Content available at: https://www.ipinnovative.com/open-access-journals

IP Journal of Diagnostic Pathology and Oncology

Journal homepage: https://www.jdpo.org/

Original Research Article

Clinico-epidemiological profile of salivary gland tumours: An institutional study

Jayanti G Humbe[1], Mandakini S Mandale[1], Vaishali A Nandkhedkar[1], Savita P Wagh[1], Poonam R Zanwar[1]*

[1]*Dept. of Oral Pathology and Microbiology, Govt. Dental College & Hospital, Aurangabad, Maharashtra, India*

ARTICLE INFO

Article history:
Received 08-07-2024
Accepted 27-07-2024
Available online 01-08-2024

Keywords:
Salivary gland tumor
Epidemiology
Incidence

ABSTRACT

Introduction: Salivary gland tumour (SGTs) is the complex group of heterogeneous entities that pose serious challenges to the pathologist, surgeons and oncologist SGTs demonstrate wide geographical variation, constituting 2-6% of all head and neck cancers and 0.5% of total body malignancies. Most SGTs are benign with 70% arising in major glands. Malignant SGTs comprise approximately with 15–35% of parotid gland, 41–45% of submandibular and 70–90% of sublingual glands. SGTs have diverse histomorphology with 33 different tumours recognised by WHO, making diagnosis challenging.
Aim: This study aimed to mitigate by accessing and analysing epidemiological data including demographic, clinical features and histological diagnoses of SGTs from tertiary regional cancer centre and government medical college
Materials and Methods: The retrospective study was included clinically and histopathological diagnosed 243 cases of SGTs from tertiary regional cancer centre, government medical college and government dental college.
Results: A total of 243 cases were analysed including 46% benign and 54% malignant tumours. A slight female predilection and peak incidence between the fifth and sixth decade for both benign and malignant tumours was observed. The majority (61%) of the SGT presented in minor and 39% in the major salivary glands. The parotid gland was the most common location for malignant SGT and minor glands for Benign SGT. Pleomorphic adenoma (38%), and Basal cell adenoma (31%), were the most common benign tumours whereas mucoepidermoid carcinoma (41%) and adenoid cystic carcinoma (32%) were the most frequent malignant tumours.
Conclusion: A morphologic diagnostic approach combined with ancillary immunohistochemical and molecular tests provides a frame work for the differential diagnosis of salivary gland neoplasms.

1. Introduction

Salivary gland tumors (SGT) are rare, constituting 5% of all head and neck cancers and 0.5% of total body malignancies, with an annual incidence of 0.5–2 patients/100,000 people.[1–4] Most occur in the sixth decade of life. The proportional morbidity for men and women is similar with ratio of 1.3: 1. The SGT develops in large (parotid, sub- -mandibular sublingual) as well as in small salivary glands located within the mucous membrane of the upper section of the gastrointestinal tract.[3] The majority occur in the parotid gland (70%) and they are less common in minor salivary (20%), submandibular (10%), and sublingual (7%). SGT are a very non-homogenous group, in which 32 histological types and subtypes can be distinguished.[5]

Therefore, the epidemiology of these neoplasms is not well recognized. Many studies include only data on parotid gland cancer, others contain data concerning only the large

* *Corresponding author*.
E-mail address: poonamz70160@gmail.com (P. R. Zanwar).

https://doi.org/10.18231/j.jdpo.2024.022

salivary glands.[6] As a relatively large number of neoplasms are benign lesions, epidemiological data are incomplete and can in many cases be underestimated. Additionally, because of the rarity of incidence and great diversity of those neoplasms, data concerning the etiology of specific histopathological types are scant.[7] In this paper, we present the latest epidemiological data concerning SGT in our region. With regards to malignant SGTs, the smaller the salivary gland the higher the risk of malignancy, with nearly 100% of sublingual and 60% of minor salivary gland tumours diagnosed as malignant.[8]

To date, most of the epidemiological studies on SGTs are limited for a variety of reason including being out of date, extrapolated from either a single centre or country studies, or investigating either major or minor glands only.

2. Materials and Methods

The retrospective study was consisted of 245 cases of major and minor SGT selected among 32,789 cases over the 5yr recorded in the files of the Laboratory of clinically and histopathological diagnosed cases of SGTs from tertiary regional cancer centre, government medical college and government dental college.

Data collection was based on information obtained with the sample's results of histopathology exams, which were reproduced to a usual file developed specifically for this analysis. Patents' age, gender as well as anatomical site and histopathological diagnosis of lesion were the explored variables. Among the histopathological results obtained in the files, all cases were revised and reclassified based on 5^{th} edition of World Health Organization classification (2022) on the basis of neoplastic and non-neoplastic lesion.

3. Results

All 243 cases of SGT corresponded to 0.15% of the total cases registered by this laboratory during the stated period. Malignant neoplasm were more common than benign ones, while Mucoepidermoid carcinoma was the most frequent type (Table 7). Regarding malignant neoplasm, mucoepidermoid carcinoma followed by adenoid cystic carcinoma and Adenocarcinoma were the most frequently observed types (Table 7). The majority (61%) of the SGT presented in minor and 39% in the major salivary glands. Considering the anatomical site, greater salivary glands, especially the palate followed by involving site was parotid gland, submandibular gland and sublingual gland respectively (Table 6), were the most affected both by benign and malignant neoplasias.

Concerning patients' gender, women were more frequently affected (Table 4). Peak incidence relative to age was the fifth and sixth decades for benign and malignant neoplasias (Table 5), respectively.

Table 1: Distribution of overall salivary gland lesion

Assessment and distribution of salivary gland lesions		
SG lesions	N	%
Non neoplastic	110	32%
Neoplastic	243	68%

Table 2: Assessment and distribution of SGT

Assessment and distribution of SGT		
SGT (N)	N	%
Benign	112	46%
Malignant	131	54%

Table 3: Assessment and distribution of nonneoplastic SG lesions

Assessment and distribution of Nonneoplastic SG lesions		
Nonneoplastic SG lesions	N	%
Mucocele	95	86%
Sailoadenitis	01	0.9%
Ranula	04	3.6%
Sailolithiasis	06	5.5%
Salivary polycystic adenosis	02	1.8%
Sjogren syndrome	02	1.8%

Table 4: Gender wise distribution of SGT

Gender wise distribution of SGT		
SGT (N)	Female (170)	Male (73)
Benign (112)	72.32% (81)	27.63% (27)
Malignant (131)	68% (89)	32% (42)

Table 5: Age wise distribution of SGT

Age wise distribution of SGT		
Age group (N)	% of BSGT (112)	% of MSGT (131)
20 – 29 (16)	100% (16)	00
30 – 39 (26)	73% (19)	27% (07)
40 – 49 (43)	42% (18)	48% (25)
50 – 59 (68)	39% (27)	61% (41)
> 60 (90)	35% (32)	65% (58)

4. Discussion

Salivary glands are divided into major and minor ones. Major salivary glands include parotid, submandibular, and sublingual glands and minor ones include hundreds of small glands scattered throughout the oropharynx, nose, sinuses, larynx, and trachea.[7] Both benign and malignant lesions may be seen in salivary glands. Chance of being benign or malignant varies in different sites.[3] Epidemiological studies of epithelial SGT are difficult to conduct effectively due to tumor rarity, histological heterogeneity, tumor location diversity and a lack of national registries collecting data, especially for benign tumors.[8,9]

Alteration in salivary glandular epithelium may produce such diversities in histopathological expressions that the development of a universal classification accepted by researchers is very hard, especially when diagnosing certain

Table 6: Anatomical site wise distribution of SGT

To assess anatomical site wise distribution of SGT			
	Anatomical site	**Benign (112)**	**Malignant (131)**
Major salivary gland (95)	Parotid	26% (30)	35% (46)
	Submandibular	14% (16)	12.9% (17)
	Sublingual	12% (14)	13.74% (18)
Minor Salivary Gland (146)	Palate	38% (43)	25% (34)
	Retromolar	00	3.8% (05)
	lip	2% (03)	3% (04)
	Buccal Mucosa	5% (06)	5% (07)

Table 7: Histopathological type wise SGT

Histopathological type wise SGT			
	Anatomical site	**N**	**%**
Benign SGT (112)	Pleomorphic Adenoma	43	38.39%
	Basal Cell Adenoma	35	31.25%
	Myoepithelioma	21	18.75%
	Warthin Tumor	07	6.25%
	Salivary Duct Papiloma	03	2.67%
Malignant SGT (131)	Mucoepidermoid Carcinoma	54	41.22%
	Adenoid Cystic Carcinoma	42	32.06%
	Adenocarcinoma	17	12.97%
	Basal Cell Adenocarcinoma	12	9.16%

Table 8: Assessment of recurrence and metastasis of SGT

To Assess recurrence and metastasis of SGT		
SGT (N)	**Benign (n=112)**	**Malignant (n=131)**
Recurrence	3% (04)	6% (09)
Metastasis	00	3% (05)

neoplasia's. Multiple histological aspects of SGT have been attributed to presence of myoepithelial cells in these glands. There were several attempts to classify these lesions in the past years, and the most recent and adopted classification is the World Health Organization publication (2022).[1,2] It is clear that this document aims at grouping all known SGT into two major groups: benign and malignant. Once this classification was developed by an institution accepted and recognized worldwide, the present study followed their criteria.[10]

Out of 353 cases of major and minor epithelial salivary glandular lesion, it was observed that minor salivary glands were most commonly affected in both non neoplastic lesion and neoplastic lesion i.e. both in benign and malignant tumors, specifically the palate (61.6%). Tumours involving minor glands have worse prognosis, higher recurrence rate and poor outcomes compared to major gland tumours.

In the present study, parotid gland represented the second most frequent site of benign and malignant tumors, which was favoured with Rivera-Bastidas H et al. few cases were recognised in submandibular and sublingual salivary gland respectively.[5] Benign SGT were more frequent in female than in male at a 3:1 rate, with mean age of 46.1 years. Malignant neoplasias were also observed with higher frequency in female at a 2:1 ration and mean age of 64.8 years. Similar findings were studied in Solange Souza Lima et al.[11]

Peak incidence of benign SGT was experiential at the fourth decade of life and malignant SGT was fifth decade of individuals. Some literature showed that for benign SGT, and malignant SGT was observed fifth decade and seventh decade respectively, partly substantiating the findings with the present study, except for benign SGT.[8,12,13]

On basis of histopathological diagnosis in this study, pleomorphic adenoma was the most frequent lesion (41.96%) among benign SGT, which is in accordance with most literature around the world. Out of 47 cases of pleomorphic adenoma, 34 (72.34%) occurred in female, with a peak incidence at the fourth decade of life and mean age of 39.2 years. The most frequent site of pleomorphic adenomas in this study was the minor salivary gland i.e. palate; however, it is important to emphasize that this neoplasia was also the most frequently found in other salivary glands, which is accordance with other authors reported in their study.[1,5]

Malignant tumors of salivary glands summed 131 cases (53.90%), among which mucoepidermoid carcinoma was the majority, totalizing 54 cases (41.22%). These findings

are similar with the Otoh EC et al and Stryjewska-Makuch G et al.[6,7] although Solange Souza Lima et al are reporting the Adenoid cystic carcinoma is the most frequent malignant SGT.[11,14]

Increasing numbers of researchers are highlighting the importance of genetic alterations as biomarkers of salivary gland pathology. It has been suggested that the genetic changes have also prognostic and predictive potential.[1] Alterations at the genetic level result in changes to the tumour microenvironment. In summary, the data presented in this study are very similar to those of other published research studies. We concluded that the incidence of salivary gland neoplasia in the Marathwada region is in accordance with the incidence observed in several other regions of worldwide.[15]

5. Conclusion

Correct diagnosis of salivary gland lesion is essential in determining the treatment and prognosis of the patient. SGT are a diverse group of disease and each patient must be treated individually. The data demonstrated that epidemiology profile of the studied neoplasms corroborated most of the studied literature.

In the future, the importance of genetic alterations in the diagnosis of salivary gland pathology will increase even more. These alterations will also be helpful as prognostic and predictive biomarkers, and may also serve as targets for anti-cancer therapies.

6. Source of Funding

None.

7. Conflict of Interest

None.

References

1. Zurek M, Fus Ł, Niemczyk K, Rzepakowska A. Salivary gland pathologies: evolution in classifcation and association with unique genetic alterations. *Eur Arch Otorhinolaryngol*. 2023;280(11):4739–50.
2. Gontarz M, Bargiel J, Gąsiorowski K, Marecik T, Szczurowski P, Zapała J, et al. Epidemiology of Primary Epithelial Salivary Gland Tumors in Southern Poland-A 26-Year, Clinicopathologic, Retrospective Analysis. *J Clin Med*. 2021;10(8):1663. doi:10.3390/jcm10081663.
3. Gao M, Hao Y, Huang MX, Ma DQ, Chen Y, Luo HY, et al. Salivary gland tumours in a northern Chinese population: A 50-year retrospective study of 7190 cases. *Int J Oral Maxillofac Surg*. 2017;46(3):343–9.
4. Hill AG. Major salivary gland tumours in a rural Kenyan hospital. *East Afr Med J*. 2002;79(1):8–10.
5. Lukšić I, Virag M, Manojlović S, Macan D. Salivary gland tumours: 25 years of experience from a single institution in Croatia. *J Craniomaxillofac Surg*. 2012;40(3):75–81.
6. Rivera-Bastidas H, Ocanto RA, Azevedo AM. Intraoral minor salivary gland tumours: a retrospective study of 62 cases in Venezuelan population. *J Oral Pathol Med*. 1996;25(1):1–4.
7. Otoh EC, Johnson NW, Olasoji H. Salivary gland neoplasms in Maiduguri, north-eastern Nigeria. *Oral Dis*. 2005;11(6):386–91.
8. Stryjewska-Makuch G, Kolebacz B, Janik MA. Increase in the incidence of parotid gland tumors in the years. *Otolaryngol Pol*. 2005;71(2):29–34.
9. Li L, Li Y, Wen Y, Liu H, Zhao H, Wen YM, et al. Clinical analysis of salivary gland tumor cases in West China in past 50 years. *Oral Oncol*. 200802;44(2):187–92.
10. Jones AV, Craig GT, Speight PM, Franklin CD. The range and demographics of salivary gland tumours diagnosed in a UK population. *Oral Oncology*. 200804;44(4):407–17.
11. Subhashraj K. Salivary gland tumors: a single institution experience in India. *Br J Oral Maxillofac Surg*. 2008;46(8):635–8.
12. Licitra L, Grandi C, Prott FJ, Schornagel JH, Bruzzi P, Molinari R, et al. Major and minor salivary glands tumors. *Crit Rev Oncol Hematol*. 2003;45(2):215–25.
13. Lima RA, Tavares MR, Dias FL, Kligerman J, Nascimento MF, Barbosa MM, et al. Clinical prognostic factors in malignant parotid gland tumors. *Otolaryngol Head Neck Surg*. 2005;133(5):702–8.
14. Lima SS, Soares AF, Amorim RFB, Freitas RA. Epidemiologic profile of salivary gland neoplasms: analysis of 245 cases. *Braz J Otorhinolaryngol*. 2005;71(3):335–40.
15. Cheng YQ, Wang SB, Liu JH, Jin L, Liu Y, Yang C, et al. Modifying the tumour microenvironment and reverting tumour cells: New strategies for treating malignant tumours. *Cell Prolif*. e12865;53(8):e12865. doi:10.1111/cpr.12865.

Author biography

Jayanti G Humbe, Associate Professor

Mandakini S Mandale, HOD and Associate Professor

Vaishali A Nandkhedkar, Assistant Professor

Savita P Wagh, Assistant Professor

Poonam R Zanwar, Assistant Professor https://orcid.org/0000-0003-0447-9955

Cite this article: Humbe JG, Mandale MS, Nandkhedkar VA, Wagh SP, Zanwar PR. Clinico-epidemiological profile of salivary gland tumours: An institutional study. *IP J Diagn Pathol Oncol* 2024;9(2):116-119.