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Salivary Gland Tumors - An Institutional Experience

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Abstract

Introduction: Salivary gland neoplasm represents the most complex and diverse group of neoplasm of the head and neck. Their diagnosis and management are complicated by relatively infrequency. The parotid gland shows 64-80%, the submandibular glands showed 7-11% and the remainder being distributed between the sublingual (1%) and the minor salivary glands (9-23%) throughout the oral cavity.

Aim: 1) To assess the frequency of salivary gland tumor based on tumour type and anatomic location. 2) To correlate gender and age in different tumour type. 3) To correlate the location of benign and malignant tumours.

Materials and methods: A retrospective study was done in the Department of Oral Medicine and Radiology from the period of January 2006 to December 2017, data was collected from the archives maintained in the department of Oral Medicine. Details of the patient include age, sex and site of the tumour were obtained and confirmed with histopathological study.

Results and Discussion: Chi square test was applied to find out the distribution of malignant and benign tumours. The prevalence of salivary gland tumors in our study was 0.3%, and the benign: malignant ratio was 1:2.2, with mean age of occurrence was 45.01 ± 16.3 years with slight overall female predominance, and a male to female ratio of 0.7-0.9 respectively.

Conclusion: This study was a single institutional experience where analysis of 32 SGTs was carried out. Malignant tumours were more compared to benign. Among benign tumours pleomorphic adenoma was the most common type. Among the malignant salivary gland tumors mucoepidermoid carcinoma was the most common followed by adenoid cystic carcinoma then ex pleomorphic adeno carcinoma followed by low grade polymorphous adeno carcinoma.

Keywords: Salivary gland tumor; Gender; Age; Pleomorphic adenoma; Mucoepidermoid carcinoma; Parotid gland; Minor salivary gland

Introduction

Salivary gland tumors represent an uncommon heterogeneous group of neoplasms with complex clinicopathological behaviour [1]. These are diverse group of neoplasms and this constitute about 0.5% of all cancers and 5% of head and neck malignancy. Around 64-80% are located in the parotid gland, 7-11% in the submandibular glands and the remainder being distributed between the sublingual (1%) and the minor salivary glands (9-23%) throughout the oral cavity [2,3]. While tumours of the salivary glands can appear at any age, the maximum incidence is in the fourth decade of life for benign lesions and in the fifth decade for malignant tumors [4,5]. The etiological agents of salivary gland cancers remain unclear. Whilst most other head and neck cancers are strongly related to smoking and alcohol drinking, these do not play a role in the salivary glands. Presently there are two theories trying to elucidate the origin of malignant salivary gland tumors. The more accepted of the two theories is the Reserve Cell Theory, this states that salivary gland neoplasms arise from a stem cell of the salivary duct system. The second and less accepted theory is the Multicellular Theory. This theory states that salivary tumors arise from differentiated cells along the salivary gland unit [6-8]. The incidence of salivary gland tumors (SGTs) is claimed to be influenced by geographical and racial factors. Tumours of the salivary glands display one of the greatest diversities of histology among human cancers. According to literature, salivary gland tumors are probably the most complex among human neoplasias, due to their broad histological spectrum resulting from a multiple tumor-cell differentiation, its cell arrangements and extracellular matrix synthesis produced by certain tumor cells. The World Health Organisation (WHO) proposed the first histological classification of salivary gland tumors in 1972 [9]. Due to advances in the understanding of the aetiology and behaviour of these tumours as well as their wide morphological diversity, the WHO published the third and last edition of this classification in 2005 [10]. A neoplasm in the parotid gland is statistically more likely to be benign than one arising in a minor salivary gland. Pleomorphic adenoma is the most common benign salivary gland tumour, mucoepidermoid carcinoma is the common malignant salivary gland tumour, the diagnosis of the salivary gland tumour include clinical examination, supported by complementary techniques such as magnetic resonance imaging (MRI), computed tomography (CT) alone or combined with sialography and fine needle aspiration biopsy (FNAB). The combination of some of these techniques is able to offer a tentative diagnosis that must be confirmed by histopathological study. Diversities of phenomenology of tumours of salivary glands such as diverse histological forms, unpredictable clinical behaviour, different opinions expressed by several workers of long experience of different aspects of theses tumors, hence the diagnosis and management of these tumours are considered to be little challenging. Efficacy of treatment of malignant salivary gland tumors is dependent upon stage, location, presence of perineural invasion, treatment modality, histologic type, and presence of regional invasion [11]. Benign and malignant salivary gland tumors epidemiology have been described using many studies. The incidence, prevalence, age, gender, anatomical distribution and

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Type	Site							X^2	p-value
	Palate	Sub-mandibular Gland	Parotid Gland	Tongue	Maxilla	Right Buccal Mucosa	Mandible		
Malignant	10	2	1	2	1	1	5	-	-
Benign	4	1	4	0	0	0	1	7.995	0.38NS
Total	14	3	5	2	1	1	6	-	-

Table 1: The prevalence of salivary gland tumors.

Gender	Site							X^2	p-value
	Palate	Sub-mandibular Gland	Parotid Gland	Tongue	Maxilla	Right Buccal Mucosa	Mandible		
Male	5	2	3	1	0	0	3	-	-
Female	9	1	2	1	1	1	3	3.227	0.780NS
Total	14	3	5	2	1	1	6	-	-
NS: Not Significant									

Table 2: Mean age of occurrence with slight overall female predominance.

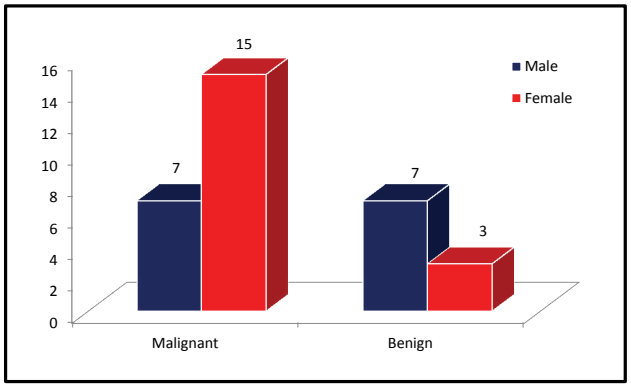

Figure 1: Graph showing the Chi square test 1.

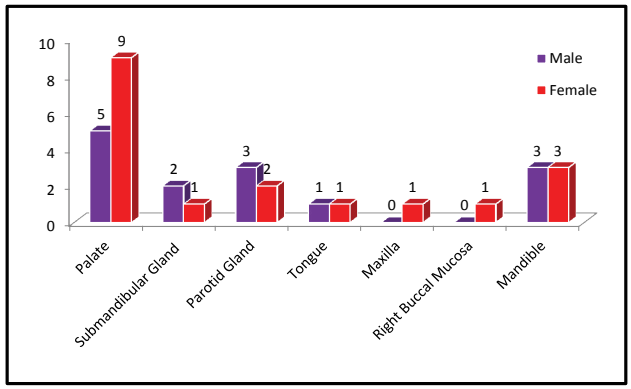

Figure 2: Graph showing the Chi square test 2.

survival rates varies between different parts of the world. In India, overall incidence of SGTs can be ascertained from the cancer registry established by Indian Council of Medical Research. However, the geographic area and population covered by these registries are small and perhaps unrepresentative of the Indian population. In addition, there is a limited published literature on SGTs in Indian population [12,13]. Hence this study was conducted to reveal the distribution literature of benign and malignant salivary gland tumors.

Aim of this study

This study was aimed to:

1. To assess the frequency of salivary gland tumour based on tumour type and anatomic location.

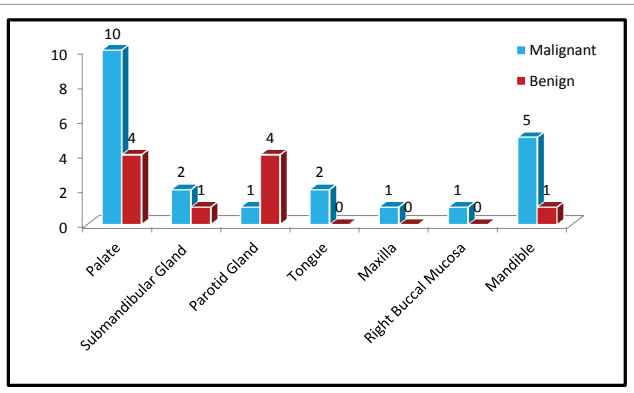

Figure 3: Graph showing the Chi square test 3.

Gender	Type		X2	p-value
	Malignant	Benign		
Male	7	7	-	-
Female	15	3	4.073	0.04*
Total	22	10	-	-
*Significant p<0.05				

Table 3: Benign tumour in the parotid gland.

2. To correlate gender and age in different tumour type.
3. To correlate the location of benign and malignant tumours.

Patients and Methods

A retrospective study was made in the Department of Oral Medicine and Radiology, Mahatma Gandhi Post Graduate Institute of Dental Sciences Puducherry, India during the period of January 2006 to December 2017, data was collected from the archives maintained in the Department of Oral Medicine, details of the patient including age, sex and site of the tumour were obtained and confirmed with histopathogical study. There were 12,003 histopathological reports in that particular period. Only salivary gland tumors both benign and malignant were included. Data was collected pertaining to the tumour type, location, age, gender of the patients and sent for statistical analysis. The tumours were classified according to (WHO) World Health Organisation's histological typing of salivary gland tumors. The collected data were analysed statistically, and results obtained compared with existing studies in the literature.

Results

During the period of January 2006 to December 2017 a total number of 12,003 specimens received for histopathological examination. Out of which 32 specimens were of salivary gland tumors. Chi square test was applied to find out the distribution of malignant and benign tumours. The prevalence of salivary gland tumors in our study was 0.3%, and the benign: malignant ratio was 1:2.2 (Table 1 and Figure 1). In this 10-year study, SGTs were found in patients between the ages of 14 and 71 years with mean age of occurrence was 45.01 ± 16.3 years with slight overall female predominance, and a male to female ratio of 0.7- 0.9 respectively (Table 2 and Figure 2). Malignant salivary gland tumour was present mostly in the palate and mandible, and benign tumour in the parotid gland (Table 3 and Figure 3). In case of benign tumours pleomorphic adenoma was common and among the malignant mucoepidermoid carcinoma was observed.

Discussion

The salivary glands are the site of origin of various neoplasm. These salivary gland tumors are relatively uncommon tumours and represent less than 2% of all tumours in the body and 5% of all head and neck tumours. The prevalence of SGTs in our Institution from January 2006 to December 2017 was 0.3%. The relatively low frequency of SGTs is the most probable reason for our review. Only a few published analysis of SGTs based on substantially large number of cases are registered from India and few information is ready on the tumours of the head and neck for the past two-three decades. The annual occurrence appears to be higher in western publications which may be due to the fact that these were based on centralized treatment centres. Among salivary gland tumors, in the present study malignant salivary gland tumors prevalence was more compared to benign salivary gland tumors in the ratio of 1: 2.2 respectively. Most of the other studies reported that benign tumours were more compared to malignant salivary gland tumors. Among benign tumours pleomorphic adenoma was the most common type. Among the malignant salivary gland tumors, mucoepidermoid carcinoma was the most common followed by adenoid cystic carcinoma, ex pleomorphic adeno carcinoma followed by low grade polymorphous adeno carcinoma. The clinical characteristics of MEC has proved to be tough to foretell but comparison to tumour grade and stage have been published. The histologic features most useful in predicting the vigorous nature of these tumors are 1) a minor cystic component (less than 20%) 2) tumour necrosis 3) neural invasion 4) cellular anaplasia and 5) brisk mitotic activity [14]. In our case series we reported with intermediate type of mucoepidermoid carcinoma of minor salivary glands origin which were common, and mainly the site of occurrence was from hard palate, retro molar trigone followed by major salivary glands including submandibular gland. Histologic grade and tumour stage appear to have enormous effects on survival. Aro et al. found a statistically significant difference in disease free survival (DFS) between low-grade MEC and intermediate high-grade MEC (p=0.001) [15]. Second most common malignant salivary gland tumour was ACC. Histopathologically it can be classified into three growth patterns, cribriform, tubular, and solid patterns. The cribriform type (44%) being the most common histopathological type, identified by a "Swiss Cheese" arrangements of vacuolated areas. In our study only, cribriform pattern of adenoid cystic carcinoma was reported. The prognosis for the cribriform subtype is intermediate. The tubular subtype (35%) carries the best prognosis and is characterized by cords and nests of malignant cells. Clinical feature was varying in each case, benign tumours mostly presented with painless swelling. Swelling with pain and ulceration was noted with short duration among malignant tumours. Central salivary gland tumour mainly from the posterior mandible was reported as an expansile swelling with pain. There was one case with soft tissue growth clinically similar to the inflammatory soft tissue, but histopathologically it turned out to be an adenoid cystic carcinoma. So, the clinical presentation of these tumours was challenging. Yet another case of MEC reported with swelling, pain and nasal regurgitation. No facial paralysis was reported, and one case of adenoid cystic carcinoma was with perineural invasion. Bony destruction on CT scan and lymph node metastasis was noted in the intermediate type of MEC arising from the retromolar trigone. In another case, which reported with expansile lytic lesion in the body of the mandible, histopathologically the diagnosis was MEC originating from odontogenic cyst. Present case series among benign salivary gland tumour, pleomorphic adenoma was most common and among malignant salivary gland tumors, adenoid cystic carcinoma, ex pleomorphic adeno carcinoma, followed by low grade polymorphous adeno carcinoma. Similar such case series were reported from Edda et al., Ahmed et al. Nagarkar et al. [16-18]. The incidence of benign neoplasms was high in the fifth decade on the other hand malignant neoplasms were seen more common in sixth and seventh decades [19]. Furthermore, the present study also showed malignant SGTs are seen in older patients than with benign tumours which correlates with most reported articles. The youngest case was reported at the age of 14 and oldest case at the age of 71 with average age of occurrence of 45.01 ± 16.3 years. From age wise distribution, benign tumours were noted in age range from 8 to 71 years with mean age of 39.5 years and mostly common in the 4th decade of life. Malignant tumors were noted in age range of 18 to 71 years with mean age of 48.5 years and common from 5th decade onwards. With slight overall female predominance, male to female ratio was 0.7- 0.9, this finding is logical with the other reports [20]. However, few studies have established more male predominance in SGTs [21]. Limitation and drawbacks of this study may be attributed to the fact that, this being an institutional retrospective study and data has been retrieved from the archives of the department and all demographic and histopathological details were analysed and only such cases were included. Moreover, in the present study, only cases over a period of ten years were examined thus resulting in fewer sample size.

Conclusion

The present study was a single centred institutional experience in which examination of 32 SGTs was worked out. The details of age, gender, site distribution and pathologic features observed in the study were in correlation with those studies established from India and other parts of the world. On the other hand, only few studies based on significantly large number of cases are published from India and a very little information is accessible on the tumours of the head and neck over the last two to three decades. Hence prospective multicentre studies ought to be carried out to better distinguish the risk factors.

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