Original Article

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Pathology Section

Clinicopathological Spectrum of Salivary Gland Lesions- A Retrospective Study from Tertiary Care Research Institute, Andhra Pradesh, India

SANUVADA VIJAY RAMA RAJA SEKHAR[1], REGIDI SWATHI RATNAM[2], B GOUTHAMI[3], B RAVICHANDRA[4]

ABSTRACT

Introduction: The salivary glands are subjected to various pathological conditions ranging from simple inflammation to most complex malignant lesions. Majority of these lesions can be diagnosed by simple histopathological examination. But, as these salivary gland lesions are not common, the incidence of these varies in different geographic locations.

Aim: To study the spectrum of different salivary gland lesions and demographic data in a tertiary care hospital serving north-east coastal area of Andhra Pradesh.

Materials and Methods: This was a retrospective study conducted in Great Eastern Medical School and Hospital, Srikakulam, Andhra Pradesh, India. Total of 85 salivary gland lesions were analysed for a period of four years (December 2015 to November 2019). From the records of Histopathology, Department of Pathology, data was retrieved. Typing of the salivary gland tumours were done using sections stained with Haematoxylin and Eosin (H&E). All the cases were analysed and divided according to the demographics and histological type. Descriptive statistics were used and data was tabulated in frequency and percentages.

Results: A total of 85 salivary gland lesions were studied, of which 14 (16%) were non neoplastic and 71 (84%) were neoplastic in nature. Among the neoplastic lesions, 56 (66%) were benign and 15 (18%) were malignant. There was slight male preponderance with a ratio of M:F=1.3:1. Majority of the tumours occurred in parotid gland (73), followed by submandibular gland (7) and minor salivary glands (5). All the tumours were classified and graded according to World Health Organisation (WHO), while Brandwein Grading System was followed for mucoepidermoid carcinoma. Pleomorphic adenoma was the most frequent benign tumour and mucoepidermoid carcinoma was the most common malignant tumour.

Conclusion: Though benign salivary gland tumours are more frequently encountered in the present study, malignant salivary gland tumours are not uncommon.

Keywords: Benign, Histopathology, Malignant, Mucoepidermoid carcinoma, Pleomorphic adenoma

INTRODUCTION

Among the different exocrine glands in our body, salivary glands are subjected to various pathological conditions ranging from simple inflammation to most complex malignant lesions. Though 2-7% of head and neck neoplasms are due to salivary gland neoplasms, but they constitute only 0.3% malignancies of all over the body [1]. Most commonly, these are located in parotid glands, followed by submandibular, sublingual and minor salivary glands. Malignant lesions are more common in minor salivary glands, while benign lesions are more common in parotid and submandibular gland [2].

Salivary gland lesions, being uncommon, has differences in its incidence in different geographical locations and there are only few studies in the Indian published literature [3,4]. The purpose of the present study was to know the spectrum of different salivary gland lesions and demographic data in a tertiary care hospital serving north-east coastal area of Andhra Pradesh, as there are no such studies from this region.

MATERIALS AND METHODS

This was a retrospective study conducted in Great Eastern Medical School and Hospital, Srikakulam, Andhra Pradesh, India. The data of excised salivary gland lesions were retrieved from December 2015 to November 2019 from the records of Histopathology, Department of Pathology and was analysed in December 2019. The excised salivary gland lesions were retrospectively analysed for a period of four years (December 2015 to November 2019). Data was retrieved from the records at Department of Histopathology, Great Eastern Medical School and Hospital, Srikakulam, Andhra Pradesh, India.

The demographic data of patients, site of biopsy and histopathological diagnosis were recorded.

Inclusion and Exclusion criteria: Slides and blocks having patient details related to all salivary gland lesions during the above-mentioned period were included in the study. Those cases where neither slides/blocks nor patient details are available, blocks with inadequate tissue, slides with non representative material and incisional biopsies were excluded from the study.

Authors reviewed Haematoxylin and Eosin (H&E) stained slides of all the 85 cases and classified the salivary gland lesions into non neoplastic and neoplastic. Neoplastic lesion were further classified into benign and malignant according to WHO [5] and mucoepidermoid carcinomas are in addition graded by Brandwein Gensler grading system [6]. Special stains and Immunohistochemistry (IHC) were done, whenever necessary.

STATISTICAL ANALYSIS

Descriptive statistics were used for patients' epidemiological data and histopathological features. Median was used to summarise continuous data, while frequency counts and percentages were used for categorical data.

RESULTS

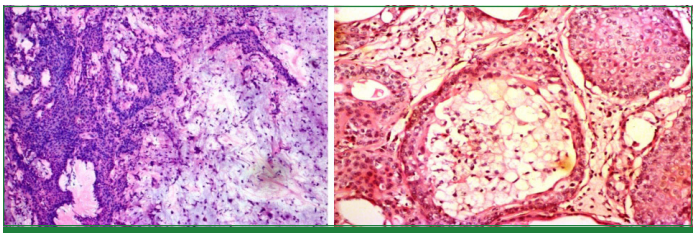
A total of 85 salivary gland lesions were studied, of which 14 (16.4%) were non neoplastic and 71 (83.5%) were neoplastic in nature. Among the neoplastic lesions, 56 (65.88%) were benign and 15 (17.6%) were malignant [Table/Fig-1]. Majority of the patients were in 5th decade (n=23) (27%), followed by 4th decade (n=21) (25%). There were 48 (56.47%) males and 37 (43.5%) females with a sex ratio M:F of about 1.3:1.

The salivary gland lesions were mainly located in parotid gland (n=73) (85.88%), followed by submandibular gland (n=7) (8.2%)

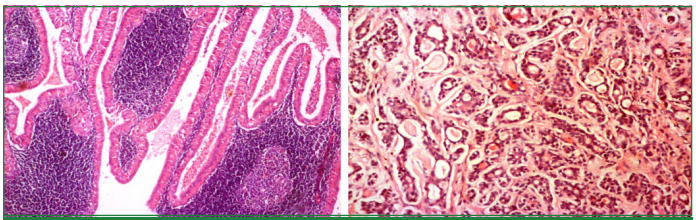
and minor salivary glands (N=5) (5.8%) at different sites in oral cavity. Among the various lesions, pleomorphic adenoma [Table/Fig-2] was the most common (n=46) (54.11%), followed by chronic sialadenitis (n=10) (11.76%), mucoepidermoid carcinoma (n=5) (5.8%) [Table/Fig-3], Warthin's tumour (n=4) (4.70%) [Table/Fig-4] and myoepithelioma (n=4) (4.70%). There were 3.52% (n=3) cases of adenoid cystic carcinoma [Table/Fig-5], salivary duct carcinoma [Table/Fig-6] and schwannoma [Table/Fig-7] each, 2.35% (n=2) cases of carcinoma ex-pleomorphic adenoma, 2.35% (n=2) cases of mucocele and benign lymphoepithelial cyst [Table/Fig-8] each and 1.17% (n=1) cases of Non-Hodgkin's lymphoma [Table/Fig-9].

Salivary gland lesions	n (%)
Non neoplastic	14 (16%)
Neoplastic	71 (84%)
• Benign	56 (66%)
• Malignant	15 (18%)
Location of lesion	
Parotid	73 (85.88%)
Submandibular	7 (8.2%)
Minor salivary glands	5 (5.8%)
Various lesions	
Pleomorphic adenoma	46 (54.11)
Chronic sialadenitis	10 (11.76%)
Mucoepidermoid carcinoma	5 (5.8%)
Warthin's tumour	4 (4.70%)
Myoepithelioma	4 (4.70%)
Adenoid cystic carcinoma	3 (3.52%)
Salivary duct carcinoma	3 (3.52%)
Schwannoma	3 (3.52%)
Ex-pleomorphic adenoma	2 (2.35%)
Mucocele	2 (2.35%)
Benign lymphoepithelial cyst	2 (2.35%)
Non-Hodgkin's lymphoma	1 (1.17%)

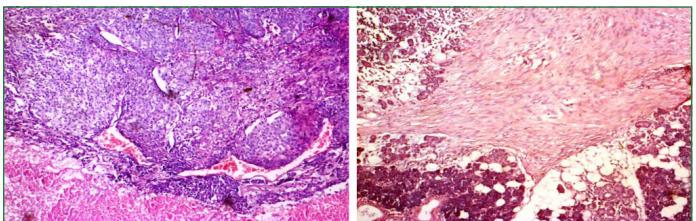
[Table/Fig-1]: Distribution of salivary gland lesions.



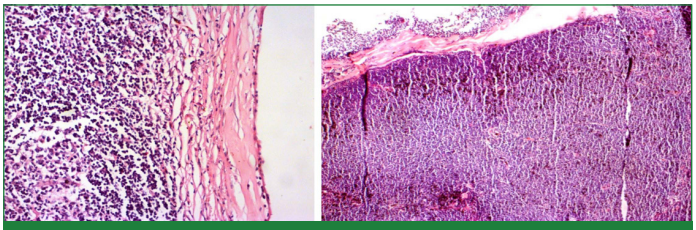
[Table/Fig-2]: Microscopic appearance of pleomorphic adenoma showing epithelial and mesenchymal elements, H&E stain (4x). **[Table/Fig-3]:** Microscopic appearance of low grade Mucoepidermoid carcinoma showing mucinous areas and intermediate cell nests, H&E stain (10x). (Images from left to right)



[Table/Fig-4]: Microscopic appearance of Warthin's tumour showing papillary columnar lining of the cyst with underlying lymphoid tissue, H&E stain (10x). **[Table/Fig-5]:** Microscopic appearance of Adenoid cystic carcinoma showing cribriform arrangement of tumour cells, H&E stain (4x). (Images from left right)



[Table/Fig-6]: Microscopic appearance of salivary duct carcinoma showing malignant epithelial component with necrosis, H&E stain (4x). **[Table/Fig-7]:** Microscopic appearance of schwannoma showing fascicles of spindle cells and adjacent normal salivary acini, H&E stain (4x). (Images from left right)



[Table/Fig-8]: Microscopic appearance of lymphoepithelial cyst showing cyst lined by flattened epithelium and underling lymphoid tissue, H&E Stain (10x). **[Table/Fig-9]:** Microscopic appearance of Non-Hodgkin's lymphoma showing monomorphic lymphoid proliferation, H&E Stain (4x). (Images from left right)

DISCUSSION

The present study showed male predominance (M:F=1.3:1) unlike that reported in literature [7-9]. However, there can be some gender variation according to the tumour type. Peak age of incidence in present study was 5th decade similar to Kessler A and Handler SD study [7] [Table/Fig-10]. Malignant lesions are usually more common in older patients compared to younger [10].

Studies	Mean age in benign tumours	Mean age in malignant tumours
Kessler A and Handler SD [7]	46	47
Present study	41.2	44.3

[Table/Fig-10]: Comparison of mean age in benign and malignant tumours [7].

Benign tumours (78.8%) were more common than malignant tumours (21.2%) as seen in present study [Table/Fig-11] [7,14]. Most common involved gland is parotid followed by submandibular and minor salivary glands which is consistent with the literature [2]. In the neoplastic lesions, pleomorphic adenoma is the most common benign tumour. These cases showed epithelial components as ducts with epithelial and myoepithelial cells exhibiting varied morphology. The mesenchymal component is predominantly myxoid in nature, also areas with hyaline and cartilaginous differentiation. All these lesions were diagnosed with H&E stain only without any need for special stains or IHC similar to other studies [11]. Complete excision is the treatment of choice as tumours are prone for recurrence. Recurrence does not favour good prognosis, as treatment is difficult in these cases.

Studies	Benign	Malignant
Kessler A and Handler SD [7]	54-79	21-46
Sajeevan TP et al., [14]	56.4%	43.7%
Present study	78.8%	21.2%

[Table/Fig-11]: Comparison of percentage of benign and malignant tumours with other studies [7,14].

The next most common benign tumour is Warthin's tumour. It was found only in males, particular those with smoking history. Histologically, these lesions showed cysts lined by oncocytic epithelium, thrown into papillae with subepithelial lymphoid stroma. All these lesions were also diagnosed by H&E stain itself. As these lesions do not recur, excision is enough.

As in most large studies [8,12-14], mucoepidermoid carcinoma is the most common malignant tumour. Microscopically, they showed solid and cystic areas of mucous, intermediate and epidermoid cells of varying proportions. These lesions were graded into low, intermediate and high grades basing on Brandwein Gensler Grading System, which was useful in predicting the prognosis [12-15] [Table/Fig-12]. These grades reciprocates the prognosis. As low grade tumours prognosis is almost similar to benign tumours while high grade tumours have poorer prognosis with five year survival rate less than 50%.

The next common malignant tumour is the adenoid cystic carcinoma, which showed cribriform, tubular and solid patterns histologically.

Grade	N=5
Low	2
Intermediate	2
High	1

[Table/Fig-12]: Brandwein Grading System was done for the mucoepidermoid carcinoma cases for predicting the prognosis [12].

Perineural invasion was seen in all the variants of adenoid cystic carcinoma. In general, these lesions have local recurrence and presence of perineural invasion further worsens the prognosis [16].

Other tumours in the present study were myoepithelioma, carcinoma ex-pleomorphic adenoma and salivary duct carcinoma. Among the four cases of myoepithelioma, histologically, two cases showed spindled cells arranged in fascicles and two cases showed plasmacytoid cells with eccentrically placed nuclei and eosinophilic cytoplasm. Intervening stroma was collagenous. IHC showed positivity for pan-cytokeratin (CK) and smooth muscle actin [17]. Simple excision was done as, these have lower recurrence rates compared to pleomorphic adenoma.

The two cases of carcinoma ex-pleomorphic adenoma had characteristic history of parotid mass, since many years with rapid growth in two months and one month, respectively. Histologically malignant component is predominant with poorly differentiated adenocarcinoma morphology and a peripheral minor pleomorphic adenoma component. Identifying the pleomorphic adenoma component is crucial in diagnosis [18]. As both cases were intracapsular, only wide resection with lymphnodal dissection was done without radiation therapy.

The salivary duct carcinoma cases showed morphology of high grade ductal carcinoma with brisk mitotic activity, comedone necrosis and infiltration with desmoplastic stroma. Even after extensive grossing no component of pleomorphic adenoma was identified. IHC markers like Carcinoembryonic antigen (CEA), Androgen Receptor (AR) and HER2neu will substantiate the diagnosis [19]. As these are aggressive tumours, wide excision with neck dissection and radiation therapy are mandatory.

Unusual tumours encountered were schwannoma and Non-Hodgkin's lymphoma. Schwannoma showed the spindled cells with hyper and hypocellular areas with verocay body formation adjacent to salivary acini. They were positive for S-100, negative for cytokeratin like benign nerve sheath tumours of elsewhere [20]. Non-Hodgkin's lymphoma case showed monomorphic population of sheets of lymphoid cells which were positive for CD19, CD20 and negative for CD3, CD5, BCL6 and Cyclin D1 and diagnosed as MALT lymphoma [21].

The cases of chronic sialadenitis showed salivary acini and dilated ducts surrounded by lymphoplasmacytic cells. Whereas in lymphoepithelial cyst, the dense lymphoid tissue is present beneath the cyst lined by cuboidal to flattened epithelium. While in mucocele, there was a cyst without any inflammation. Surgical excision is curative in all these lesions.

Limitation(s)

Because of smaller sample size, influencing factors for development are not well understood. Prospective studies with larger sample size including racial, geographical, environmental factors along with cytogenetic studies for chromosomal abnormalities are needed for better understanding of these diseases.

CONCLUSION(S)

Though salivary gland tumours are uncommon, wide variety of lesions can arise from these glands. Of all the lesions, pleomorphic adenoma was the most frequent benign tumour and mucoepidermoid carcinoma was the most common malignant tumour. Brandwein Grading System was helpful in predicting the prognosis of mucoepidermoid carcinomas. For majority of cases, diagnosis can be made on histomorphology and role of IHC can be limited to few unusual cases.

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PARTICULARS OF CONTRIBUTORS:
1. Associate Professor, Department of Pathology, GEMS Hospital, Srikakulam, Andhra Pradesh, India.
2. Assistant Professor, Department of Pharmacology, GMC, Srikakulam, Andhra Pradesh, India.
3. Assistant Professor, Department of Pathology, GEMS Hospital, Srikakulam, Andhra Pradesh, India.
4. Assistant Professor, Department of Pathology, GEMS Hospital, Srikakulam, Andhra Pradesh, India.

NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:
Dr. SVR Raja Sekhar,
Associate Professor, Department of Pathology, GEMS Hospital,
Ragolu, Srikakulam-532484, Andhra Pradesh India.
E-mail: rajsanuvada@gmail.com

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