EPIDEMIOLOGY AND PATHOLOGY OF PAROTID TUMORS – FIVE-YEAR RETROSPECTIVE STUDY

Loredana-Beatrice Ungureanu¹, Delia Ciobanu¹, M. Danciu¹, V. Costan², Carmen Ungureanu¹, A. Nicolau², Eugenia Popescu²

University of Medicine and Pharmacy “Grigore T. Popa”- Iasi
Faculty of Medicine
1. Department of Morpho-Functional Sciences
   Faculty of Dental Medicine
2. Department of Oral and Maxillofacial Surgery

EPIDEMIOLOGY AND PATHOLOGY OF PAROTID TUMORS – FIVE-YEAR RETROSPECTIVE STUDY (Abstract) **Aim:** To retrospectively analyze the epidemiological, clinical and pathological data of parotid tumors. **Material and methods:** Reassessment of the histologic diagnosis of parotid tumor in the patients admitted to the Oral and Maxillofacial Surgery Unit of the Iasi “Sf. Spiridon” University Emergency Hospital during 2009-2013. Data on gender, age, place of residence, location, size, surgical procedure type and histopathological type were recorded. **Results:** The risk of developing pleomorphic adenoma is 7.40 times higher in women and 4.08 times higher before the age of 50 years. The risk of Warthin tumor is 16.47 times higher in male patients and 3.58 times higher in urban patients. People older than 50 years have a 7.14 times higher risk of developing malignancy and rural people have a 2.41 times higher risk of developing cancer. Diabetes, obesity and systemic hypertension were not important risk factors in our study. **Conclusions:** According to this study age and the place of residence could be important predictors for parotid gland tumors. Since in Romania there are few epidemiological data regarding the parotid gland pathology, further cohort studies are needed for a better understanding of their clinical and pathological behavior. **Keywords:** PAROTID GLAND TUMOR, EPIDEMIOLOGICAL STUDY, PATHOLOGY.

Parotid tumors are a heterogeneous group of tumors accounting for 85% of all salivary gland tumors, 2-6% of the head-neck tumors and about 1% of all tumors. Several studies have analyzed the epidemiology of salivary gland tumors but only a few have investigated the parotid tumor pathology. Most of them were conducted on less than 300 cases. In a study by Ali et al. (1) on the characteristics of parotid tumors in Pakistan population besides demographic and histopathological data the authors also described the clinical complaints, fine needle aspiration cytology results and complications. In another study, Moeller et al. (2) considered also the imaging findings. A study from China conducted by Chan et al. (3) described the demographic data and the management and complications of parotid tumors. In another study the epidemiological data were completed by a survival analysis (4). In the Romanian literature there are a
few studies about salivary gland pathology, some of them being case reports (5), some describing only pleomorphic adenoma of parotid gland (6), but there are no epidemiological studies.

The aim of this study was a descriptive analysis of the epidemiological and morphological aspects of benign and malignant tumors treated at the Oral and Maxillofacial Surgery Clinic and diagnosed in Pathology Department of “Sf. Spiridon” Emergency Hospital Iasi, Romania during the period 2009-2013.

MATERIAL AND METHODS

In present study were analyzed 162 tumors, of which 116 (67.46%) benign tumors and 46 (32.53%) malignant tumors.

The histologic diagnosis of the patients with parotid tumors admitted during 2009-2013 to the Department of Oral and Maxillofacial Surgery, “Sf. Spiridon” University Emergency Hospital, Iasi was reevaluated. After fixation in buffered formalin 10%, neutral pH, biopsy specimens were processed using paraffin embedding and hematoxylin-eosin, van Gieson, Alcian blue and PAS staining methods. The age of the study patients ranged between 13 and 90 years. To describe the morphological pattern of parotid tumors we used the 2005 World Health Organization classification (7).

Our analysis was based on demographic data (gender, place of residence, age), clinical data (location of the parotid gland, size of the tumor, type of surgical procedure) and histopathological type of tumor (benign/malignant). All patients with missing data on one or more variables used in the study were excluded.

For univariate analysis we used Mann-Whitney U to compare average age and chi square test to compare gender, place of residence, tumor location, size and type of surgical procedure. For multivariate analysis we used Multiple Logistic Regression considering as variables the gender, age (≤ 50 years/ > 50 years), place of residence (urban/rural), parotid gland location (left/right), tumor size (≤ 4 cm/ > 4 cm), and type of surgical intervention (superficial parotidectomy/total parotidectomy/extended parotidectomy). Data were considered significant at p <0.05.

RESULTS

The gender distribution showed a slight male predominance (55%) (fig.1A). No statistically significant gender differences were found between benign and malignant tumors (p=0.339). Most patients with benign tumors were living in urban areas (58.62%) and most patients with malignant tumors in rural areas (63.04%) (fig. 1B).

The difference between the two groups was statistically significant (p=0.012). There was a slight predominance of right parotid location of benign tumors (52.58%) and a slight predominance on left parotid location of malignant tumors (53.33%). The difference was not statistically significant (p=0.163). The mean size of malignant tumors was greater for (4.36 ± 3.14 cm) than that of benign tumors (3.49 ± 1.8 cm). The difference was statistically significant (p=0.025) (tab. I).

The age of patients with benign tumors ranged between 13 and 86 years, mean age 50.3 ± 15.81 years, and of the patients with malignant tumors between 20 and 90 years, mean age 67.17 ± 14.62 years. There were 2 cases under the age of 18 years, both with pleomorphic adenoma (tab. I). Age group distribution showed that most of benign tumors occurred in patients aged 41-70 years while malignant tumors were more
Epidemiology and pathology of parotid tumors – five-year retrospective study

frequent in patients aged between 61 and 80 years (fig.2). Age group difference between benign and malignant tumors was statistically significant (p=0.025) (tab. I).

**Fig. 1** Distribution of patients according to: A. Gender. B. Place of residence

**Fig. 2.** Age group distribution of benign and malignant tumors
TABLE I
Comparative study of benign and malignant tumors

<table>
<thead>
<tr>
<th></th>
<th>Results</th>
<th>Benign tumors</th>
<th>Malignant tumors</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean ± SD, y</td>
<td>50.3±15.81</td>
<td>67.17±14.62</td>
<td>S (p=0.039) (Mann-Whitney U test)</td>
</tr>
<tr>
<td></td>
<td>Min-Max, y</td>
<td>13-86</td>
<td>20-91</td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Location</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Left parotid No (%)</td>
<td>55 (47.41%)</td>
<td>24 (53.33%)</td>
<td>NS (p=0.163) (χ² test)</td>
</tr>
<tr>
<td></td>
<td>Right parotid No (%)</td>
<td>61 (52.58%)</td>
<td>21 (46.66%)</td>
<td></td>
</tr>
<tr>
<td>Size</td>
<td>Mean ± SD, cm</td>
<td>3.49 ± 1.8</td>
<td>4.36 ± 3.14</td>
<td>S (p=0.025) (χ² test)</td>
</tr>
<tr>
<td></td>
<td>under 4 cm</td>
<td>82 (70.69%)</td>
<td>24 (52.17%)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>over 4 cm</td>
<td>34 (29.31%)</td>
<td>22 (47.83%)</td>
<td></td>
</tr>
<tr>
<td>Surgery type</td>
<td>Superficial parotidectomy No (%)</td>
<td>68 (72.34%)</td>
<td>13 (38.23%)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total parotidectomy No (%)</td>
<td>4 (4.25%)</td>
<td>13 (38.23%)</td>
<td>NS (p=0.355) (χ² test)</td>
</tr>
<tr>
<td></td>
<td>Extended parotidectomy No (%)</td>
<td>22 (23.43%)</td>
<td>8 (23.53%)</td>
<td></td>
</tr>
</tbody>
</table>

The multivariate analysis indicated a statistically significant difference between benign and malignant tumors in terms of age and place of residence and a significant difference between rural and urban area in terms of histopathological diagnosis.

Of the benign tumors the most common was pleomorphic adenoma (70%), followed by Warthin tumor (21%), and basal cell adenoma (7%) (fig. 3A).

In our study the most common primary malignant tumors were represented by acinic cell carcinoma (21%), squamous cell carcinoma (17%), adenoid cystic carcinoma (12%), adenocarcinoma NOS (12%), and carcinoma ex pleomorphic adenoma (12%) (fig. 3B).

In the present study the analysis of risk factors showed that gender, age and place of residence may influence the histologic type of parotid tumors. The risk of developing pleomorphic adenoma was 7.40 times higher in females than in males (OR=7.401, CI=2.76-19.82, p<0.0001) and 4.08 times higher before the age of 50 years (OR=4.085, CI=1.64-10.13, p=0.0016). The risk of developing Warthin tumor was 16.47 times higher in males than in females (OR=16.47, CI=3.65-74.17, p<0.0001) and 3.58 times higher in urban patients than in rural patients (OR=3.583, CI=1.23-10.37, p=0.01). The risk of developing cancer was 7.14 times higher in patients older than 50 years than in those under 50 years (OR=7.141, CI=2.63-19.36, p=0<0.0001) and 2.41 times higher in rural patients than urban patients (OR=2.416, CI=1.19-4.88, p=0.012). Diabetes, obesity and systemic hypertension proved not to be important risk factors in our study. Due to incomplete data regarding the smoking habit this parameter could not be included in the study.
DISCUSSION

There are many epidemiological studies regarding the salivary gland tumors, some of them the importance of parotid tumor pathology. Most of the studies are conducted on a limited number of cases and there are only few cohort series. Our paper presents the demographic data of the patients with parotid tumors diagnosed during the period 2009-2013 at the Oral and Maxillofacial Surgery Clinic and Pathology Department of the Iasi “Sf. Spiridon” University Emergency Hospital.

We found a male predominance which is consistent with other studies (1, 3, 4) but not with the study by Altinay et al. (8). Although, age distribution was similar with other studies (4, 8) in our patients mean age was a little higher. Unlike other reports (4) the majority of benign tumors were on the right side (52.58%) while most malignant tumors were on the left side (53.33%). The mean size of tumors in our study (3.49 cm for benign tumors and 4.36 cm for malignant tumors) was slightly greater than in other reports (3).

Using univariate and a multivariate analysis we found a predominance of benign tumor in urban areas (58.62%) and of malignant tumor in rural areas (63.04%), the difference being statistically significant (p=0.012). The lower utilization of medical services by the rural people could depend on their medical education, their trust in alternative medicine and a lower availability of medical services. This could be the cause for the delayed treatment of benign tumors with an increased risk of malignant transformation in these cases. Our study demonstrated that the risk factors were
represented by female gender and age less than 50 years for pleomorphic adenoma, male gender and urban residence for Warthin tumor, age over 50 years and rural residence for malignant tumors.

In terms of histopathological diagnosis the incidence of benign and malignant tumors is different in the international reports due to the great variability of study population. According to other studies (9, 10) 71% of the parotid gland tumors were benign and 29% malignant ones. In the present pleomorphic adenoma was the most common benign tumor, followed by Warthin tumor study which is agreement with other studies (1, 3). In case of malignant tumors the epidemiological data differed. Despite the low incidence of malignant tumors, five histopathological subtypes are considered the most frequent (11, 12). Thus, in some studies the most common types were mucoepidermoid carcinoma and adenoid cystic carcinoma (9, 13-16). Fonseca et al. considered adenocarcinoma Not Otherwise Specified (NOS) as the most common malignancy (10). A study in Taiwan indicated acinar cell carcinoma and mucoepidermoid carcinoma as the most frequent malignancies (3). The fifth more frequent carcinoma is carcinoma ex pleomorphic adenoma (12). Unlike these studies in our study the most common malignant tumors were acinic cell carcinoma, squamocellular carcinoma and adenoid cystic carcinoma. In our study there was a statistically significant difference (p= 0.017) between rural and urban residence in terms of tumor histological type.

CONCLUSIONS

Our study demonstrates that the age under 50 years is a risk factor for benign tumors, while the age over 50 years for malignant tumors. The patients residing in rural areas have a higher risk to develop malignant tumors due to a low utilization of health services. Since in Romania there are few epidemiological data on parotid gland pathology, further cohort studies are needed for a better understanding of their clinical and pathological behavior.

REFERENCES

Epidemiology and pathology of parotid tumors – five-year retrospective study


---

**NEWS**

**RELATIONSHIP BETWEEN OBESITY AND ORAL DISEASES**

The aim of a study realized by a group of researchers from University of Benin, Nigeria was to determine the relationship between obesity and periodontal status and dental caries experience of a group of Nigerian dental patients. Participants were selected from patients attending dental outpatient clinics of the University of Benin Teaching Hospital, Benin City, Nigeria. Their weight and height were measured and body mass index (BMI) estimated in kg/m², gingival health assessed using bleeding on probing index, oral hygiene estimated using the simplified Oral Hygiene Index (OHI-S), periodontal health estimated using the Basic Periodontal Examination (BPE) and caries experience was estimated with the Decayed, Missing, Filled teeth (DMFT) index. A few participants (3.8%) were underweight, 52.6% fell within the normal BMI range, 28.2% pre-obese, 12.2% obese class I and 3.2% obese class II. The mean OHI-S score was 2.16 ± 1.13 among the overweight participants and 2.05 ± 1.13 among those who are not (P = 0.543). The mean DMFT score was 3.03 ± 4.25 among the overweight participants and 2.32 ± 3.01 among those who are not (P = 0.223). Sixty-five percent of participants with BPE score of 0, considered to signify periodontal health, had normal BMI while all the participants with the worst BPE score recorded belonged to the obese 1 group (P = 0.070). The binary logistic regression revealed that the likely predictor of gingival bleeding in the study is BMI between 35.0 and 39.9 (obese class 2) (P = 0.046, odds ratio = 0.07, 95% confidence interval = 0.01-0.96). It can be concluded that there was no statistically significant relationship between obesity and periodontal status and dental caries experience in the studied group of dental patients. Increased body mass index may however be a predictor of gingival bleeding (Sede MA, Ehizele AO. Relationship between obesity and oral diseases. *Niger J Clin Pract*, 2014; 17 (6) : 683-690)

*Irina Grădinaru*