

Mucoepidermoid carcinoma: A retrospective clinicopathologic study of 25 cases

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Abstract

Background: Salivary gland tumors are rare and clinically represent a diverse group of neoplasms among which mucoepidermoid carcinoma (MEC) is a relatively common salivary gland tumor with varying potential for aggressive behavior. The purpose of the study was aimed at to analyze the relative frequency and correlate with age, sex, anatomical site and histological grade of MEC and compare the findings with epidemiological data from different geographic locations.

Materials and Methods: Twenty-five cases diagnosed with MEC during the period June 1985 to June 2004 (19 years) were retrieved from the Department of Pathology, Government Medical College and Hospital, Ambajogai, and clinical data were recorded and reviewed histopathologically.

Results: The relative frequency of MEC was 13.15%. Low-grade MEC (44%) was the most common, followed by intermediate-grade MEC (36%) and high-grade MEC (20%). The mean age for occurrence of MEC was 44.28 ± 13.29 years. MEC was predominant in females (60%) than males (40%). Thus, the overall female-male ratio was 1.5:1. Among minor salivary glands, palate (48%) was the most common site, and among major salivary glands, parotid gland (16%) was the common site.

Conclusion: Comparing the present data with previous studies on MEC, one may infer that some demographic characteristics and the predominance vary in different geographic regions. Analysis of the distribution and particular features of MEC in a specific population helps in establishment of appropriate treatment.

Keywords: Mucoepidermoid carcinoma, salivary gland, salivary gland tumor

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Submitted: 23-Feb-2021, **Accepted:** 30-Apr-2021, **Published:** 11-Jan-2022

INTRODUCTION

Tumors of the salivary glands constitute an important area in the field of oral and maxillofacial pathology.^[1] Salivary gland tumors are reported to represent between 1% and 5% of all head-and-neck tumors and are either benign or malignant tumors.^[2,3] Mucoepidermoid was first described

by Masso and Berger in 1924; previously, it was termed as “mucoepidermoid tumor” and was considered to be benign lesion. The World Health Organization (WHO) in 1990 classified it as malignant neoplasm and renamed it as mucoepidermoid carcinoma (MEC).^[1,4] Among malignant salivary gland tumors, MEC is the most frequent tumor.

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How to cite this article: Jeergal PA, Namazi NA, Patil S, Kochar A, Sohoni R, Bussari SB. Mucoepidermoid carcinoma: A retrospective clinicopathologic study of 25 cases. *J Oral Maxillofac Pathol* 2021;25:490-3.

Access this article online

Quick Response Code:



Website:

www.jomfp.in

DOI:

10.4103/jomfp.jomfp_67_21

MEC accounts for 35% of all salivary gland tumors and <3% of all head-and-neck tumors.^[1] It occurs most frequently between the third and sixth decades of life and affects women more often than men.^[2-4] It is frequently seen in parotid gland followed by minor salivary glands. Involvement of minor salivary glands is commonly seen in region of buccal mucosa, floor of mouth and labial mucosa. Palate is the most frequent site for MEC, followed by retromolar region, floor of mouth, buccal mucosa and lower lip.^[1,5] Etiology is not clear, but the factors that have a role in carcinogenesis of these tumors are attributed to radiation, endogenous hormones, viruses, lifestyle and certain occupations.^[3,4] Literature from various parts of the world points out that there are differences in the frequency of particular histologic type and in frequency with which major and minor salivary glands are involved.^[1,5-14]

The aim of the study was to analyze the frequency and correlate with the age, sex, anatomical site of the lesion and histopathological grades of MEC by retrieving from the registry of Department of Pathology, Government Medical College and Hospital, Ambajogai, from June 1985 to June 2004 (19 years) and compare the findings with epidemiological data from different geographic locations.

MATERIALS AND METHODS

A total of 190 cases of salivary gland tumors were reported from June 1985 to June 2004 (19 years) in the Department of Pathology of Government Medical College and Hospital, Ambajogai. This study received approval from the Institutional Ethics Committee. Out of these, totally 25 cases were diagnosed as MEC. Paraffin-embedded sections each of 4 µm thick were cut on rotary microtome and stained using hematoxylin and eosin (H & E) stain. The clinicopathological analysis was done on 25 cases of histologically confirmed MEC considering the parameters such as age, sex and anatomical site of salivary gland tumors. The cases were histologically reviewed and classified as per the WHO international classification of salivary gland tumors in 2005.^[15] MEC was subclassified according to Spiro *et al.*'s criteria^[16] as low grade (LG), intermediate grade (IG) or high grade (HG), based on histological criteria as follows: MEC is classified as LG, IG and HG tumors depending on the presence and absence of the following criteria: (1) neural invasion, (2) necrosis, (3) anaplasia, (4) >4 mitoses per 10 high-power fields and (5) <20 cystic spaces relative to solid areas.^[1,2,16] LG tumors showed well-formed glandular structure, prominent mucin-filled cystic spaces, minimum cellular atypia and high proportion of mucous cells. IG tumors had solid areas of epidermoid cells or squamous cells

with intermediate basaloid cells. Cyst formation is less predominant. HG tumor consists of cells present as solid nests and cord of intermediate basaloid cells and epidermoid cells. Prominent nuclear pleomorphism and mitotic activity are noted.^[2,16]

Observation and results

These 25 paraffin-embedded sections were stained according to H & E method. All the H- & E-stained sections were examined and diagnosed under light microscope in accordance with the WHO international classification of salivary gland tumors^[15] (in 2005), as shown in Table 1 and Figure 1a-c. These thirty cases included 11 cases of LG MEC (LG), 9 cases of IG MEC (IG) and 5 cases of HG MEC (HG).

RESULTS

Incidence

When analyzed, MEC constituted about 13.15% (number of MEC per total number of salivary gland tumors) of all salivary gland tumors. The overall annual frequency of MEC was found to be 1.31 cases per year.

Frequency

The individual frequencies of different grades of MEC are tabulated in Table 2 which reveals that among the MEC, LG MEC (44%) was the most common, followed by IG MEC (36%) and HG MEC (20%), and the difference was statistically nonsignificant (*P* > 0.05) by proportion test.

Age distribution

As shown in Table 3, the mean age for occurrence of MEC was 44.28 ± 13.29 years, LG and IG MECs were with a peak in the fourth decade and HG carcinomas were in the seventh decade. HG MEC was seen in older age group. The difference in mean age of LG MEC and HG MEC was

Table 1: Histopathological grades of mucoepidermoid carcinoma

MEC	Number of cases (n=25)
LG MEC	11
IG MEC	9
HG MEC	5

MEC: Mucoepidermoid carcinoma, LG: Low-grade, IG: Intermediate-grade, HG: High-grade

Table 2: Relative frequency of grades of mucoepidermoid carcinoma

MEC	Number of cases (n=25)	Relative frequency (%)
LG MEC	11	44
IG MEC	9	36
HG MEC	5	20

MEC: Mucoepidermoid carcinoma, LG: Low-grade, IG: Intermediate-grade, HG: High-grade

statistically significant as a value of $P < 0.05$ by a two-tailed, unpaired Student's *t*-test.

Sex distribution

Among a total of 25 cases of MEC, 15 cases (60%) were female and 10 cases (40%) were male. Thus, the overall female-male ratio was 1.5:1. There was a female predilection for MEC. The difference was statistically nonsignificant as a value of $P > 0.05$ by proportion test.

Site distribution

The site-wise distribution of tumors in major and minor salivary glands is given in Table 4. Among major salivary glands, parotid gland (16%) was the most common site, and among minor salivary glands, palate (48%) was the most commonly involved site.

DISCUSSION

In the present study, the relative frequency of MEC was 13.15% whereas a lower incidence of the tumor (MEC) was reported in the literature in studies by Saldanha *et al.*^[4] and Rajdeo *et al.*^[17] which was 12.31% and 8.6%, respectively. A higher incidence of MEC was reported in studies by Vuhahula,^[11] Tilakaratne *et al.*,^[18] and Subhashraj^[12] as

21.6%, 21.6% and 18%, respectively. There is a disparity with other studies, which may be due to differences in the total number of cases that were analyzed.

In the present study, LG MEC constituted 44%, IG MEC 36% and HG MEC 20% of all MECs which is in accordance with a study by Rapisdis *et al.*^[5] whereas the study by Agarwal *et al.*^[19] showed high cases of IG MEC, followed by LG MEC and HG MEC. This disparity in findings of our studies compared to other studies may be due to various reasons such as differences in the total number of cases that were analyzed, geographical location of population, genetic and ethnic factors.

In the present study, the mean age for occurrence of MEC was 44.28 ± 13.29 years. HG MEC was reported in older age group compared to LG MEC and IG MEC. These findings were similar to studies by Saldanha *et al.*,^[4] Li *et al.*,^[9] Subhashraj,^[12] Chatterjee and Panda,^[20] and Isacson and Shear;^[13] these studies reported peak age incidence for malignant tumors in the fourth and fifth decades.

In the present study, among a total of 25 cases of MEC, 15 cases (60%) were female and 10 cases (40%) were male. Thus, the overall female-male ratio was 1.5:1. There was a female predilection for MEC. Our findings are in accordance with the studies by Li *et al.*,^[9] Vuhahula^[11] Tilakaratne *et al.*,^[18] and Subhashraj.^[12]

In the present study, among major salivary glands, parotid gland (16%) was the common site, and among minor salivary glands, palate (48%) was the common site for MEC which was similar to the study by Saldanha *et al.*^[4] Tilakaratne *et al.*,^[18] Subhashraj,^[12] and Eveson and Cawson.^[14]

Table 3: Age distribution in mucoepidermoid carcinoma

Salivary gland tumor	Age range (years)	Mean±SD (years)
MEC (n=25)	15-75	44.28±13.29
LG MEC (n=11)	15-74	38±11.45
IG MEC (n=9)	27-61	39.3±12.61
HG MEC (n=5)	52-75	67±10.54

MEC: Mucoepidermoid carcinoma, LG: Low-grade, IG: Intermediate-grade, HG: High-grade, SD: Standard deviation

Table 4: Anatomical site distribution of mucoepidermoid carcinoma

Site distribution	Number of cases	Frequency (%)
Parotid gland	4	16
Submandibular gland	1	4
Palate	12	48
Labial mucosa	4	16
Buccal mucosa	2	8
Retromolar area	1	4
Floor of mouth	1	4

SUMMARY

In the present study total 25 cases of MEC were retrieved from the Department of Pathology, Government Medical College and Hospital, Ambajogai. For these 25 cases clinicopathologic study was done by retrospective analysis with respect to parameters such as frequency, age, sex, site

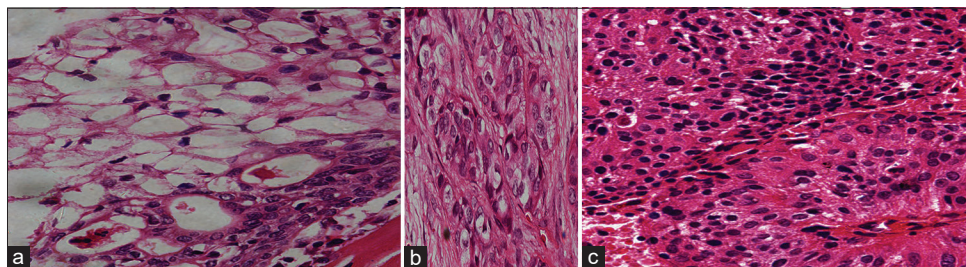


Figure 1: (a) Low-grade mucoepidermoid carcinoma, H & E stain (×40 magnification). (b) Intermediate-grade mucoepidermoid carcinoma, H & E stain (×40 magnification). (c) High-grade mucoepidermoid carcinoma, H & E stain (×40 magnification)

of the tumour and histopathological grade of the tumour. Our data was compared with the epidemiological data of other studies of different geographic locations.

The observations in the present study can be summarized as follows:

The relative frequency of MEC was 13.15%. LG MEC (44%) was the most common, followed by IG MEC (36%) and HG MEC (20%). The mean age for occurrence of MEC was 44.28 ± 13.29 years. MEC was predominant in females (60%) than males (40%). Thus, the overall female-male ratio was 1.5:1. Among minor salivary glands, palate (48%) was the most common site, and among major salivary glands, parotid gland (16%) was the common site.

CONCLUSION

General physicians and dental practitioners may be the first health-care provider to examine patients with palatal lesions, presenting as nonhealing ulcer or swelling. Knowledge of presentation of MEC and its prompt diagnosis will lead to its early detection, thus preventing further spread into adjoining vital structures, reducing the surgical morbidity and improving the prognosis of the disease. Analyzing the present findings in light of data from previous studies on SGTs, one may infer that some demographic characteristics (e.g., gender and age) and the predominance of malignant tumors vary in different geographic regions. Factors that influence biologic behavior and prognosis should be investigated further.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

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