

## A Retrospective Research at A Tertiary Care Centre in The Bihar Region to Assess Salivary Gland Tumours

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Received: 13-04-2021 / Revised: 26-05-2021 / Accepted: 20-06-2021

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Conflict of interest: Nil

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### Abstract

**Aim:** To evaluate the salivary gland tumours at a tertiary care centre in Bihar region. **Methods:** A retrospective study was conducted in the Department of ENT, Darbhanga Medical College & Hospital, Darbhanga, Bihar, India, for 1 year, 60 biopsied salivary gland specimens received at the Department of Histopathology 60 histologically diagnosed as SGTs formed the focus of this study. Corresponding slides were also retrieved and, where necessary, new sections were made from the corresponding paraffin-embedded tissue blocks. **Results:** A total of 24000 surgical specimens were received in the Department of Pathology during this study period. Of these, 4100 specimens were neoplastic. SGTs accounted for 60 cases, constituting 0.25% of all surgical specimens and 1.46% of all neoplasms received. The age range of patients was 2-77 years, with a mean age of  $40.63 \pm 15.87$  years. The mean ages for benign and malignant SGTs were  $36.75 \pm 14.55$  and  $42.87 \pm 20.32$  years, respectively. The peak incidence for the benign and the malignant tumors were in the 3rd and 6th decades, respectively. The anatomical distributions of the tumors include parotid gland (60%), submandibular gland (14%) and minor salivary glands (26%). The palate, buccal mucosa, tongue, lip, retro molar mucosa and neck were the anatomical sites of the minor SGTs in this study, with the palate accounting for 80% of the cases. 55 percent of these tumors were benign, with pleomorphic adenoma accounting for 72.73% of them. The most common malignant tumors in this study were adenoid cystic carcinoma, mucoepidermoid carcinoma and acinic cell carcinoma, accounting for 25.93%, 18.52% and 14.81% of all malignant tumors seen. Few cases of squamous cell, basal cell, salivary duct and small cell carcinomas, sialoblastoma, hemangiopericytoma, myxoid liposarcoma and polymorphous low-grade adenocarcinoma were also seen. **Conclusion:** We found the peak incidences of benign and malignant tumors were in the 3rd and 6th decades, respectively. Pleomorphic adenoma and adenoid cystic carcinoma were the most common benign and malignant SGTs in our study populace.

**Keywords:** pleomorphic adenoma, salivary glands, tumor

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### Introduction

Salivary gland tissues are diffusely distributed in the upper aero digestive tract. The parotid, submandibular, and sublingual

glands are the major salivary glands. Minor salivary glands are present in many sites, such as the lips, gingiva, cheek, palate,

tongue, oropharynx, paranasal sinuses, and parapharyngeal space. Salivary gland tumors are relatively uncommon lesions accounting for 3–6% of all head and neck neoplasms[1]. The global incidence of these tumors is 0.4–13.5 per 100,000 persons annually[2]. These neoplasms composed heterogeneous groups of tumors with variable histological pictures. The site, patient age, and sex distributions of different types of salivary gland neoplasms vary with race and geographic location. The incidence of these tumors is different in between geographic areas and ethnic groups[3]. A variety of tumors can develop in the salivary glands. Currently recognized 10 subtypes of benign and 20 subtypes of malignant salivary gland tumors (SGT)[4]. However, SGT are rare, representing less than 3% all head and neck tumors.<sup>5</sup> The majority of SGT are benign, with pleomorphic adenoma (PA) the most common. Among malignant tumors, mucoepidermoid carcinoma (MEC) and cystic adenoid carcinoma (ACC) are more common[5]. Epidemiological studies across the world have shown differences in the incidence and distributions of SGT, with diverse demographic results in different regions[6-7]. However, there are few studies about the incidence in the Brazilian population, especially considering its geographical size[8-9].

### Materials and Methods

A retrospective study was conducted in the Department of ENT, Darbhanga Medical College & Hospital, Darbhanga, Bihar, India, for 1 year, after taking the approval of the protocol review committee and institutional ethics committee. 60 biopsied salivary gland specimens received at the Department of Histopathology 60 histologically diagnosed as SGTs formed the focus of this study.

Corresponding slides were also retrieved and, where necessary, new sections were made from the corresponding paraffin-embedded tissue blocks. These sections were later stained with hematoxylin and eosin stains.

Special stains were applied where necessary.

These SGTs were classified in accordance with the 2005 World Health Organization (WHO) Histological Classification of Salivary Gland Tumours[10], and their frequency distribution were analyzed using SPSS version 22.0 (Microsoft Corporation, Chicago, 2007) and presented in tables.

Cases with recurrence, unknown origin and uncertain histological diagnosis were excluded from this study. Specimens in which the corresponding slides or tissue blocks could not be retrieved were also excluded from the study.

### Results

A total of 24000 surgical specimens were received in the Department of Pathology during this study period. Of these, 4100 specimens were neoplastic. SGTs accounted for 60 cases, constituting 0.25% of all surgical specimens and 1.46% of all neoplasms received. The age range of patients was 2-77 years, with a mean age of  $40.63 \pm 15.87$  years. The mean ages for benign and malignant SGTs were  $36.75 \pm 14.55$  and  $42.87 \pm 20.32$  years, respectively. The peak incidence for the benign and the malignant tumors were in the 3<sup>rd</sup> and 6<sup>th</sup> decades, respectively. The age distribution of SGTs is shown in Table 1. The age range and mean age of various SGTs is also shown in Table 2. Forty-four percent of the cases occurred in males, giving an M:F ratio of 1:1.5 for all SGTs. The anatomical distributions of the tumors include parotid gland (60%), submandibular gland (14%) and minor salivary glands (26%). The palate, buccal mucosa, tongue, lip, retromolar mucosa and neck were the anatomical sites of the minor SGTs in this study, with the palate accounting for 80% of the cases. The benign-malignancy ratio for the parotid, minor salivary gland and the submandibular tumors were 1.3:3, 1.9:3 and 4.6:3, respectively. 55 percent of these tumors were benign, with pleomorphic adenoma accounting for 72.73% of them. Other benign tumors seen in this study were

basal cell adenoma, adenolymphoma (Warthin’s tumor), capillary hemangioma, myoepithelioma and fibrolipoma. The most common malignant tumors in this study were adenoid cystic carcinoma, mucoepidermoid carcinoma and acinic cell carcinoma, accounting for 25.93%, 18.52%

and 14.81% of all malignant tumors seen. Few cases of squamous cell, basal cell, salivary duct and small cell carcinomas, sialoblastoma, hemangiopericytoma, myxoid liposarcoma and polymorphous low-grade adenocarcinoma were also seen.

**Table 1: Distribution of salivary gland tumours with age**

Tumor types		Age in years								Total
		Below 10	10-20	20-30	30-40	40-50	50-60	60-70	Above 70	
Benign	Pleomorphic adenoma	1		10	4	5	3	1		24
	Basal cell adenoma		1			1	2			4
	Capillary hemangioma			1		1				2
	Adenolymphoma		1							1
	Myoepithelioma			1						1
	Fibrolipoma							1		1
Malignant	Adenoid cystic carcinoma			1	1	2	2	1		7
	Mucoepidermoid carcinoma		2	1	1			1		5
	Acinic cell carcinoma				1	1	2			4
	Basal cell adenocarcinoma						1			1
	Carcinoma ex-pleomorphic adenoma				1					1
	Carcinosarcoma					1				1
	Hemangiopericytoma						1			1
	Myxoid liposarcoma						1			1
	Polymorphous low-grade adenocarcinoma		1	1						2
	Salivary duct carcinoma						1			1
	Sialoblastoma	1								1
	Squamous cell carcinoma								1	1
	Small cell carcinoma			1						1
<b>Total</b>		2	5	16	8	11	13	4	1	60

**Table 2: Age range, mean age and standard deviation of SGTS**

Histological type/group	Age range(years)	Mean age	Standard deviation
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Pleomorphic adenoma	12-65	36.8	15.3
Basal cell adenoma	13-53	41.4	21.3
Capillary hemangioma	5-48	26.1	19.7
Adenoid cystic carcinoma	22-72	48.9	14.5
Mucoepidermoid carcinoma	13-71	32.8	25.1
Acinic cell carcinoma	29-62	51.2	8.8
Polymorphous low-grade adenocarcinoma	9-25	21.9	6.9
Squamous cell carcinoma	62-76	71.8	8.6
All salivary tumors	2-77	40.3	16.8
Benign SGT	5-69	28.3	14.7
Malignant SGT	1-73	50.2	15.6

**Table 3: gender distribution of tumours**

Gender	Benign	Malignant	
Male	13	11	24
Female	20	16	36
Total	33	27	60

## Discussion

In this study, SGTs accounted for 1.46% of all neoplasm seen at the histopathology unit of the UBTH. This is similar to the findings by Ochicha et al.[11] in Kano, northern Nigeria, but lower than the 2% reported in the western population[10]. This difference may be explained by the poor health-seeking behaviors of our populace. Also, there may be slight variations in the geographical distributions of various neoplasms. Our findings are also remarkably lower than the report from the Canadian Eskimos where SGTs accounted for a quarter of all malignant tumors seen in their population[12]. The age of patients seen in this study ranged from 2 to 77 years. This parallels the reports from Ochicha et al. in Kano, Nigeria (13-65 years)[11], Bahra et al. in Kenya (8-80 year)[13] and Thomas et al. in Malawi (1-75 years)[14]. Our findings are however at variance with reports in the western literature, where SGTs occurred over a wider age group with a peak age reported in the 7th and 8th decades[10]. It can therefore be implied that there are relatively more elderly patients with SGTs in the western population.

The fewer number of elderly patients seen in African studies may be ascribed to its

lower life expectancy. The peak for benign and malignant SGTs was observed in the 3rd and 6th decades, respectively. Similarly, Otoh et al. in Maiduguri (Nigeria)[15], Silas et al. in Jos (Nigeria)[16] and Chatterge et al. in Asia[17] reported a peak incidence in the 3rd decade for benign SGTs. In Ibadan (Nigeria)[18] and in South Africa[19], a peak incidence for benign tumors was reported in the 4th decade. On the contrary, the peak incidence in the 5th decade was reported among Caucasians for benign SGTs[10]. Abiose et al. in Ibadan (Nigeria)[18], Van heerden in South Africa[19], Vulhulu in Uganda[20] and Chatterge in Asia[17] reported a peak for malignant tumors, a decade lower than our observation. On the contrary, studies has shown that the peak incidence for malignant tumors among Caucasians occurred in the 7th and 8th decades[10]. The mean age of presentation for benign and malignant tumors in our study were 37.03 and 49.10, respectively, which is comparable to other African reports with a mean age range of 25-45 and 45-55 years, respectively, for the benign and malignant tumors[18,19]. Comparatively, reports from Europe and the US show that the mean age for benign and malignant SGTs are

either a decade or two later than the observations from African studies[10].

This difference may be attributed to our low life expectancy and probable genetic or environmental factors that are unique to the African population. There were more females than males with SGTs in this study population, which is similar to the previous studies performed in Enugu (Nigeria)[21], Uganda[20], Zimbabwe[22], Kenya[23] and the UK.[24] Equal gender distribution was reported in India[17], Pakistan[25], Brazil[26] and in another study in Ibadan (Nigeria)[18], while in Tanzania a male dominance was reported[27]. There was no significant association between the gender of our patients and the histological type of SGT. Apart from the sublingual gland that was not involved, all other major salivary glands were affected. The percentage distributions were 60%, 14% and 26% and for the parotid, submandibular and minor salivary glands, respectively. Our finding is slightly similar to the 1:1:1 ratio reported in Uganda[20] and the 2:1:1 ratio reported in Kano (Nigeria).<sup>11</sup> On the contrary, salivary neoplasm follows a distribution ratio of 100:10:10 in Europe and the US.[4] The low prevalence of sublingual tumors, as seen in this study, is similar to its general global low incidence[20]. The incidence of parotid tumor in our report (57%) is comparable to the 60% reported by Ezeanolue et al. in Enugu (Nigeria) and Moatemri et al. in Tunisia[21,28]. Our review is however intermediate between the 32% and 49% reported in other African series and the 71% and 80% reported in Asia, South America, Europe and the US[11,15,17,20,27,29,30].

The palate was the most common site affected among the minor salivary glands, accounting for 20% of all SGTs and 80% of minor SGTs. This is comparable to the reports by Ochich et al. in Kano (Nigeria), Thomas et al. in Malawi and Massanja et al. in Tanzania, where palatine tumors accounted for 15%, 18.9% and 24%, respectively, of all SGTs[11,14,27]. This is however at variance with the findings in

Europe where palatine tumors accounted for 3.8-7.5% of SGTs[31]. Our present data show a high prevalence of benign tumors, giving an approximate benign-malignancy ratio of 1.5:1, which is similar to the findings in China and the UK[32]. This is however intermediate between the 1:1 ratio reported in Ibadan (Nigeria), Kano (Nigeria), Kenya, Tanzania and Uganda and 3-4:1 ratio reported in Zimbabwe and Pakistan[22,23,27]. This may be attributed to the differences in methodologies and inclusion criteria used in the different studies. Pleomorphic adenoma was the most common SGT in our study, accounting for 72.73% of all benign cases and 40% of all cases. A mean age of 37.1 years was reported in our study for pleomorphic adenoma, which is similar to the mean age of 31 years reported by Odukoye et al. in Lagos (Nigeria), but about a decade lower than the mean age reported among the European population[33]. This difference may also be explained by the low life expectancy of the study population, which was 51.9 years as in 2011[34]. It has been generally observed that Warthin's tumor is very rare in African series[11,13,19,22,23,27]. This is evident in our study, as only a single case was found in our 20-year audit of SGTs. However, in India, China, Europe and America, Warthin's was reported as the second most common benign SGT[32,35]. It has earlier been adduced that there is a strong association between cigarette smoking and the incidence of Warthin's tumor; the relatively lower rate of smoking as compared with the Asian and Western populations may partly explain this difference in incidence[36]. Considering only the malignant tumors, adenoid cystic carcinoma was the most common condition in this sample (25.93%), followed by mucoepidermoid carcinoma (18.52%). As in our study, some reports have suggested that adenoid cystic carcinoma is the most common malignant SGT[20,22,23,,27,32]. Other researchers have however reported that mucoepidermoid carcinoma is the most common malignant SGT[11,35,37].

However, there is no doubt in the literature that either mucoepidermoid or adenoid cystic carcinoma has remained the most common malignant SGT globally. A changing pattern in the incidence of these two tumors was observed in our study. Mucoepidermoid carcinoma was the predominant malignant tumor in the first decade of our study, with the second malignant SGT accounted for by adenoid cystic carcinoma. A relatively sharp rise in the incidence of adenoid cystic carcinoma was observed in the second decade of this study, with adenoid cystic carcinoma becoming the most common malignant SGT. This finding of a changing pattern in the occurrence of these malignant SGTs in our environment calls for further research. Acinic cell carcinoma was the 3rd most common malignant SGT in this study, accounting for 6.67% of all SGTs and 14.81% of malignant SGTs, and having a female to male ratio of 5:1. Our finding was comparable to the report from Eveson et al., where acinic cell carcinoma showed a female predominance and accounted for 17% of malignant SGTs. The rarity of polymorphous low-grade adenocarcinoma, carcinosarcoma, small cell carcinoma, salivary duct carcinoma, sialoblastoma, myxoid liposarcoma, capillary hemangioma and fibrolipoma in our study is comparable to their general global low incidence[10].

### Conclusion

We found the peak incidences of benign and malignant tumors were in the 3rd and 6th decades, respectively. Pleomorphic adenoma and adenoid cystic carcinoma were the most common benign and malignant SGTs in our study populace.

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