Demographics of Salivary Gland Tumors: An Institutional Study in Western Uttar Pradesh

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Abstract

AIM OF STUDY: Salivary gland tumors are uncommon, and the epidemiological data of these tumors in various parts of the world can be helpful for a better understanding of their biology and clinical characteristics. Thus, this study was an epidemiological survey of salivary gland tumors in the western Uttar Pradesh population.

MATERIALS AND METHODS: This retrospective study was a clinical review of our experience with different subtypes of salivary gland tumors, diagnosed from May 2004 to May 2010. The histological diagnoses were evaluated according to the 2005 WHO classification. These data were analyzed for the distribution of benign and malignant salivary tumors in minor salivary glands, male to female ratio, age range, and site of occurrence.

RESULTS: A total of 1805 specimens were received; of these, 4% were diagnosed as salivary gland tumors, with a male to female ratio of 1:1.4. The mean age of the patients was 51.4±18.1 years. Of the tumors, 59.5% were benign and 40.5% were malignant neoplasms, with the most common tumors being pleomorphic adenoma and mucoepidermoid carcinoma.

CONCLUSION: The present study provides demographic data on a series of salivary gland tumors in the western Uttar Pradesh population. This study confirmed that some tumors have a predilection for certain sites, and that the risk of malignant disease is also greater at specific sites within the oral cavity.

Keywords: minor salivary gland tumors, demographic, epidemiologic.

Introduction

Salivary gland tumors are rare, comprising less than 3% of all neoplasms of the head and neck region(1). Tumors of minor salivary gland origin account for less than 25% of all salivary neoplasms(1, 2). Reports from several parts of the world have shown differences in the incidence of salivary gland tumors. Variation in the frequency of each histological type has also been reported. The estimated global incidence rate ranges from 0.4 to 3.5 cases per 100,000 annually, with the highest percentage of cases occurring in specific populations. Most studies include major and minor salivary gland tumors together, and few articles have examined minor salivary gland tumors separately(3-9).

However, varying circumstances have made it difficult to compare the data among various studies of minor salivary gland tumors. For example, there is considerable variability across the studies in relation to diagnostic criteria, which do not always follow the 1991 WHO classification(1). Moreover, the relative frequency of individual tumor types in some surveys is biased in favor of malignant tumors, as the material was drawn from major cancer institutes(10-12). Only a few epidemiological studies were not from a cancer institute.

There are numerous studies on the incidence and histological types of salivary gland tumors from areas such as the USA, Brazil, Japan, Jordan, Africa, and Nigeria(3-10). However, there is little information available about the
pattern of their presentation from Asian countries, particularly in India, where epidemiological analyses of these tumors are very scarce (13).

The purpose of this retrospective, single institutional study was to determine the relative frequency and distribution of the various types of minor salivary gland tumors in an Indian population, and to provide data for comparison with other epidemiological findings in different geographic locations. Demographic data from these studies should provide us with a better understanding of the biological and clinical characteristics of the disease.

**Materials and Methods**

A total of 74 cases of primary intraoral minor salivary gland tumors, which were diagnosed histologically in the Department of Oral Pathology, Subharti Dental College, Meerut, India, between 2004 and 2010, were examined through a retrospective review of case notes. The present retrospective study was from a university hospital, which is not a special cancer institute but a general hospital, located in the western part of India. The study sample is thought to be representative of the Indian population as a whole, with minimal bias.

Clinical features including age, sex, and the location of the tumors were obtained from each clinical record. In some rare tumors, histopathological findings and the clinical course were also surveyed in detail. All cases were reassessed histologically according to the 2005 WHO classification. (14)

**Results**

A total of 74 minor salivary gland tumors, consisting of 44 benign and 30 malignant tumors, were identified in 31 male and 43 female patients; the male to female ratio was 1:1.36. Benign neoplasms were found among people in the age group 41–50 years, whereas malignant lesions were more common in those >50 years. The peak incidence was seen in those 41–50 years in women and those 51–60 years in men. There was a predominance of men among the malignant tumor cases and of women among the benign neoplasm cases. (Table 1)

As shown in Table 2, 71.6% of all tumors were located in the palate, making it the most common site, followed by the buccal region, the upper lip, the floor of the mouth, and the retromolar region. The palate was also the most common site for both benign and malignant tumors, where 75% and 66.6% of the benign and malignant tumors were located, respectively.

<table>
<thead>
<tr>
<th>Age (years)</th>
<th>All tumors</th>
<th>Benign (n=44)</th>
<th>Malignant (n=30)</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>All tumors</td>
<td>Male</td>
<td>Female</td>
</tr>
<tr>
<td>0-9</td>
<td>0</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>10-19</td>
<td>1</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>20-29</td>
<td>2</td>
<td>-</td>
<td>2</td>
</tr>
<tr>
<td>30-39</td>
<td>7</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>40-49</td>
<td>26</td>
<td>6</td>
<td>12</td>
</tr>
<tr>
<td>50-59</td>
<td>11</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>60-69</td>
<td>13</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>70-79</td>
<td>14</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>Total</td>
<td>74</td>
<td>13</td>
<td>31</td>
</tr>
</tbody>
</table>
Histologically, benign tumors were all pleomorphic adenomas, except for one case of myoepithelioma, which was found in the left upper labial mucosa in a 66-year-old woman.

Pleomorphic adenomas accounted for 58.1% of all tumors and 97.7% of all benign tumors; they were found in 13 male and 30 female patients, showing a marked predilection for females, with a male to female ratio 1:2.3. (Table 2)

Mucoepidermoid carcinoma was the most common malignant tumor, accounting for 21.6% of all tumors and 53.3% of all malignant tumors. The patients ranged in age from 21 to 83 years, with a mean age of 54.7 ± 18.6 years. There were 2 male and 2 female patients with palatal tumors. Histologically, 4 tumors were poorly differentiated, and the rest were well differentiated. Acinic cell carcinomas were found in two males, both of whom were 55 years old. One tumor was located in the palate, while the other was located in the floor of the mouth. Histologically, both were of a predominantly solid type. In

<table>
<thead>
<tr>
<th>Histological type</th>
<th>Palate</th>
<th>Buccal vestibule</th>
<th>Gingiva</th>
<th>Upper lip</th>
<th>Lower lip</th>
<th>Floor of the mouth</th>
<th>Retromolar region</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pleomorphic adenoma</td>
<td>33</td>
<td>2</td>
<td>3</td>
<td>1</td>
<td>3</td>
<td>1</td>
<td>-</td>
<td>43</td>
</tr>
<tr>
<td>Myoepithelioma</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1</td>
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<td>Adenoid cystic carcinoma</td>
<td>4</td>
<td>-</td>
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<td>-</td>
<td>-</td>
<td>-</td>
<td>3</td>
<td>7</td>
</tr>
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<td>Mucoepidermoid carcinoma</td>
<td>12</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>4</td>
<td>16</td>
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<tr>
<td>Acinic cell carcinoma</td>
<td>1</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Adenocarcinoma</td>
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<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>2</td>
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<td>Basal cell adenocarcinoma</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>Carcinoma ex pleomorphic adenoma</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>Polymorphous low-grade adenocarcinoma</td>
<td>1</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>53</td>
<td>2</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>7</td>
<td>74</td>
</tr>
</tbody>
</table>
one tumor, clear cells were predominant. Adenocarcinoma in the palatal region was seen in two 45-year-old men. One case of basal cell adenocarcinoma was found in the floor of the mouth of a 35-year-old woman, and one case of carcinoma ex pleomorphic adenoma was found in the floor of the mouth of a man. Only one case of polymorphous low-grade adenocarcinoma was found in a 58-year-old male in the palatal region (Table 2).

Discussion

Despite India being the second most populated country in the world and the tremendous advances in health care, little information is available on the clinical presentation of tumors of the head and neck in India.

This was a six-year retrospective study of a referral teaching hospital, which is the major tertiary health institution offering histopathology service to a large, ethnically Indian population.

Most studies have shown that minor salivary gland tumors are more common in females (6-9) than males, with a male to female ratio ranging from 1:1.02 to 1:2.0 (14,15). A high proportion of females was also found in the present study, with a ratio of 1:1.4. The tendency for a female predominance has been reported to be especially marked for benign tumors (12, 15, 16), with a male to female ratio ranging from 1:1.8 to 1:2.4. The present study found a higher proportion of benign tumors among females than did previous studies, with a ratio of 1:2.3. For malignant tumors, many studies have shown a tendency for female predominance (9,12,15,16), with a ratio varying between 1:1.04 and 1:1.9 (16). Although several studies have shown the opposite sex predilection, with a male to female ratio of 1:0.60 and 1:0.86 (3,10) as did the present study, with a male to female ratio of 1:0.6.

The majority of tumors (59.4%) in the present series were benign, corresponding to the results of most studies showing a predominance of benign over malignant tumors (3,5,7,8,12,15,16); in these studies, the percentage of benign tumors varied from 51.3% to 72.1%. In contrast, some studies have shown a predominance of malignant over benign tumors; in these studies, the percentage of malignant tumors was reported to be 87%, 88.2%, 51.4%, 65.3%, and 76.3% (2,9-12). However, these studies were from special institutions, such as major cancer referral centers. Thus, the relative incidence of benign versus malignant minor salivary gland tumors reflects the character of each institution.

Considering that these high incidences of malignant tumors have been reported mainly from cancer referral centers, it is probably more accurate to consider that the real prevalence of benign and malignant minor salivary gland tumors may show only a slight predominance of malignant tumors.

In the present study, the palate was the most common site for minor salivary gland tumors, with a high frequency of involvement (71.6%). Moreover, the percentage of palatal cases was higher among benign tumors (75%) than among malignant tumors (66.6%). Major studies have also reported that the palate was the most common site for minor salivary gland tumors, and that approximately 40-80% of all tumors occurred in this site (2-9). It has also been reported that the percentage of benign tumors was higher than that of malignant tumors in the palate (2,3,5-8), and that the palate was the predominant site even for malignant minor salivary gland tumors (3,5,8,10,16) as in the present study.

In most studies, pleomorphic adenoma is the most common minor salivary gland tumor (3,8,11,16) with an incidence ranging from 33% (15) to 70% (8) of all tumors and from 70.6% (16) to 100% (2,11,12) of benign tumors. An especially high incidence of pleomorphic adenoma has been reported in the study from South Africa; in this study, Isacsson & Shear (8) reported that 70% of the tumors in their series were classified as pleomorphic adenomas. They stated that Black people are affected by this tumor about 3.5 times more often than Caucasian people. Rivera-Bastidas et al. (16) also reported that all Black patients and 85% of Mestizo (mixed race) patients in their series of the Venezuelan population were affected by pleomorphic adenomas. In the studies from Japan, 62% and 57% of the tumors were classified as pleomorphic adenomas (1). In the present study, a higher incidence (58.1%) of this tumor was found. These incidences for the Japanese population are higher than those for the population samples in the USA (2-5), the UK (7) Australia (3), and the Netherlands (15), in which the percentage of pleomorphic adenomas ranged from 38.1% to 54%. It has been reported that the palate is the most common site for pleomorphic adenomas of minor salivary gland origin (3-8); the incidence of palatal involvement has been reported to range from 55.3% to 91% in these studies. In the present study, 76.6% of pleomorphic adenomas occurred in the palate. In the previous reports (4,5,7,8,11,16), the male-to-female ratio for this tumor ranged from 1:1.1 to 1:2.5 (4,9). The present study...
showed a marked tendency for female predominance, with a ratio of 1:2.3. Because pleomorphic adenoma represents the majority of benign tumors, the clinical features of benign minor salivary gland tumors, including the predilection for the palate and for female patients, are affected significantly by this type of tumor. The especially high incidence of benign tumor in South Africa and Japan, which was described above, may be caused by the especially high frequency of pleomorphic adenoma in these countries. Adenoid cystic carcinoma and mucoepidermoid carcinoma have been reported to account for 7.7-48.0% and 6.5-41.3% of all tumors and for 11.5-51.1% and 16.7-73.6% of malignant tumors, respectively (2-10). The studies from Japan have shown similar results. In the study by Takhashi et al. (17), adenoid cystic carcinoma was the most common malignant tumor, with incidences of 16.5% and 12.2% of all tumors and 45.2% and 37.0% of malignant tumors, respectively. In the study by Kusama et al. (18) and the present study, mucoepidermoid carcinoma was the most common malignant tumor, with incidences of 19.4% and 21.6% of all tumors and 51.0% and 53.3% of malignant tumors.

The studies prior to 1984 did not recognize polymorphous low-grade adenocarcinoma as an entity, and it may have been frequently diagnosed as adenoid cystic carcinoma. Even after 1984, polymorphous low-grade adenocarcinoma was either not found or reported as a small number in the literature, although a relatively high incidence of this tumor has been reported in several studies from the USA, South Africa, and The Netherlands. In these studies, the incidence of polymorphous low-grade adenocarcinoma was reported to range from 11.0% to 15.7% of all tumors and from 13.8% to 30.6% of malignant tumors. On the other hand, the studies from Japan found no cases of polymorphous low-grade adenocarcinoma, suggesting the rarity of this tumor, especially in the Japanese population. Also in the present study, the presence of only one case suggests its rarity.

From the results of the present study and a review of the literature, salivary gland tumors in western Uttar Pradesh may be characterized by a higher incidence of benign tumors, especially of pleomorphic adenoma; a more marked tendency for female predominance; a higher incidence of palatal involvement; and a rare occurrence of polymorphous low-grade adenocarcinoma.

Due to the morphological diversity in salivary gland tumors both within and between the different subtypes, the classification of salivary tumors can cause difficulties for those pathologists not used to dealing with such lesions. Accurate diagnosis is essential, since salivary lesions have diverse clinical and prognostic outcomes. This study has confirmed that some tumors have a predilection for certain sites, and that the risk of malignant disease is greater at specific sites within the oral cavity.

Conclusion:

The results of this study from India show that many clinical characteristics of the disease are similar to those found elsewhere in the world. In order to clarify the geographic variations in the frequency and distribution of the minor salivary gland tumors, further epidemiological data should be accumulated through more extensive studies. Further epidemiological surveys from India and other Asian Countries should be encouraged for better understanding of the disease and to provide early and better treatment of salivary gland tumors.

References


