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Histopathological Spectrum of Salivary Gland Lesions: A Study in a Tertiary Care Hospital of Bangladesh

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Abstract: ***Background:*** Salivary gland lesions encompass a range of benign and malignant tumors, inflammatory conditions, and developmental anomalies. Histopathological examination plays a critical role in accurate diagnosis and management. **Objective:** This study aimed to evaluate the histopathological spectrum of salivary gland lesions, focusing on their frequency, distribution, and associated clinical characteristics in a sample of patients. ***Methods*:** A prospective observational study was conducted at the Department of Pathology, Rajshahi Medical College, Rajshahi, from July 2022 to June 2023. A total of 52 cases of salivary gland lesions were enrolled through purposive sampling. Specimens were processed using standard histological techniques, including hematoxylin and eosin staining, followed by histopathological examination. Data were analyzed using MS Office tools. ***Results:*** The study included 63% male and 37% female patients. Among males, 27.27% had right parotid lesions, while 21.21% had left parotid lesions. In females, 31.58% had left parotid lesions. The most frequent lesion site was the parotid gland (48.08%), followed by the submandibular gland. Pleomorphic adenoma (34.61%) was the most common lesion, followed by chronic non-specific sialadenitis (25%). Pleomorphic adenoma was more common in males (36.37%) than females (31.58%). Mucoepidermoid carcinoma was found in 13.6% of cases, while Warthin tumor, acinic cell carcinoma, adenoid cystic carcinoma, metastatic carcinoma, and oncocytoma were observed in 5.77%, 5.77%, 5.77%, 3.85%, and 1.92% of cases, respectively. ***Conclusion:*** Pleomorphic adenoma and chronic non-specific sialadenitis were the most common salivary gland lesions. The study emphasizes the importance of histopathological diagnosis for effective management of these lesions.

Keywords: Salivary gland lesions, Pleomorphic adenoma, Parotid and submandibular gland, Histopathological spectrum.

Original Research Article

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Article at a glance:

Study Purpose: *The purpose of the study is to evaluate of various histopathological patterns of salivary gland lesions.*
Key findings: *The most common lesions seen was pleomorphic adenoma and the most common malignant lesion was mucoepidermoid carcinoma with male predominance.*
Newer findings: *The parotid gland is the primary location for both non-neoplastic and neoplastic lesions.*
Abbreviations: *H&E - Hematoxylin and Eosin, MS – Microsoft, MEC - Mucoepidermoid Carcinoma, WTS - Warthin Tumor, ACC - Acinic Cell Carcinoma.*

INTRODUCTION

Salivary gland lesions are relatively rare, constituting less than 1% of all tumors and less than 4% of all epithelial neoplasms in the head and neck region[1], there are three major salivary glands – the parotid, submandibular, and sublingual glands, as well as minor salivary glands distributed throughout the mucosa of the oral cavity. Minor glands are present in the mucosal lining of the upper aerodigestive tract and can be found in various areas of the oral cavity, including the lips, gingiva, floor of the mouth, cheek, hard and soft

palate, tongue, tonsillar areas, and oropharynx.[2-3] Salivary gland lesions encompass a wide range of clinical problems, from non-neoplastic conditions like inflammation (sialadenitis) and cysts to common benign tumors like pleomorphic adenoma and malignant lesions with varying degrees of malignancy.[4] Salivary gland neoplasms encompass a wide range of tumors, both benign and malignant. These tumors are approximately 12 times more common in the parotid gland compared to the submandibular gland. The majority of salivary gland tumors are benign, with pleomorphic adenoma being the most prevalent.[5-6]

Specifically, the parotid gland accounts for nearly 80% of salivary gland tumors, while the submandibular gland represents approximately 10-15% of these tumors. A significant majority, around 80-85%, of these tumors are benign in nature, and among the benign tumors, pleomorphic adenoma is the most common, constituting approximately 70% of benign salivary gland tumors.[7] It's worth noting that the incidence and frequency of different histological subtypes of salivary gland tumors can vary in different regions of the world.[8-9]

While there have been studies in Portugal focusing on malignant oral cancers, epithelial salivary gland tumors in children and adolescents, tumors of the parotid gland, and prognostic factors of malignant salivary gland tumors.[10-12] Salivary gland tumors can be challenging to diagnose due to their rarity, wide range of morphological characteristics, and potential overlap among different tumor types. These tumors not only display variations in their biological behavior but also in their prognosis.[13] As a general guideline in clinical practice, smaller salivary glands are more likely to host malignant tumors. Thus, making an accurate diagnosis of malignant tumors is of utmost importance in ensuring the proper treatment and management of patients with salivary gland neoplasms. The objective of this current study was to assess the histopathological spectrum of salivary gland lesions.

METHODS

This retrospective hospital based observational study was conducted at the Department of Pathology, Rajshahi Medical College, Rajshahi over a period from July 2022 to June 2023. The study comprised 52 cases in total of salivary gland biopsy specimens. After surgical resection biopsy specimens were submitted and proccesed routinely, sections were made from paraffin blocks and stained with hematoxyllin and eosin stain in the Department of Pathology. All the salivary gland lesions irrespective of age, sex were included in this study. According to the exclusion criteria of this study, patients who underwent surgical treatment due to primary skin or oral cancers with salivary gland direct invasion and autolyzed tissues specimen were excluded. Clinical data and other information were obtained from hospital record and requisition form. All the demographic and clinical information of the participants was recorded. Data were processed, analyzed, and disseminated using MS Office tools.

RESULTS

In this study, the highest percentages of patients (26.92%) were in the 41-50 years age group, followed by 15.38% in both the 31-40 and 51-60 years age groups (Table I). The majority of cases (63%) were male, with the remaining 37% being female (Table I and Figure -1) When analyzing the lesion site by gender, it was observed that among male participants, 27.27% had a right parotid lesion, 21.21% had a left parotid lesion, 24.24% had a right submandibular lesion, and 12.12% had a left submandibular lesion. Additionally, 9.09% had a right cheek lesion, and 6.06% had a left cheek lesion. Among female participants, 15.79% had a right parotid lesion, 31.58% had a left parotid lesion, 21.05% had a right submandibular lesion, and 15.79% had a left submandibular lesion. Moreover, 10.53% had a right cheek lesion, and 5.26% had a left cheek lesion (Table II).

In this study the histopathological spectrum of salivary gland lesions in this study showcased a diverse range of pathological findings. Table III & Table IV indicate Pleomorphic adenoma and chronic non-specific sialadenitis were the most prevalent conditions, accounting for 34.61% and 25% of cases, respectively. Mucoepidermoid carcinoma represented 13.46%. Warthin's tumor, adenoid cystic carcinoma, acinic cell carcinoma, tuberculosis, metastatic carcinoma, and oncocytoma made up the remaining cases with varying frequencies. Pleomorphic adenoma was found in 12 males (36.37%) and 6 females (31.58%),

contributing to a total of 18 cases (34.61%). Chronic non-specific sialadenitis affected 8 males (24.24%) and 5 females (26.32%), totaling 13 cases (25.00%). Mucoepidermoid carcinoma was present in 4 males (12.12%) and 3 females (15.79%), resulting in 7 cases (13.46%).

Warthin's tumor was observed in 2 male cases (6.06%) and 1 female case, resulting in a total of 3 cases (5.77%). Adenoid cystic carcinoma was diagnosed in 1 male (3.03%) and 2 females (10.53%), totaling 3 cases (5.77%). Acinic cell carcinoma affected 2 males (6.06%) and 1 female (5.26%), contributing to 3 cases (5.77%). Metastatic carcinoma was observed in 1 male (3.03%) and 1 female (5.26%). Tuberculosis was observed in 2 male cases (6.06%) and no female cases, resulting in a total of 2 cases (3.85%). Lastly, oncocytoma was reported in 1 male (3.03%) with no female cases.

Table 1: Age distribution of participants (N=52)

Age (years)	n	%
11-20	9	17.30
21-30	1	1.92
31-40	8	15.38
41-50	14	26.92
51-60	8	15.38
61-70	6	11.53
71-80	3	5.77
>80	3	5.77
Total	52	100%

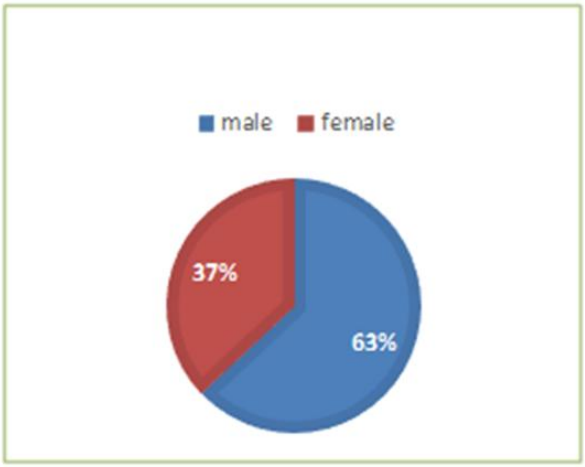

Figure 1: Gender distribution of the cases

Table 2: Site and gender distribution among cases

Site	Male (33)		Female (19)	
	n	%	n	%
Parotid (Right)	9	27.27	3	15.79
Parotid (Left)	7	21.21	6	31.58
Submandibular (R)	8	24.24	4	21.05
Submandibular (L)	4	12.12	3	15.79
Check (Right)	3	9.09	2	10.53
Check (Left)	2	6.06	1	5.26
Total	33	100%	19	100%

Table 3: Incidence and age-wise distribution of salivary gland lesions

Lesions	Age group (Years)								Total	
	11-20	21-30	31-40	41-50	51-60	61-70	71-80	>80	n	%
Pleomorphic Adenoma	5	--	3	4	3	--	2	1	18	34.61
Chronic Non-specific Sialadenitis	4	--	2	3	--	2	--	2	13	25.00
Mucoepidermoid carcinoma	--	--	1	2	--	3	1	--	7	13.46
Warthin's tumour	--	1	--	1	1	--	--	--	3	5.77
Adenoid cystic carcinoma	--	--	--	2	1	--	--	--	3	5.77
Acinic cell carcinoma	--	--	1	--	1	1	--	--	3	5.77
Tuberculosis	--	--	1	--	--	--	--	1	2	3.85
Metastatic carcinoma	--	--	--	1	1	--	--	--	2	3.85
Oncocytoma	--	--	--	--	1	--	--	--	1	1.92
Total	**9**	**1**	**8**	**14**	**8**	**6**	**3**	**3**	**52**	**100%**

Table 4: Gender-wise distribution of salivary gland lesions

Lesions	Gender				Total	
	Male		Female			
	n	%	n	%	n	%
Pleomorphic adenoma	12	36.37	6	31.58	18	34.61
Chronic non-specific sialadenitis	8	24.24	5	26.32	13	25.00
Mucoepidermoid carcinoma	4	12.12	3	15.79	7	13.46
Warthin's tumour	2	6.06	1	5.26	3	5.77
adenoid cystic Carcinoma	1	3.03	2	10.53	3	5.77
Acinic cell Carcinoma	2	6.06	1	5.26	3	5.77
Metastatic Carcinoma	1	3.03	1	5.26	2	3.85
Tuberculosis	2	6.06	0	0	2	3.85
Oncocytoma	1	3.03	0	0	1	1.92
Total	**33**	**100**	**19**	**100**	**52**	**100**

Figure 2: Gross photograph showing solitary bosselated myxoid mass within the parotid gland, a case of pleomorphic adenoma (Case no 4)

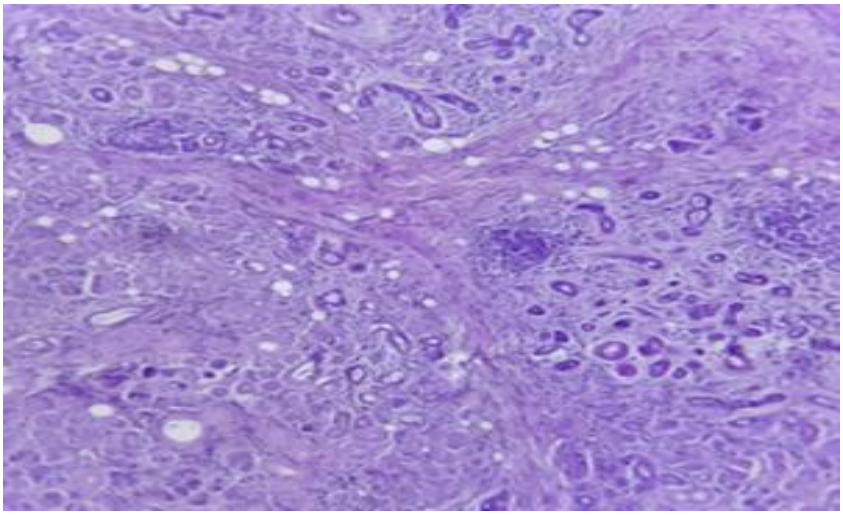

Figure 3: Tissue from the parotid gland (Biopsy): Chronic non-specific sialadenitis (Case no 18, H&E stain, 400x)

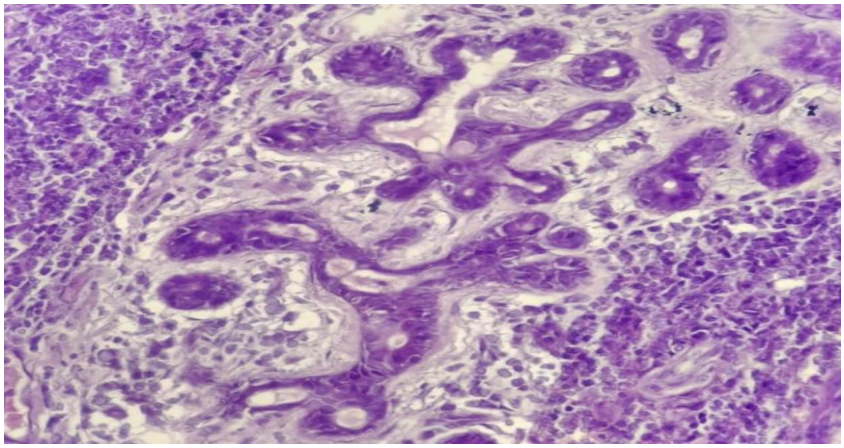

Figure 4: Tissue from submandibular gland: Chronic non-specific sialadenitis (Case no 28, H&E stain, 400x)

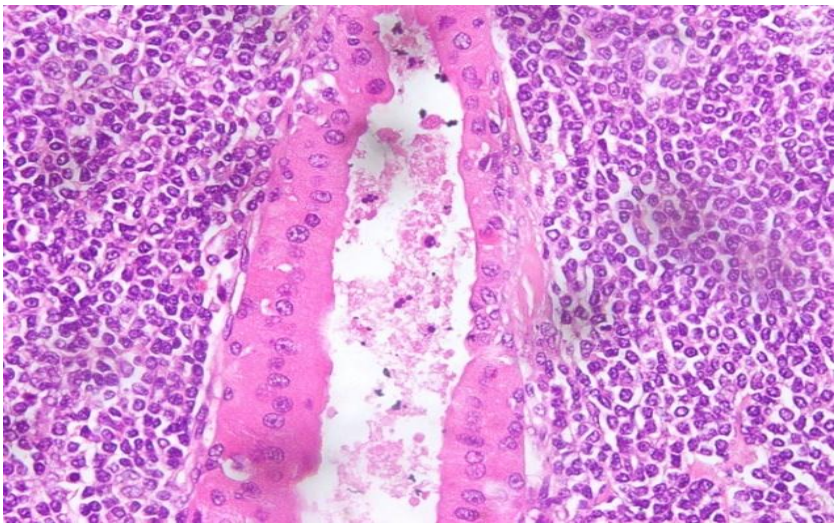

Figure 5: Tissue from Submandibular gland (Biopsy): Warthin tumor (Case no 31, H&E stain, 400x)

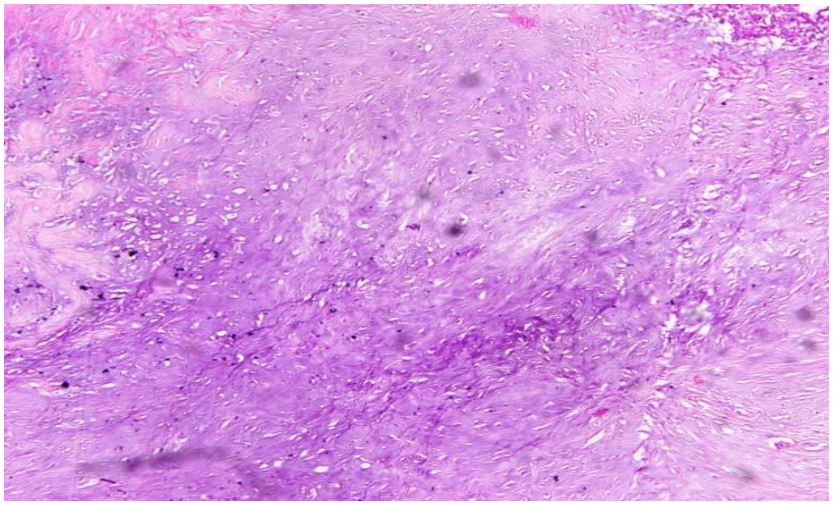

Figure 6: Tissue from the parotid gland (Biopsy): Pleomorphic Adenoma showing mesenchymal chondromyxoid matrix background (Case no 35, H&E stain, 400x)

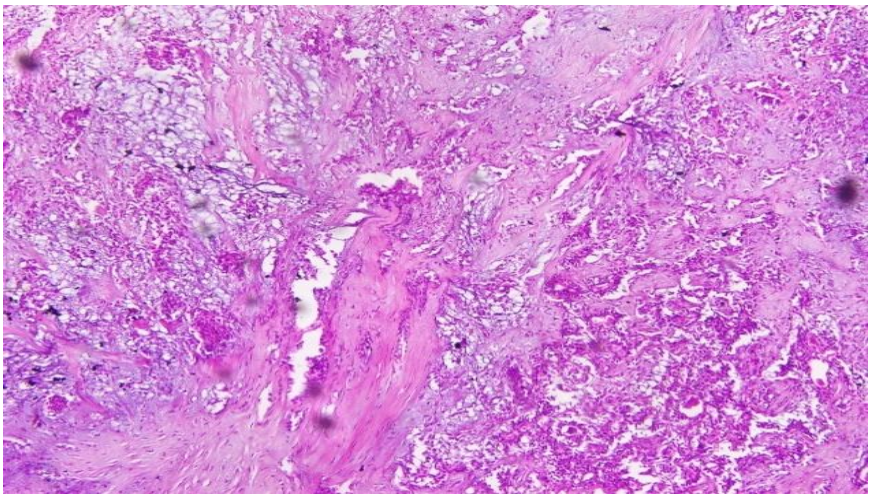

Figure 7: Tissue from Submandibular gland (Biopsy): Pleomorphic Adenoma showing ducts with mesenchymal chondromyxoid matrix. (Case no 40, H&E stain, 400x)

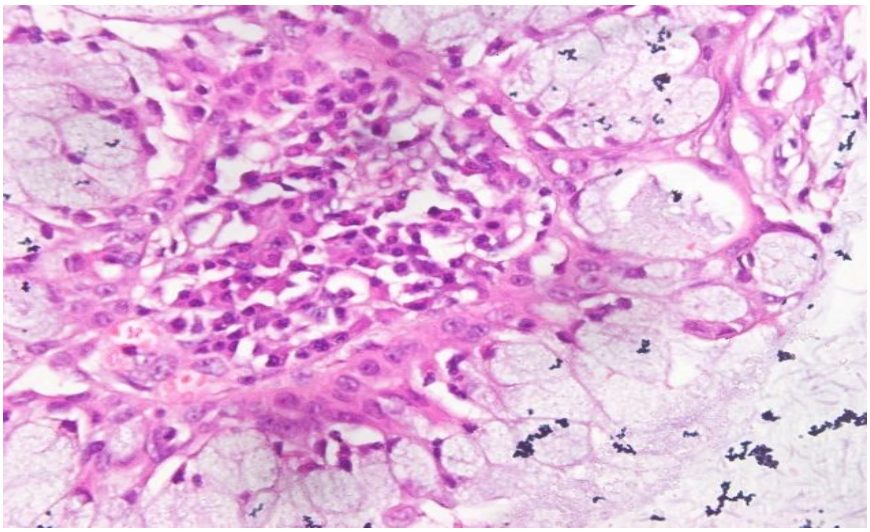

Figure 8: Tissue from parotid gland (Biopsy): Mucoepidermoid carcinoma (Case no 42 H&E stain, 400x)

DISCUSSION

This study aimed evaluate the histopathological spectrum of salivary gland lesions.In this study, around 26.92% of the participant were in the 41-50 years age group with an additional 15.38% falling into the both 31-40 and 51-60 years age groups. This is comparable to the study done by Aggarwal P et al (2014).[14] In this study, the majority (63%) were male, while the remaining cases (37%) were female. Similar finding was found in the study conducted by Subhashraj K (2008).[15] When analyzing the lesions by side of salivary gland, we found right sided parotid glands are predominant. In our study parotid gland lesions (25 cases, 48.08%) are significantly more common than the submandibular gland lesions (19 cases, 36.53%). This is very similar to the observation of the Garg M et al(2023).[16]

The histopathological spectrum of salivary gland lesions in this study revealed a diverse range of pathological findings. In this study, non-neoplastic lesions are chronic non-specific sialadenitis and Tuberculosis accounting for 25% and 3.85% of cases, respectively. Similar finding was seen in the study by Greenthalakshmi et al (2021).[17] The present study has indicated that the most common benign and malignant tumor of parotid and submandibular gland were pleomorphic adenoma and mucoepidermoid carcinoma .Pleomorphic adenoma was found in the highest 12 males and 6 females, contributing to 18 cases (34.61%).This is comparable to the study done by Bobati SS et al (2017).[18] In our study 3 cases (5.77%) had warthin's tumor, similar finding was found in a study by Garg M et al(2023).[16]

Oncocytoma was reported in 1 male (3.03%). These findings were comparable to the observations of Amin NS et al (2017).[19] Mucoepidermoid carcinoma was present in 4 males (12.12%) and 3 females (15.79%), resulting in 7 cases (13.46%) with male predominance. This observation is similar to studies by) Garg M et al (2023)[16] , Vargas PA et al (2002)[20] and Patel KG (2018)[21] In this study adenoid cystic carcinoma accounting for 5.77%, acinic cell carcinoma and metastatic carcinoma contributing to 5.77% and 5.26% respectively .Our findings are similar to the study of Garg M et al (2023)[16] and Belulescu IC et al (2020)[22]

Limitation of the study

This study was conducted at a single center with a small sample size, and it was carried out over a relatively short period. Therefore, the findings of this study may not accurately represent the broader situation in the entire country.

CONCLUSION

Pleomorphic adenoma and chronic non-specific sialadenitis stand out as the predominant features among salivary gland lesions. This study illuminates the distribution of various salivary gland lesions, underscoring the importance of early diagnosis and the need for tailored management approaches to address these diverse pathological conditions effectively.

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Authors' contributions

Dr. Tanshina Afrin and Dr. Md. Saifur Rahman contributed to the concept and design of the study, data acquisition, interpretation, drafting, and final approval of the manuscript. Dr. Khadiza Khanom and Dr. Arefa Sultana were involved in data acquisition, interpretation, drafting, final approval, and have agreed to be accountable for all aspects of the work.

Declarations

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Ethical approval: Not applicable

Consent for publication: Taken

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