

Perplexing Intraoral Swellings: A Cross-Sectional Study On Minor Malignant Salivary Gland Tumors

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Abstract:

Background: This study aims to assess the prevalence and correlation between age, gender, and site of malignant minor salivary gland tumors among patients attending a tertiary healthcare centre in Trivandrum from 2015 to 2022. A total of 26 cases were reviewed, with mucoepidermoid carcinoma (MEC) being the most prevalent, followed by adenoid cystic carcinoma (ACC) and polymorphous adenocarcinoma (PAC). Our findings suggest a slight female predilection overall, though certain tumor types showed gender-specific trends. The study highlights important epidemiological insights that can help future research and clinical practice in managing malignant minor salivary gland tumors.

Keywords: Malignant minor salivary gland tumors, mucoepidermoid carcinoma, adenoid cystic carcinoma, polymorphous adenocarcinoma, cross-sectional study, Trivandrum.

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I. Introduction

Malignant salivary gland tumors are a rare and diverse group of neoplasms with variable clinical behavior and prognosis. These tumors account for less than 5% of all head and neck malignancies, yet they present significant diagnostic and therapeutic challenges due to their histological diversity and complex anatomical locations^[1] (Speight & Barrett, 2002; Guzzo et al., 2010)^[2]. Among these, mucoepidermoid carcinoma (MEC) and adenoid cystic carcinoma (ACC) are the most common types, followed by polymorphous adenocarcinoma (PAC) and less frequently occurring types such as carcinoma ex pleomorphic adenoma (CEPA) and epithelial-myoepithelial carcinoma (EMC) (Auclair et al., 1991; Laurie et al., 2011)^[3].

The etiopathogenesis of these tumors remains poorly understood, although some studies have suggested potential roles for genetic mutations and environmental factors (Eveson & Cawson, 1985)^[4]. Demographic factors such as age and gender also appear to influence the incidence and type of malignant salivary gland tumors, with certain tumors showing a predilection for specific age groups and genders^[5] (Liu et al., 2019).

This study aims to explore the prevalence and demographic correlations of malignant minor salivary gland tumors among patients attending a tertiary healthcare centre in Trivandrum. By examining the distribution of tumor types across age, gender, and anatomical sites, this study seeks to contribute to the existing knowledge and improve the understanding of these complex neoplasms. Malignant minor salivary gland tumors, though rare, pose significant diagnostic and therapeutic challenges due to their diverse histopathological presentations and variable clinical outcomes. Understanding the prevalence and demographic correlations of these tumors is crucial for improving diagnostic accuracy, guiding treatment strategies, and predicting outcomes. This study provides a comprehensive analysis of malignant salivary gland tumors in a tertiary healthcare setting, offering valuable insights into the epidemiology and clinical behavior of these neoplasms.

II. Objective:

To estimate the prevalence of common minor malignant salivary gland tumors among patients attending a tertiary healthcare centre in Trivandrum and to assess the association of these lesions with age, gender, and site.

III. Materials And Methods

Study Design: This was a cross-sectional study.

Study location: conducted at a tertiary healthcare centre in Trivandrum, in patients diagnosed with malignant minor salivary gland tumors between 2015 and 2022.

Data Collection: Patient data were collected retrospectively from clinical records in the Oral Medicine and Radiology Specialty Clinic. Data included demographic details (age and gender), tumor type (based on histopathological diagnosis), and anatomical site of the tumor. Histopathological diagnoses were confirmed by examining biopsy specimens stained with hematoxylin and eosin, and additional immunohistochemical staining was performed in indicated cases.

Study Population: The study included 26 cases of malignant salivary gland tumors diagnosed within the study period. The inclusion criteria were all patients with a confirmed histopathological diagnosis of malignant minor salivary gland tumors, while cases with incomplete records or lacking histopathological confirmation were excluded.

Data Analysis: Data were analysed using descriptive statistics to calculate frequencies and percentages of various tumor types. Chi-square tests were performed to evaluate the significance of associations between demographic factors (age and gender) and tumor types. A p-value of <0.05 was considered statistically significant.

IV. Results

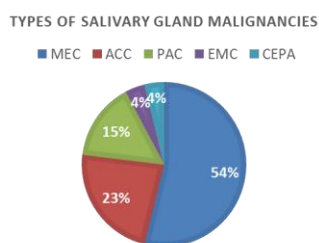


Figure 1

A total of 26 cases of malignant salivary gland tumors were identified among patients attending the Oral Medicine and Radiology Specialty Clinic in Trivandrum from 2015 to 2022. The distribution of tumor types was as follows: mucoepidermoid carcinoma (MEC) was the most prevalent, accounting for 54% (14/26) of cases, followed by adenoid cystic carcinoma (ACC) at 23% (6/26), polymorphous adenocarcinoma (PAC) at 15% (4/26), and carcinoma ex pleomorphic adenoma (CEPA) and epithelial-myoepithelial carcinoma (EMC) each constituting 4% (1/26) of cases.

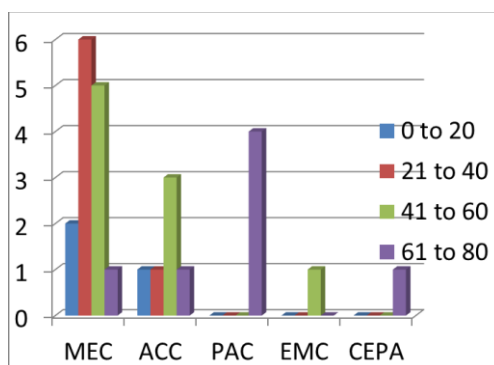
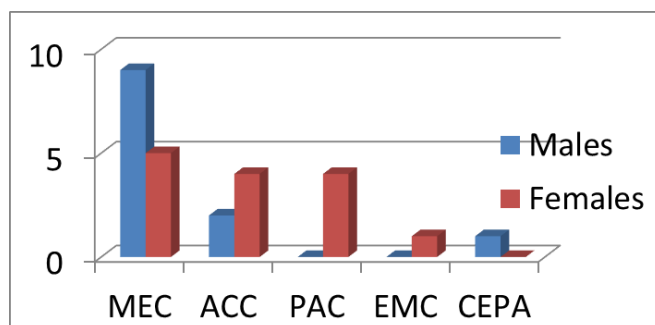


Figure 2
Based on Age

Age Distribution:

- MEC was most frequently diagnosed in the 21-40 years age group.
- ACC was most common in the 41-60 years age group.
- PAC predominantly affected patients between 61 and 80 years.
- EMC was mainly seen in the 41-60 years age group.
- CEPA cases were found in patients aged 61 to 80 years.



Based on Gender

The study found a slight female predilection overall, with 54% (14/26) of cases occurring in females. MEC and CEPA showed a higher prevalence in males, while ACC, PAC, and EMC were more common in females.

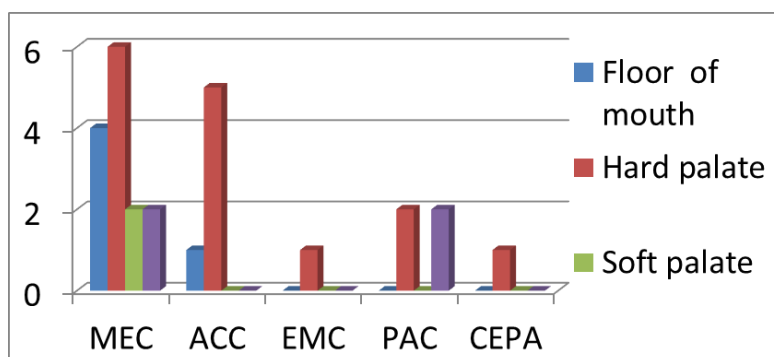


Figure 3

Based on common sites

Anatomical Site Distribution:

The hard palate was the most common site for all tumor types identified in this study, including MEC, ACC, PAC, EMC, and CEPA. The second common site for MEC was floor of the mouth

Statistical Analysis

Chi-square tests showed a significant correlation between age groups and specific tumor types ($p < 0.05$), suggesting that certain age groups are more susceptible to specific types of malignant salivary gland tumors. No statistically significant correlation was found between gender and tumor type ($p > 0.05$), although certain types showed a trend toward gender predilection.

V. Discussion

This study highlights the prevalence and demographic patterns of malignant minor salivary gland tumors in a tertiary healthcare setting in Trivandrum. Our findings of MEC as the most prevalent tumor followed by ACC align with global trends^[1] (Guzzo et al., 2010). The age and gender distribution observed also corroborates with existing literature, where younger patients tend to develop MEC, and older patients are more likely to develop ACC and PAC^[6]Seethala et al., 2017). Most of the cases were in the age group of 41 to 60 years of age with 9 cases where as the younger age group between 0-20 years showed the least predilection with just 3 cases these results are consistent with the studies by^[7]Young et al.

A female predilection is seen for carcinoma ex pleomorphic adenoma^[8], also 65% female predilection seen for polymorphous adenocarcinoma^[9] In our study slight female predilection was seen with 14 of the 26 malignant salivary gland tumors affecting females. Mucoepidermoid carcinoma and carcinoma ex pleomorphic adenoma showed male predilection while rest of the malignancies showed female predilection. According to

Michael Gibson et al for MEC the median age of diagnosis was between 20 to 50 years. In our study also the same was seen.

The higher incidence of these tumors in the hard palate is consistent with previous studies, which suggest that the palate is a common site for these malignancies due to their density and distribution^[10] (Dmitry jose de Santana sarmento et al Eveson & Cawson, 1985). The unique anatomical location of these glands often complicates surgical management, making early detection and a multidisciplinary approach essential.

Clinical Implications:

These findings emphasize the importance of demographic factors in the diagnosis and management of minor malignant salivary gland tumors. Awareness of the predilection of specific tumor types for certain age groups and genders can guide clinicians in formulating differential diagnoses and management plans.

Future Research:

Future studies should incorporate molecular and genetic analyses to better understand the pathogenesis of these tumors. Additionally, multi-centre studies with larger sample sizes are necessary to validate the findings and explore potential regional differences in tumor prevalence and characteristics.

Strengths and Weaknesses

Strengths

1. **Comprehensive Data Collection:** The study spans a seven-year period, providing a robust and representative dataset.
2. **Cross-Sectional Design:** The design allows for an effective assessment of demographic correlations with tumor types.
3. **Focus on a Specific Population:** Provides valuable insights into the local epidemiology of malignant salivary gland tumors.
4. **Inclusion of Rare Tumor Types:** Enhances the comprehensiveness of the study by including rare neoplasms.

Weaknesses

1. **Retrospective Nature and Data Limitations:** Potential biases due to incomplete or missing data.
2. **Single-Centre Study:** May limit the generalizability of the findings to other regions or settings.
3. **Small Sample Size:** Limits the statistical power and generalizability of the results.
4. **Lack of Molecular and Genetic Data:** The absence of molecular analyses limits insights into the biological mechanisms of tumor development.
5. **Potential for Selection Bias:** May not fully represent all cases of malignant salivary gland tumors in the broader population.
6. **Limited External Validity:** Findings may not be applicable to broader populations due to specific regional characteristics.

VI. Conclusion

This study provides significant insights into the prevalence and demographic characteristics of malignant minor salivary gland tumors in a tertiary healthcare setting in Trivandrum. Mucoepidermoid carcinoma (MEC) was found to be the most common tumor type, followed by adenoid cystic carcinoma (ACC) and polymorphous adenocarcinoma (PAC). The study also highlighted distinct patterns in age and gender distribution, with MEC and carcinoma ex pleomorphic adenoma (CEPA) showing a male predilection, while ACC, PAC, and epithelial-myoeplithelial carcinoma (EMC) were more common in females. The hard palate emerged as the most frequent site for these tumors, with the floor of the mouth being a notable secondary site for MEC.

These findings underscore the importance of considering demographic factors in the diagnosis and management of malignant salivary gland tumors. By identifying trends and patterns specific to the local population, this study contributes valuable information that can aid in early diagnosis and targeted treatment strategies. Future research should aim to expand the scope of this study by incorporating molecular and genetic data and conducting multi-centre investigations to validate these findings and explore broader epidemiological trends.

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