ORIGINAL ARTICLE

Morphological Patterns of Salivary Gland Tumors

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Abstract

This is a retrospective study of 63 cases of Salivary gland tumors collected from record files of the histopathology section of department of Pathology, GMC Jammu from 1st January 2010 to 31st December 2015. Tumors were analysed considering histological type, age and sex of the patients and anatomic location. Out of 63 cases, 53 (84.13%) were benign and 10 (15.87%) were malignant with male to female ratio of 1.33:1. The mean age observed was 39 years with age range of 11 to 76 years. Pleomorphic Adenoma was found to be the commonest benign tumor (86.79%) followed by Basal Cell Adenoma (3.77%). The Mucoepidermoid Carcinoma was the most common malignant tumor (30%) followed by Adenoid Cystic carcinoma (20%). Parotid was the most common site of location of tumors (58.73%) followed by Submandibular gland (36.51%). The principal site of salivary gland tumors is the Parotid gland and Pleomorphic Adenoma outnumbered all other tumors. Mucoepidermoid Carcinoma was the most malignant Salivary Gland tumor. Males are affected more in the both benign and malignant groups.

Key Words

Salivary Gland Tumors, Pleomorphic Adenoma

Introduction

Concerning head and neck regions, it is known that tumors of the salivary glands correspond on an average to 3% of the affections of this site and the majority being of epithelial origin (1, 2). The majority of these neoplasms are benign and only 20% are malignant. The annual incidence of salivary gland cancers ranges from 0.5 to 2 per 100,000 in different parts of the world, with the highest incidence occurring in Croatia (3, 4). About 80% are located in the parotids, 10% in the submandibular glands and the remainder being distributed between the sublingual and the countless minor salivary glands (5). As a general rule in clinical practice, smaller the salivary gland, the more likely the tumor to be malignant. In the Parotid glands, 20-25% of the tumors are malignant. This rises to 40% for the submandibular glands and more than 90% of the sublingual gland tumors are malignant (6). The sex distribution of the salivary gland tumors is equal however the malignant tumors are more frequent in women than men. These are observed in all ages but the highest incidenece is observed in 3rd and 4th decades for benign tumors and 5th and 6th decades for malignant tumors (7). Histogenesis of the salivary tumors still remains elusive. Several hypotheses have been postulated to cover the varied histological picture. Mixed tumors have mostly myoepithelial cells as origin and the matter is still open for further studies (8,9). The etiological agents of the salivary glands cancers remain unclear. History of previous cancers, Ebstein barr virus infections, Immunosuppression, radiation exposure, patients of Hodgkins Lymphomas and HIV infections are the possible risk factors (10, 11).

Salivary Gland Tumors in the Parotid or Submandibular glands usually present as an enlarging masses, sometimes associated with facial nerve palsy. Minor salivary gland tumors present as a submucosal intraoral mass which subsequently ulcerates. Clinical features suspicious of malignancy include ipsilateral Facial Nerve Palsy, sudden tumor growth, pain, tumor fixation to the overlying skin or underlying muscle and Cervical lymphadenopathy (12).

In view of the facts like malignant and benign salivary gland tumors may resemble each other grossly if seen early in their clinical course; most malignant salivary gland

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tumors show histologically bland nature and many benign tumors show aggressive biological nature typified by high rate of recurrence, the correct histomorphological diagnosis is obligatory as well as a big aid in the treatment protocol (13).

Although literature on Salivary Gland Tumors from the Western countries is voluminous, there is paucity of data from India. Therefore, a retrospective study was carried out for analysis of morphological patterns of Salivary Gland Tumors.

Aims and Objectives

The aim of this study is to recognise various histomorphological types of Salivary Gland Tumors, their frequency, age and site distribution.

Materials and Methods

This is a retrospective study carried out from January 2010 to December 2015. All the Salivary Gland tumor specimens received at Histopathology Section of Department of Pathology, Government Medical College (GMC) Jammu were included in the study. GMC Jammu is a major Tertiary Health Care teaching Health Institute offering Histopathology services to the entire Province as well as neighbouring areas. Clinical data (Age, Sex and Site) were obtained from the Laboratory Archives derived from the Information provided on the Histopathology request forms. The Microscopic slides were re-examined by a Pathologist for verification of the original results. For all the records whose diagnosis was equivocal, the slides were retrieved or fresh ones processed and re-evaluated. The study samples were fixed in 10% formalin and stained using Hamatoxylin and Eosin (H&E) following standard procedures (14). Special Stains (eg for Mucin) were occasionally employed. In categorisation of these tumors efforts were made to closely adhere to the revised WHO classification of Salivary Gland Tumors (2005) (15, 16). Data collected was analysed and deductions observed. Ethical approval was taken for this study from Institutional Ethical Committee.

Results

During the period of six years, 63 specimens of Salivary Glands showed neoplastic pathology. Out of these 63 cases, 53 (84.13%) were benign and 10 (15.87%) were malignant representing a ratio of 5.3:1. The age range was between 11 to 76 years and the mean age was about 39 years. The youngest patient was female of 11 years and was diagnosed with Benign tumor i.e. Pleomorphic Adenoma. The oldest patient was male of 76 years having a diagnosis of Malignant tumor i.e. Adenoid Cystic Carcinoma. The majority of the neoplasms (66.66%) presented between the 2nd to 5th decade. There were bimodal age distribution with increased frequency noted between the age groups of 31 to 40 years in case of benign tumors and 51 to 60 years in case of Malignant tumors. There were only 6 patients below 20 years of age and just 3 patients above 70 years of age (*Table 1*). Out of 63, 36 (57.14%) were males and 27 (42.86%) were females giving a Male to Female ratio of 1.33: 1. Benign tumors affected both sexes with higher frequency as compared to malignant tumors (*Table 2*).

The Salivary Gland Tumors more commonly affected the major Salivary Glands i.e. 60 cases as compared to minor salivary glands i.e. 3 cases only. Of the major Salivary Glands the most commonly affected was the Parotid Gland (58.73%) followed by Submandibular Gland (36.51%). Other sites involved were the Sublingual and the Palate. From the histopathological examination, Pleomorphic Adenoma, 46 (73.01%) was found to be the most frequent type of tumor (Fig I). Other Benign tumors that followed in frequency were Monomorphic Adenoma (3.17%), Basal Cell Adenoma (3.17%), Warthin's Tumor (1.59%). Occassional cases of Schwannoma and Lipoma were also encountered. Among the Malignant tumors, the Mucoepidermoid carcinoma was the commonest (4.76%) (Fig. II) followed closely by Adenoid Cystic Carcinoma (3.17%). Singleton case of Acinic Cell Carcinoma, Carcinoma Ex Pleomorphic Adenoma, Polymorphous low grade adenocarcinoma, Non- Hodgkins Lymphoma and Salivary Duct Carcinoma were also seen with a frequency of (1.59% each). It was seen that the benign Salivary Gland Tumors occurred a decade younger than the malignant ones. It was also seen that Mucoepidermoid Carcinoma and Adenoid Cystic Carcinoma occurred in Parotid Gland whereas Salivary Duct carcinoma was seen in Sublingual Salivary Glands (*Table 3*).

Discussion

Tumors of the Salivary glands have continuously interested the medical profession, pathologists in particular because of a number of peculiarities of the subject. These peculiarities are: (i) their diverse histological forms, (ii) unpredictable clinical behaviour (iii) and different opinions expressed by several workers of long experience on different aspects of these tumors. Though Salivary gland tumors have always interested pathologists, their overall incidence vis-à-vis total tumor occurrence is rather small. Strictly speaking the incidence recorded is only of those tackled by one centre of Pathology and not necessarily the occurrence in the population at large; however the figures certainly give an idea of their frequency of occurrence (17, 18). So, Salivary Gland Tumors are

Table1 Age wise distribution of Salivary Gland Tumors.

Age gps	Benign		Malignant		Total	
	No.	% age	No.	% age	No.	% age
< 20	4	7.55	2	20	6	9.52
21-30	14	26.42	0	0	14	22.22
31-40	15	28.30	2	20	17	26.98
41-50	10	18.87	1	10	11	17.46
51-60	7	13.21	3	30	10	15.87
61-70	2	3.17	0	0	2	3.17
>70 1	1.87	2	20	3	4.76	
Total	**53**		**10**		**63**	

Table 2. Distribution of salivary Gland Tumors according to Sex and Site

	Parotid		Submandibular		Minor Salivary Gland		Total
Sex	**B**	**M**	**B**	**M**	**B**	**M**	
Male	12	6	17	1	0	0	36 (57.14%)
Female	17	2	5	0	2	1	27 (42.86%)

Table 3 . Site Distribution of Salivary Gland Tumors

Tumor Type	Parotid Gland	Submandibular Gland	Palate	Others	Total	
Pleomorphic Adenoma	25		20	1	0	46 (73.01%)
Warthin's Tumor	0		0	0	1	1 (1.59%)
Monomorphic Adenoma	1		1	0	0	2 (3.17%)
Basal Cell Adenoma	2		0	0	0	2 (3.17%)
Schawannoma	1		0	0	0	1 (1.59%)
Lipoma	0		1	0	0	1 (1.59%)
Mucoepidermoid Ca	3		0	0	0	3 (4.76%)
Adenoid Cystic Ca	2		0	0	0	2 (3.17%)
Acinic Cell Ca	1		0	0	0	1 (1.59%)
Carcinoma Ex P A	1		0	0	0	1 (1.59%)
Polymorphous Low grade Adenocarcinoma	0		1	0	0	1 (1.59%)
Non Hodgkin's Lymphoma	1		0	0	0	1 (1.59%)
Salivary Duct Ca	0		0	0	1	1(1.59%)
Total	**37 (58.73%)**		**23(36.51%**	**0 1 (1.59%)**	**2 (3.17%)**	

uncommon and their epidemiology has not been well described (19). In the present study of 63 cases of salivary gland tumors, 53 (84.13%) were benign and 10 (15.89%) were malignant i.e benign tumors predominated over the malignant ones similar to a series of 124 cases by Vargas *et al* in a Brazilian population (20). Studies by Satko *et al* in Slovakian population and Ahmad et al in Kashmir were also comparable to our study (21, 5). They also showed the highest incidence of benign tumors in 3rd and 4th decade and malignant tumors in 4th and 5th decades of life consistent with our study. A bimodal age peak as seen in this study has also been reported in Nigeria, Uganda and South Africa with peaks in 2nd and 5th decades (22, 23).

In the present study a male preponderance was noted with Male: Female ratio of 1.33 : 1. This is in agreement with series reported by Potdar GG *et al* and Spiro et al (24, 25). However; this was in contrast to the series reported by Dandapat et al who reported a female preponderance in their series (26). There is gender

Fig 1. Pleomorphic Adenoma Showing both Epithelial and Mesenchymal Components (HE stain, X 400)

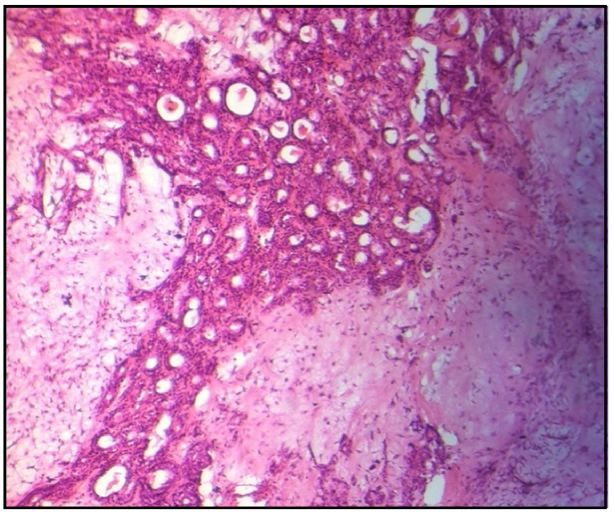
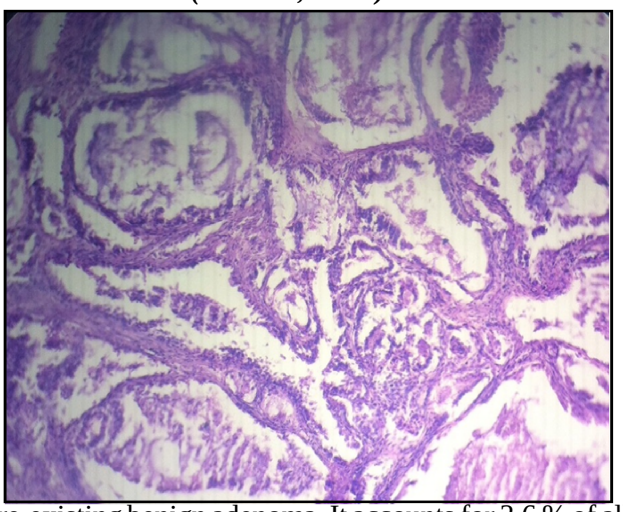


Fig.2 Low Grade Mucoepidermoid Carcinoma Showing Glandular Spaces with Mucous Secreting Cells and Intermediate Cells (HE stain, X 400)



variation in Salivary Gland Tumors noted between countries however, the reason for this is not quite clear. Parotid was the commonest site of neoplasia (58.73%) in this series followed by submandibular gland (36.51%) and minor salivary glands. This is in conformity with other workers viz; Gore *et al* and Hill AG (27, 28).

Altered Salivary Glandular tissue may produce such diversified histopathological expressions that the development of a Universal Classification accepted by researchers is very hard, especially when diagnosing certain neoplasias. Multiple histological aspects of Salivary glandular neoplasias have been attributed to the presence of myoepithelial cells in these glands (29). There were several attempts to classify these lesions in the past years, the most recent and adopted classification is WHO publication (2005) 16. In the present study Pleomorphic Adenoma (73.01%) was the most common benign salivary gland tumor encountered in parotid, submandibular and minor salivary glands similar to that observed by Li *et al* followed by Basal Cell Adenoma and monomorphic adenoma (30). Literature review reveals that Lipoma and Schwannoma are rare neoplasms but having recognised entities. In our study we found one case each of Lipoma and Schwannoma (31, 32). Mucoepidermoid Carcinoma was the most common malignant salivary gland tumor of Parotid constituting (4.76%) of all tumors. These findings were supported by studies carried out by Richardson *et al* and Spiro *et al* (32, 25). Adenoid Cystic Carcinoma was reported to be the second most common malignant tumor in this study and Vargas *et al* also reported similar findings 20. Carcinoma Ex Pleomorphic adenoma is an infrequent aggressive malignancy that is believed to evolve from a pre-existing benign adenoma. It accounts for 3.6 % of all Salivary neoplasms and for 11.7% of Salivary malignancies (34). We found one case (1.59%) of Carcinoma Ex Pleomorphic Adenoma of the Parotid Gland. Polymorphous low grade adenocarcinoma occurs almost exclusively in minor Salivary gland and its origin in a major salivary gland is considered rare (35). We found a case of Polymorphous low grade adenocarcinoma of submandibular gland. A single case of Non- Hodgkin's Lymphoma was also reported but being a retrospective study, its primary or secondary nature could not be determined.

Conclusion

Salivary gland tumors is a subject of considerable interest as these are not very rare, have varied histology and characterstic clinical features. Pleomorphic adenoma is the most common benign salivary gland tumor and mucoepidermoid carcinoma is the most frequent malignant neoplasm. Parotid gland is the most common site of origin of both benign and malignant tumors. The overall relative frequency of salivary gland tumors in this series correlates with that reported in most of the literature.

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