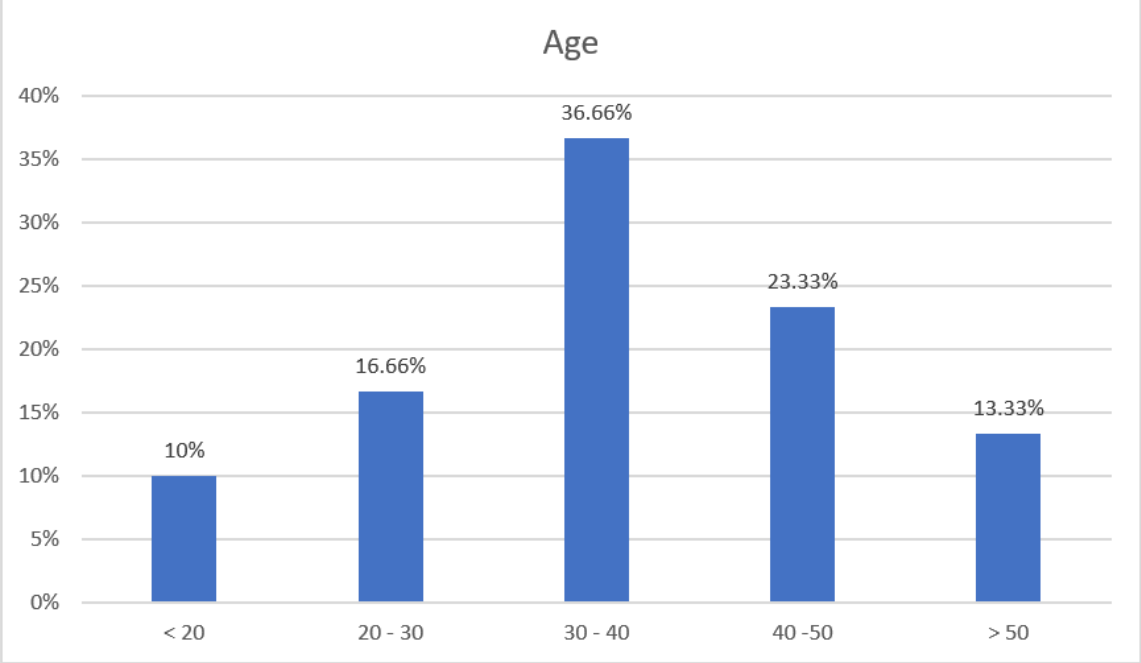


**Figure-1: Age distribution of the study population (n=30)**

Figure-1 shows age distribution of the study population, it was observed that 16.66% patients belonged to age 20-30 years. Besides, 36.66% patients belonged to age 30-40 years and 23.33% patients belonged to age 40-50 years respectively.

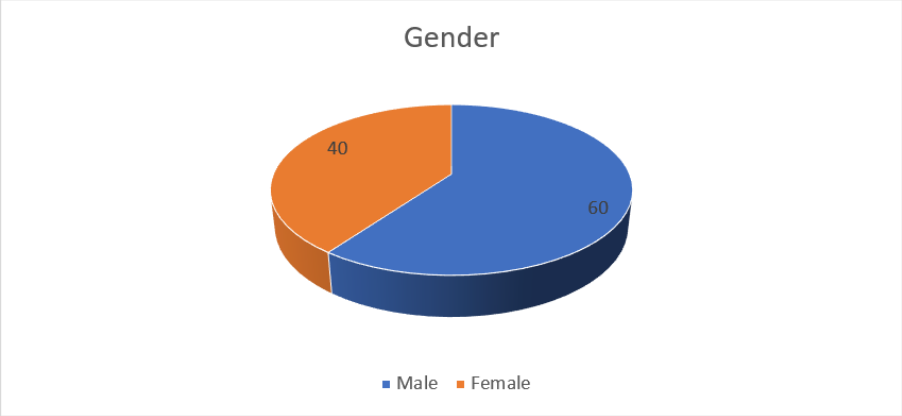


**Figure -2: Sex distribution of the study population (n=30)**

Figure - 2 shows sex distribution of the study population, it was observed that majority 18(60%) patients were male and 12(40%) patients were female.

**Table – 1: Socioeconomic condition of study population (n=30)**

| Socioeconomic condition | n=30 | % |
|---|---|---|
| Low | 10 | 33.33 |
| Middle | 11 | 36.66 |
| High | 9 | 30 |

Table - 2 shows socioeconomic status of the study population, it was observed that 33.33% of the patients come from low class, 36.66% of the patients come from middle class and 30% of the patients come from high class family respectively.

**Table 2: Distribution of study population according to main symptoms (n=30)**

| Symptoms | n=30 | % |
|---|---|---|
| Intraoral mass/neck mass | 13 | 43.33 |
| Dysphagia/foreign body sensation | 11 | 36.66 |
| Symptom free | 8 | 26.66 |
| Ear fullness/hearing loss/tinnitus | 5 | 16.66 |
| Obstructive sleep apnea | 4 | 13.33 |
| Painful throat | 4 | 13.33 |
| Hoarseness | 3 | 10.00 |
| Pain (facial) | 3 | 10.00 |
| Dysarthria | 3 | 10.00 |
| Difficulty in opening mouth | 4 | 13.33 |
| Headaches | 2 | 6.66 |
| Epistaxis/nasal obstruction | 2 | 6.66 |
| Tongue deviation | 1 | 3.33 |
| Paresthesia (facial) | 1 | 3.33 |

Table - 2 shows main symptoms of the study population, it was observed that 43.33% patients had Intraoral mass, 36.66% had Dysphagia, 16.66% had Ear fullness, 13.33% had Obstructive sleep apnea, 10.00% had Hoarseness and 3.33% had Tongue deviation respectively.

**Table 3: Distribution of study population according to complications (n=30)**

| Symptoms | n=30 | % |
|---|---|---|
| Nerve injury | 13 | 43.33 |
| Vascular complications | 3 | 10.00 |
| Postoperative complications | | |
| Infection | 7 | 23.33 |
| Hematoma | 2 | 6.66 |
| Prolonged healing times | 5 | 16.66 |

Table - 3 shows complications of the study population, it was observed that 13(43.33%) patients had Nerve injury, 3(10.00%) had Vascular complications, 7(23.33%) had Infection, 2(6.66%) had Hematoma and 5(16.66%) had Prolonged healing times respectively.

**Table 4: Distribution of study population according to tumor types (n=30)**

| Tumor Types | n=30 | % |
|---|---|---|
| **Benign** | | |
| Neurilemmoma | 20 | 66.66 |
| Pleomorphic adenoma | 10 | 33.33 |
| Basal cell adenoma | 5 | 16.66 |
| Hemangioma | 4 | 13.33 |
| Inflammatory myofibroblastic tumor | 3 | 10.00 |
| Paraganglioma | 2 | 6.66 |
| Lymphoepithelial cyst | 2 | 6.66 |
| Neurofibroma | 1 | 3.33 |
| Lipoma | 1 | 3.33 |
| Intramuscular hemangioma | 1 | 3.33 |
| Ganglioneuroma | 1 | 3.33 |
| **Malignant** | | |
| Adenocarcinoma | 5 | 16.66 |
| Lymphoma | 4 | 13.33 |
| Embryonal rhabdomyosarcoma | 2 | 6.66 |
| Malignant solitary fibrous tumor | 1 | 3.33 |
| Unidirectional synoviosarcoma | 1 | 3.33 |
| Malignant myoepithelioma | 1 | 3.33 |
| Malignant hemangiopericytoma | 1 | 3.33 |

Table - 4 shows the tumor types of the study population. It was observed that among Benign group, 20(66.66%) patients had Neurilemmoma, 10(33.33%) had Pleomorphic adenoma, 4(13.33%) had Hemangioma, 3(10.00%) had Inflammatory myofibroblastic tumor, 2(6.66%) had Paraganglioma and 1(3.33%) had Neurofibroma respectively. And among the Malignant group, it was observed that, 5(16.66%) patients had Adenocarcinoma, 4(13.33%) had Lymphoma, 2(6.66%) had Embryonal rhabdomyosarcoma and 1(3.33%) had Malignant solitary fibrous tumor respectively.

**Table 5: Distribution of the surgical approaches of study population (n=30)**

| Symptoms | n=30 | % |
|---|---|---|
| Transcervical | 13 | 43.33 |
| Transcervical-transparotid/Transparotid | 3 | 10.00 |
| Transcervical-transmandibular | 5 | 16.66 |
| Transoral/Transoral + transcervical | 3 | 10.00 |
| Infratemporal fossa | 1 | 3.33 |
| Lateral base of skull | 1 | 3.33 |
| Transnasal | 3 | 10.00 |
| Others | 1 | 3.33 |

Table - 5 shows the surgical approaches of the study population, it was observed that 13(43.33%) patients had Transcervical, 5(16.66%) had Transcervical-transmandibular, 1(3.33%) had Infratemporal fossa and 3(10.00%) had Transnasal respectively.

## DISCUSSION

This cross-sectional study was carried out in the Department of ENT & Head-Neck Surgery, Mymensingh Medical College Hospital, Mymensingh, during January 2023 to December 2023. A total of 30 patients participated in the study. The PPS is defined as an inverted pyramid, with the base near the skull base and the peak pointing toward the hyoid bone. This anatomical compartment is seated deeply and bordered by other anatomically specified areas. PPS anatomy is complicated, making clinical assessment difficult, and a direct surgical approach impossible. PPS-related tumors are the most difficult for head and neck surgeons to treat because of their rarity, late manifestation, difficulty in establishing a diagnosis, diverse histology, and complex surgical therapy.

In our present study, the age distribution of the study population revealed that 16.66% of the patients were between the ages of 20 and 30. Furthermore, 36.66% were between the ages of 30 and 40, with 23.33% falling between the ages of 40 and 50. The majority among patients, 18 (60%), were male, while 12 (40%) were female. According to socioeconomic status, 33.33% of patients are from the low class, 36.66% from the middle class, and 30% from the high class.

Several surgical methods have been developed to help remove PSTs. The approach should be determined by the tumor's location, size, relationship to the carotid artery and jugular vein, suspicion of malignancy, and proximity to the base of the skull [3]. Post styloid tumors are typically located in the upper part of the PPS, near the skull base, and necessitate a broad transcervical-transparotid approach; pre-styloid tumors may always be removed using a pure transcervical technique. However, standard approaches for pre- and post-styloid lesions are still being debated. According to the Iglesias-Moreno report, neurogenic tumors typically arise in the post-styloid region [11]. Another study found that tumor location in either the pre- or post-styloid area did not influence the decision to undergo a transcervical resection [12]. In our study, among the study population's surgical approaches, 13(43.33%) were transcervical, 5(16.66%) were transcervical-transmandibular, 1(3.33%) was infratemporal fossa, and 3 (10.00%) were transnasal.

Our study also observed that, according to the type of benign tumor, 20(66.66%) patients had Neurilemmoma, 10 (33.33%) had Pleomorphic adenoma, 4(13.33%) had Hemangioma, 3(10.00%) had Inflammatory myofibroblastic tumor, 2(6.66%) had Paraganglioma, and 1(3.33%) had Neurofibroma. In terms of malignant tumors, 5(16.66%) patients had adenocarcinoma, 4(13.33%) had lymphoma, 2(6.66%) had embryonic rhabdomyosarcoma, and 1(3.33%) had malignant solitary fibrous tumor.

PPS tumors' proximity to neurovascular structures frequently results in serious neurological consequences, which can be noticed before or after surgery. In malignant pathologies, nerve involvement occurs early owing to infiltration, but in benign pathologies, the tumor grows to a significant size before palsy becomes visible [13]. The following surgical methods can be utilized to remove parapharyngeal tumors: transcervical, combined transcervical-transparotid, transmandibular, transoral, and transoral robotic approach. The location, size, histology, and relationship to other anatomical structures all influence the technique chosen [14].

In our series, according to the study population's major symptoms, 43.33% of patients had intraoral mass, 36.66% had dysphagia, 16.66% had ear fullness, 13.33% had obstructive sleep apnea, 10.00% had hoarseness, and 3.33% had tongue deviation. In terms of complications, 13 (43.33%) patients had nerve injuries, 3(10.00%) had vascular issues, 7(23.33%) had infections, 2(6.66%) had hematomas, and 5(16.66%) had prolonged healing durations.

Imaging plays a crucial role in the diagnosis and therapy of PPS tumors. The many imaging techniques available for PPS tumors include MRI, CECT scan, and angiography, all of which are complimentary. The origin of the lesion can influence the surgical strategy. Imaging can assist determine the origin of the tumor by examining the fat displacement pattern in PPS [15]. There are a few advantages to MRI, which is said to be superior to a CT scan in terms of soft tissue contrast resolution between PPS masses and surrounding fat, although a CT scan's spatial resolution clearly defines essential structures. The MRI allows for a more accurate assessment of the margins, stage of the disease, and fat infiltration. It can also be used to assess skull base or perineural spread in circumstances where a CT scan is unclear [16].

**Limitations of the study**

The present study was conducted in a very short period due to time constraints and funding limitations. The small sample size was also a limitation of the present study.

## CONCLUSION

PPS tumors emerge from an anatomically complex location and have a heterogeneous histology. The majority of these tumors are benign and indolent, becoming symptomatic only when they reach considerable sizes. Multiple cranial nerve palsies are frequently associated with neurogenic tumors originating in the poststyloid region. The MRI is the most effective imaging modality for diagnosis; nevertheless, the CT scan and angiography are complementing. A multidisciplinary strategy combining head and neck surgeons, radiologists, and oncologists is critical for optimizing surgical outcomes in the treatment of PPS tumors. Surgery is the primary treatment option, and the majority of these tumors can be accessed using a transcervical technique.

## RECOMMENDATION

This study can serve as a pilot to much larger research involving multiple centers that can provide a nationwide picture, validate regression models proposed in this study for future use and emphasize points to ensure better management and adherence.

## ACKNOWLEDGEMENTS

The wide range of disciplines involved in surgical management of primary parapharyngeal space tumors in 30 patients in tertiary care hospital research

means that editors need much assistance from references in the evaluation of papers submitted for publication. I would also like to be grateful to my colleagues and family who supported me and offered deep insight into the study.

## REFERENCE


1. Shahab, R., Heliwell, T., & Jones, A. S. (2005). How we do it: a series of 114 primary pharyngeal space neoplasms. *Clinical Otolaryngology: Official Journal of ENT-UK; Official Journal of Netherlands Society for Oto-rhino-laryngology & Cervico-facial Surgery*, *30*(4), 364-367.
2. Riffat, F., Dwivedi, R. C., Palme, C., Fish, B., & Jani, P. (2014). A systematic review of 1143 parapharyngeal space tumors reported over 20 years. *Oral oncology*, *50*(5), 421-430.
3. Dimitrijevic, M. V., Jesic, S. D., Mikic, A. A., Arsovic, N. A., & Tomanovic, N. R. (2010). Parapharyngeal space tumors: 61 case reviews. *International journal of oral and maxillofacial surgery*, *39*(10), 983-989.
4. Dang, S., Shinn, J. R., Seim, N., Netterville, J. L., & Mannion, K. (2019). Diagnosis and treatment considerations of parapharyngeal space masses–A review with case report. *Otolaryngology Case Reports*, *11*, 100120.
5. Mendenhall, W. M., Strojan, P., Beitler, J. J., Langendijk, J. A., Suarez, C., Lee, A. W., ... & Ferlito, A. (2019). Radiotherapy for parapharyngeal space tumors. *American Journal of Otolaryngology*, *40*(2), 289-291.
6. Riffat F, Dwivedi RC, Palme C, Fish B, Jani P. A systematic review of 1143 parapharyngeal space tumors reported over 20 years. Oral oncology. 2014 May 1;50(5):421-30..
7. Stambuk HE, Patel SG. Imaging of the parapharyngeal space. Otolaryngologic Clinics of North America. 2008 Feb 1;41(1):77-101..
8. Iglesias-Moreno, M. C., López-Salcedo, M. A., Gómez-Serrano, M., Gimeno-Hernández, J., & Poch-Broto, J. (2016). Parapharyngeal space tumors: fifty-one cases managed in a single tertiary care center. *Acta Oto-Laryngologica*, *136*(3), 298-303.
9. Hughes III, K. V., Olsen, K. D., & McCaffrey, T. V. (1995). Parapharyngeal space neoplasms. *Head & neck*, *17*(2), 124-130.
10. Zhi, K., Ren, W., Zhou, H., Wen, Y., & Zhang, Y. (2009). Management of parapharyngeal-space tumors. *Journal of Oral and Maxillofacial Surgery*, *67*(6), 1239-1244.
11. Iglesias-Moreno, M. C., López-Salcedo, M. A., Gómez-Serrano, M., Gimeno-Hernández, J., & Poch-Broto, J. (2016). Parapharyngeal space tumors: fifty-one cases managed in a single tertiary care center. *Acta Oto-Laryngologica*, *136*(3), 298-303.
12. Cohen, S. M., Burkey, B. B., & Netterville, J. L. (2005). Surgical management of parapharyngeal space masses. *Head & Neck: Journal for the Sciences and Specialties of the Head and Neck*, *27*(8), 669-675.
13. Muraz, E., Delemazure, A. S., Mourrain-Langlois, E., Bourget, K., Malard, O., & Frampas, E. (2016). Peripharyngeal space tumors: can magnetic resonance and multidetector-row computed tomography help predict location, malignancy and tumor type?. *Diagnostic and Interventional Imaging*, *97*(6), 617-625.
14. Chen, H., Sun, G., Tang, E., & Hu, Q. (2019). Surgical treatment of primary parapharyngeal space tumors: a single-institution review of 28 cases. *Journal of Oral and Maxillofacial Surgery*, *77*(7), 1520-e1.
15. Stambuk, H. E., & Patel, S. G. (2008). Imaging of the parapharyngeal space. *Otolaryngologic Clinics of North America*, *41*(1), 77-101.
16. Muraz, E., Delemazure, A. S., Mourrain-Langlois, E., Bourget, K., Malard, O., & Frampas, E. (2016). Peripharyngeal space tumors: can magnetic resonance and multidetector-row computed tomography help predict location, malignancy and tumor type?. *Diagnostic and Interventional Imaging*, *97*(6), 617-625.