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A gland of diverse pathology and unpredictable behaviour: our experience of primary submandibular gland malignancies

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Abstract. Submandibular gland tumours are relatively uncommon tumours and demonstrate diverse histological types and a variable prognosis. The aim of this study was to analyze our experience with submandibular malignancies over a period of 6 years (January 2009 to December 2015). Patient data from the 6-year period were reviewed retrospectively and 51 patients with submandibular malignancies were identified. Demographic data, clinicopathological details, treatment received, complications, and follow-up were recorded. The mean age of the 51 patients at presentation was 49.1 years. They were followed up for a mean 20.3 months. Nine of 47 patients (19.1%) developed distant metastasis during follow-up, while only three (6.4%) developed local recurrence. Disease-free survival at 2 years was 69.7% and overall survival at the end of 2 years was 77.8%. Actuarial 5-year survival was 57.8% when all subtypes were considered. The overall mean time to recurrence was 10 months (6–24 months). Nodal positivity was the only prognostic factor that was significant on multivariate analysis, while age, sex, perineural invasion, and grade were not. With advances in surgical and radiotherapy techniques, loco-regional control rates have improved greatly; however, effective adjuvant treatment to prevent systemic relapse is still lacking.

Key words: salivary gland malignancies; adenoid cystic carcinoma; mucoepidermoid carcinoma; submandibular gland malignancies; lymph node metastasis.

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Salivary gland tumours are a heterogeneous group of neoplasms with a reported incidence of 0.05–2 per 100,000 population[1]. They constitute 2% of head and neck malignancies. Salivary gland malignancies have been divided into major and minor gland malignancies, with parotid being the most common site, followed by the submandibular gland. Submandibular gland tumours are relatively uncommon and constitute about 8–9% of salivary gland malignancies[2].

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There is a substantial amount of literature describing the salivary gland neoplasms in general, with only a few specifically describing the submandibular neoplasms. Some controversy remains regarding the prognosis of submandibular malignancies when compared to parotid malignancies. A few studies have demonstrated that submandibular malignancies have a higher rate of distant metastasis and hence a comparatively poorer survival[3,4], while other studies have reported that, by stage, both submandibular and parotid malignancies have the same prognosis[5,6].

The clinical presentation of submandibular gland tumours is usually the same whether benign or malignant: a painless lump. However, the malignant tumours may have additional features such as fixity to the skin or nerve involvement. Chronic sialadenitis with associated fibrosis is a common differential diagnosis for the tumours, which are often misdiagnosed, leading to an unplanned intervention such as incision and drainage. The purpose of this study was to evaluate this diverse group of malignancies, to follow the natural course of the disease, to look for prognostic factors in predicting the survival, and to present our experience, which will add to the existing literature.

Materials and methods

This study was a retrospective analysis of patients with malignant submandibular tumours seen at Rajiv Gandhi Cancer Institute and Research Centre from January 2009 to December 2015.

Patients with infectious lesions, lymphomas, and metastatic tumours to the submandibular gland, those with benign tumours, and patients who were lost to follow-up or who did not complete treatment were excluded.

A total of 51 patients with submandibular malignancies were identified in the database of the study institution. Data were collected for each patient and included demographic profile, operative records, any other treatment received in the form of chemotherapy or radiotherapy, histopathological findings, complications reported, and additional treatment for recurrent disease. Adjuvant radiotherapy was given to patients with high-risk features such as a primary tumour size of >4 cm, perineural invasion, positive margins, extraglandular spread, positive lymph nodes, and high-grade tumours.

Statistical analysis

The data were entered into a Microsoft Excel spreadsheet and the analysis was performed using IBM SPSS Statistics version 21.0 software (IBM Corp., Armonk, NY, USA). Categorical variables were presented as the number and percentage (%) and continuous variables as the mean ± standard deviation and/or median. Normality of the data was tested by Kolmogorov–Smirnov test. If the data were not normally distributed, then a non-parametric test was used. Quantitative variables were compared between groups using the Kruskal–Wallis test and qualitative variables were analyzed using the χ^2 test or Fisher's exact test. Kaplan–Meier survival analysis with the log rank test was used to assess overall survival (OS) and disease-free survival (DFS) in relation to various factors. A P-value of <0.05 was considered statistically significant.

Results

Patient characteristics

This study included 51 patients: 30 male and 21 female. The mean age of the patients at presentation was 49.1 years, with a mean age at presentation of 48.1 years for female patients and 49.4 years for male patients. Twenty-two patients (43.1%) had a history significant for smoking and tobacco consumption. None of the patients had any prior history of radiation exposure. The mean time to treatment in the total study population was 13 months (1.5–32 months). In patients who developed local/distant metastasis, the mean time from initial treatment was 18 months in all histological types and 22 months in patients with adenoid cystic carcinoma. Only four patients (7.8%) had distant metastasis on presentation: three patients had lung metastasis, while one had bone metastasis. The majority of the patients had a localized disease (47/51, 92.2%). Out of the 47 patients with localized disease, 10 had clinically palpable nodes (Table 1).

Adenoid cystic carcinoma (ACC) was the most common pathology (26 patients, 51.0%), followed by mucoepidermoid carcinoma (MEC) (11 patients, 21.6%) (Table 1). Of the 11 patients with MEC, seven had a high-grade malignancy and only four had low or intermediate grade disease.

Patients with distant metastasis received chemotherapy and palliative radiotherapy ($n = 4$) and the other patients with localized disease underwent surgery ($n = 47$). Wide local excision with neck dissection was done in 37 patients (78.7%), and 10 patients (21.3%) had only

Table 1. Patient characteristics and histopathological distribution.

Characteristics	Results
Age in years, mean (range)	49.1 (24–74)
Sex	
Male	30 (58.8%)
Female	21 (41.2%)
Laterality	
Left	16 (31.4%)
Right	35 (68.6%)
Smokers	
Yes	22 (43.1%)
No	29 (56.9%)
Histological types	
Acinic cell carcinoma	1 (2.0%)
Adenoid cystic carcinoma	26 (51.0%)
Adenosquamous carcinoma	1 (2.0%)
Epithelioid MPNST/dendritic reticulum cell sarcoma	1 (2.0%)
Mucoepidermoid carcinoma	11 (21.6%)
Myoepithelial carcinoma	4 (7.8%)
Carcinoma ex pleomorphic adenoma	4 (7.8%)
Poorly differentiated adenocarcinoma	1 (2.0%)
Squamous cell carcinoma	1 (2.0%)
Small cell undifferentiated carcinoma	1 (2.0%)
Total	51 (100.00%)
Stage at the time of presentation (clinical assessment)	
Localized N0 (T1–T3)	37 (72.5%)
Localized (T1–T3, N1)	3 (5.9%)
Localized (T1–T3, N2–3)	7 (13.7%)
Metastatic	4 (7.8%)
Treatment	
Wide local excision	10 (21.3%)
Wide local excision + neck dissection	37 (78.7%)
Palliative chemotherapy	4 (7.8%)

MPNST, malignant peripheral nerve sheath tumour.

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