

## Original Research Article

# Salivary gland tumours: a hospital-based study on demographic and incidence pattern, histopathological types and treatment strategy

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**Received:** 17 September 2020

**Revised:** 19 October 2020

**Accepted:** 28 October 2020

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### ABSTRACT

**Background:** Salivary gland tumours constitute 3-4% of all head and neck cancers (mostly benign). These tumours are epithelial (95%) or mesenchymal in origin. Pleomorphic adenoma is the most common benign salivary gland tumour and mucoepidermoid carcinoma (45%) is the most common malignant salivary gland tumour followed by adenoid cystic carcinoma (30%). The parotid, submandibular and the minor salivary glands of palate are commonly involved and the sublingual gland is rarely affected.

**Methods:** Hospital based cross sectional study was done in a tertiary care centre during a period of 1 year, which included 21 patients (10 men and 11 women). Patients were analysed according to age, gender, food habits, histopathological type and site of the tumour and treatment strategy.

**Results:** All the cases were from upper Assam province sharing a particular demographic pattern between 19-65 years. Peak incidence in males was fourth decade and females was third decade. Male female ratio was 0.9:1. Out of 21 cases, 14 were parotid gland tumours, 6 submandibular gland tumours and 1 minor salivary gland tumour. Most of the tumours were benign (16) and 5 were malignant.

**Conclusions:** Two patients were of age 19 years which is conflicting the normal national incidence. All cases belonged to lower economic strata with decreased intake of beta carotene enriched food items. The most common site is parotid gland and most common tumour is pleomorphic adenoma which is in accordance to other studies. Benign cases were subjected to superficial parotidectomy and malignant cases to total parotidectomy with neck dissection.

**Keywords:** Parotid, Submandibular, Sublingual, Salivary gland

### INTRODUCTION

The salivary glands are responsible for the production, modification and secretion of saliva, which aids mastication, deglutition, digestion and protection of teeth and soft tissues.<sup>1</sup> There are three pairs of major salivary glands (parotid, submandibular and sublingual salivary gland) and minor salivary glands. Salivary gland tumours are relatively uncommon compared to other tumours and said to account for less than 1% of all human tumours.<sup>3</sup> Salivary gland tumours correspond to approximately 3-4% of neoplasm of the head and neck region.<sup>2</sup> The majority (70%) of salivary gland tumours arise in the

parotid gland and the majority of minor salivary gland tumours are malignant, but three fourth parotid tumours are benign.<sup>4</sup> This study presents the comprehensive study of cytological and histological pattern of the salivary gland tumours. Patients from upper Assam province came to department of ENT and head and neck surgery, Assam medical college, aimed at understanding the epidemiological pattern of these tumours in the upper Assam Province.

Aim of study was to analyse demographic and incidence pattern, histopathological types and treatment strategy.

**METHODS**

A hospital based cross sectional prospective study was done in patients presenting with salivary gland tumors to our hospital in a period of 1 year (January-December 2019), who were from upper Assam province showing a particular demographic pattern. 1 patient was from Khunsa district of Arunachal Pradesh.

Inclusion criteria included cases of neoplasms of salivary glands attending otorhinolaryngology department.

Exclusion criteria-inflammatory disorders of salivary gland, sialolithiasis and any associated systemic illness.

Main objective was to analyse the demographic distribution and incidence pattern in relation to pre-operative fine needle aspiration (FNA). They were then subjected to surgery and post-operative histopathological examination (HPE) were recorded. The data collected were tabulated in Microsoft excel worksheet and computer-based analysis was performed using the statistical product and service solutions (SPSS) 20.0 software and Microsoft excel 2010. The categorical variables were summarised as proportions and percentages. The study was a hospital-based observational study so no statistical analysis between the parameters were evaluated. These salivary gland tumours were classified in accordance with the 2005 world health organization (WHO), histological classification of salivary gland cytopathology (MSRSGC).<sup>5</sup>

**RESULTS**

All patients of salivary gland lesions attending otorhinolaryngology department during the study period who fulfil the inclusion criteria were included in the study. There was a total of (n) 21 patients of salivary gland tumours during this study period. The number of cases were slightly higher in female with 11 cases (52.38%) in comparison to male which was only 10 cases (47.62%). The male to female ratio was 0.9:1. Most of the salivary gland tumours were found in the age group of 30 to 40 years (i.e. fourth decade of life) (Table 2).

**Table 1: Region wise distribution.**

Place	Total cases	Male	Female
Charaideo	2	2	0
Dhemaji	2	1	1
Dibrugarh	8	4	4
Golaghat	1	0	1
Lakhimpur	2	1	1
Sibsagar	3	1	2
Tinsukia	2	1	1
Arunachal Pradesh	1	1	0

Table 1 is showing region wise case distribution in 7 districts of upper Assam province, viz. Charaideo, Sivsagar, Golaghat, Dibrugarh, Tinsukia, Dhemaji, Lakhimpur and Khunsa district of Arunachal Pradesh. All these mentioned regions are generally as per environment is concerned. According to the history all the cases in our study belong to upper lower strata of modified Kuppuswamy classification. They use kerosene oil for cooking, low intake of yellow vegetables, high intake of protein diet and drink water without filtration and boiling from tube well. These might be considered as risk factors of salivary gland tumours in upper Assam province.

**Table 2: Age wise distribution.**

Age (year)	No. of patients	Percentage (%)
11-20	3	14.29
21-30	5	23.81
31-40	7	33.33
41-50	4	19.05
51-60	1	4.76
61-70	1	4.76

**Table 3: Sex wise distribution.**

Sex	No. of patients	Percentage (%)
Male	10	47.62
Female	11	52.38
Total	21	100

**Table 4: Age and sex wise distribution of benign and malignant tumours.**

Tumors	Benign		Malignant	
	Male	Female	Male	Female
Sex				
Age group (years)				
11-20	0	3	0	0
21-30	2	3	0	0
31-40	1	4	2	0
41-50	2	1	1	0
51-60	0	0	1	0
61-70	0	0	1	0

**Table 5: Site wise distribution of benign and malignant tumours.**

Site	Benign	Malignant	Total (%)
Parotid gland	10	4	14 (66.67)
Submandibular gland	5	1	6 (28.57)
Minor salivary gland	1	0	1 (4.76)
Total (%)	16 (76.1)	5 (23.81)	21 (100)

There was a predominance of female (52.38%) in benign salivary gland tumours, but malignant tumours are more prevalent in males (Table 4). The peak incidence was

seen in fourth decade in females. Malignant salivary gland tumours were seen only in males in our study (Table 4). In our study, parotid gland was the most common site (66.67%), followed by submandibular gland (28.57%) and then minor salivary gland (4.76%) (Table 5).

**Table 6: Histological reports (FNA and HPE).**

Site	FNA	HPE
<b>Parotid gland</b>	Pleomorphic adenoma	Pleomorphic adenoma with areas of squamous metaplasia
<b>Parotid gland</b>	Pleomorphic adenoma	Pleomorphic adenoma with chronic lymphadenitis
<b>Parotid gland</b>	Pleomorphic adenoma	Pleomorphic adenoma
<b>Parotid gland</b>	Pleomorphic adenoma	Pleomorphic adenoma
<b>Parotid gland</b>	Pleomorphic adenoma	Pleomorphic adenoma
<b>Parotid gland</b>	Pleomorphic adenoma	Pleomorphic adenoma
<b>Parotid gland</b>	Pleomorphic adenoma	Pleomorphic adenoma
<b>Parotid gland</b>	Pleomorphic adenoma	Pleomorphic adenoma
<b>Parotid gland</b>	Squamous cell carcinoma	Pleomorphic adenoma
<b>Parotid gland</b>	Pleomorphic adenoma	Myoepithelioma
<b>Parotid gland</b>	Pleomorphic adenoma	Polymorphous low-grade adenocarcinoma
<b>Parotid gland</b>	Mucoepidermoid carcinoma	Mucoepidermoid carcinoma
<b>Parotid gland</b>	Mucoepidermoid carcinoma	Squamous cell carcinoma
<b>Parotid gland</b>	Acinic cell carcinoma	Acinic cell carcinoma
<b>Submandibular gland</b>	Pleomorphic adenoma	Pleomorphic adenoma
<b>Submandibular gland</b>	Pleomorphic adenoma	Pleomorphic adenoma
<b>Submandibular gland</b>	Pleomorphic adenoma	Pleomorphic adenoma
<b>Submandibular gland</b>	Pleomorphic adenoma	Pleomorphic adenoma
<b>Submandibular gland</b>	Pleomorphic adenoma	Pleomorphic adenoma
<b>Submandibular gland</b>	Pleomorphic adenoma	Squamous cell carcinoma
<b>Minor salivary gland</b>	Pleomorphic adenoma	Pleomorphic adenoma

In our study, pre-operative FNA and post-operative HPE of 16 cases showed same results, while rest 5 cases showed different results.

Superficial parotidectomy was done in 10 cases. 1 case of mucoepidermoid carcinoma (as diagnosed pre-operatively) presented with skin involvement, where total parotidectomy with hemi-mandibulectomy with pectoralis major myocutaneous (PMMC) flap reconstruction was done. 2 cases were treated with total parotidectomy with neck dissection.

Submandibular and minor salivary gland tumours were treated with total excision of the gland.

Concurrent radiotherapy was given to malignant cases post-operatively.

**DISCUSSION**

The study was taken up to evaluate the variables like age, sex, food habits, site and incidence pattern of salivary gland tumors, pathological investigations and treatment strategy.

During this 1-year study, a total of 21 cases were included. The observations and results of our study were analysed, evaluated and compared with observations made by various other studies on salivary gland tumors.

In our study, salivary gland tumour was seen in any age as early as 19 years, which is contradictory to national and worldwide data. The most common age group involved in both benign and malignant tumours was 31-40 years. Our findings are at variance with western literature, where salivary gland tumour occur over a wider age group with a peak age reported in the 7<sup>th</sup> and 8<sup>th</sup> decade.<sup>7</sup> Most of the studies reviewed shows a female predominance similar to our finding, though Sashikala et al found male predominance.<sup>4,8,9</sup> In our study, most commonly involved salivary gland is the Parotid gland (66.67%). This finding is similar with various literature.<sup>10,13</sup> The pleomorphic adenoma constitutes total of 15 out of 21 cases (71.42%) and was found to be most common benign salivary gland tumour, which is similar with various studies of salivary gland tumours.<sup>8-10,13</sup>

The most common presentation of all salivary gland tumour in our study was progressive swelling (100%). All submandibular, minor salivary and benign parotid gland tumour swellings were firm, non-tender and mobile on palpation. 4 cases (1 squamous cell carcinoma, 1 pleomorphic adenoma, 1 mucoepidermoid carcinoma and 1 polymorphous low-grade adenocarcinoma) also presented with trismus, difficulty in chewing and swallowing. 1 case (1 mucoepidermoid carcinoma) also had skin involvement. Literature such as Shetty et al also found results in accordance to our study.<sup>15</sup>

Most of the patients in our study belong to lower socioeconomic strata with decreased intake of beta carotene enriched food items. In a study by Zheng et al, it has been found that there is inverse association of salivary gland cancer with dark yellow vegetables.<sup>3</sup> Thus, beta carotene enriched foods might be considered protective for salivary gland tumours.

In our study, a thorough clinical evaluation was done and FNA was advised to all the patients. FNA revealed 17 cases to be benign and 4 to be malignant, while HPE of 5 cases showed different results. FNA reporting was done with the help of Milan staging of parotid tumors and HPE reporting was done with the help of WHO classification.

Agustin et al found in their retrospective study that 80% cases were benign and 20% malignant which is almost similar to our study.<sup>16</sup>

Complications of surgery was seen in one case, i.e., facial nerve palsy. In another case, marginal mandibular nerve was injured, which recovered within 2 weeks. Frey's syndrome was not seen in any of the cases. However, a minimum of 6 months follow-up is necessary for diagnosing Frey's syndrome. All the patients were advised to follow up at 2<sup>nd</sup> week, 1<sup>st</sup>, 3<sup>rd</sup> and 6<sup>th</sup> months.

## CONCLUSION

The results of this study showed that various clinical features of salivary gland tumors in upper Assam province are almost similar to those seen in other parts of the country and worldwide. But the incidence pattern is a bit higher in this part of the state. Further epidemiological surveys should be done for better understanding of the disease in the light of genetic counselling. Awareness among the population should be encouraged to provide early and better treatment of salivary gland tumours.

*Funding: No funding sources*

*Conflict of interest: None declared*

*Ethical approval: The study was approved by the Institutional Ethics Committee*

## REFERENCES

1. Jude UO, Olu-Eddo AN. Salivary gland tumors, a twenty-year retrospective study. *Afr J Med Health Sci.* 2014;13:24-9.
2. Ezeanolue BC. Salivary gland neoplasms: a descriptive analysis of the pattern seen in Enugu. *West Afr J Med.* 1999;18:179-82.
3. Zheng W, Shu XO, Ji BT, Gao YT. Diet and other risk factors for cancer of the salivary glands: A population-based case-control study. *Int J Cancer.* 1996;67(2):194-8.
4. Laishram RS, Kumar KA, Pukhrambam GD, Laishram S, Debnath K. Pattern of salivary gland tumors in Manipur, India: A 10-year study. *South Asian J Cancer.* 2013;2:250-3.
5. Faquin WC, Rossi ED, Baloch Z, Barkan GA, Foschini M, Kurtycz DFI et al editors. *The Milan System for Reporting Salivary Gland Cytopathology.* Cham: Springer. 2018;1-9.
6. Kucuk U, Akoz G, Cakir E, Pala EEO, Bayol U, Gumussoy M et al. Documentation of the Salivary Gland Tumors: An Institutional data from Turkey. *Oral Surg Oral Med Oral Pathol Oral Radiol.* 2015;119(3):166.
7. Eveson JW, Cawson RA. Salivary gland tumours: A review of 2410 cases with particular reference to histological type, site, age and sex distribution. *J Pathol.* 1985;146:51-8.
8. Lawal AO, Adisa AO, Kolude B, Adeyemi BF, Olajide MA. A review of 413 salivary gland tumours in the head and neck region. *J Clin Exp Dent.* 2013;5(5):218-22.
9. de Oliveira FA, Duarte EC, Taveira CT, Maximo AA, de Aquino EC, Alencar Rd et al. Salivary gland tumor: a review of 599 cases in a Brazilian population. *Head Neck Pathol.* 2009;3(4):271-5.
10. Srivani N, Srujana S, Shahista S, Kumar OS. Spectrum of salivary gland tumors - A five-year study. *IAIM.* 2016;3(7):132-6.
11. Rahrotaban S, Masoomi P, Moradi M, Sharifpour V. Frequency of salivary gland tumors in two referral center of Qazvin university of Medical sciences from 1999-2009. *J Res Dent Sci.* 2009;2:27-31.
12. Satko I, Stanko P, Longauerova I. Salivary gland tumors treated in the stomatological clinics in Bratislava. *J Craniomaxillofac Surg.* 2000;28:56-61.
13. Vijayalaxmi M, Swaminadh P, Tati ST, Gattu VR, Nakka A, Avinash C et al. Demographic And Clinico-Pathological Study of Salivary Neoplasms. *J Dental Med Sci.* 2017;16(10):59-63.
14. Sardar MA, Ganvir SM, Hazarey VK. A demographic study of salivary gland tumors. *SRM J Res Dent Sci.* 2018;9:67-73.
15. Shetty A, Geethamani V. Role of fine-needle aspiration cytology in the diagnosis of major salivary gland tumors: A study with histological and clinical correlation. *J Oral Maxillofac Pathol.* 2016;20:2249.
16. Agustin VP, Renê G, Vergílius AFJF, Vieira de CI. Salivary gland tumors in a Brazilian population: a retrospective study of 124 cases. *Rev Hosp Clin.* 2002;57(6):271-6.

**Cite this article as:** Mili MK, Das HJ, Saikia A, Saikia NJ, Phookan J, Gohain M. Salivary gland tumours: a hospital-based study on demographic and incidence pattern, histopathological types and treatment strategy. *Int J Otorhinolaryngol Head Neck Surg* 2020;6:2218-21.