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Original Article

Minor salivary gland tumors in the Indian population: A series of cases over a ten year period

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ABSTRACT

Problem considered: Minor salivary glands are found in the sino-nasal cavities, oropharynx, larynx and trachea with the majority being found in the oral cavity. 80% or more of minor salivary gland tumors are malignant and they tend to have a great variation in presentation and histology. We sought out to compare the presentation of various minor salivary gland tumors (MSGT's) in the Indian population as compared to that reported in different races and regions.

Methods: We report a clinical case series in which 17 patients with biopsy proven minor salivary gland tumors both benign and malignant at various intraoral sites viz the palate, cheek, retromolar trigone and floor of the mouth were operated upon and followed up over a span of 10 years from 2001 to 2011.

Results: 15 patients were treated timely with complete removal of the lesions by wide local excision and as confirmed by histopathology; one patient with adenoid cystic carcinoma delayed in seeking treatment and expired within a month and another with salivary duct carcinoma presented with advanced disease and regional metastases in the form of multiple ipsilateral enlarged lymph nodes and distant metastases in the liver. He was given palliative radiotherapy but he died after six weeks of receiving treatment.

Conclusion: the results that we obtained for Indians were comparable to the various population studies done around the world.

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1. Introduction

There are between 450 and 750 minor salivary glands in the head and neck region¹ scattered throughout the sinonasal cavities, oropharynx, larynx² and trachea with the majority being found in the oral cavity.¹ Heterotopic minor salivary glands can also occur at unexpected sites including lymph

nodes, the capsule of the thyroid gland, facial bones and the hypophysis.^{1,3,4} All types of salivary tumors, both benign and malignant, can occur at any of these sites, including heterotopic locations^{5,6} thus accounting for their varied presentation. Unlike the major salivary glands where approximately 80% of tumors are benign, 80% or more of minor salivary gland tumors (MSGT's) are malignant^{1,5} and they tend to have a great variation in presentation and histology.^{1,6}

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Tumors of minor salivary gland origin are uncommon, accounting for 2–3% of all malignant neoplasms of the upper aero digestive tract and less than 20% of all salivary gland tumors.⁷ The majority of these glands are concentrated at the junction of the hard and soft palate. Thus, this region is the most common site for minor salivary gland tumors. 55% tumors occur in the palate while the lips account for 15% of such tumors. The upper lip is more frequently involved than the lower lip which is the least frequent site. The remaining are distributed about equally among the other glands in the floor of the mouth, retro – molar region, cheek, tongue, and peri – tonsillar area. Uncommonly, tumors may occur in the mandible apparently as intra – osseous growths.⁸

Salivary duct carcinoma (SDC) is a highly aggressive malignant tumor consisting of solid, papillary, cribriform and a rare comedo pattern of growth that resemble in situ as well as invasive ductal carcinoma of the breast.⁹ Previously grouped with adenocarcinoma not otherwise specified, it was classified as a distinct neoplasm by the World Health Organization in 1991. Eighty-eight percent of all cases of SDC occur in the parotid gland, approximately 8% arise in the submandibular gland, and only 4% occur in the minor salivary glands. SDC is usually seen in patients over 50 years of age and is three times more frequent in men. Clinically, it is characterized by aggressive behavior, with a high risk of local recurrence and lymph node and distant metastasis. There is a low survival rate.¹⁰

2. Patients and method

17 patients (Table 1) with scalpel biopsy or fine needle aspiration biopsy (FNAB) proven MSGTs were operated upon and

followed up over a span of 10 years (2001–2011). The initial diagnostic work up included proper history taking from the patient regarding the duration of the swelling/mass, increase in size; whether it was gradual or sudden, presence or absence of pain or paresthesia. Any deleterious habit(s) were noted. Regional lymph nodes were examined. Routine blood investigations, serum electrolyte levels, occlusal radiographs and computerized tomographic scans were taken in patients where lesions involved the palate and retromolar areas. In patients where the swellings were in the substance of the cheek and lower lip, no radiographs were taken. Surgery for lesions in the hard palate ($n = 7$), cheek ($n = 2$), and retromolar area ($n = 1$) that were pleomorphic adenoma consisted of excision with 1 cm of surrounding healthy margins. In all cases where the tumor was in the palate, the bone showed a smooth depression on its surface. In one patient of 13 years the defect of the hard palate after tumor excision was repaired with a pedicled rotation flap from the opposite side. In other cases where excision was done in the hard palate or hard palate-soft palate an acrylic splint with coe pak dressing was placed (Figs. 1–4) and changed at periodic intervals until the bare bone was covered by granulation tissue from the wound edges (Fig. 5). The tumor on the retromolar triangle was similarly removed with 1 cm surrounding healthy tissue, the buccal mucosa was undermined and primary closure was achieved (Figs. 6–8). Two patients with cheek lesions were operated upon where an incision was given in the buccal musosa overlying the lesion, the underlying tissues were bluntly dissected and the tumor was then sharply dissected out (Figs. 9–11). Primary wound closure was done by undermining the submucosal and mucosal tissues and suturing them layer wise. A bolster dressing was placed by suturing it

Table 1 – Table of patients in the study.

S. no	Age (years)	Sex	Site	Duration of illness (months)	Histopathological diagnosis	Surgical procedure performed
1	32	F	R palate	24	Pleomorphic adenoma	Excision and repair with pedicled palatal flap
2	13	M	L palate	18	Pleomorphic adenoma	Excision
3	68	F	R palate	18	Pleomorphic adenoma	Excision
4	30	F	L palate	6	Pleomorphic adenoma	Excision
5	22	M	L cheek	12	Pleomorphic adenoma	Excision
6	28	F	R cheek	12	Pleomorphic adenoma	Excision patient had recurrence after 2 years
7	27	M	L palate	36	Pleomorphic adenoma	Excision
8	36	F	L retromolar area	24	Pleomorphic adenoma	Excision
9	22	F	R palate	30	Pleomorphic adenoma	Excision
10	42	M	R palate	24	Pleomorphic adenoma	Excision
11	15	M	L cheek	6	Warthin's tumor	Excision
12	56	F	R floor of mouth	36	Adenoid cystic carcinoma	Excision and removal of sublingual gland
13	40	F	L floor of mouth	12	Low grade MEC	Excision
14	35	F	L palate	24	Low grade MEC	Excision with partial maxillectomy
15	36	M	R palate	24	Low grade MEC	Excision with partial maxillectomy
16	45	F	R palate	12	Adenoid cystic carcinoma	Patient delayed treatment and expired
17	52	M	L palate	6	Salivary duct carcinoma	Patient had advanced local disease, regional and distant metastases, he was given palliative radiotherapy

Fig. 1 – Pleomorphic adenoma hard palate-ulceration is due to previous incisional biopsy.

Fig. 3 – Excised specimen- Pleomorphic adenoma right hard-palate- soft palate.

to the outside of the cheek thereby eliminating any dead space formation. In the patient where initial FNAB showed adenolymphoma, the surgery was done and the mass was enucleated from the left cheek by blunt dissection. In two patients with low grade mucoepidermoid carcinoma (MEC) and adenoid cystic carcinoma of the palate, excision of the primary tumor with partial maxillectomy was done and the maxilla was later reconstructed with obturators deriving

support from the remaining teeth and mucosa (Figs. 12 and 13). Two patients had low grade MEC in the floor of the mouth region one on the left and one on the right side of the lingual frenulum. Excision of the sublingual gland along with the tumor mass was carried out in both these patients. Two patients, one with adenoid cystic carcinoma (palate) delayed in seeking treatment and expired within a month and another

Fig. 2 – Pleomorphic adenoma of right hard palate-soft palate-wide local excision.

Fig. 4 – Acrylic palatal splint with coe pak dressing placed over defect.

Fig. 5 – Healing by secondary intention of right soft palate-hard palate showing complete re-epithelization.

with salivary duct carcinoma (palate) presented with advanced disease and regional metastases in the form of multiple ipsilateral enlarged lymph nodes and distant metastases in the liver. He was given palliative radiotherapy and he died after six weeks of receiving radiotherapy (Figs. 14 and 15).

3. Results

In the present series, 59% were females while 41% of the patients were males. The female: male ratio was 1.4:1, with a ratio of 2:1 for malignant tumors and 1.2:1 for benign tumors.

The age range was from 13 to 68 years, with the majority of tumors (29%) in the 21–30 years and 31–40 years age groups.

Fig. 6 – Pleomorphic adenoma of retromolar trigone.

Fig. 7 – Excised retromolar trigone pleomorphic adenoma.

12% were in the 10–20, the 41–50 and 51–60 years age groups while 6% (one patient) was in the 61–70 years age group.

The mean age of the patients at the time of presentation was 35 ± 14 years and the median age was 35 years. The mean age of presentation in males was 29.5 ± 14 years and in females it was 39 ± 13 years. The mean ages of presentation of benign and malignant tumors were 30 ± 15 years and 44 ± 8 years respectively. The mean age of presentation of benign tumors in females was 36 ± 16 years and that in males was 23 ± 11 years. Similarly, the mean age of presentation for malignant tumors in females was 41 ± 9 years whereas for malignant tumors in males it was 44 ± 11 years. The mean duration of illness was 18 ± 10 months for all the patients.

In patients who had pleomorphic adenoma ($n = 10$), the mean age was 32 ± 14 years, with a mean duration of the illness of 20 ± 9 months. For MEC, the mean age of patients was 42 ± 10 years and the mean duration of illness in these patients was 19 ± 6 months. For adenoid cystic carcinoma, the mean age and mean duration of presentation was 50 ± 7 years and 24 ± 16 months respectively.

Two thirds (65%) of the tumors were benign and the remaining (35%) were malignant. The most common benign tumor was pleomorphic adenoma (59% of all tumors and 91% of the benign tumors), occurring in 10 out of 11 benign cases

Fig. 8 – Pleomorphic adenoma retromolar trigone-photomicrograph.

Fig. 9 – Warthins' tumor of the cheek with ulceration of skin.

Fig. 11 – Photomicrograph- Warthins' tumor cheek.

and the most common malignant tumor was low grade MEC (18% of all tumors and 50% of malignant tumors), followed by adenoid cystic carcinoma (11% of all tumors and 34% of malignant tumors). There was one case of adenolymphoma and one case of salivary duct carcinoma of the minor salivary gland which account for 6% of all tumors and 9% of benign tumors and 6% of all tumors and 17% of malignant tumors respectively.

Site wise, the hard palate was the most common site for these tumors accounting for 65% of all the cases (of which 67% were benign and 37% were malignant), 64% of all benign tumors and 67% of all malignant tumors. The next common site was the buccal mucosa, accounting for 18% of all the cases. All the three patients had benign tumors in the buccal mucosa. The floor of the mouth was the third common site with two malignant MSGTs making up 12% of all the tumors. Finally, there was one patient (6%) with a benign pleomorphic adenoma in the retromolar area.

4. Discussion

The present retrospective evaluation in the Indian population and studies from other countries has shown a similar trend in the presentation of MSGT's. The tumors are more common in females than males with a ratio ranging from 1:1.02¹¹ to 1:2.¹² The tendency for female predominance has been reported to

be especially marked in benign tumors with a male to female ratio ranging from 1:1.8 to 1:2.4 and up to as high as 1:3.2. Also for malignant tumors, many studies have shown the tendency for female predominance with a ratio varying between 1:1.04 and 1:1.9.¹³

The age range of the patients was 13–68 years, with a mean age of 35 years (± 14) with two patients being minors of 13 and 15 years and having pleomorphic adenoma and Warthin's tumor respectively. Patients with malignant tumors were 14 years older than the patients with benign tumors. According to Waldron et al. the patients with benign tumors were 5.4 years younger to patients with malignant tumors.¹⁴ This larger difference in age of presentation may be due to the inclusion of two minor patients with benign tumors in the present series. Another study by Toida et al. showed that the patients with malignant salivary gland tumors were 6 years older than those with benign tumors¹³ and had similar results to other studies in which the difference in the age between benign and malignant tumors ranged from 3.4 years¹⁵ to 13.3 years.¹⁶

In our series, the ratio of incidence of benign and malignant MSGTs is consistent with other reports. The majority of

Fig. 10 – Shelled out adenolymphoma left cheek.

Fig. 12 – Mucoepidermoid carcinoma (low grade) of palate.

Fig. 13 – Mucoepidermoid carcinoma treated by partial maxillectomy.

the tumors were benign (65%) which is in accordance with the 67.1% reported by Toida et al.¹³ and by others in which the percentage ranges from 51.3%¹⁵ to 72.1%.¹⁷

The most common tumor we encountered was Pleomorphic adenoma (59%). In most reports, pleomorphic adenoma is the most common minor salivary gland tumors with an incidence ranging from 33% to 70 % of all tumors and from 70.6%¹² to 100%^{16,18,19} of benign tumors. Issacson and Shear reported that 70% of the tumors in their series were classified as pleomorphic adenoma and that Blacks were affected by this tumor about 3.5 times more than Caucasians.¹⁷ Pleomorphic adenoma was found to be the most common tumor overall and of

Fig. 14 – Patient with salivary duct carcinoma extending into maxillary sinus and nasal cavity.

Fig. 15 – Coronal computerized tomographic scan showing extent of salivary duct carcinoma palate into maxillary sinus and nasal cavity.

the benign tumors whereas MEC was the most common malignant tumor in the reports of many authors.^{14,20–23} The next common malignant tumor has been shown to be adenoid cystic carcinoma,^{14,21,22} although it is the most commonly occurring tumor in some studies.^{12,13,19} In the studies conducted before 1984, polymorphous low grade adenocarcinoma was not recognized as an entity and it may have been diagnosed frequently as adenoid cystic carcinoma, thus making it seem that it was the most common malignant MSGT. According to Waldron et al., monomorphic adenomas constituted approximately 19% of benign lesions.¹⁴ The present series reports one case that accounts for 9% of the benign tumors and 6% of all the tumors. About 10 percent of the minor salivary gland tumors are low-grade mucoepidermoid carcinomas. These lesions have a good prognosis and can be treated safely by conservative local excision.²³ All the MECs in our report were of the low grade variety and therefore were treated by excision alone.

In the present study, the most common site for MSGTs was the palate followed by the cheek, floor of the mouth and the retromolar area.^{13,21,22} It has been reported that the palate was the most common site for MSGTs^{5,12,15–19,22–28} and also, that the percentage of benign tumors occurring in the palate was higher than that of malignant tumors^{12,15–19,24,25,27,28} and that the palate was the predominant site even for the malignant MSGTs.^{12,16,17,24–28} Jaber,²¹ however, in his series of 75 cases in the Libyan population reported that the floor of the mouth was the most common site for the malignant MSGTs. Pleomorphic adenoma was the most common tumor in the palate followed by MEC and adenoid cystic carcinoma. The incidence of pleomorphic adenoma occurring in the palate ranges from 55.5%¹⁵ to 91%.¹⁶ The retromolar area was less common and the tumors in these sites were all of a benign nature. In our series only one pleomorphic adenoma was encountered in the retromolar area. The patient with salivary duct carcinoma of the palate presented with distant metastases in the liver and palliation radiotherapy was given. Histopathology of biopsy

tissue taken resembled comedo type ductal carcinoma in situ of mammary tumor and the tumor cells showed a cribriform pattern of arrangement. The tumor was extensive and destructive. Apart from being a carcinoma de novo, salivary duct carcinoma may constitute the malignant component in carcinoma ex pleomorphic adenoma.^{9,29–31} Lewis et al.¹⁰ reported that the tumor mortality was as high as 77% at a mean follow up of 3 years. In their analysis of 104 cases, Barnes et al. found that 33% patients experienced local recurrences, lymph node metastasis in 59% and 49% developed distant metastases to lung and bone.^{30,31}

Conflicts of interest

All authors have none to declare.

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