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Rates of tumour recurrences and metastases after surgical removal of malignant salivary gland tumours throughout 5-years of follow-up: A retrospective single-centre study

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ABSTRACT

Purpose: The purpose of the current study was to evaluate the frequency rates of tumour recurrences and rates of metastases in patients with surgical removal of malignant salivary gland tumours throughout 5 years of follow-up after initial therapy, and determine which salivary gland and histological diagnosis are the major contributors for the occurrence.

Methods: Between 2005 and 2017, 74 patients underwent surgical removal of localized malignant cancers of the salivary glands. Data were analysed retrospectively from our tertiary hospital database. The demographic characteristics (age and gender) were obtained from the patients' records. Pearson's χ-square test and logistic regression were used to analyse the data with $p < 0.05$ as statistically significant.

Results: Malignant salivary gland tumours were mostly diagnosed at parotid gland in 51.4% of cases, thus majority of patients underwent surgical extirpation (37.8% of cases) of tumour removal. Adenocarcinoma was the most common form of malignancy (19 patients, 25.6%), followed by adenoid cystic carcinoma (13 patients 17.6%) and mucoepidermoid carcinoma (11 patients, 14.9%). Postoperative complications; namely tumour recurrences were detected in 8 patients (10.8%) throughout 5 years of follow-up after initial therapy. Metastases were observed in 6 patients (8.1%), and facial nerve paralyses were diagnosed in 19 (25.7%) of all patients and with no specific risk factors, that could have contributed to the occurrence of nerve damage.

Conclusions: A significant proportion of patients who are presumed to be cured of their disease through 5 years after initial treatment for salivary gland cancer will be found to develop late disease recurrences or metastases.

1. Introduction

Malignant salivary gland tumours (MSGTs) are uncommon neoplasms that account for 3–5% of all head and neck cancers and have unpredictable clinical course by frequent metastases, which often occur years after diagnosis [1–3]. Although much has been learned regarding the biologic behaviour of these tumours and the propensity for late recurrences over the last decades, questions persist and according to our knowledge only scarce data exist addressing these issues.

For instance, histology of the tumours is varied (Table 1), with adenoid cystic carcinoma as the most common form of malignancy

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with regional recurrence occurring years later [4–6]. Moreover, Ladeinde et al. [7] reported that MSGTs represented 60.8% of all salivary gland tumours, while benign tumours accounted for 40.2% of their cases. Although, there are many studies [5,8–10], which have examined the demography of benign salivary gland tumours, studies examining MSGTs are rare [11,12].

General management guides for such tumours are available, but they vary from centre to centre [13,14] so the management of carcinomas are still discussable. The treatment of MSGTs is often challenging, mainly due to unpredictable and varied biologic behaviour and their prolonged risk of recurrence [15]. Although a surgery with or without postoperative radiotherapy results in effective disease control for many patients, disease recurrence, in the form of both regional recurrence and distant metastasis, has been reported to occur approximately 20 years after the completion of treatment [16,17].

Furthermore, the aetiology of MSGTs is still unknown. High or prolonged doses of radiation to the head and neck have been shown to be risk factors in previous studies [18]. Reports from several studies have shown that a history of prior cancer, especially those related with ultraviolet radiation, immunosuppression and Epstein-Barr virus were found to be associated with an increased occurrence of MSGTs [19].

The aim of our study was to evaluate the frequency rates of tumour recurrences and rates of metastases in patients with surgical removal of malignant salivary gland tumours, throughout 5 years of follow-up after initial therapy, and determine which salivary gland and histological diagnosis are the most frequent contributors for the occurrence.

2. Materials and methods

2.1. Study design

Study was designed as a 12-year retrospective analysis of patients who underwent different surgical procedures of removal of MSGTs from our tertiary Department of Maxillofacial Surgery in Clinical University Centre of Kosovo between the years 2005–2017. The research has been conducted in full accordance with the Declaration of Helsinki on medical protocols and ethics and was approved by the Institutional ethical review board at Medical faculty in Prishtina. Patients did not need to give the consent of participation since all data were obtained from our archive database.

2.2. Patients' data

Data were collected from the electronic archive database of patients, who were treated at our department. All cases of MSGTs were included, that were resected at our institute during 2005 and 2017 time period. The patients who were selected for analysis underwent

Table 1
Basic characteristics of patients with malignant salivary gland tumours.

	N = 74
Gender	
M/F	44/30
Age [years]	59.2 ± 17.3
Salivary gland	
Parotid	38 (51.4%)
Buccal	4 (5.4%)
Submandibular	12 (16.2%)
(Sub)lingual	6 (8.1%)
Palate	14 (18.9%)
Operation	
Superficial parotidectomy	7 (9.5%)
Total parotidectomy	20 (27.0%)
Surgical excision	19 (25.7%)
Surgical extirpation	28 (37.8%)
Histological diagnosis	
Acinic cell carcinoma	6 (8.1%)
Adenocarcinoma	16 (21.6%)
Adenoid cystic carcinoma	13 (17.6%)
Lymphoma	6 (8.1%)
Squamous Cell Carcinoma	10 (13.5%)
Mucoepidermoid Carcinoma	11 (14.9%)
Salivary duct Carcinoma	3 (4.1%)
Melanoma	1 (1.4%)
Others[a]	8 (10.8%)
Tumour recurrence	8 (10.8%)
Metastasis	6 (8.1%)
Facial nerve injury	19 (25.7%)

*M-male; F-female.

[a] Carcinoma ex adenoma pleomorphe, clear cell carcinoma, carcinoma metastaticum.

superficial/total parotidectomy, extirpation, excision or biopsy of different salivary glands resection. Excision of tumours was done for minor salivary gland tumours located in palate region. Extirpation was performed for tumours located at superficial parotid lobe and which were encapsulated. From the sublingual and submandibular regions gland tumours were resected together with the salivary gland, thus we performed extirpation of salivary gland together with the tumour. We included patients of all ages (children and adults), who underwent surgery for removal of MSGTs, and were followed up for 5 years after initial therapy. In total, 74 cases were selected for analysis.

The diagnosis of tumours was established pre-operatively in all cases by histology. The specimens were reviewed by a blind and experienced histo-pathologist. The following pre-operative demographic and clinical data were included: age and sex of patients, location of the tumour and type of surgical procedure. Postoperative complications such as tumour recurrence, metastasis or facial paralysis were prospectively recorded in follow-up visits through 5 years.

2.3. Statistical analysis

Statistical Package of Social Sciences SPSS 21 (IBM, New York, USA) was used for statistical analyses. Quantitative variable (patients' age) was expressed as mean ± standard deviation, was normally distributed and compared by the independent *t*-test. Qualitative variables were compared by Pearson's chi square test according to the type of variable. The main outcome parameters were diagnosis of metastasis and tumour recurrence. Odds ratios as predictive values for probability of tumour recurrence and metastasis were calculated by univariate and multivariate logistic regression. Statistical significance for all tests was set at $p < 0.05$.

3. Results

Between 2005 and 2017, MSGTs were removed from 74 patients. Basic characteristics of patients with MSGTs are presented in Table 1. Tumours were diagnosed in 44 males and 30 females with approximate male-to-female ratio 1.5:1. Mean age at presentation was 59.2 ± 17.3 years.

MSGTs were mostly diagnosed at parotid gland in 51.4% of cases. Therefore, majority of patients underwent surgical extirpation (37.8% of cases), one quarter underwent total parotidectomy and surgical excision, respectively. Adenocarcinoma was the most common form of malignancy (16 patients, 21.6%), followed by adenoid cystic carcinoma (13 patients, 17.6%) and mucoepidermoid carcinoma (11 patients, 14.9%) (Table 1).

Post-operative complications in aspect of tumour recurrences were detected in 8 patients (10.8%) throughout 5 years of follow-up after initial therapy. Metastases were observed in 6 patients (8.1%), and facial nerve paralyses were diagnosed in 19 (25.7%) out of all examined patients.

According to the gender, males were older than females, but the difference was not statistically significant (Table 2). Distribution of tumour anatomical locations varied between the genders ($p < 0.001$). Most males accounted tumours at parotid gland (70.5% of male cases). Meanwhile, most females accounted tumours at palate region (40.0% of female cases). There were no differences in the type of MSGTs, tumour recurrence rates and metastases rates between the genders.

Table 2
Characteristics of patients according to the gender.

	Male (N = 44)	Female (N = 30)	p-value
Age [years]	61.5 ± 17.3	55.8 ± 17.0	0.173
Salivary gland			<0.001
Parotid	31 (70.5%)	7 (23.3%)	
Buccal	1 (2.3%)	3 (10.0%)	
Submandibular	7 (15.9%)	5 (16.7%)	
(Sub)lingual	3 (6.8%)	3 (10.0%)	
Palate	2 (4.5%)	12 (40.0%)	
Operation			0.006
Superficial parotidectomy	6 (13.6%)	1 (3.3%)	
Total parotidectomy	17 (38.6%)	3 (10.0%)	
Surgical excision	6 (13.6%)	13 (43.3%)	
Surgical extirpation	15 (34.1%)	13 (43.3%)	
Histological diagnosis			0.856
Acinic cell carcinoma	3 (6.8%)	3 (10.0%)	
Adenocarcinoma	9 (20.5%)	7 (23.3%)	
Adenoid cystic carcinoma	6 (13.6%)	7 (23.3%)	
Lymphoma	4 (9.1%)	2 (6.7%)	
Squamous Cell Carcinoma	8 (18.2%)	2 (6.7%)	
Mucoepidermoid carcinoma	6 (13.6%)	5 (16.7%)	
Salivary duct carcinoma	2 (4.5%)	1 (3.3%)	
Melanoma	1 (2.3%)	0	
Others[a]	5 (11.4%)	3 (10.0%)	
Tumour recurrence	4 (9.1%)	4 (13.3%)	0.564
Metastasis	5 (11.4%)	1 (3.3%)	0.214

[a] Carcinoma ex adenoma pleomorphe, clear cell carcinoma, carcinoma metastaticum, cylindroma.

Tumour recurrences were detected in 8 cases. No risk factors were identified as potential contributor to the tumour recurrence by univariate and multivariate regression (Table 3). Although highest recurrence rates were detected in females, at (sub)lingual and palate region, after superficial parotidectomy or surgical excision and adenoid cystic carcinoma, no associations were statistically confirmed.

Overall, metastases were detected in 6 patients and were associated with facial nerve injury ($p = 0.016$). Other variables were not statistically associated with metastasis rates although they occurred more frequent in male patients, patients after total parotidectomy and in patients with squamous cell carcinoma as diagnosis (Table 4). All metastasis were diagnosed after parotid gland tumours but distribution among tumour location was not statistically significant ($p = 0.186$).

Out of all studied population, 19 cases of facial nerve injuries were detected through 5 years of follow-up. Facial nerve injury was diagnosed as full facial paralysis, which was statistically associated with higher patients' age, male gender, parotid salivary gland, total parotidectomy as procedure, mostly diagnosed in patients with squamous cell carcinoma and salivary duct carcinoma (Table 5) calculated by univariate regression analysis. Single case of melanoma also resulted in facial nerve injury. According to multiple regression analysis only total parotidectomy as surgical procedure could predict facial nerve damage (OR = 0.431; 95% CI: 0.223–0.833; p-value = 0.012).

4. Discussion

This study included all patients with diagnosed and treated MSGTs during a 12-year period and with a 5-year follow-up period from a single centre in Kosovo. The finding that MSGTs occurred more in the parotid gland is in agreement with most previous studies [9,10, 20]. Adenocarcinoma with 21.6% of cases was the most common MSGT seen. On the contrary, Chidzonga et al. [21], Al-Khateeb et al. [5], Ostman et al. [11] and Aro et al. [22] all found acinic cell carcinoma to be the most common MSGT. In our case acinic cell carcinoma was the second most common contributor to overall number of all types and might be possible due to single-centre design. Adenoid cystic carcinoma was also the most frequently encountered malignancy in research by Chen et al. [17].

The gender distribution of MSGTs from previous studies has been conflicting. Some studies indicated that there was no gender predilection for MSGTs [20]. In the current report, also no special differences were found among the gender. Male patients demonstrated higher rates of facial nerve injuries, but these were associated to the surgical procedure of total parotidectomy, which was more commonly performed in men (data not shown). The anatomical distribution of MSGTs was with predilection for the major salivary glands and 51.4% of cases were seen in the parotid gland.

Postoperative complications as tumour recurrence were detected in 8 patients (10.8%), metastasis in 6 (8.1%) and facial nerve paralysis in 19 (25.7%) patients through 5 years of follow-up after initial therapy. To our knowledge, the current study is one of the rare reports to specifically analyse disease recurrence and metastasis rates among patients undergoing definitive therapy for localized

Table 3
Risk factors for the recurrence of tumours.

	Tumour recurrence					
	No(N = 66)	Yes(N = 8)	Recurrence rates	B value	OR (95% CI)	p-value
Age	58.6 ± 17.6	63.6 ± 15.6	/	0.019	1.019 (0.971–1.070)[b]	0.447
Gender M/F	40/26	4/4	9.1%/13.3%	−0.431	0.650 (0.149–2.830)[b]	0.564
Salivary gland				0.105	1.110 (0.771–1.733)[b]	0.917
Parotid	34 (51.5%)	4 (50.0%)	10.5%			
Buccal	4 (6.1%)	0	/			
Submandibular	11 (16.7%)	1 (12.5%)	8.3%			
(Sub)lingual	5 (7.6%)	1 (12.5%)	16.7%			
Palate	12 (18.2%)	2 (25.0%)	14.3%			
Operation				−0.054	0.948 (0.569–1.578)[b]	0.885
Superficial parotidectomy	6 (9.1%)	1 (12.5%)	14.3%			
Total parotidectomy	18 (27.3%)	2 (25.0%)	10.0%			
Biopsy	3 (4.5%)	0	/			
Surgical excision	16 (24.2%)	3 (37.5%)	15.8%			
Surgical extirpation	23 (34.8%)	2 (25.0%)	8.0%			
Histological diagnosis				0.015	1.015 (0.748–1.378)[b]	0.922
Acinic cell carcinoma	6 (9.1%)	0	/			
Adenocarcinoma	15 (22.7%)	1 (12.5%)	6.3%			
Adenoid cystic carcinoma	10 (15.2%)	3 (37.5%)	23.1%			
Lymphoma	6 (9.1%)	0	/			
Squamous cell carcinoma	7 (10.6%)	3 (37.5%)	30.0%			
Mucoepidermoid carcinoma	11 (16.7%)	0	/			
Salivary duct carcinoma	3 (4.5%)	0	/			
Melanoma	1 (1.5%)	0	/			
Others[a]	7 (10.6%)	1 (12.5%)	12.5%			

*M-male; F-female.

[a] carcinoma ex adenoma pleomorphe, clear cell carcinoma, carcinoma metastaticum, cylindroma.

[b] Odds ratios (OR) were calculated with univariate and multivariate logistic regression, where presence of tumour recurrence presented dependent variable. B value was determined as correlation coefficient between independent and dependent variable.

Table 4
Risk factors for the tumour metastasis.

	Metastasis					
	No(N = 68)	Yes(N = 6)	Metastasis rates	B value	OR (95% CI)	p-value
Age	59.0 ± 17.8	61.8 ± 12.3	/	0.010	1.010 (0.959–1.065)[b]	0.700
Gender M/F	39/29	5/1	11.4%/3.3%	1.313	3.718 (0.412–33.560)[b]	0.214
Salivary gland				−15.722	0[b]	0.186
Parotid	32 (47.1%)	6 (100%)	15.8%			
Buccal	4 (5.9%)	0	/			
Submandibular	12 (17.6%)	0	/			
(Sub)lingual	6 (8.8%)	0	/			
Palate	14 (20.6%)	0	/			
Operation				−0.335	0.716 (0.398–1.287)[b]	0.224
Superficial parotidectomy	7 (10.3%)	0	/			
Total parotidectomy	16 (23.5%)	4 (14.3%)	20.0%			
Biopsy	3 (4.4%)	0	/			
Surgical excision	18 (26.5%)	1 (42.9%)	5.3%			
Surgical extirpation	24 (35.3%)	1 (14.3%)	4.0%			
Histological diagnosis				0.068	1.071 (0.763–1.503)[b]	0.693
Acinic cell carcinoma	6 (8.8%)	0	/			
Adenocarcinoma	15 (22.1%)	1 (16.7%)	6.3%			
Adenoid cystic carcinoma	13 (19.1%)	0	/			
Lymphoma	6 (8.8%)	0	/			
Squamous cell carcinoma	6 (8.8%)	4 (66.7%)	40.0%			
Mucoepidermoid carcinoma	10 (14.7%)	1 (16.7%)	9.1%			
Salivary duct carcinoma	3 (4.4%)	0	/			
Melanoma	1 (1.5%)	0	/			
Others[a]	8 (11.8%)	0	/			

*M-male; F-female.
[a] Carcinoma ex adenoma pleomorphe, clear cell carcinoma, carcinoma metastaticum, cylindroma.
[b] Odds ratios (OR) were calculated with univariate and multivariate logistic regression, where presence of metastasis presented dependent variable. B value was determined as correlation coefficient between independent and dependent variable.

Table 5
Risk factors for the facial nerve injuries.

	Facial nerve injury					
	No(N = 55)	Yes(N = 19)	FN injury rates	B value	OR (95% CI)	p-value
Age	55.7 ± 18.3	68.9 ± 9.1	/	0.064	1.066 (1.018–1.117)[b]	0.004
Gender M/F	27/28	17/2	38.6%/6.7%	2.176	8.815 (1.857–41.848)[b]	0.002
Salivary gland				−17.351	0[b]	<0.001
Parotid	19 (47.1%)	19 (100%)	50.0%			
Buccal	4 (5.9%)	0	/			
Submandibular	12 (17.6%)	0	/			
(Sub)lingual	6 (8.8%)	0	/			
Palate	14 (20.6%)	0	/			
Operation				−1.271	0.281 (0.154–0.510)[b,c]	<0.001
Superficial parotidectomy	7 (10.3%)	0	/			
Total parotidectomy	1 (23.5%)	19 (100%)	95.0%			
Biopsy	3 (4.4%)	0	/			
Surgical excision	19 (26.5%)	0	/			
Surgical extirpation	25 (35.3%)	0	/			
Histological diagnosis				0.250	1.284 (1.027–1.604)[b]	0.028
Acinic cell carcinoma	6 (10.9%)	0	/			
Adenocarcinoma	12 (21.8%)	4 (21.1%)	25.0%			
Adenoid cystic carcinoma	13 (23.6%)	0	/			
Lymphoma	5 (9.1%)	1 (5.3%)	16.7%			
Squamous cell carcinoma	4 (7.3%)	6 (31.6%)	60.0%			
Mucoepidermoid carcinoma	8 (14.5%)	3 (15.8%)	27.3%			
Salivary duct carcinoma	2 (3.6%)	1 (5.3%)	33.3%			
Melanoma	0	1 (5.3%)	100%			
Others[a]	5 (9.1%)	3 (15.8%)	37.5%			

*M-male; F-female FN-facial nerve.
[a] Carcinoma ex adenoma pleomorphe, clear cell carcinoma, carcinoma metastaticum, cylindroma.
[b] Univariate regression.
[c] Multivariate regression.

MSGTs. Our results demonstrated that recurrences which developed 5 years after initial treatment occurred in nearly 11% of the study population and confirmed long-standing concerns that a sizable proportion of patients who are presumed to be cured at 5 years will subsequently develop clinical evidence of disease with continued follow-up [23,24]. In the subsequent decades, reports of late recurrences after treatment for salivary gland cancer appeared, with authors suggesting that this disease has the ability to recur after a prolonged period [23,24]. Walvekar et al. [26] previously reported that most high-grade parotid malignancies recur in the first 18 months. The results of several more recently published single institutional experiences support this hypothesis. For example, Mendenhall et al. [16] reported that 14% of all disease recurrences occurred after 5 years after definitive treatment among 224 patients with salivary gland cancer. Although Garden et al. [27] demonstrated a disease-free survival rate of 75% at 5 years among 160 patients treated with surgery and postoperative radiotherapy for carcinomas of the minor salivary glands, this percentage decreased to 62% at 10 years and 54% at 15 years, thereby suggesting that nearly half of all patients will experience recurrence with extended follow-up. In a separate series from these investigators [28] the reported disease-free survival rates at 5 years, 10 years, and 15 years among 166 patients with major salivary gland cancer were 79%, 71%, and 69%, respectively. Highest recurrence rate was seen with (sub)lingual region and not parotid.

From our analysis it is important to recognize that late recurrences were observed among three histologic subtypes of salivary gland carcinomas in the current series (i.e. squamous cell carcinomas, adenoid cystic carcinomas and adenocarcinomas). Although the traditional notion is that this phenomenon may be more common, or even limited, to patients with adenoid cystic carcinoma, we did not identify a statistically significant correlation between late disease recurrences and histologic subtype ($p = 0.922$). It is interesting to note that disease recurrences occurring after 5 years of treatment for non-adenoid cystic carcinoma subtypes have been previously documented [29–31]. In a classic analysis of 367 cases of mucoepidermoid carcinoma of the head and neck, Spiro et al. [20] determined absolute rates of patients alive and clinically without evidence of disease of 46%–81% at 5 years, but these rates decreased to only 36%–66% at 10 years, with prognosis depending on tumour grade and differentiation. Others have also estimated that approximately 25%–50% of all disease recurrences occurred after 5 years from the time of treatment for mucoepidermoid carcinoma [31]. For patients with adenocarcinoma of the salivary glands, Kagan et al. [25] reported that 2 of 30 patients developed local recurrence >6 years after definitive treatment, what coincides with the rates from our analysis (i.e. 6.7%). However, we did not find any recurrences with acinic cell carcinoma through 5 years of follow-up. Moreover, there was no association with surgical procedure or anatomical region.

Primary malignancies of the salivary gland are rare, constituting only 5% of all salivary gland malignancies [14]. Because of this, and the fact that their presentation is frequently indistinguishable from benign disease, the management of this disease is particularly difficult for the surgeon and also accounts in part, for a worse prognosis in comparison with malignancies of the parotid gland. In addition, treatment protocols tend to vary significantly from centre to centre [13]. Our findings confirmed the observations reported, although some surgical procedures have higher risks for recurrence, we have not observed issues like that. Surgical excision was the procedure with highest recurrence rate, but not significant unlike in some studies [32], where inadequacy of primary excision of the tumour was also a positive predictor of local recurrence. The relatively high local recurrence rate and the greater percentage of high grade malignancy suggests that more radical primary treatment is required which may not be available in district hospitals without a specialised cancer centre.

The rate of metastases varies. For instance, some studies report high figures of up to 45% [33] and 50% [34], Aro et al. [22] found rate of 20%, but in the current study 8.1% was demonstrated. Metastases rates are dependent of stages of the disease. In addition to the different tumour stages histologies were reported in studies. In a study by Aro et al. [22] a metastatic rate of acinic cell carcinoma was 7%. Meanwhile, in our study we did not detect any metastases with acinic cell carcinoma. Hirvonen et al. [35] found the metastatic rate of 4%, Yoo et al. [36] reported metastases in 19%, and similarly Cohen et al. [37] reported no metastases in acinic cell carcinoma. Other researchers reported higher figures for distant metastasis; Roh et al. [38] found that 31% of patients experienced recurrence within a mean follow-up period of 64 months. A study by Han et al. [33] reported a metastasis rate of 36% within a mean follow-up time of 48 months. By contrast, Hirvonen et al. [35] reported that 50% of patients treated for major salivary gland developed distant metastases, typically within 10 years. According to that, no special risk factors were found in our analyses to predict the occurrence of metastases.

Out of our population 19 (25.7%) cases of facial nerve injuries were detected through 5 years of follow-up. Facial nerve injury was statistically associated with higher patients' age and most in male gender according to univariate analysis. It was also associated with parotid salivary gland, but we believe the possibility for that was an association with total parotidectomy as surgical procedure with highest risk for damaging nerve branches, what we confirmed with multivariate analysis, where only total parotidectomy showed statistical significant predictions.

Our study had some limitations. The data were retrospectively analysed and had minor gaps due to the length of follow-up time. Although this investigation was the largest study of such in our region, the sample size was still relatively small. In addition, we did not investigate patients' survival rate and did not detect stages of diagnosed tumours. Finally, we should have followed up our patients for at least 10–15 years, to evaluate the recurrence and metastases rates with greater confidence. The main limitation of our study was that it was a single centre study; thus the findings might not be generalizable to the whole region and should be interpreted with caution. In the future we encourage researchers to study a larger group of patients.

5. Conclusions

In our study, we investigated epidemiological data of MSGTs from our tertiary centre. The findings of the current study clearly demonstrate the importance of lengthy follow-up for those patients treated for salivary gland cancer. A significant proportion of

patients who are presumed to be cured of their disease through 5 years after initial treatment for salivary gland cancer will may develop late disease recurrence or metastases. Tumour recurrences and metastases have been demonstrated despite 5-year follow-up of patients who were treated and checked relatively frequently. Male gender was not affected more with MSGTs as observed in some other reports. MSGTs occurred more with the parotid gland. Moreover, adenocarcinoma present in 21.6% of cases was the most common MSGT seen. This was the first such report from our region so in the future more studies have to be done in this aspect.

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Conflict of interests

All authors declare that they have no conflict of interest.

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