

The Clinical Approach and Treatment of Benign and Malignant Parotid Masses

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ABSTRACT

Background: Parotid gland tumors account for 80% of all salivary gland neoplasms, 20% of these are malignant, but in daily clinical practice most parotid masses are operated on before obtaining the final histological diagnosis. This clinical setting further complicates the critical point of parotid surgery, which is the management of the facial nerve. **Materials and methods:** 45 patients underwent parotidectomy for benign and malignant neoplasms. A complete history is collected from the patients with the duration and the site of the tumor, the facial nerve examined and its associations, a medical consultation done for opinion and management. Clinical examination with facial nerve was mandatory to avoid any mistakes that may occur. The most significant single parameter in this series of malignancies regarding disease specific survival was the clinical involvement of the facial nerve. Also for this reason, as there is no evidence that the facial nerve sacrifice improves prognosis, when it is not clinically involved, every attempt is made to dissect and preserve it. A treatment plan was contemplated regarding nerve preservation for malignancy or with nerve sacrifice.

Result: This study showed that females (62%) are more affected than males (38%), tumors occur at left parotid gland (65%) more than right parotid gland (35%), a malignancy affected the left parotid gland more than the right one and a malignancy affected females more than males. Pleomorphic adenomas are the most frequent benign tumors while the adenocarcinoma most frequent malignant tumors.

Conclusion: The most complicated situation concerning nerve preservation may be the recurrence of a benign tumor, in particular pleomorphic adenoma, which, in our series, has a higher incidence (62.5%) of permanent facial dysfunction, than surgery with nerve preservation for malignancy (37.5%) and to resect the nerve when is clinically involved and when is totally embedded in a clearly malignant neoplasm with attempt to preserve it in all other.

Key words: Parotid tumors, Prognostic factors, Facial nerve, malignancy. (J Bagh Coll Dentistry 2016; 28(2):84-91).

INTRODUCTION

Salivary gland 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 tumors occur in the parotid gland. Of these, approximately 75- 80% are benign. There is no consistent correlation between the rate of tumor growth and whether a tumor is benign or malignant. The majority of benign tumors of the parotid gland are epithelial tumors.

Most benign parotid tumors present as slow growing, painless masses often in the tail of the 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 biopsy (FNAB) is also indicated by some authors ⁽²⁻⁴⁾.

Nevertheless, none of these tools 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 of tumor cells 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 also in cases of a clinically benign lesion.

Surgery of the parotid gland is challenging because the VII cranial nerve, which emerges at the stylomastoid foramen, enters the gland and branches out inside the parotid, defining the superficial and the deep lobe, and must always be identified and dissected when performing parotidectomy. Experience shows that most of the primary salivary tumors of the parotid are found directly adjacent to at least one branch of the facial nerve, and rarely, if ever, will the surgeon feel that dissection of the nerve has been useless, also in the case of a clearly benign mass. Furthermore, in the event of recurrence, the risk to the facial nerve increases exponentially, particularly in the relatively frequent event of a multi-nodular relapse of a pleomorphic adenoma ⁽⁵⁾.

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Enucleation alone is, therefore, inadequate for tumors of the parotid gland, on account both of the increased risk of facial nerve lesions and the increased risk of recurrence. Some Authors believe that the only exception to this rule could be Warthin tumors especially when presenting posterior to the facial nerve⁽⁶⁾. Because there is no evidence that the facial nerve sacrifice improves prognosis at malignancy, when it is not clinically involved, the aim of this study every attempt is made to dissect and preserve facial nerve.

MATERIALS AND METHODS

The data evaluated refer to approximately 45 consecutive patients who underwent parotidectomy for benign and malignant neoplasms between August 2008 and December 2014, at the Al-Wasity hospital for reconstructive surgery, Baghdad- Iraq.

For every patient, personal data were recorded, family history, with particular regard to tumors (salivary or not), and the clinical presentation of the parotid neoplasm. Data were collected regarding surgery, complications, complementary and rehabilitative treatments, as well as respective follow-up, by means of revision of charts, direct clinical re-examination and imaging of surviving patients. Before surgery, in all patients, staging had been defined by clinical examination and contrast enhanced CT scans of the head and neck, in the presence of a suspicion for malignancy this work-up was completed with imaging of the lungs, contrast enhanced MRI of the head and neck and salivary US, FNAB. In cases of malignancy, also collected were data regarding TNM classification.

As far as concerns clinical presentation of parotid tumors, especially the malignant, the researcher evaluated the involvement of the facial nerve.

The masses operated upon were classified, based upon the site of origin, as deep or superficial, and, when they were demonstrated to be malignant, namely primitive (when the parotid was the site of origin of the neoplasm) or metastatic (when parotid localization was a metastasis); based upon the clinical history, as primary or recurrent.

As far as concerns surgery, the parotidectomies were classified as superficial or total parotidectomy with nerve preservation or total parotidectomy with nerve sacrifice (of the main trunk or branches) and when extension of the resection to other structures was necessary this was recorded.

In cases presenting malignancy, follow-up data were collected from the records of the visits performed in the multidisciplinary outpatient unit with the involvement of Otolaryngologists (the surgeons), Radiation oncologists, and radiologists. In the first year, we recommend a ct scan of the parotid and neck every 4 months, and, in the second year every 6 months; we also suggested a chest CT scan, every year, during follow-up since lung metastases are not infrequent⁽⁷⁻⁹⁾.

RESULTS

The overall study population comprised 17 males and 28 females (Figure 1). Overall 35 masses (77.7%) were found to be benign tumors, and 10 masses proved to be malignant tumors (22.2%).

For male group 3 were malignant masses while 14 were benign, and for female group 7 masses were malignant while 21 proved to be benign (Table 1). 16 masses in the right parotid gland and 29 in the left one (Table 2), 9 of them were recurrent and 36 presented as a primary tumor.

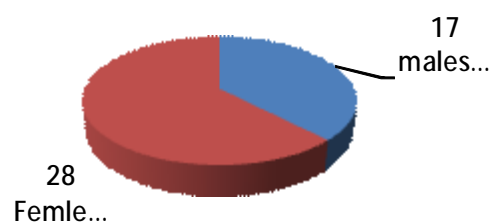


Figure 1: Sex Distribution

Table 1: Numbers of patients with benign and malignant tumors

Sex	No. of patients	Benign	Malignant
Male	17	14	3
Female	28	21	7
Total	45	35	10

Table 2: Distribution of parotid tumors

No. of tumors	Side	
	Right	Left
45	16	29
100%	35%	65%

In the "benign" group (range 16-60 years); with the peak was in the 3rd decade and another in the 5th decade (Figure 2). Regarding the "malignant" group (range 35-63 years), with the peak was in the 6th decade (Figure 3). In the case of benign disease, the clinical presentation was usually a swelling of the gland, slowly growing or

apparently stable in dimensions. In cases of malignant disease, clinical presentation was as an asymptomatic parotid mass in 5 patients (50%), 3 patients presented with pain, 1 patient with sinus discharge and 1 patient came with facial nerve function deficit.

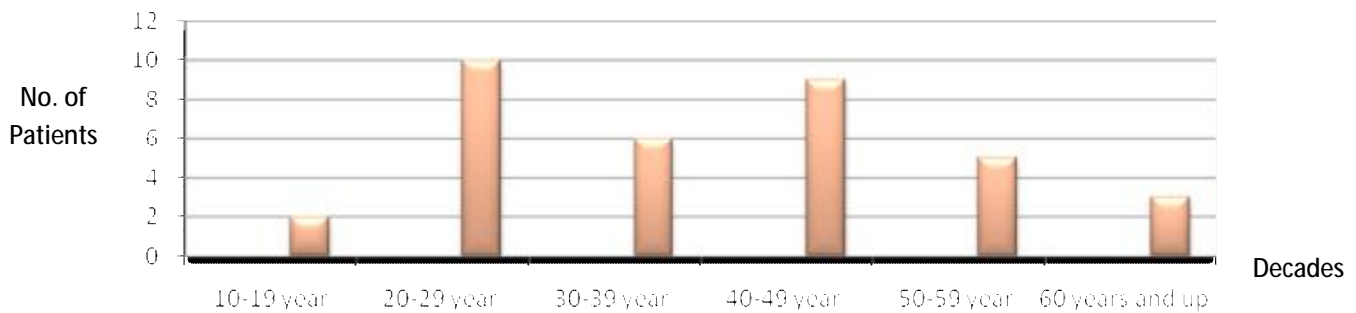


Figure (2): Benign group age

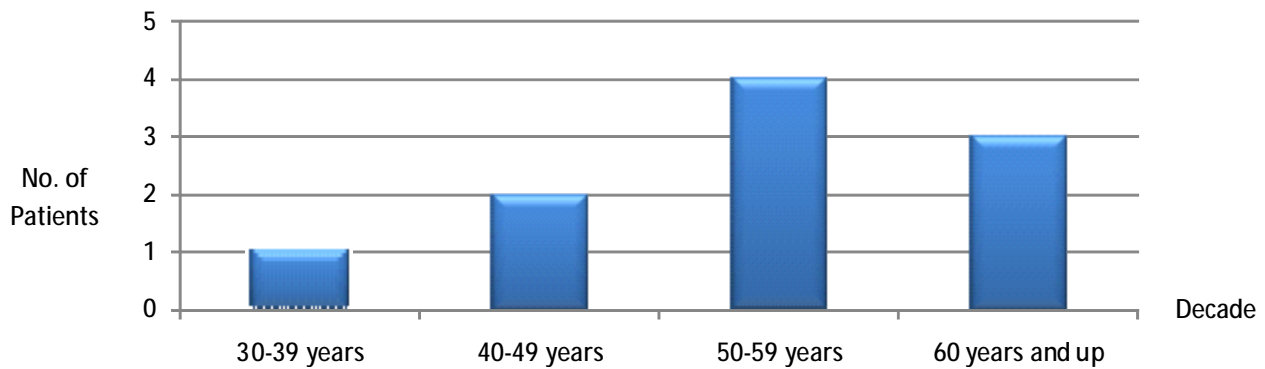


Figure 3: Malignant group age

Among the benign lesions, the most frequent, by far, were pleomorphic adenomas (almost 91%), Warthin's tumors (almost 9%), 15 cases were in the superficial lobe, 13 cases in the superficial and deep lobes, 4 cases were localized in the deep lobe and 3 cases in the tail of the gland (Table 3) and considering malignancies adenocarcinoma 7

cases, adenoid cystic carcinoma 2 cases and lymphoma 1 case, 6 cases of which arose in the superficial and deep lobe and 4 cases arose in superficial lobe (Table 4). Eight cases of pleomorphic adenomas were recur cases (mostly after enucleation) and one malignant case recur.

Table 3: Distribution of benign parotid tumors

Location	No. of Cases	Percentage
Superficial lobe of parotid gland	4	40%
Superficial and deep lobes of parotid gland	6	60%
Total	10	100%

Table 4: Distribution of malignant parotid tumors

Type	No. of cases	Percentage
Superficial parotidectomy	16	35%
Total parotidectomy with preservation of facial nerve	15	33%
Total parotidectomy with sacrifice of facial nerve	7	16%
Encucleation	4	9%
Not operated	3	7%
Total	45	100%

As far as concerns surgery, in benign lesions, superficial parotidectomy was performed in 14 cases, total parotidectomy with facial nerve preservation in 13 cases (mostly recurrences and primaries of the deep lobe), total parotidectomy with VIIth nerve sacrificed in 4 cases and encucleation in 4 cases. A trans-mandibular approach was never needed (not even in malignancies), the deep lobe tumors always being resectable using a standard parotidectomy approach by modifying the neck incision when needed.

In malignancies, a superficial parotidectomy was performed in 2 cases (20%), total parotidectomy with VIIth nerve preservation in 2 of cases (20%), and total parotidectomy with VIIth nerve sacrifice in 3 of cases (30%). In the

latter group, only one patient was possible to preserve the superior (orbitofrontal) branch, in second case the operator reconstructed the nerve with a sural graft and a third case buccal branch sacrifice and reconstructed with cervical branch, 3 patients (30%) not operated upon due to unfitness their medical conditions (Table 5).

Due to the suspected or clinically evident involvement, resection was extended to other structures in 2 cases (overlying skin), submandibular gland: in one case. In 2 cases, in which a wide area of skin had to be resected, we reconstructed the defect with a local flap (Figure 4). Selective neck dissection in 5 cases, modified radical neck dissection type III in 2 cases were done.

Table 5: Types of surgical operation

Location	No. of Cases	Percentage
Superficial lobe of parotid gland	15	43%
Superficial and deep lobes of parotid gland	13	37%
Deep lobe of parotid gland	4	11%
Tail of parotid gland	3	9%
Total	35	100%

Adjuvant therapy was recommended and performed in all the metastatic masses: radio-chemotherapy in (3 cases) (60 Gy and three cycles of concurrent CDDP 100 mg/m on days 1, 22, and 43. Overall (4) of patients with a parotid primary tumor underwent adjuvant radiotherapy alone.

Early complications of surgery were the same both in the case of benign and malignant lesions, sialocele which is a complication of surgery in this series, occurring in 2 patients (4.7%), but was always a self-limiting problem within 2 weeks of local medications, aspiration and compressive dressing. As far as concerns facial nerve, in the cases with anatomical nerve preservation, post-operative facial weakness occurred in all cases

(always more evident on the marginal mandibular branch), but only 5 presented a permanent dysfunction (2 malignancies and 3 recurrences of pleomorphic adenoma). Two out of these 3 recurrences of pleomorphic adenoma with the permanent dysfunction, actually had a macroscopic lesion of the facial nerve during an extremely difficult dissection from multi-nodular lesions.

The most frequent long-term sequel, in this series, was the sensory deficit, probably presented in all patients after parotidectomy (due to section of the great auricular nerve). Overall, 15% of patients, in this series, complained of a residual sensory deficit 4 months after surgery.

DISCUSSION

The causes of salivary gland cancer have not been determined. Primary malignant salivary gland histotypes have been classically subdivided into high grade and low grade, based mainly upon the criterion of clinical aggressiveness. Some histotypes (such as mucoepidermoid carcinomas) can be either high grade or low grade, while for others the grade was always the same (adenoid cystic carcinoma was always considered high grade).

Before surgery, it is mandatory for the surgeon to assess the risk of malignancy, because it affects on prognosis and, most of the entire attitude towards the facial nerve, the sacrifice of which may be necessary in solid malignant neoplasms. A suspicion of malignancy, therefore, changes the informed consent, avoiding the legal controversies related to the so-called histological surprises. In researcher opinion, histological surprises should be extremely rare: malignancy can almost always be at least suspected, we experienced only 4

(about 12.5%) histological surprises, with no suspicion of malignancy before the operation, in 2 of these cases the surprise was intra-operative, with difficulties arising in dissecting the nerve (which was anyways preserved) (Figure 4).

Avoiding surprises is achieved by adequate anamnesis, physical examination, imaging and FNAB. With the exception of surgical exploration, physical examination remains the most important tool for the experienced diagnostician: a hard mass with fixation is likely to be malignant; NCCN guidelines for the management of head and neck cancer suggest some suspicion criteria such as a mass > 4 cm, or arising from the deep lobe⁽⁷⁾. The origin in the deep lobe is probably actually a suspicion criterion for malignancy, the frequency of deep lobe masses, in the series presented herewith, is definitely higher in malignant lesions than in benign masses, as confirmed also by another recent study⁽¹¹⁾.



Figure 4: Patient with left parotid encapsulated mass involving buccal branch of facial nerve which was preserved.

At the first clinical observation of a parotid mass, symptoms and signs such as compromise in nerve function (10-20% of malignant parotid tumors) and/ or facial pain (10-15%) greatly increase concern regarding malignancy⁽¹²⁻¹⁴⁾. In this series, facial deficit was practically as frequent as data reported in the literature (14%),

while facial pain is definitely more unusual (28%) (Figure 5). Imaging helps in defining the dimensions, the site of origin, the involvement in adjacent structures which can be difficult to evaluate by means of physical examination (such as the parapharyngeal space).



Figure 5: Patient with a big left parotid mass

Radiotherapy and chemotherapy was performed in those cases of intermediate, high grade or adenoid cystic tumors, with close or positive margins, neural/perineural invasion.

Disease-specific survival decreases for many years, especially in patients with adenoid cystic carcinoma and malignant mixed tumor, because of distant metastases, which have been reported in approximately 20% of parotid malignancies,

mainly high grade, and are predictive of poor prognosis⁽¹²⁾. In particular, 40% of patients with adenoid cystic carcinoma and 26-32% with malignant mixed tumors demonstrated this feature⁽⁸⁻⁹⁾. In all these lesions, the site of distant metastases is most often the lung (s). Several previous investigations showed that advanced stage, higher histological grade, and submandibular location were prognostic for poorer outcome^(8,10,13,15-18). VII th nerve involvement and positive/close margins in the histological sample are the only clinical parameters, at diagnosis, associated with significant differences in survival in this series. In particular, VII th nerve clinical involvement, at diagnosis, is the most significant prognostic marker in agreement with most of the data in the literature⁽¹⁹⁻²⁰⁾.

The significance of positive/close margins might suggest extending the indications for nerve sacrifice, because the attempt to preserve the nerve sometimes leads the surgeon to leave microscopic (or even macroscopic) disease behind. Nevertheless, such a "destructive" attitude with liberal resection of the facial nerve (and of other important structures) no longer dominates surgical philosophy. Instead, the surgeon's reliance upon post-operative radiation therapy to manage histological disease and the likelihood of distant metastases make many surgeons reluctant to sacrifice a functioning facial nerve also in the event of a clear malignancy which is difficult to

dissect. If the results analyzed more in-depth, we come to share this form of surgical minimalism which has been gaining consent over the last few years. In fact, facial nerve sacrifice, in this series, is associated with a less favorable survival, even if not of statistical significance, because the most significant prognostic parameter in this series, the clinical involvement on VII the nerve, always required resection of this structure, which clearly did not help in improving prognosis.

At present, the worst problems in dissecting the nerve, especially in consideration of the benign histology, are encountered in multi-nodular recurrences of pleomorphic adenomas, in the present series, as in others in the literature^(5,21,22). In fact, the incidence of permanent facial dysfunction is markedly higher in cases of recurrence of pleomorphic adenomas (62.5%) than in cases of surgery with nerve preservation for malignancy (37.5%). In researcher opinion, in these cases, the best defense for the surgeon is adequate informed consent of the patients, who must be informed regarding the concrete possibility of facial palsy following an operation for a benign disease. This event is the main argument in favor of extensive surgery (at least a superficial parotidectomy) in pleomorphic adenomas. On the other hand, we do not believe in the usefulness of irradiation in these cases, as it can make subsequent surgery even more complicated, without significant data regarding the clinical effectiveness^(21,23) (Figure. 6).



Figure 6: Patient with a recurrence of multi-nodular pleomorphic adenoma of left parotid gland

In this study most of patients operated upon for a malignancy with positive margins had undergone total parotidectomy with nerve sacrifice, which is, therefore, not a solution for the issues of margins. In fact, when available on the histopathological report, the positive margins were found to be usually outside the parotid, due to the involvement of other structures, so probably a more aggressive attitude is warranted on extra-glandular structures, possibly resorting more often to reconstructive techniques (Figure 7).

The opinion was, clinical nerve dysfunction and extra-parotid extension, often not associated with bulky tumors, in researcher experience

(Figure 8), are, in themselves, expressions of intrinsically more aggressive tumors and can be interpreted as independent prognostic factors.

As conclusion; clinical involvement of the VII th nerve and positive margins after resection are the most significant parameters, as they are probably the expression of an intrinsic "biological" potential for malignancy.

On the other hand, there is no evidence showing that liberal VIIth nerve sacrifice improves prognosis, thus our attitude remains to resect the nerve when it is clinically involved and when it is totally embedded in a clearly malignant neoplasm, but to, at least, attempt to dissect and

preserve it in all other cases. This guidance is strengthened by the consideration that ultimate diagnosis of malignancy, and definition of histotype, immunohistochemistry) and that, at present, neither clinical and surgical feeling, nor

frozen section, or FNAB can provide reliable and legally acceptable indications for VII th nerve sacrifice.



Figure 7: Patient with left parotid encapsulated mass involving the overlying skin resected and reconstructed with local advancement flap.

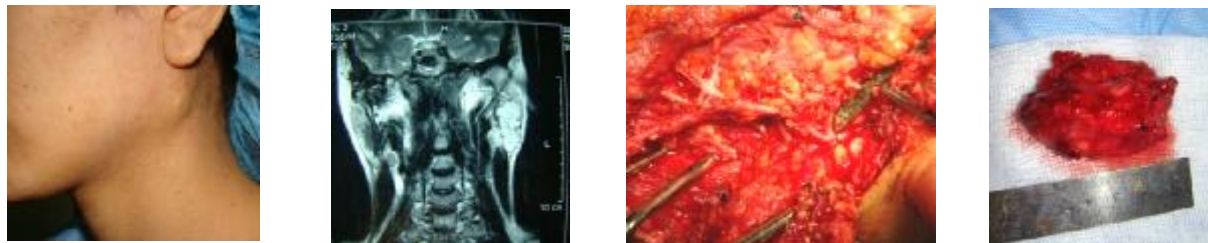


Figure 8: A relatively small volume malignancy of the parotid gland in a 35 years old female with static and dynamic facial nerve dysfunction. Total parotidectomy with facial nerve preservation was preformed.

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