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Farah C, Ghorra C, Nassif C, Tabchy B, Haddad A. Parotid tumors : Is surgery always the only way ? J Med Liban 2015 ; 63 (4) : 179-184.

ABSTRACT • Aim of the study : To analyze the characteristics and management of parotid tumors in a tertiary care center. **Study design :** Retrospective cohort study. **Methods :** All cases of parotid tumors (or masses) in our department between Jan 1, 1999 and December 31st, 2012 were studied. Demographic data, clinical characteristics, histopathology and management were analyzed. We also evaluated the diagnostic value of fine needle aspiration cytology (FNAC) in our center. **Results:** Of the 216 parotid tumors, 164 underwent parotidectomy and 52 were not managed surgically; 73.1% had a benign tumor (36.6% had Warthin's tumor) and 16.7% had a malignant one. In our center, FNAC was found to have a sensitivity for reporting malignancy of 71.4% and a specificity to rule in malignancy of 100%. **Conclusion :** In our series, Warthin's tumor was the most frequent mass probably related to the high tobacco use. The prevalence of malignant tumors was relatively high in our series. Primary malignant tumors and pleomorphic adenomas should always be treated surgically, however, lymphomas, metastatic and benign inflammatory masses and cases of Warthin's tumors could be managed nonsurgically.

Keywords : benign parotid tumors, malignant parotid tumors, parotidectomy, nonsurgical management, fine needle aspiration cytology

INTRODUCTION

Salivary gland neoplasms are rare tumors and account for 2-3% of all head and neck tumors. About 70% to 85% of all salivary gland tumors are located in the parotid gland [1-5]. The majority (80%) of parotid masses are benign neoplasms with pleomorphic adenoma being the most common type [1,3,5]. Parotidectomy is a common surgical procedure for parotid tumors while some tumors can be nonsurgically managed such as inflammatory masses, Warthin's tumors that are not esthetically disturbing and some malignant tumors (lymphoma and metastasis to the parotid gland).

Due to the possibility of major postoperative complications such as facial nerve paresis or paralysis that can

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RÉSUMÉ • Objectif de l'étude : Analyser les caractéristiques des tumeurs parotidiennes et leur prise en charge dans un centre de soins tertiaires. **Type d'étude :** Étude de cohorte rétrospective. **Matériels et méthodes :** Tous les cas de tumeurs (ou masses) parotidiennes traités dans notre département entre le 1/1/1999 et le 31/12/2012, ont été inclus dans cette étude. Les données démographiques, les caractéristiques cliniques, ainsi que les résultats histopathologiques et le type de prise en charge dans chaque cas ont été analysés. En plus, la valeur diagnostique de la cytoponction à l'aiguille fine réalisée dans notre centre a été évaluée. **Résultats :** Parmi les 216 cas de tumeurs parotidiennes inclus dans l'étude, 164 ont bénéficié d'une parotidectomie et 52 ont été traités non chirurgicalement ; 73,1% avaient une tumeur bénigne (tumeur de Warthin : 36,6%) et 16,7% une tumeur maligne. Dans notre centre, la cytoponction à l'aiguille fine s'est révélée avoir une sensibilité pour rapporter une tumeur maligne de 71,4% et une spécificité d'éliminer la présence d'une tumeur maligne de 100%. **Conclusion :** Dans notre série, la tumeur de Warthin a été la plus fréquente probablement en raison du taux élevé de tabagisme. La prévalence de tumeurs malignes était relativement élevée. Les tumeurs malignes primaires de la parotide et les adénomes pléomorphes doivent toujours être traités chirurgicalement. Par contre, les lymphomes, les métastases et les masses inflammatoires bénignes ainsi que certains cas de tumeur de Warthin peuvent être traités médicalement.

occur in 10-30% of cases [6], especially with regard to the treatment of benign tumors, the adequate extent of surgery is always the question.

The majority of the studies in the literature consider surgery as the main treatment option in the management of parotid tumors. In our study, we presented two groups of patients having a parotid mass; one managed surgically and the other consisting of patients who didn't undergo surgery in our center.

The objective of the study was to analyze the profile and the management options of parotid tumors, and the diagnostic value of fine needle aspiration cytology (FNAC) in our center.

METHODS

The study protocol was reviewed and accepted by the ethics committee of Hôtel-Dieu de France hospital.

We reviewed retrospectively the medical and pathology records of all the patients who presented with a

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parotid mass to the Otolaryngology Department in Hôtel-Dieu de France Hospital, Beirut, Lebanon, a tertiary care center, between January 1st, 1999 and December 31st, 2012.

These patients were divided into two groups in relation with the different management options. We had a group of tumors managed surgically and another group not managed surgically.

For the two groups we reviewed the medical and pathology records and noted the age, sex, tobacco use, clinical signs and symptoms and their duration, diagnostic tests, cytology results (if present), and location of the parotid tumor. For the surgical group we also noted the date of the surgery, surgical technique, hospital stay, post-operative histopathology results, early and late complications and recurrence.

Our results regarding epidemiology, clinical characteristics, diagnostic tests, management and follow-up, were tabulated for each group using Excel sheets. For the surgically managed group, we also calculated the percentages of the different postoperative complications and recurrence rates. As for the types of tumors, we noted the overall percentages of benign and malignant ones and the specific distribution of the different types in each group.

Concerning the diagnostic value of FNAC in our center, we used a 2 x 2 table to calculate the sensitivity for reporting malignancy, the specificity to rule in malignancy, the positive predictive value (PPV), the negative predictive value (NPV) and the overall accuracy. These results were calculated in the group of patients who underwent a FNAC in our center preoperatively, comparing the cytology results with the final histopathology results. All the non-diagnostic cytology results were not included.

RESULTS

Patients

From January 1st, 1999 to December 31st, 2012, 215 patients complaining of a parotid mass presented to the Otolaryngology Department at Hôtel-Dieu de France hospital, a tertiary care center. One patient had a bilateral parotid mass that was managed in our center. Of the 216 parotid masses studied, 164 were managed surgically and 52 were not. In the study population, the age range was between 2 and 92 years with male sex predominance.

TABLE I
PATIENTS' BASELINE CHARACTERISTICS

	Management	
	Surgical group (n = 164)	Nonsurgical group (n = 52)
Mean age (years)	51.1	54.1
Sex ratio (M/F)	1.45	1.6
Tobacco use (%)	51.2	31*
Side: Right/Left	90/74	22/28 (2 unknown)

* 42 patients had medical records & tobacco use was noted for only 13 patients.

In the nonsurgically managed group, 10 of the 52 patients didn't have a medical record as outpatients but all of them had pathology records and only 13 patients of the 42 were noted to have tobacco use.

The patients' baseline characteristics of each group of parotid masses are detailed in Table I.

Clinical presentation

In our study, the most common clinical presentation in the two groups was the presence of a mass in the parotid region (100%).

In 23 patients of the nonsurgically managed group, the duration of symptoms was not noted. The mean duration of symptoms for the 19 remaining patients (with medical records) was 34.6 months. In the surgically managed group, the mean duration of symptoms was approximately 40 months. Table II shows the details related to clinical presentation in the two groups.

TABLE II
CLINICAL PRESENTATION

	Management	
	Surgical group (n = 164)	Nonsurgical group (n = 52) [only 42 had medical records]
Mean symptoms duration (months)	40	34.6 *
Mass	164 (100%)	42 (100%)
Recurrent swelling	1 (0.61%)	0
Pain	14 (8.5%)	2 (4.76%)
Facial weakness	9 (5.5%)	2 (4.76%)

*Only in 19 cases of the 42 with records, the symptoms duration was noted.

Management

Of the 164 surgically managed parotid tumors in 163 patients, 12 had surgeries elsewhere for the same tumor and were reoperated in our center for recurrence or incomplete resection. Four patients had bilateral parotid tumors including one that was operated in our center in the study time period and was included in the study. As of the other three patients: one was operated elsewhere, one was operated before 1999 in our center and the last one was not operated for the second tumor because he was diagnosed as having a lymphoma. The mean postoperative hospital stay was 1.5 days.

Three patients were readmitted for total parotidectomy after undergoing a superficial one and diagnosed as having a malignant tumor.

Seventy-three tumors had a preoperative pathology diagnosis; 71 underwent a FNAC (only 31 in our center) and 2 had a revision of a previous pathology diagnosis done elsewhere. Details related to other diagnostic tests are mentioned in Table III.

The most frequent surgical approach in our study was superficial parotidectomy (75%) followed by total (20.1%) and subtotal parotidectomy (4.3%) and one patient (0.6%) had an extensive mass that was managed by a debulking

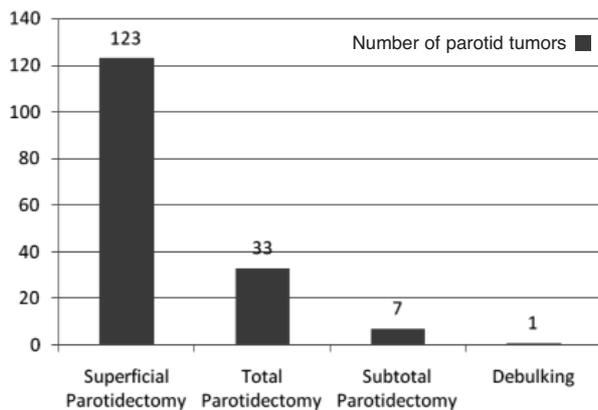


FIGURE 1. Surgical techniques

(Figure 1). Eighteen patients had a neck dissection, 10 cases of malignant tumors received an adjuvant radiation therapy, 1 an adjuvant chemotherapy and radiation therapy and 1 only chemotherapy. One patient, who was diagnosed with a metastasis of a papillary thyroid carcinoma, received postoperatively radioactive iodine therapy. All parotidectomies were performed under intraoperative facial nerve monitoring (or nerve stimulation).

As for the location of the tumors in the surgical group; 135 were in the superficial parotid lobe (82.3%) and 29 were in the deep lobe (17.7%).

In the nonsurgically managed group, 50 patients had a FNAC in our center and the other 2 patients had a revision of a previous pathology diagnosis done elsewhere. Three patients (2 pleomorphic adenomas and one atypical cytology) didn't return for surgery and the others were managed medically (inflammatory lesions, Warthin's tumors, lymphomas, metastases). Pathology details will be discussed in the next section.

Of the 42 patients who had medical records, 20 had only a cervical CT scan, 4 only a cervical MRI, 4 a CT scan and a MRI and one had a PET scan.

Pathology results

Of the 216 parotid tumors: 73.1% were benign with Warthin's tumor being the most frequent one (36.6%), 16.7% were malignant (4.2% lymphomas and 3.7% mucoepidermoid carcinomas), 5.1% consisted of an inflamma-

TABLE III

DIAGNOSTIC TESTS in the SURGICALLY MANAGED GROUP

	Surgically managed group (n = 164)
Fine needle aspiration cytology	71
Revision of pathology results	2
Cervical CT scan	110
Cervical MRI	42
Cervical ultrasound	15
PET scan	2

tory lesion and 5.1% had a normal or a nonspecific pathology result. The exact distribution of the pathology results for each group is detailed below (Table IV).

TABLE IV

PATHOLOGY RESULTS in the TWO GROUPS of PAROTID TUMORS

PATHOLOGY	Surgically managed group (%)	Nonsurgically managed group (%)
Benign	131 (79.9)	27 (51.9)
Pleomorphic adenoma	55 (33.54)	3 (5.8)
Warthin's tumor	58 (35.4)	21 (40.4)
Lymphoid tissue with follicular hyperplasia (Warthin's tumor v/s lymph node)	0	2 (3.8)
Basal cell adenoma	3 (1.83)	0
Lymphoepithelial cyst	3 (1.83)	0
Epidermoid cyst	3 (1.83)	1 (1.9)
Lipoma	2 (1.2)	0
Cavernous hemangioma	1 (0.61)	0
Desmoid/Fibromatosis	1 (0.61)	0
Sebaceous cyst	1 (0.61)	0
Sabaceous lymphadenoma	1 (0.61)	0
Oncocytic lipoadenoma	1 (0.61)	0
Myoepithelioma	1 (0.61)	0
Neurofibroma plexiform	1 (0.61)	0
Malignant	29 (17.7)	7 (13.5)
Mucoepidermoid carcinoma	6 (3.7)	2 (3.8)
Salivary duct carcinoma	2 (1.2)	0
Basal cell carcinoma	0	1 (1.9)
Carcinoma ex pleomorphic adenoma	2 (1.2)	0
Squamous cell carcinoma	3 (1.83)	0
Lymphoma	7 (4.3)	2 (3.8)
Cylindroma (adenoid cystic carcinoma)	2 (1.2)	0
Acinic cell carcinoma	2 (1.2)	0
Epithelial myoepithelial carcinoma	1 (0.61)	0
Rhabdomyosarcoma	2 (1.2)	0
Carcinomatous lymphangitis	1 (0.61)	0
Metastasis	1 (0.61)	2 (3.8)
Inflammatory	2 (1.2)	9 (17.3)
Non specific inflammation/granulation tissue	2 (1.2)	2 (3.8)
Abscess	0	5 (9.6)
Granuloma	0	2 (3.8)
No specific lesion/Normal tissue	2 (1.2)	9 (17.3)
TOTAL	164 (100)	52 (100)

Diagnostic value of FNAC

Thirty-one patients underwent a preoperative FNAC in our center; 4 results (13%) were not diagnostic and 27 were diagnostic. In order to determine the diagnostic value of FNAC in our center we took into consideration only the diagnostic results and we compared them with the final histopathology results. We had no false positive results and two false negative ones: one considered as a benign lymphoid inflammatory reaction on cytology was found to be a lymphoma, and one considered as pleomorphic adenoma was found to be a cylindroma (Table V). The sensitivity for reporting malignancy was 71.4 % and the specificity to rule in malignancy was 100%. PPV was 100%, NPV was 90.9% and the overall accuracy was 92.6%.

Follow-up

In the surgically managed group, of the 164 cases in this group, 27 were lost to follow-up and 137 were followed for a mean period of 18.8 months.

The most frequent postoperative complication was facial weakness in 26 cases (15.8%); 8 presented a total facial palsy and 18 a facial paresis. Seven of these cases had already preoperatively a facial weakness which persisted postoperatively and 17 (10.4%) had a newly onset nerve dysfunction. Two cases who presented with facial weakness preoperatively had a complete resolution of their symptoms in the immediate postoperative period. (Figure 2). Six patients of the 24 who had a persistent facial weakness were noted to have a total recovery during the follow-up.

The second most common complication was the salivary fistula found in 12 patients (8.8%) followed by a reported Frey's syndrome in 7 patients (5.1%) and a salivary collection in 5 patients (3.6%). The recurrence rate in this group was 2.2% (3 patients of the 137 cases who had a follow-up), where one patient who had a cavernous hemangioma had a recurrence 11 years later and was reoperated in our center, another one who had a pleomorphic adenoma had a recurrence 11 years later and didn't return for surgery and the last one, who had a nonspecific lesion on the pathology result, presented a

	Malignant histopathology	Benign histopathology	Total
Malignant FNAC	5	0	5
Benign FNAC	2	20	22
Total	7	20	27

*4 cytology results were not diagnostic FNAC: fine needle aspiration cytology

recurrence of his mass two years later and was operated by a plastic surgeon in our center with a final diagnosis of pleomorphic adenoma.

In the nonsurgically managed group, and of the 42 patients who had medical records, 17 were lost to follow-up and only 25 patients were followed for a mean period of 14.8 months. Other than the three patients who didn't return for surgery, all the cases of lymphoma and metastasis (Table IV) were referred to the oncology and radiation therapy departments. As for the two cases of mucoepidermoid carcinomas (Table IV), one didn't have a medical record and the other was lost to follow-up and the 3rd case of pleomorphic adenoma didn't have a medical record. The two cases diagnosed with a granulomatous disease were referred to the internal medicine department.

DISCUSSION

In our study, we reviewed 216 cases of parotid tumors over a 14-year period with two different management approaches in a tertiary care center. The majority of our patients were males with an age range of 2 to 92 years.

Parotid gland tumors typically present with a palpable mass, recurrent swelling, pain or facial nerve dysfunction. In our study, the most common clinical presentation was a slowly growing mass followed by pain and facial weakness, which is consistent with the literature results [4,7-8].

Parotid gland surgery nowadays is established as standard therapy throughout the world. Superficial and total parotidectomy are recognized as a standard procedure for removal of parotid gland tumors [9].

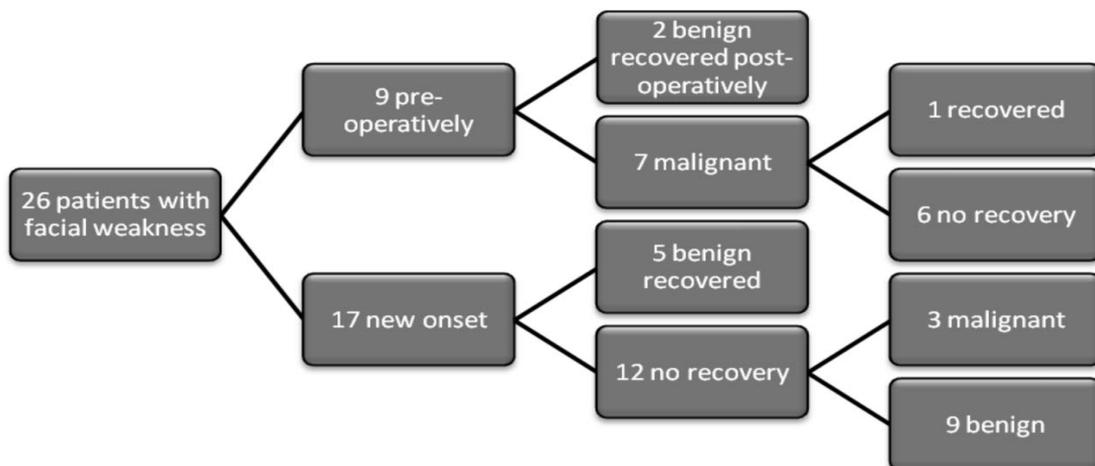


FIGURE 2. Facial weakness

In our surgical group, parotid tumors were most frequently found in the superficial lobe (82.3%) and the most frequent surgical approach was superficial parotidectomy (75%) followed by total parotidectomy in 20.1% of cases and subtotal parotidectomy in 4.3% of cases.

According to the literature, the preferred surgical management of benign parotid tumors confined to the superficial lobe is the partial superficial parotidectomy, while complete superficial parotidectomy or total parotidectomy were performed in cases where tumors were large or recurrent tumors with involvement of the deep lobe [1,3,9]. Partial superficial parotidectomy was found to reduce postoperative morbidity especially facial nerve dysfunction and Frey's syndrome [9].

As for the malignant tumors, management requires a combination of treatment modalities. According to the stage and grade of the tumor, we have a choice of parotidectomy alone if the tumor was in an early stage and a low grade or parotidectomy plus adjuvant radiation therapy in the early stage and high grade or parotidectomy plus neck dissection and adjuvant radiation therapy in the advanced stages [1]. In our study, malignant tumors were managed according to the stage and grade of the tumor with combination of treatment modalities.

In the group of patients who were not managed surgically, the majority had Warthin's tumor (40.4%) that was not esthetically disturbing and the others were diagnosed of having lymphomas, metastases and inflammatory lesions that were better managed medically. Six patients should have had a surgical treatment (3 had primary malignant tumors and 3 had pleomorphic adenomas) but 3 of them didn't return for surgery and the other 3 were lost to follow-up.

Although pleomorphic adenoma of the parotid gland is considered as a benign disease, it should be managed surgically because of the possibility of malignant transformation (carcinoma ex pleomorphic adenoma) and distant metastases [10].

In a review of the literature, we found that most of the parotid tumors were benign accounting for approximately 60.6 to 80% with pleomorphic adenoma being the most frequent one followed by Warthin's tumor [1,3,5]. Twelve to seventeen percent of the tumors were malignant [11] with mucoepidermoid carcinoma being the most frequent (3-4% of all tumors) [1,3,7,12]. Lymphoma was reported to be found in 1 to 5% of parotid tumors [13-14]. In our study, the results of benign tumors were consistent with the literature (79.9% in the surgical group) but we have found that Warthin's tumor was the most frequent tumor even in the surgically managed group (35.4%). This result is probably related to high tobacco use (51.2%) and male predominance in this group, as it was shown by Cardoso *et al.* [15]. As for the malignant tumors, we have found a number in the high reported ranges (17.7%) in the surgical group with a slight predominance of lymphoma (4.3% of all the tumors and 24% of the malignant tumors in the surgical group) over mucoepidermoid carcinoma (3.7%)

but still consistent with the literature ranges.

FNAC is considered by many authors as a safe and accurate diagnostic test that helps the surgeon in his management plan. Throughout the literature, FNAC is found to have a sensitivity for reporting malignancy of 64-99% and a high specificity to rule in malignancy of 96.3-100% and an overall accuracy of 81-98% [1,3,16-17]. In our series, 31 patients had a preoperative FNAC in our center with 13% of nondiagnostic results. The sensitivity was 71.4% but the specificity was found to be 100% (no false positive results) and the overall diagnostic accuracy was 92.6%. In our center, FNAC can be considered as a reliable tool to rule in malignancy and to help the surgeon in his management plan.

Although FNAC is not reliable to diagnose lymphoma, it could guide the surgeon, when finding lymphoid cells in the specimen, toward nonradical management of these tumors (a biopsy instead of a parotidectomy).

Parotidectomy carries the risk of postoperative complications affecting the patient's quality of life.

Facial nerve dysfunction is considered as the major and the most frequent complication found transiently in 10-68% of cases and permanently in 0-19% of cases [9,18]. In our experience it was encountered in 15.8% of cases with only 10.4% of newly onset postoperative nerve dysfunction and 11.6% with permanent dysfunction over the follow-up period.

Frey's syndrome is always underestimated and is usually noted if the patient complains. The reported Frey's syndrome in the literature accounts for 2 to 96% [9,19]. In our series, we had only 5.1% of Frey's syndrome reported by the patients.

Salivary fistula (8.8%) and salivary collection (3.6%) were also found in our series and were consistent with the literature results [9].

The use of a more conservative surgery especially for benign tumors and intraoperative monitoring (or stimulation) of facial nerve, in our experience and in the literature [20], helped us reduce the risk of postoperative complications especially nerve dysfunction.

In our study, we had a low recurrence rate (2.2%) with no malignant tumor recurrence in a mean follow-up period of 18.8 months which is consistent with the published rates (0-12%) depending on extent of surgery and tumor histology [9], and even in some studies, 40 to 45% recurrence rates were noted for benign and malignant tumors [1,5,21].

Our study had some limitations regarding its design (retrospective) carrying the problem of information collection from nonstandardized medical records. We tried to limit the effect of this bias by collecting each patient's information from three different sources; the hospital medical records, the private clinics medical records and the pathology records. On another hand, in our series, surgeries were mainly performed by two experienced head and neck surgeons but the fact that all of them were made under facial nerve monitoring and in merely the same surgical techniques according to standardized indications, reduced the surgical technique-related bias.

CONCLUSION

Parotid tumors are rare neoplasms with a predominance of benign over malignant ones. In our series, we found Warthin's tumor to be the most frequent tumor in the two groups related most probably to high tobacco use and male sex predominance. Malignant tumors were found to be in the high reported ranges.

In our experience, parotid tumors were managed surgically or nonsurgically according to the tumor's type and patient's preferences. The use of a surgical approach adapted to the tumor's type and extent and the use of intraoperative facial nerve monitoring have shown a reduced risk of postoperative complications and recurrence rate.

In our center, FNAC was found to be an effective tool in the diagnosis and treatment planning of parotid tumors and should be more frequently performed in order to reduce non necessary radical treatments.

Although we tend to think of primary malignant neoplasms in the context of a parotid gland mass, which should be treated radically, we should keep in mind the possibility of having a lymphoma to guide our management toward a simple biopsy instead of a parotidectomy.

Moreover, benign inflammatory masses or metastatic masses in the parotid gland should be treated medically by a multidisciplinary team.

Finally, we should also consider a nonsurgical management of some cases of Whartin's tumor especially in elderly patients having comorbidities and with no esthetical disturbance in order to avoid anesthetic and surgical risks in this special population.

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