

Original paper

Surgical Outcome of Parotid Gland Tumours: An experience from two institutions in Iraq

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Abstract

Background: Approximately 80% of salivary gland tumours occur in the parotid gland. Of these, approximately 75- 80% are benign. Physical examination is the first diagnostic tool. Ultrasonography, CT and/or MRI are useful complementary studies for correct surgical planning. Fine-needle aspiration cytology (FNAC) is also indicated by some authors.

Objectives: To analyze the different types of parotid gland tumours, the modalities of surgical treatments and their complications, and the role of FNAC.

Methods: Data of 45 patients who were treated for parotid gland lesions, were analyzed retrospectively. FNAC was performed in 31 patients and concordance between FNAC and final histological diagnosis were assessed.

Results: Forty-five patients involved in this study (mean age 36.6 years); there was a female gender predominance. Most of the cases were benign. Pleomorphic adenoma was the most common benign tumour while mucoepidermoid carcinoma was the most common tumour in the malignant group. All tumours were localized in the superficial lobe. Most of our patients underwent a conservative superficial parotidectomy. FNAC was performed in 31 patients; there was 87% concordance between FNAC and final histological diagnosis. Sensitivity and specificity rates were 75% and 100% respectively and diagnostic accuracy was 97%.

Conclusions: The diagnosis of parotid gland neoplasm must be considered in any patient presenting with a mass near the mandible. Pleomorphic adenoma and Warthin's tumour were the most frequent histological types. Superficial parotidectomy appears to be the treatment of choice. Preoperative FNAC plays an important role in the accurate diagnosis of parotid tumors. Surgery was the only tool for definite diagnosis and definitely prevents long term malignant degeneration.

Keywords: Parotid gland tumours, FNAC, pleomorphic adenoma, parotidectomy.

Introduction

Salivary cancers account for approximately 3% of all head and neck malignancies diagnosed in the United States each year; most of these are located in the parotid glands⁽¹⁾. Approximately 80% of salivary gland tumours occur in the parotid gland. Of these, approximately 75- 80% are benign. Most benign parotid tumours present as a slow growing, painless masses often in the tail of parotid gland. In the presence of a parotid mass, physical examination is the first diagnostic tool, since, in most cases it guides the clinician

in the right direction (benign versus malignant). Ultrasonography (US) is a low-cost modality with high sensitivity in detecting masses in the superficial lobe of the parotid gland. Its inability to show part of the deeper parotid lobe is overcome by computerized tomography (CT) and/or magnetic resonance imaging (MRI) which can be particularly useful, as complementary studies, for correct surgical planning. Fine-needle aspiration cytology (FNAC) is also indicated by some authors⁽²⁻⁴⁾. Nevertheless, none of these tools

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provide definitive information regarding the nature and the precise histology of a parotid mass and, furthermore open biopsy of a parotid mass is not recommended due to the risk of seeding in the case of solid malignancy. Therefore, what usually occurs in clinical practice is that most parotid masses are operated upon in order to obtain the final histological diagnosis. Obviously, lumpectomy must be avoided whenever possible and an oncologically safe surgical approach, involving at least the superficial lobe of the parotid, should always be performed: this is true also in cases of a clinically benign lesion.⁽⁵⁾ Ultrasound is useful to detect the extent of the mass, to find any cystic changes, and to detect any lymph node enlargement. CT scan and MRI are helpful in suspicious cases and to rule out soft tissue or bony involvement^(6,7). Surgical resection is the treatment modality of choice for tumours arising from salivary glands, whether benign or malignant. However, there is some controversy about the extent of surgery to be performed for benign tumours of the parotid.⁽⁸⁾ Once the poor performance of enucleation has been established, the most common surgical procedure for tumours located in the superficial lobe of the parotid gland is to perform a superficial parotidectomy, lateral or suprafacial. Currently, many authors prefer the partial superficial parotidectomy, or even extracapsular dissections to produce less morbidity with similar rate of recurrence.⁽⁹⁻¹¹⁾

Patients and Methods

A retrospective study was carried out on 45 consecutive patients with parotid swelling at Al-Hussain Teaching Hospital, Karbala and Alzahra Teaching Hospital, Kut between 2007 to 2014 focusing on patient's age, sex, clinical features, FNAC findings, type of surgical procedure, definitive histology, surgical complications and

recurrence rate. Data from FNAC results were collected and cytological results were compared with those of definitive histology to calculate the sensitivity, specificity, and accuracy of this diagnostic procedure. FNAC was only performed at our pathology department in Al-Hussain Teaching Hospital using a 22-gauge needle attached to a 10 mL syringe holder by a free hand technique. A minimum of two needle passes were made in each case. The specimens were expelled onto two or three slides, and thin smears were prepared between two slides and immediately fixed. The slides were generally stained with haematoxylin and eosin (H&E). None of the FNAC was carried out with ultrasonography. We classified our FNAC results after comparing them with the final surgical histology into the following categories: true-negative (correct diagnosis of absence of malignancy), true-positive (correct diagnosis of presence of malignancy), false-negative (incorrect diagnosis of absence of malignancy), and false-positive (incorrect diagnosis of presence of malignancy). As surgical complications we included: postoperative haemorrhage/haematoma, necrosis or wound dehiscence, fever or wound infection, sialocele, Frey's syndrome and facial paresis or paralysis.

Results

The data of 45 patients presented with parotid swelling were collected, there were 21 (47%) males and 24 (53%) females patients (M/F ratio 1:1.1). The age range was 7 to 76 years with a mean age of 36.6 years (Table 1). In 23 patients the swellings were on the right side (51%), and in 22 patients the swellings were on the left side (49%). There were 41 (91%) benign lesions, while 4 tumours (9%) were malignant. The final histological diagnosis of the included cases are listed in table 2. Pleomorphic adenoma was the most common benign tumour (67%) followed by Warthin's tumour (7%) while

mucoepidermoid carcinoma was the most common malignant one (7%). There was a predominance of male gender for malignancy and females for benign neoplasms. In cases of benign tumours, the clinical presentation was a swelling of the gland, slowly growing or apparently stable in dimensions. In cases of malignancy, the clinical presentation was an asymptomatic parotid mass sometime associated with pain. All tumours were localized in the superficial lobe, only five cases extended to the deep lobe (3 pleomorphic adenoma, 1 lymphangioma, and 1 lipoma). Regarding the surgical treatment approach: 39 cases (87%) underwent a conservative superficial parotidectomy, 4 (9%) patients underwent total conservative parotidectomy (pleomorphic adenoma, n=3; lymphangioma, n=1) one patient underwent a radical parotidectomy due to recurrent pleomorphic adenoma (2%), and one patient with dermoid cyst underwent enucleation of the cyst (2%). Early surgical complications are similar in both benign and malignant lesions: no postoperative bleeding within 36 hours after parotidectomy, no haematoma,

infection, and skin necrosis; there were two cases of sialoceles (which is a self-limiting problem); and four cases of facial nerve weakness (that improved within two weeks). The long-term sequelae, in our study, was as the following: auricular anesthesia due to section of the greater auricular nerve (n=4), Frey 's syndrome (n=2), and cosmetic deformities with dip at operative site (n=6) table 3. One case with radical parotidectomy for recurrent pleomorphic adenoma came three years later with adenocarcinoma of external auditory meatus. There was no case with recurrence until writing of this study.

Fine needle aspiration cytology was performed in 31 patients, in Al-Hussian Teaching Hospital and not done in 14 patients, in Alzahra Teaching Hospital, the cytological diagnosis in this series is reported in table 4. There was an overall of eighty-seven percent (27/31) concordance between FNAC and final histological diagnosis. The cytological diagnosis was true-positive in 3 (9.6%) cases and true-negative in 27 (87%) cases.

Table 1. Age distribution

Benign Age (years)				Malignant		
	Male	Female	total	Male	Female	Total
1-10	---	2	2	----	----	---
11-20	2	2	4	----	----	---
21-30	3	9	12	1	----	1
31-40	4	5	9	1	----	1
41-50	4	4	8	---	----	---
51-60	4	1	5	1	----	1
61-70	---	1	1	---	----	---
71-80	---	---	---	1	----	1
Total	17	24	41	4		4

Table 2 Histological diagnosis

Pleomorphic adenoma	30
Warthin's tumour	3
Lymphoepithelial cyst	2
Lipoma	2
Sialadenitis	1
Lymphangioma	1
Tuberculosis (T.B)	1
Dermoid cyst	1
Mucoepidermoid carcinoma	3
Malignant melanoma	1
Total	45

All true-positive neoplasms and 23 of the 27 (85%) of the true-negative benign lesions were determined as an accurate results (Table 5 and 6). There were no false positive case and only one false

negative case. According to formulas (Weinberger 1992)⁽¹²⁾, the calculated sensitivity and specificity rates were 75% and 100% respectively, and the diagnostic accuracy was 97%.

Table 3. Surgical Complications

Hemorrhage	0	Facial nerve weakness	4
Haematoma	0	Frey 's syndrome	2
Infection	0	Auricular anesthesia	4
Skin necrosis	0	Cosmetic deformities	6
Sialocele	2		
Total			18

Table 4 Cytological diagnosis

Lesion	No. of cases	Percentage
Pleomorphic adenoma	17	55%
Lipoma	2	6.4%
Lymphoepithelial cyst	2	6.4%
Warthin's Tumour	1	3.2%
Salivary gland cystic tumour	1	3.2%
Retention salivary ductal cyst	1	3.2%
Fibroadenoma	1	3.2%
Lymphangioma	1	3.2%
Tuberculosis (T.B)	1	3.2%
Dermoid cyst	1	3.2%
Mucoepidermoid tumour	2	6.4%
Melanoma	1	3.2%
Total	31	100%

Table 5. True-positive with accurate and inaccurate results n = 3

True positive (n = 3)	Accurate (n = 3)	Inaccurate (n = 0)
Cytologic diagnosis	Histologic diagnosis	
2 Mucoepidermoid	2 Mucoepidermoid	
1 Melanoma	1 Melanoma	

Table 6. True-negative with accurate and inaccurate results n = 27

True negative (n = 27)	Accurate (n = 24)	Inaccurate (n = 3)
Cytologic diagnosis	Histologic diagnosis	Cytologic diagnosis
16 Pleomorphic adenoma	16 Pleomorphic adenoma	1 Pleomorphic adenoma
1 Warthin's tumour	1 Warthin's tumour	1 Salivary gland cystic tumour
2 Lipoma	2 Lipoma	1 Fibroadenoma
2 Lymphoepithelial cyst	2 Lymphoepithelial cyst	
1 Lymphangioma	1 Lymphangioma	
1 Tuberculosis (T.B)	1 Tuberculosis (T.B)	
1 Dermoid cyst	1 Dermoid cyst	
		1 Warthin's tumour
		1 Sialadenitis
		1 Pleomorphic adenoma

Discussion

Approximately 25% of parotid masses are nonneoplastic, whereas the remaining 75% are neoplastic. The most common presentation is a painless, asymptomatic mass. More than 80% of patients present because of a mass existing in the cheek. Approximately 30% will relate pain associated with the mass, although most malignancies are painless. Pain most likely indicates perineural invasion, which greatly increases the suggestion of malignancy. Of these patients, 7-20% present with facial nerve paralysis, which almost never accompanies benign lesions and indicates a grave prognosis⁽¹³⁾. In this 7 year period study, parotid gland neoplasms were found in patients with the age from 1st to 8th decade. There was a slight overall female predominance, with a male to female ratio of 1:1.1. This finding is different from other reports⁽¹⁴⁻¹⁶⁾, and similar to others as far as an association between the male sex and malignant neoplasms and the female sex and benign neoplasms is concerned^(14,17,18,19). Benign neoplasms were more common than malignant ones in all the salivary glands, which is similar to the findings in other countries^(14-18, 20-24). In our study, the most common benign parotid tumour was pleomorphic adenoma and the most frequent malignant tumour was mucoepidermoid carcinoma, which was consistent with some studies⁽²⁵⁻²⁸⁾. The second most common benign neoplasm was Warthin's tumour, this was confirmed by all previously published reports^(14,17,21,22). Most tumors of the parotid, approximately 90%, originate in the superficial lobe. Superficial parotidectomy is an appropriate surgical approach for malignancies confined to the superficial lobe⁽²⁹⁻³²⁾. Most of our patients with parotid lesions underwent superficial or total parotidectomy. Some degree of facial nerve dysfunction is common immediately after parotidectomy, being reported in

46% of the Cleveland Clinic's experience⁽³³⁾. Other, often specialized centers, report a clinically detectable but transient facial weakness in up to 25% of cases⁽³⁴⁻³⁷⁾; The majority resolve, palsy present for longer than 3 months occurring in 0.7-7% of cases^(33,34,36-40). Facial nerve weakness was noted in 8.8% of our patients undergoing parotidectomy which resolved within two weeks, no permanent facial nerve palsy was noted, this is comparable to others described in the literature⁽⁴¹⁾. The incidence of Frey's syndrome after superficial parotidectomy varies widely from 2-43% in the literatures^(34,35,38,39,42,43). This is at least partly related to the enthusiasm with which the condition is sought and the time interval after surgery. Frey's syndrome were evident in 4.4% of our patients, yet careful follow-up of the patients may identified more possible cases. As symptoms become manifested about 2 years after surgery, more of our patients may subsequently present with Frey's syndrome. Transient sialoceles were evident in 4.4% of parotidectomies performed and were treated on an outpatient basis by repeated punctures; these figures are comparable with those generally described in the literatures⁽⁴⁴⁾. One of our patients underwent enucleation for small dermoid cyst. We accept that a significant proportion of cysts turn out to be neoplasms, so that there is a theoretical risk of recurrence. However, this has not occurred to date in our limited experience. Most publications focus attention on the efficacy of FNAC but at present, there is no consensus regarding its effective role in the diagnostic work-up of parotid masses^(45,46). In our Department at Al-Hussain Teaching Hospital, FNAC is performed in every case of parotid lesion, benign or malignant, palpable or not, in order to correctly plan surgery. The most important goal of this examination is to distinguish a benign from a malignant mass. However, the preoperative cytology helps in the differential diagnosis between

benign and malignant lesions of parotid gland, and thus the extent of the surgery can be planned and modified accordingly. In recent scientific literatures, sensitivity ranges from 57% to 98%, specificity from 56% to 100%, and accuracy from 78% to 98%^(7,45,47-56). In our study the sensitivity was 75%, the specificity was 100%, and the accuracy was 97%. Different causes could account for this variability. It is difficult to compare data from different studies because of the different methods adopted to classify patients, exams and results. It is the dependence on the skill of the cytotechnologist performing FNAC and the expertise of the pathologist to assess adequacy and accurate examination of the specimen. The only relative contraindication for performing the FNAC are the hemorrhagic diseases. Many authors exclude the possibility of the implantation of the malignant cells or its recurrence caused by FNAC⁽⁵⁷⁾. The phenomenon of tumor cells seeding has become a rare complication with the current use of small-bored needles⁽⁵⁸⁾.

Conclusions

The diagnosis of parotid gland neoplasm must be considered in any patient presenting with a mass near the mandible. Pleomorphic adenoma and Warthin's tumour are the most frequent histological types. Formal parotidectomy (conservative superficial or deep lobe parotidectomy) appears to be the treatment of choice, when feasible and even if performed by multioperators. The most dreaded complications of surgical treatment, include facial nerve palsy, Frey's syndrome, and local recurrences. Preoperative FNAC plays an important role in the accurate diagnosis of parotid tumors. It is a safe and effective modality for the treatment of patients with parotid lesion but its role still controversial. Only surgery can give histological certainty of benignity and

definitely prevents long term malignant degeneration

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