

Research Article

Mucoepidermoid Carcinoma: A Clinico-Pathological Review of 75 Cases

Sana Mehmood Qureshi, Omer Sefvan Janjua, Sefvan Majed Janjua

Abstract

Purpose: To determine the frequency and clinico-pathological presentation of mucoepidermoid carcinoma. **Patients and Methods:** The study included all the cases which presented to the department and were diagnosed as mucoepidermoid carcinomas in the last six years. Records of all the malignant tumors of salivary glands that presented during this period were analyzed and out of these the frequency of mucoepidermoid carcinoma was noted. The data analysis included the age, gender, anatomical site of tumor and its histopathological grading. **Results:** A total of 151 malignant salivary gland tumors presented to our department in the last six years. Out of these, 75 (49.6%) were diagnosed as mucoepidermoid carcinomas. The age ranged from 06 to 67 years (mean 42.6 ± 1.85 years). Thirty-six were males and 39 were females with a male to female ratio of 1:1.08. Regarding site of malignancy, it was observed that 56% of the tumors originated in Parotid gland followed by 34.7% in minor salivary glands. Based on histopathological grading, 38.7% were high, 13.3% intermediate and 48% were low grade malignancies. **Summary & Conclusion:** Frequency of mucoepidermoid carcinoma was 49.6% among all the salivary gland malignancies with more than half of the tumors originating in parotid gland. Histopathologically, low grade type was the most common pattern observed (48%).

Key Words: Salivary Glands; Mucoepidermoid; Carcinoma; Malignancy; Neoplasms; Cystic, Mucinous and Serous.

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Introduction

Salivary gland tumors account for almost 5% of the head and neck malignancies and among these tumors the most common is the Mucoepidermoid carcinoma (MEC). Mucoepidermoid carcinoma of the salivary gland was first described by Stewart et al in 1945 as a separate entity in salivary gland neoplasms.¹ Prevalence of MEC among salivary gland tumors reported in Pakistan is around 9.5% - 25.6%^{2,3} with an overall prevalence of 12% - 40% worldwide.^{4,5} MEC carries a slight female preponderance with a female to male ratio of around 3:2.^{6,7} MEC has a predilection for adults in their fourth to sixth decade with the highest prevalence noted during the fifth decade of life.^{3,4,7}

It is thought to arise from the reserve cells in the excretory ducts of the salivary glands and consists of mucous, epidermoid and intermediate cells.⁶ Histopathologically it is classified into three grades, low grade, intermediate grade and high grade.⁷ Overall five year survival rates for MEC range from almost 57% - 62.3% and is strongly associated with the grade of the tumor.⁶ Most commonly affected gland is parotid with a reported incidence of about 45% -

56.9% MEC in parotid gland.^{4,6} Next common site is the minor salivary glands with an incidence of 22.9% - 37.1%.^{5,8}

Clinically MEC usually presents as a slow growing and long standing painless swelling. Pain and ulceration is usually seen in aggressive MEC especially when it involves the facial nerve. There are multiple research papers on MEC, but most of them are from the western world and still in our set up this tumor and its clinic-pathological parameters are quite under-reported and this is an effort to highlight the presentation of MEC in our set up.

Materials and Methods

Records of all the malignant salivary gland tumors which were presented to the histopathology department from Jan 2005 - Dec 2010 were analyzed retrospectively. Out of these records, tumors with a diagnosis of Mucoepidermoid carcinoma were retrieved. Fresh hematoxylin and eosin stained slides were prepared and histopathological pattern was reconfirmed. The age, gender and anatomic location of tumor were noted as described in the records and the samples with incomplete

record or with necrosed, scanty and autolysed tissue were excluded from the study as it was difficult to identify the histopathological pattern in these samples. Frequency and percentages were calculated for the quantitative variables using statistical software SPSS 17.0.

Results

A total of 151 malignant salivary gland tumors presented to our department in the last six years. Out of these 75 were diagnosed as mucoepidermoid carcinomas with an overall frequency of 49.6% among the salivary gland malignancies. Overall mean age of the patients was 42.6 ± 1.85 years and age ranging from 6 - 67 years. Mean age for patients with high grade malignancy was 51.2 years, for intermediate grade MEC 40.7 years and for low grade tumors mean age seen was 35.7 years. Male patients were 36 out of 75 and remaining were females with an overall male to female ratio of 1:1.08. Forty-two cases (56%) occurred in parotid gland, 6 (8 %) in submandibular gland, 1 (1.3%) in sublingual gland and 26 (34.7%) were observed in minor salivary glands (Graph 1). Among the tumors occurring in minor salivary glands, palate was the most common site with 11 (42.3%) cases out of 26 occurring on the palate. Other intraoral sites of minor salivary glands are shown in (Table 1). Regarding histopathological grading of the tumors, 29 (38.7%) were high grade, 10 (13.3%) intermediate grade and 36 (48%) were classified as low grade malignancies (Graph 2). This was correlated with gender and no statistical significance was observed ($p > 0.05$). Cross tabulation shown in Table 2. Total of 6 cases were found in children, one of them was on palate, and the rest five were in parotid gland. Five out of six cases in children were low grade and only one was diagnosed as high grade. Table 3 shows the distribution of cases according to age.

Discussion

Salivary gland tumors account for almost 5% of the head and neck malignancies¹ and among these, Mucoepidermoid carcinoma is considered the most common malignancy of major and minor salivary glands.³⁻⁵ MEC is thought to arise from pluripotent reserve cells of the excretory ducts of salivary glands that have the potential to differentiate into squamous, columnar and mucous cells and hence tumor consists of epidermoid cells, mucous cells and poorly differentiated intermediate cells and a growth pattern

ranging from cystic to solid to infiltrative.^{2,3} Parotid gland, followed by intraoral minor salivary glands, is considered to be the most common anatomical sites for MEC. In less than 10% of cases it is also seen in minor salivary glands in extra oral sites like maxillary sinus, nasopharynx, nasal cavity, oropharynx, vocal cords, larynx and trachea.⁸

Location	Frequency	%
Palate	11	42.3
Buccal mucosa	3	11.6
Lower lip	3	11.6
Retro molar area	2	7.7
Base of tongue	2	7.7
Lower Alveolus	2	7.7
Dorsum of Tongue	1	3.8
Upper Lip	1	3.8
Intraosseous MEC	1	3.8
Total	26	100

Table 1: Distribution of Tumors in the Minor Salivary Glands.

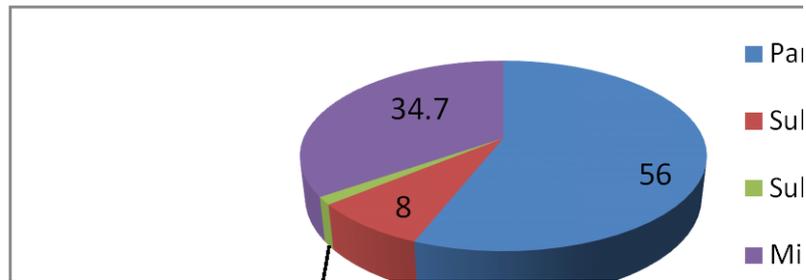
Histopathological Grading	Total Cases	Males	Females
High	29	15	14
Intermediate	10	4	6
Low	36	17	19

Table 2: Showing correlation between gender and histopathological grade of MEC.

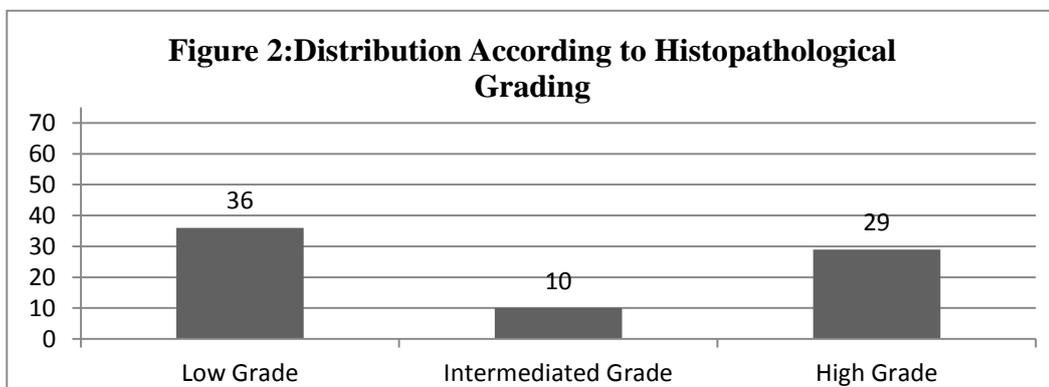
Auclair et al and Goode et al described a reproducible histologic grading system for MEC and described MEC as low grade, intermediate grade and high grade malignancy using five histopathologic features namely, intracystic component, neural invasion, necrosis, mitosis and anaplasia.⁹ Low grade tumors are well demarcated and exhibit pushing margins and dilated cystic spaces containing mucinous material. Intermediate grade MEC comprise of solid rather than cystic architecture with more intermediate cells than mucinous cells. In high grade MEC features seen are infiltrative border, anaplasia, necrosis, atypical mitoses, perineural and lymphatic invasion.^{2,6-9} Low grade MEC are usually treated by local surgical excision where as in high grade MEC wide surgical excision, neck dissection and post op radiotherapy is required for loco-regional disease control.⁷

Differentiation of MEC in low grade, intermediate grade and high grade is at times difficult especially the differentiation between intermediate grade and high grade and between high grade MEC and poorly differentiated squamous cell carcinoma.

Histopathological grading is an important prognostic factor regarding 5-year survival outcome (92 - 100% in low grade, 62 - 93% in intermediate grade and 0 - 43% in high grade).⁸



Graph 1: Distribution according to the anatomical site.



Graph 2: Distribution according to histopathological grading.

Histopathological Grading	0-10 years	11-20 years	21-30 years	31-40 years	41-50 years	51-60 years	61-70 years	Total
Low	4	3	6	10	5	8	0	36
Intermediate	0	1	0	4	4	1	0	10
High	1	0	1	4	5	11	7	29
Total	5	4	7	18	14	20	7	75

Table 3: Showing distribution of cases according to age.

In our analysis of 151 cases of salivary gland malignancy, frequency of mucoepidermoid carcinoma was seen to be 49.6%. This is comparable to a study from Karachi⁴, whereas studies from, Rawalpindi⁵, Lahore³, China¹⁰ and Italy¹⁴ have depicted a lesser frequency of mucoepidermoid carcinoma among all the salivary gland malignancies. The mean age of presentation in our study sample was 42.6 years. This fact has also been reported by authors from Karachi⁴, Lahore³, Brazil⁶, Rawalpindi⁵, and New York¹¹, while authors from Greece¹² and Japan⁹ report sixth and seventh decade to be the mean age in their population respectively. Then we analyzed

the mean age according to histopathological grading and it was seen that mean age for high grade tumors was significantly higher (51.2 years) as compared to low grade tumors (35.7 years) showing that patients with increasing age were more prone to get high grade malignancy as compared to younger lot. Similar findings have been reported by Nance et al⁷ in his study.

We observed that there was no significant predilection of mucoepidermoid carcinoma for any gender (male to female ratio of 1:1.08). This fact is in accordance with what is reported by Nance et al⁷ and Brandwein et al¹¹ whereas Qureshi et al³, Okabe et al⁹ and

Rahman et al⁵ have reported a female predilection. On the contrary, a study by Rapidis et al¹² shows a male preponderance.

Regarding anatomic location, we observed that most commonly involved gland was parotid gland (56%). The next most common location was minor salivary glands (34.7%). Very small percentage affected the submandibular gland (8%) and sublingual glands (1.3%). This finding is in harmony with studies by Qureshi et al³, Brandwein et al¹¹, Rapidis et al¹² and Gill et al.⁴ However, Pires et al⁸, Tian et al¹⁰ and Kokemueller et al¹³ have reported that minor salivary glands were the most common location for MEC in their respective groups followed by parotid gland as the second most common site. When distribution of MEC according to various intraoral sites was analyzed, it was seen that palate was the most common location (42.3%), this fact has also been supported by other studies from various authors.^{5,8,9,11,14,15} There were few unusual sites for intra oral presentation like base of tongue, alveolus etc but as minor salivary glands are present in these areas and they could have possibly contributed towards tumor formation and similar cases have been reported in literature.¹⁶⁻¹⁸

When we analyzed the histopathological grading of the tumors, we found that low grade pattern was the most common (48%) followed by high grade variety (38.7%). The least common was intermediate grade tumor and was seen in only 13.3% of the cases. This finding is in harmony with that reported by Pires⁸, Okabe⁹ and Kokemueller¹⁰ in their studies showing that low grade variety is indeed the most common histopathological pattern of MEC. Then we cross tabulated the histopathological pattern with gender but no significant correlation was observed.

We received 75 cases of MEC in the last six years which is a great number, a possible reason for this large number could be that hospital where study was carried out is a tertiary care teaching hospital and covers a very vast area from where cases are referred.

Conclusion

Mucoepidermoid carcinoma is the most common salivary gland malignancy in our set up accounting for almost half of these salivary gland malignancies. Mean age of presentation was in the fifth decade and no

gender predilection was observed. The most common site was parotid followed by minor salivary glands. Regarding the histopathological pattern low grade variety was most commonly seen.

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References

1. Ali SS, Memon AS, Shaik NA, Soomro AG. Mucoepidermoid carcinoma of parotid presenting as unilocular cyst. J Ayub Med Coll Abbottabad 2008;20:141-2.
2. Din I, Bukhari MH, Hamid T, Zaman S, Qureshi GR, Naveed IA. Incidence of salivary gland tumors: a morphological study at pathology department of King Edward Medical University/Mayo hospital, Lahore. Ann King Edward Med Coll. 2006;12:161-3.
3. Qureshi A, Rehman K, Hussain S, Khawaja NH, Qureshi GR, Naveed IA. Salivary gland tumors - a three years' experience of King Edward Medical College, Lahore. Ann King Edward Med Coll. 2004;10:200-2.
4. Gill MS, Muzaffar S, Soomro IN, Kayani N, Hussainy AS, Pervez S, et al. Morphological patterns of salivary gland tumors. J Pak Med Assoc 2001;51:343-6.
5. Rahman B, Mamoon N, Jamal S, Zaib N, Luqman N, Mushtaq S, et al. Malignant tumors of the minor salivary glands in Northern Pakistan: a clinicopathological study. Hematol Oncol Stem Cell Ther 2008;1:90-3.
6. Ozawa H, Tomita T, Sakamoto K, Tagawa T, Fujii R, Kanzaki S, et al. Mucoepidermoid carcinoma of the head and neck: clinical analysis of 43 patients. Japan J Clin Oncol. 2008;38:414-8.
7. Nance MA, Seethala RR, Wang Y, Chiosea SI, Myers EN, Johnson JT, et al. Treatment and survival outcomes based on histologic grading in patients with head and neck mucoepidermoid carcinoma. Cancer. 2008;113:2082-9.

8. Pires FR, de Almeida OP, de Araújo VC, Kowalski LP. Prognostic factors in head and neck mucoepidermoid carcinoma. *Arch Otolaryngol Head Neck Surg.* 2004;130:174-80.
9. Okabe M, Inagaki H, Murase T, Inoue M, Nagai N, Eimoto T. Prognostic significance of p27 and Ki-67 expression in mucoepidermoid carcinoma of the intraoral minor salivary gland. *Mod Pathol.* 2001;14:1008-14.
10. Tian Z, Li L, Wang L, Hu Y, Li J. Salivary gland neoplasms in oral and maxillofacial regions: a 23 year retrospective study of 6982 cases in an eastern Chinese population. *Int J Oral Maxillofac Surg* 2010;39:235-42.
11. Brandwein MS, Ivanov K, Wallace DI, Hille JJ, Wang B, Fahmy A, et al. Mucoepidermoid Carcinoma: a clinicopathologic study of 80 patients with special reference to histological grading. *Am J Surg Pathol* 2001;25:835-45.
12. Rapidis AD, Givalos N, Gakiopoulou H, Stavrianos SD, Faratzis G, Lagogiannis GA, et al. Mucoepidermoid carcinoma of the salivary glands. Review of the literature and clinicopathological analysis of 18 patients. *Oral Oncol* 2007;43:130-6.
13. Kokemueller H, Brueggemann N, Swennen G, Eckardt A.
- Mucoepidermoid carcinoma of the salivary glands--clinical review of 42 cases. *Oral Oncol.* 2005;41:3-10.
14. Copelli C, Bianchi B, Ferrari S, Ferri A, Sesenna E. Malignant tumors of intraoral minor salivary glands. *Oral Oncol* 2008;44:658-63.
15. Subhashraj K. Salivary gland tumors: a single institution experience in India. *Br J Oral Maxillofac Surg* 2008;46:635-8.
16. Moshy J, Mwakyoma H, Owibingire S. Intra oral Minor salivary gland neoplasms; The pattern and management. *Professional Med J* 2010;17:483-9.
17. Leong SCL, Pinder E, Sasse R. Mucoepidermoid carcinoma of the tongue. *Singapore Med J* 2007;48:e272-4.
18. Van der Waal JE, Snow GB, van der Waal I. Histological reclassification of 101 intra oral salivary gland tumors (new WHO classification). *J Clin Pathol* 1992;45:834-5.

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