Parotid glands tumours: overview of a 10-years experience with 282 patients, focusing on 231 benign epithelial neoplasms

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Abstract. – Salivary gland tumours are uncommon, representing less than 6% of head and neck neoplasm. Pleomorphic adenoma is the most common benign epithelial salivary gland neoplasm, comprising 50%-74% of all parotid tumours. It is followed by Warthin’s tumour (4-14%).

The authors retrospectively reviewed 282 eligible patients surgically treated for parotid gland tumours in the last 10 years, focusing on 231 benign epithelial neoplasms.

Clinical and diagnostic findings, surgical treatment and surgical outcome were discussed.

The diagnosis of a parotid gland neoplasm must be considered in any patient presenting with a lump near the mandible. Smoking habit is important in Warthin’s tumour pathogenesis. Fine needle aspiration citology (FNAC) can’t lead alone to histological diagnosis. Only surgery can give histological certainty of benignity, thus preventing malignant degeneration, lump infection or risk of size-dependent surgical complications. Conservative formal parotidectomy appears to be the treatment of choice. Tumour pseudopodia and capsule ruptures are recognised factors involved in pleomorphic adenoma recurrences but also tumour multicentricity might play an important role.

Key Words:
Parotid gland tumours, Smoking habit, Multicentricity, FNAC, Surgical treatment.

Introduction

Salivary gland tumours are uncommon, accounting for between 2 to 6.5 percent of all neoplasms of the head and neck. The age-standardized incidence rate of salivary gland malignant tumours in the Italian 1981 census population is of 1/100,000 per year in males and 0.8/100,000 per year in females. About 70% of all salivary gland tumours arise in the parotid gland and the great number of this are benign tumours, with an average prevalence of 75%-85% of all parotid lesions. Parotid glands can give rise to a wide variety of benign and malignant neoplasm because of their mixed array of cells and tissues.

The current largest and most detailed classifications of salivary gland tumours are the WHO Seifert and Sobin classification and the Ellis and Auclair Armed Forces Institute of Pathology (AFIP) classification.

Pleomorphic adenoma is considered as the most common benign salivary gland neoplasm, comprising 50%-74% of all parotid tumours. It is followed by Warthin’s tumour (4-14%). Approximately 90% of parotid tumours occur in the superficial lobe while the remaining 10% occur in the deep lobe, lying under to the facial nerve. If there is clinical evidence of bilateral parotid swelling, Warthin’s tumour should be suspected, being the most frequent synchronous or metachronous bilateral histological type.

Clinical history and physical exam is reported as giving adequate information to focus on a feasible diagnosis. If patient history and clinical exam only are inadequate, further investigation by Ultrasound (US), US-guided Fine-Needle Aspiration Cytology (FNAC), Magnetic Resonance Imaging (MRI) or by Computed Tomography (CT) might be required.

Anyway, in our experience, only surgery can give histological certainty of tumour nature and prevents long term malignant degeneration or lump infection or size-dependent facial nerve damage risk. Conservative parotidectomy is the most widely accepted surgical treatment for parotid tumours removal.

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We have retrospectively reviewed 282 eligible patients surgically treated for parotid tumours in the last 10 years. Epidemiology, clinic pathological findings and surgical outcome are hereby discussed in the lights of literature findings, focusing on 231 benign epithelial neoplasms.

**Materials and Methods**

During the 10-years period between January 1996 and January 2006, 282 consecutive patients with parotid tumours were surgically treated at the University of Rome “La Sapienza”, Department of Maxillo-Facial surgery. We collected 135 males and 147 females and patients ages ranged from 10 years to 85 years (median age: 49 years).

Definitive tumour presence and histotype was stated by histology in all cases. Histological findings (see Table I) were classified according to Ellis and Auclair AFIP tumours classification.

Data from medical records and archive materials were retrospectively reviewed focusing on patient’s age, sex, smoking habit, clinical features, FNAC findings, type of surgical procedure, definitive histology, surgical complications and recurrence rate.

Patients smoking more than 5 cigarettes per day for more than five years were considered as smokers and smoking history was compared with histological findings.

Data from FNAC results were collected and cytological results were compared with those of definitive histology to calculate the accuracy of this diagnostic procedure.

Data on tumour localization (superficial or deep parotid gland lobe) were obtained from CT and MRI results, when possible, otherwise from US results.

Data collected from CT, MRI and data from histological examination were used to evaluate the median parotid neoplasm diameter and the presence of macro and/or microscopic tumour multicentricity.

We also evaluate surgical approach performed for each patient, on the basis of tumour histology and tumour localization (conservative superficial parotidectomy, conservative total parotidectomy, radical superficial parotidectomy, radical total parotidectomy with or without neck dissection).

### Table I. 282 benign and malignant parotid glands neformations: our surgical series histological classification (1996-2006).

<table>
<thead>
<tr>
<th>231 benign epithelial neoplasms</th>
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<tbody>
<tr>
<td>172 Mixed tumours (pleomorphic adenoma)</td>
<td></td>
</tr>
<tr>
<td>56 Warthin’s tumours</td>
<td></td>
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<tr>
<td>3 Oncocytomas</td>
<td></td>
</tr>
<tr>
<td><strong>13 Non-neoplastic tumour-like conditions</strong></td>
<td></td>
</tr>
<tr>
<td>6 Benign lymphoepithelial lesions</td>
<td></td>
</tr>
<tr>
<td>4 Salivary cysts</td>
<td></td>
</tr>
<tr>
<td>2 Adenomatoid hyperplasia of mucous salivary glands</td>
<td></td>
</tr>
<tr>
<td>1 Inflammatory pseudotumour</td>
<td></td>
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<tr>
<td><strong>4 benign mesenchymal neoplasms</strong></td>
<td></td>
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<tr>
<td>4 Lipomas</td>
<td></td>
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<tr>
<td><strong>28 malignant epithelial neoplasms</strong></td>
<td></td>
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<tr>
<td>7 Mucoepidermoid carcinomas</td>
<td></td>
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<tr>
<td>7 Adenocarcinomas</td>
<td></td>
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<tr>
<td>4 Adenoid cystic carcinomas</td>
<td></td>
</tr>
<tr>
<td>2 Malignant mixed tumours (carcinoma ex mixed tumor)</td>
<td></td>
</tr>
<tr>
<td>2 Squamous cell carcinomas</td>
<td></td>
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<tr>
<td>2 Undifferentiated carcinomas</td>
<td></td>
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<tr>
<td>2 Myoepithelial carcinomas</td>
<td></td>
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<tr>
<td>1 Clear cell adenocarcinoma</td>
<td></td>
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<tr>
<td>1 Acinic cell adenocarcinoma</td>
<td></td>
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<tr>
<td><strong>6 malignant lymphomas</strong></td>
<td></td>
</tr>
<tr>
<td>3 Non-Hodgkin’s lymphomas</td>
<td></td>
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<tr>
<td>3 Hodgkin’s diseases</td>
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</tbody>
</table>

For each patient affected by a benign epithelial parotid gland neoplasm, we considered complications as listed in Table II. Our follow-up range was between 120 months and 24 months (median follow-up 60 months). Short-term follow-up and long-term outcome data were acquired either from comprehensive Department database or by patient consultation. Recurrence rate for benign epithelial parotid tumours was then calculated on the basis of this follow-up period.

**Results**

Over 282 eligible patients with a parotid neoplasm, as showed in Table I, definitive histology of 248 patients (88%) resulted as benign parotid tumours (231 patients resulted affected by benign
epithelial parotid neoplasms, 13 patients by non-neoplastic parotid tumour-like conditions, 4 patients resulted as having mesenchimal benign parotid neoplasms) whereas only 34 patients (12%) were affected by malignant tumours (28 patients were affected by malignant epithelial neoplasms and 6 patients by malignant lymphomas).

The more frequent benign histological type resulted pleomorphic adenoma (172 cases – 74.5%) followed by Warthin’s tumour (56 cases – 24.2%).

A multicentric tumour was diagnosed in 16 (7%) benign epithelial neoplasms whose 14 cases resulted as pleomorphic adenoma and only 2 cases resulted respectively as Warthin’s tumour and an oncocytoma.

The median benign parotid neoformations diameter was 26 mm, whereas the median diameter for malignant neoplasms was 32 mm.

Looking at the sex prevalence, we observed no significant differences (1:1) between parotid glands tumours as a whole (135 males and 147 females), otherwise there was a significant females prevalence (61.6%) in pleomorphic adenomas and a straight males prevalence (76.8%) in Warthin’s tumours.

The middle age of onset for patients affected by parotid neoplasms was 49 years as a whole. The middle age of onset for patients affected by benign parotid tumours was 47 years, while for patients affected by malignant parotid tumours was 60 years. Focusing on benign epithelial neoplasms, the age distribution curve showed a bimodal aspect: median age for pleomorphic adenoma was 42 years, while for Warthin’s patients the median age of onset was 58 years.

Concerning smoking habits, 44.5% of patients affected by pleomorphic adenoma were non-smokers, whereas 95% of patients affected by Warthin’s tumours were smokers (with a median of 26.4 cigarettes/day).

Retrospective review concerning our usage percentage of specific diagnostic instruments for parotid swelling assessment, showed a great prevalence of US (78.2%), followed by US-guided FNAC (54.4%); MRI and CT rate accounted respectively for 35.7% and for 30.6%.

We also compared US-guided FNAC results with those of definitive histology and we observed an high sensitivity in diagnosis of malignancy (94.6%) but a lower sensitivity (66.7%) in histotype diagnosis.

The more frequent benign epithelial neoplasms localization resulted in the superficial parotid lobe (90.5%) whereas a primary deep lobe parotid localization was more frequent for pleomorphic adenoma (11.7%) than for Warthin’s tumour (4.6%). We found a bilateral parotid swelling in 4 cases whose respectively 2 resulted as pleomorphic adenoma, one resulted as a Warthin’s tumour and the last one resulted a benign lymphoepithelial lesion.

We considered the average time interval between diagnosis and surgery for all parotid neoplasms, which resulted in 36 and 24 months respectively for benign and malignant tumours.

Concerning surgical treatment procedures for benign epithelial neoplasms: 81.5% of our patients underwent a conservative superficial parotidectomy whereas in 12.5% of cases a total conservative parotidectomy was carried out. In 6% of cases, surgical excision was considered as the treatment of choice. During a median follow-up period of 60 months, we observed complications in 11% of patients primarily treated for benign epithelial neoplasms (Table II) and a benign epithelial tumour recurrence rate of 1.9%. Definitive histology of such recurrences showed a pleomorphic adenoma in all cases.

### Discussion

Some authors stated that the only clinical evidence of a superficial lobe benign parotid neoplasm should lead to immediate surgical treat-
ment. Anamnesis and clinical examination resulted as helpful diagnostic tools. However, they did not give us critical informations. In fact, we found that in some cases tumour extended from the superficial to the deep parotid lobe, whereas in others, a clinically silent deep parotid lobe tumour was also present. Thus, we believe that imagining, particularly MRI gives crucial information for surgical planning and prognosis and we hope its use to be increased by clinicians.

In our series, pleomorphic adenoma was the most frequent histological type followed by Warthin’s tumour.

The average age of benign parotid tumours onset showed an interesting bimodal peak of incidence. The first peak resulted between the third and fourth decade of life, which is coincident with the median age of onset for pleomorphic adenoma. The second peak, congruent with the median age of onset for Warthin’s tumour, stands between the fifth and sixth decade of life. The higher Warthin’s tumour sub-group median age (58 years) may suggest that a chronic insult, such as smoking habits, might play a role in the pathogenesis of this histotype.

To the objective, in our case reports, the average percentage of Warthin’s heavy smokers patients (97% smoking more than 20 cigarettes per day) resulted considerably higher if compared with pleomorphic adenoma smoker patients (44%). This apparently would confirm international findings on the role of smoking as an important risk factor in Warthin’s tumour pathogenesis. Our series even showed that Warthin’s tumour is more prevalent in male patients (76.8%). On this basis, we might expect a progressive raise in female sex prevalence as smoking habit is constantly increasing among female population.

The median interval observed between diagnosis and surgery for all benign epithelial parotid neoplasm accounted for 36 months. This means that more care should be given to immediate surgery even for benign parotid masses by general practitioners.

The choice of the appropriate MRI is the best diagnostic tool to determine exact parotid gland tumour localization and the presence of macroscopic multicentricity. Pre-operative FNAC showed an high sensitivity for diagnosis of malignancy but a low one for histotype diagnosis. FNAC thus, is to be used by clinicians to avoid misdiagnosis in the presence of a parotid swelling, especially if it’s suspected to be a malignant tumour; but its preoperative use is not very useful if we want only to know the specific histological type of a benign or a malignant tumour.

In our case load we observed an average percentage of local recurrence rate of about 1.9% of the total amount of patients surgically treated for a primary benign epithelial parotid neoplasm. We observed recurrences only by pleomorphic adenomas and an high percentage of these (8%) were primary multicentric tumours, as showed by definitive histological examination. Multicentricity is still a factor to be considered (in addiction to pseudopodia and capsule rupture) in the pathogenesis of pleomorphic adenomas recurrences.

We recorded post-operative surgical complications (11% of surgically treated benign epithelial neoplasms) but we noted a considerably higher rate (25%) of post-operative complications in patients secondary treated for local recurrences. Thus it is important to perform an adequate surgical procedure (like formal superficial or total parotidectomy) not only to avoid recurrences but also their surgical complications.

Conclusions

The diagnosis of parotid gland neoplasm must be considered in any patient presenting with a lump near the mandible. Pleomorphic adenoma and Warthin’s tumour are the most frequent histological types. We can confirm the pathogenetical role of cigarette smoking for Warthin’s tumour, as reported by many authors.

Formal parotidectomy (conservative superficial or deep lobe parotidectomy) appears to be the treatment of choice, when feasible and even if performed by multioperators, leads to either a decreased risk of recurrences due to intra-operative neoplastic cells spreading, tumour pseudopodia and multicentricity, or a lower rate in post-operative permanent complications. The most dreaded complications of surgical treatment, include facial nerve dysfunctions, but also Frey’s syndrome and local recurrences. Some authors observed that almost all recurrences were multicentric. Primary multicentricity might influence recurrence rate; so treatment and radical excision often becomes challenging, probably not only for intrasurgical ruptures or the presence of tumour pseudopodia penetrating throughout adjacent normal glandular.
Finally, even if a benign parotid tumour has been detected by both imaging and FNAC or biopsy, appropriate surgery is always recommended more than clinical observation. Clinical and radiological findings might result in some cases discordant with definitive diagnosis due to the variable clinical presentation and the histological heterogeneity of parotid tumours. Only surgery can give histological certainty of benignity and definitively prevents long term malignant degeneration or lump infection or risk of size-dependent surgical complications.

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