



**ORIGINAL ARTICLE**

**Age and Gender Differences with Clinical Presentation of Patients with Histopathological and CT-Scan Confirmed Parapharyngeal Tumor**

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**Abstract**

**Background:** Parapharyngeal Mass can occur in different age and gender group with varied clinical features. **Objective:** The purpose of the present study was to see the age and gender differences with clinical presentation of patients with histopathological and CT-scan confirmed parapharyngeal mass. **Methodology:** This was a cross sectional type of study. This study was carried out in the Department of Radiology and Imaging at Dhaka Medical College, Dhaka, Bangladesh. This study was carried out from January 2014 to December 2016. Clinically suspected cases of para pharyngeal space mass lesions attended in the otolaryngology and Radiology & Imaging department of Dhaka Medical College, Dhaka, Bangladesh were enrolled in this study. The patient in this study was evaluated according to the management plan for surgery followed in Otolaryngology department, which includes History, Clinical examination, CT-scan and Histopathology. Detail history about the illness, chief complains taken in formatted history sheet. All patients were undergone CT examination of neck in the Department of Radiology and Imaging at Dhaka Medical College, Dhaka. After resection of the mass, the specimen was sent to histopathological examination to the Department of Pathology at Dhaka Medical College, Dhaka, Bangladesh. **Results:** Male and female ratio was 2.57:1. Maximum 54% patients were belonged to 21-40 years' age group followed by 38% 41 and above age group and 8.0% up to 20 years' age group. Mean ( $\pm$ SD) age of the patients was 37.76 (14.82). Presence of mass, fever, malaise, pain, otalgia or fullness in ear, dysphagia, facial nerve dysfunction, trismus, dyspnea and deviation of tongue were the main presenting features of this study. Out of all lesions 58% were in left parapharyngeal space and 42% were in right. Of all patients, 20% had nerve sheath tumour (14% schwannoma & 6% neurofibroma), 6% had paraganglioma, 14% had chronic nonspecific lymphadenitis, 12% had tuberculosis, 16% had squamous cell carcinoma (invasion from adjacent spaces). Parotid pleomorphic adenoma (6%) & mucoepidermoid carcinoma (4%). Rests had, lipoma (4.0%), branchial cleft cyst (4.0%), lymphoma (6.0%), and abscess (2.0%). After histopathological evaluation 24% were malignant and 76% were benign. **Conclusion:** In conclusion majority of the study population are young adult male presented with mass, fever and malaise. [*Journal of Current and Advance Medical Research, January 2023;10(1):25-30*]

**Keywords:** Age and gender differences; clinical presentation; histopathological examination; CT-scan; parapharyngeal mass

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## Introduction

Tumors of the parapharyngeal space are uncommon, comprising less than 1.0% of all head and neck neoplasms<sup>1</sup>. Both benign and malignant tumors may arise from any of the structures contained within the parapharyngeal space. Of parapharyngeal space tumors, 70.0% to 80.0% cases are benign, and 20.0% to 30.0% cases are malignant<sup>2</sup>. Most parapharyngeal space tumors are of salivary or neurogenic origin, although metastatic lesions; lymphoreticular lesions; and a variety of uncommon, miscellaneous lesions may arise in this location<sup>3</sup>.

Neoplasms of salivary gland origin are located in the prestyloid parapharyngeal space and account for 40-50.0% of parapharyngeal space lesions<sup>4</sup>. Salivary neoplasms may arise from the deep lobe of the parotid gland, ectopic salivary rests, or minor salivary glands of the lateral pharyngeal wall. The prevalence of neoplasms that arise within the deep lobe of the parotid gland is identical to that of those that arise in the superficial lobe.

The most common prestyloid parapharyngeal space lesion is pleomorphic adenoma, which represents 80.0% to 90.0% of salivary neoplasms in the parapharyngeal space<sup>5</sup>. Other benign salivary lesions, including Warthin tumors and oncocytomas, develop in the prestyloid parapharyngeal space, as do malignant salivary lesions. Carcinoma ex pleomorphic adenoma and adenoid cystic carcinoma are the most frequently reported salivary malignancies of the parapharyngeal space. Approximately 20.0% of all salivary lesions in the parapharyngeal space are malignant<sup>6</sup>.

Common benign neoplasms include pleomorphic adenomas, monomorphic adenomas, and oncocytomas; however, the malignant neoplasms include adenoid cystic carcinomas, mucoepidermoid carcinomas, adenocarcinomas, and acinic cell carcinomas<sup>7</sup>. Neurogenic lesions are the most common tumors of the poststyloid parapharyngeal space and account for 25.0% to 30.0% of parapharyngeal space lesions<sup>8</sup>.

Neurilemmomas are the most commonly encountered lesions, followed in frequency by paragangliomas and neurofibromas. Benign neurogenic lesions include neurilemoma (schwannoma), paraganglioma, neurofibroma, and ganglioneuroma; however, the malignant neurogenic lesions include

malignant paraganglioma, neurofibrosarcoma, schwannosarcoma, and sympatheticoblastoma<sup>9</sup>.

Neurilemmomas, or schwannomas, are the most common neurogenic tumors and arise from any nerve surrounded by Schwann cells. In the parapharyngeal space, the most common sites of origin are the vagus nerve and the sympathetic chain; again neurilemmomas are slow growing and rarely cause palsy of the nerve of origin and these are encapsulated and histologically distinct from the nerve itself<sup>10</sup>. Treatment is by enucleation, and preservation of the nerve of origin is usually possible; however, every patient should be cautioned about the possibility of postoperative paralysis. Paragangliomas are benign vascular neoplasms that arise from the paraganglia or extra-adrenal neural crest tissue. Paraganglia function as chemoreceptors and are associated with the carotid body, the jugular bulb, and the vagus nerve in the poststyloid parapharyngeal space. Carotid body tumors, glomus jugulare, and glomus vagale are slow-growing paragangliomas that may not produce symptoms but do cause cranial nerve deficits, bone erosion, or intracranial extension as they increase in size<sup>11</sup>.

Approximately 2.0% cases of head and neck paragangliomas secrete catecholamines and may cause paroxysmal symptoms of catecholamine excess<sup>12</sup>. Ten percent of paragangliomas are multiple and associated with paraganglioma at other locations. Ten percent of paragangliomas are hereditary, associated with a familial paraganglioma syndrome. In patients with hereditary paraganglioma, the prevalence of multicentricity is 35.0% cases<sup>13</sup>.

Hypertension and flushing are suggestive of either a secreting paraganglioma or an associated pheochromocytoma. If these symptoms are present, obtain urinary catecholamine levels. If the level of catecholamines is elevated, rule out a concomitant pheochromocytoma. Malignant transformation occurs in fewer than 10.0% of patients and is associated with rapid growth and development of metastatic disease<sup>14</sup>. The purpose of the present study was to see the age and gender differences with clinical presentation of patients with histopathological and CT-scan confirmed parapharyngeal mass.

## Methodology

**Study Design and Population:** This was a cross sectional type of study. This study was carried out

in the Department of Radiology and Imaging at Dhaka Medical College, Dhaka, Bangladesh. This study was carried out from January 2014 to December 2016. Clinically suspected cases of parapharyngeal space mass lesions attended in the otolaryngology and Radiology & Imaging department of Dhaka Medical College, Dhaka, Bangladesh were enrolled in this study.

Patient having clinical suspicion of parapharyngeal space mass lesions who undergone CT scan with all patients of all age group irrespective of their sex were selected as study population. Patients who were not willing to undergo surgery, patients who were not fit for surgery and patients whose histopathology reports were not available were excluded from this study.

**Study Procedure:** Samples were selected purposively among the patients having parapharyngeal space mass lesion who were attended in the Radiology department. The patient in this study was evaluated according to the management plan for surgery followed in Otolaryngology department, which includes History, Clinical examination, CT-scan and Histopathology. Detail history about the illness, chief complains taken in formatted history sheet. Research instruments were a pre-tested questionnaire and CT scan machine. After informing all the necessary information regarding the research study, data were collected in a pre-designed structured data collection sheets.

**CT-Scan Technique:** All patients were undergone CT-scan examination of neck in the Department of Radiology and Imaging, BSMMU, Dhaka, Bangladesh. CT scan was performed with a third generation CT machine, Hitachi W2000. (3-5) mm thick contiguous slice was taken. These scans were obtained using 120 kV, 150 mA and 1 sec scanning time for 1 slice. From skull base to root of the neck was scanned. Both pre and post contrast scans were performed. 50 ml of non-ionic water soluble iodinated contrast media of 370 strengths was administered. Immediately after completion of bolus injection 3 to 5 mm contiguous slice was obtained.

**Lymphadenopathy in Parapharyngeal Space:** Deep cervical chain of lymph node is situated in retrostyloid parapharyngeal space. Enlargement of the lymph nodes are one of the commonest causes of neck mass. Common causes of lymphadenopathy are- metastatic Ca from aerodigestive tract, lymphoma, inflammatory adenopathy, abscess,

tuberculosis. Multiple masses in the neck are most likely secondary to nodal enlargement. The key to limiting differential diagnosis is correlation with clinical history.

**Histopathological Examination:** After resection of the mass, the specimen was sent to histopathological examination to the Department of Pathology at Dhaka Medical College, Dhaka, Bangladesh.

**Statistical Analysis:** Statistical analysis was performed by Windows based software named as Statistical Package for Social Science (SPSS), versions 25.0 (IBM SPSS Statistics for Windows, Version 25.0. Armonk, NY: IBM Corp.). Continuous data were expressed as mean, standard deviation, minimum and maximum. Categorical data were summarized in terms of frequency counts and percentages. Every effort was made to obtain missing data.

**Ethical consideration:** All procedures of the present study were carried out in accordance with the principles for human investigations (i.e., Helsinki Declaration) and also with the ethical guidelines of the Institutional research ethics. Formal ethics approval was granted by the local ethics committee. Participants in the study were informed about the procedure and purpose of the study and confidentiality of information provided. All participants consented willingly to be a part of the study during the data collection periods. All data were collected anonymously and analyzed using the coding system.

## Results

A total number of 50 patients were recruited for this study. Out of all patients 72.0% were male and 28% were female. Male and female ratio was 2.57:1 (Table 1).

**Table 1: Distribution of the patients by gender (n=50)**

Gender	Frequency	Percent
Male	36	72.0
Female	14	28.0
<b>Total</b>	<b>50</b>	<b>100.0</b>

Male: Female = 2.57: 1

Out of all patients' maximum 54.0% cases were belonged to 21 to 40 years' age group followed by 38.0% 41 and above age group and 8.0% up to 20 years' age group. Mean ( $\pm$ SD) age of the patients

was 37.76 (14.82) (Table 2).

**Table 2: Distribution of the Patients by Age (n=50)**

Age Group	Frequency	Percent
≤20 Years	4	8.0
21 to 40 Years	27	54.0
More than 41 Years	19	38.0
<b>Total</b>	<b>50</b>	<b>100.0</b>

Mean ± SD (Range) = 37.76 ± 14.82 (2.7-72.0)

The distribution of the patients by duration of the symptoms of the diseases were recorded. Maximum 62% patients had suffering up to one year followed by 22% 1-2 years. Rests 10.0% and 6.0% had suffering 2-3 years and more than 3 years respectively (Table 3).

**Table 3: Distribution of duration of symptoms at presentation (n=50)**

Duration of Symptoms	Frequency	Percent
≤1 year	31	62.0
1 to 2 Years	11	22.0
2 to 3 Years	5	10.0
More than 3 Years	3	6.0
<b>Total</b>	<b>50</b>	<b>100.0</b>

Mean ± SD (Range) = 1.34 ± 1.32 (0.17-7.50)

The distribution of the patients by clinical presentations were recorded. Out of all patients 92% had mass, 50% had fever, 44.0% had complaints of malaise, 42% had pain, 36% had otalgia or fullness in ear, 34% had dysphagia, 18% had facial nerve dysfunction, 14% had trismus, 6% had dyspnea and 4% had deviation of tongue (Table 4).

**Table 4: Distribution of the patients by clinical presentation**

Clinical presentation	Frequency	Percent
Mass	46	92.0
Fever	25	50.0
Malaise	22	44.0
Pain	21	42.0
Otalgia/fullness in ear	18	36.0
Dysphagia	17	34.0
Facial nerve dysfunction	9	18.0
Trismus	7	14.0
Dyspnoea	3	6.0
Deviation of tongue	2	4.0

\*Multiple responses

The distribution of the histopathologic diagnosis of patients having parapharyngeal neoplasm were

found among the study population. Out of all patients 22.0% cases had squamous cell carcinoma, 18.0% cases had schwannoma and 14.0% cases had paraganglioma, 14.0% cases had chronic nonspecific lymphadenitis, 12% had tuberculosis. Rests had pleomorphic adenoma (6.0%), neurofibroma (6.0%), lipoma (4.0%), branchial cleft cyst (4.0%), lymphoma (6.0%), mucoepidermoid carcinoma (4%) and abscess (2.0%) (Table 5).

**Table 5: Distribution of the Patients by Histopathological Diagnosis**

Histopathological Diagnosis	Frequency	Percent
Squamous cell carcinoma	11	22.0
Schwannoma	9	18.0
Paraganglioma	7	14.0
Chronic Nonspecific Lymphadenitis	7	14.0
Tuberculosis	6	12.0
Pleomorphic adenoma	3	6.0
Neurofibroma	3	6.0
Lipoma	2	4.0
Branchial cleft cyst	2	4.0
Lymphoma	3	6.0
Mucoepidermoid carcinoma	2	4.0
Abscess	1	2.0

**Discussion**

The PPS pathologies most commonly found are primary tumours both benign and malignant, metastatic lymph nodes and involvement from lymphoproliferative diseases and adjacent site tumours which extend into this space<sup>13</sup>. In the prestyloid space, salivary gland neoplasms especially parotid gland pleomorphic adenomas) are the most common, while neurogenic tumours like schwannomas and neurofibromas are those most commonly affecting the poststyloid. Of these tumours, only 20.0% are malignant and 50.0% originate either in the deep lobe of the parotid gland or the minor salivary glands<sup>14</sup>. Other less common neoplasms include: neurogenic tumours (13.0%), vascular tumours (paragangliomas), chordomas, lypomas, lymphomas, chemodectomas, rhabdomyomas, chondrosarcomas, desmoid tumours, ameloblastomas, amyloid tumours, ectomesenchymomas, fibrosarcomas and plasmocytomas<sup>15</sup>.

PPS tumours usually display very few symptoms: sometimes a neck mass is present but usually intraorally they appear as a smooth submucosal mass displacing the lateral pharyngeal wall, tonsils



and soft palate antero-medially. The presence of a mass in the neck or in the oropharynx was the most commonly encountered symptom (68.0%) followed by cervical pain (12.0%) and dyspnoea (4.0%). Facial nerve dysfunction was present in 7.5% of the patients, all of them with malignant tumors and these clinical findings did not differ from other series<sup>16</sup>. About 92.0% patients of this study had mass; 50.0% cases had fever; 42.0% cases had pain, 36.0% had otalgia or fullness in ear, 34.0% cases had dysphagia, 18.0% cases had facial nerve dysfunction, 6.0% cases had dyspnoea and 4.0% cases had deviation of tongue<sup>17</sup>.

The most common symptom initially seen was awareness of an intraoral or a neck mass<sup>18</sup>. Facial or jaw pain was associated with a malignant lesion in 9 of 11 patients. The combination of face pain with a cranial neuropathy was associated with malignant neoplasm in 3 of 4 patients. For all 172 patients, the time from onset of symptoms to diagnosis ranged from 0 to 24 months, with a median of 9 months. In our series mean duration of disease was 1.34 year ( $\pm$  1.32) with a range of 0.17 to 7.50 years.

The use of computed tomography scan and other imaging modality, allowed to ascertain the location, size, vascularity, and relation of parapharyngeal space tumors to surrounding anatomical structures<sup>19</sup>. Imaging techniques established the site of origin of these tumors with 96% accuracy. In our study out of all lesions 58.0% were in left parapharyngeal space and 42.0% were in right. 64.0% patients had well defined, rounded margin and 54.0% had rounded lesion. 46.0% patients had lesion isodense to muscle, 20.0% hypodense to muscle, 4.0% had fat density, 6.0% had fluid density and rest 24.0% had soft tissue density<sup>20</sup>.

Tumors of the PPS encompass a wide variety of benign and malignant neoplasms. Of the neoplasms in our study, 76% were benign and 24% were malignant and comparable. In their study 80.0% were benign and 20.0% were malignant. The most common PPS mass in these series was nerve sheath tumour 20.0% (Schwannoma 14.0% and 6.0% neurofibroma), local spread / invasion by squamous cell carcinoma (16%), paraganglioma (6%), chronic nonspecific lymphadenitis (14.0%), tuberculosis (12.0%), 10.0% were parotid origin tumour (6.0% pleomorphic adenoma and 4.0% mucoepidermoid Ca), lipoma (4.0%), branchial cleft cyst (4.0%), lymphoma (6.0%), and abscess (2.0%). Several other large reports found pleomorphic adenoma to be the most common tumor in the PPS, followed by

neurogenic tumors and paraganglioma<sup>21</sup>.

The histopathologic review of the types of neoplasm encountered were pleomorphic adenoma of parotid or minor salivary gland origin (68; 40%), paragangliomas (34; 20%), neurogenic (neurilemmomas and neurofibromas) tumors (24; 14%), malignant salivary gland neoplasms (23; 13%), and miscellaneous malignant (12; 7%) and benign (11;6%) neoplasms<sup>19</sup>. Among the 160 patients for whom tumor size was reported, median size was 5.2 cm, with a range from 1.2 cm to 11 cm. These benign tumors were most frequently encountered (65.5%).

The types were neurogenic tumor (35.3%), pleomorphic adenoma of the parotid (29.4%), paraganglioma of the carotid body (29.4%) and one case of aneurysm of the internal carotid artery (5.9%). Malignancy was seen in 34.6% cases of them soft tissue sarcomas accounted for 44.5%, metastatic squamous cell carcinoma 33.3%, and 11.1% were lymphoma and mucoepidermoid carcinoma, both from the parotid gland<sup>21</sup>.

There are some limitations of the study. This is a study based on data collected from the department of Radiology and Imaging at Dhaka Medical College, Dhaka, Bangladesh. These patients were sent by the department of Otolaryngology of the same hospital. There are many patients with parapharyngeal mass who are attending other hospitals and these people are not included in this study population. Therefore, the sample lacks representation of the population. Thus, the study place was selected purposively and the respondents, those are interviewed, were attended a particular department of a specific hospital.

## Conclusion

In conclusion male is predominant than female suffering from parapharyngeal mass. The most common age group is young adult who are presented with parapharyngeal lesions. Maximum patients have suffering up to one year followed by one to two years. There are several clinical features of parapharyngeal lesion like mass, fever, complaints of malaise, pain, otalgia or fullness in ear, dysphagia, facial nerve dysfunction, trismus, dyspnea and deviation of tongue. Further large scale nationwide study should be carried out among the Bangladeshi population.

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None

**Conflict of Interest**

The authors have no conflicts of interest to disclose

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This study has been performed without any funding from outside else.

**Contributions to authors:** Khanam R, Khanam S prepared the manuscript from protocol preparation upto report writing. Khanam S, Kabir T, Kabir E have revised the manuscript. Khanam R has prepared the manuscript. All the authors have involved from protocol preparation up to manuscript writing & revision.

**Data Availability**

Any inquiries regarding supporting data availability of this study should be directed to the corresponding author and are available from the corresponding author on reasonable request.

**Ethics Approval and Consent to Participate**

Ethical approval for the study was obtained from the Institutional Review Board. As this was a prospective study the written informed consent was obtained from all study participants. All methods were performed in accordance with the relevant guidelines and regulations.

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