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Presentation and Outcome of Management of Parotid Tumors: A Local Experience from Two Sudanese States

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Abstract:

Parotid tumors are rare but good amount of knowledge is required to preserve the facial nerve during superficial or deep parotidectomy. This is a study of 49 patients who presented with parotid tumors in the last 12 year with a mean age of 44 yrs. Parotid lump was the main symptom in all patients, while facial nerve palsy was the presenting symptom in only 4.1%. In this study 69.3% of patients underwent superficial parotidectomy while 30.6% had total parotidectomy. Transient facial nerve palsy occurred in 22.4% while permanent damage occurred in (8.1%) of patients. Pleomorphic adenoma represented 91.8% of benign tumors while mucoepidermoid tumors represented 41.6% of malignant tumors making them the two most common pathological diagnoses. Recurrence occurred in only 3 patients

ملخص البحث: عرض لتجربه محلية في أورام الغدة النكفية، الأعراض والعلاج

أورام الغدة النكفية نادرة ولكنها تتطلب كم مقدر من المعرفة للحفاظ على العصب الوجهي أثناء عمليةاستئصال الغدة النكفية بشكل سطحيي أو عميق. هذة دراسة 49 مريضا يعانون من أورام غدة نكفية مع متوسط عمرحوالي 44 عاما. كان تورم النكفية أهم الأعراض في جميع المرضى، في حين كان شلل عصب الوجه يمثل عرض في 4.1٪. فقط زفي هذه الدراسة خضع 69.3٪من المرضى لاستئصال الغدة النكفية السطحي في حين خضع 30.6٪ من المرضى لاستئصال الغدة النكفية العميق . حدث شلل العصب الوجهي الموقت في 22.4٪ في حين وقعت في ضرر دائم (8.1٪) من المرضى.

مثل الورم متعدد الأشكال الحميد 91.8٪ من الأورام الحميدة الأورام بينما الورم المخاطي البشروي مثل 41.6٪ من الأورام الخبيثة ثم جعلهما التشخيصين الأكثر شيوعا لدي المرضي. حدث تكرار للورم في 3 مرضى فقط

Introduction:

The parotid glands are situated anteriorly and inferiorly to the external ear. Saliva drains via a parotid duct that pierces the buccal mucosa in the region of the second upper molar tooth. The facial nerve and its multiple branches pass through the parotid gland. .About 70% of the gland is superficial to the facial nerve and its branches. It contains lymph nodes that may become involved by metastatic disease, lymphoma or infection. Parotid tumours occur most commonly in the superficial lobe. The deep lobe extends into the retromandibular sulcus, and is related on its deep aspect, to the styloid process and deep to this, the internal carotid artery.

Salivary cancers account for approximately 3% of all head and neck malignancies [(1)]. Approximately 80% of salivary gland tumours occur in the parotid gland. Of these, approximately 75-80% are benign. They can occur at any age, and incidence does not differ significantly by

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gender. There is no consistent relationship between the rate of tumour growth and whether a tumour is benign or malignant. Most of benign tumours of the parotid gland are of epithelial origin. Most benign parotid tumours present as slow growing, painless masses. Physical examination is the first tool, since ultrasonography (US) has high sensitivity in showing masses in the superficial lobe but the same cannot be said about the deep lobe and this can be over come by computerized tomography (CT) and/or magnetic resonance imaging (MRI) which can be useful, as adjunct studies, for correct surgical planning. Fine-needle aspiration biopsy (FNAB) is also indicated by some authors [2,4]. None of these preoperative tools gives a definitive diagnosis. Open biopsy has an inherited risk of seedling in the biopsy incision. Therefore, from a practical point of view most parotid masses are operated upon in order to obtain the final diagnosis.

Surgical treatment of benign tumors is aimed at complete removal of the mass with facial nerve preservation in the form of superficial or deep parotidectomy, while in malignant cases the operation is either total or radical parotidectomy with nerve preservation, immediate grafting or later reanimation techniques are needed in case of nerve injury. Parotid gland surgery is challenging because the seventh cranial nerve, which emerges at the stylomastoid foramen, enters the gland and branches out inside the parotid, dividing the superficial and the deep lobe, and must always be identified and dissected when performing parotidectomy. Even in the presence of normal anatomy and normal surrounding parotid tissue, dissection of the branches of the facial nerve requires patience and special attention both to detail and to landmark [5] in the event of recurrence, the risk to the facial nerve increases exponentially [6]. Enucleation alone is, therefore, inadequate for tumours 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's tumours especially when presenting posterior to the facial nerve. [7]

Surgery has many consequences like scar formation. Greater auricular nerve damage is one of the complications of surgery in which patients have permanent loss of skin sensation of the lower half of the external ear, and over the parotid area. Facial nerve injury is a major complication of surgery. The nerve is very sensitive to surgical manipulation, and it is not unusual to have temporary weakness of the face, that recovers within a few weeks or months. Another consequence is Frey's syndrome (gustatory sweating) in which patients will note sweating over the parotidectomy site when eating or drinking for some years after surgery .It is due to short-circuiting between the secreto-motor nerves that supply the parotid gland and sweat glands

Tumors of the parotid glands are not frequently encountered in general practice, therefore these tumors pose a special challenge to clinicians because of their infrequency and remarkable variation in presentation and behaviour. It cannot be stressed enough that it is important to manage these in a sound way. In light of these facts we conducted this study to look into the clinical presentation, management and post-operative complications of patients presented with parotid swellings.

Patients and methods:

This is a retrospective study conducted in the period between 1998 and 2010 in Khartoum state

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and Gadarif state. Forty nine patients were included ,which consist of all patient who presented with chronic parotid swelling to Khartoum Teaching Hospital & Soba University Hospital in the time period between 1998 and 2000 and to Gadarif Teaching Hospital from 2000 up to 2010, excluding patients with apparent malignancy and facial nerve involvement who were beyond curative surgery. Patients were followed postoperatively for a period ranging between 3 months to 2 years. Data regarding clinical presentation, management and post-operative complications was collected through a preset questionnaire and analyzed using SPSS 14

Results:

The patients' age ranged between 8 and 80 years with a mean of 44 years, 77.4% were less than 60 years old while 22,4 were more than 60 years old (Table 1). There were 17 males and 32 females with male to female ration of 1 to 1.8. Lump was the presenting symptom in all patients. In addition to the lump, 26.5% were having pain and 2 patients presented with facial palsy (4.1%) and both were having malignant tumors. 16.3% presented with lymph nodes enlargement, only 1 patient (2.1%) presented with a lump and skin ulcer (Table 2)

Nineteen patients (38.7%) were having symptoms for less than one year, 18 patients (36.7%) between one to 5 years and 12 patients (24.5%) were having them for more than 5 years (Table 3) .The lump size at presentation, in its maximum diameter, was less than 5 cm in 22 patients (44.9%), between 5-10 cm in 17 patients (34.7%) and more than 10 cm in 10 patients (Table 4& Figure 1). Thirty four patients (69.3%) underwent superficial parotidectomy while 15 patients (30.6%) had total parotidectomy (Figure 2).

Regarding post-operative histopathology, benign neoplasms were diagnosed in 75.5% and malignant neoplasms were diagnosed in 24.5% (Table 5). The most common benign tumor was pleomorphic adenoma representing 91.8% of benign tumors and the most common malignant tumors was mucoepidermoid tumors representing 41.6% of malignant tumors followed closely by adenoid cystic neoplasm (33.3%) (Table5). All patients with malignant tumors were sent to nearest oncology centre.

Facial nerve palsy was the most common post operative complication occurring in 30.6% , followed by flap necrosis in 8.2% of patients .There were no reported cases of Frey syndrome during the period of follow up. Recurrence occurred in 3 patients (Table 6). Fortunately out of the 15 patients who had their facial nerve affected, 11 had complete recovery and they were labeled as transient palsy. Nine of them were having benign neoplasms while 2 were having malignant tumors. On the other hand permanent damage occurred in 4 patients (8.1%) all of them were having malignant tumors (Table 7). Three patients, who developed permanent facial nerve damage, had total parotidectomy. While among patients who underwent superficial parotidectomy only 1 patient developed permanent damage (Table 8). The relation between type of surgery and facial nerve palsy is statistically significant (p value = 0.003)

Discussion:

Approximately 70% to 80% of all salivary glands neoplasms originate in the parotid gland [8,9,10]

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.The most common benign tumor is pleomorphic adenoma, which comprises 65% of parotid gland tumors [8] The common malignant major and minor salivary gland tumor is the mucoepidermoid carcinoma, which comprises about 10% of all salivary gland neoplasms and approximately 35% of malignant salivary gland neoplasms [8,11] . In this study the most common benign tumors were pleomorphic adenoma (69.3)% while the most common malignant tumor were mucoepidermoid tumors (10%) followed by adenoid cystic tumors (8%).

Parotidectomy is classified as, superficial or total, based upon lobes resected and extent of facial nerve dissected. A superficial parotidectomy involves resection of the entire superficial lobe and dissection along all branches of the facial nerve is recommended for most benign tumors confined to the superficial lobe [12.13]. A total parotidectomy involves dissection and preservation of the facial nerve with removal of parotid tissue in the deep as well as superficial lobe and is recommended for high-grade malignant tumors. Lower grade tumors and high-grade tumors located peripherally within the superficial lobe, particularly in the inferior aspect, may be treated with a superficial parotidectomy [12.13.14.15.] These procedures are in contrast to a simple inoculation, or shelling out of tumor, which is rarely indicated for salivary gland tumors [12.15]. In our study the most common procedure performed was superficial parotidectomy (69.3%). (figure1) as our patient's tumors were mainly located in the superficial lobe.

Patients with benign and low-grade tumors are typically treated with surgery alone, whereas patients with high-grade carcinomas and those with positive margins and other high-risk features are usually treated with surgery and adjuvant radiation therapy (RT). Patients with unresectable tumors may be treated with definitive conventional radiation.

Table 1: Age distribution in 49 patients with parotid swellings

Age	No.	percentage
<40	19	38.7%
41-60	19	38.7%
>61	11	22.4%
Total	49	100%

Table 2: The presenting symptoms in 49 patients with parotid swellings

Presenting symptoms		Frequency	Percentage
symptom N=49	Lump	49	100%
	Pain	13	26.5%

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	F. palsy	2	4.1%
	Lymph N.	8	16.3%
	Ulcer	1	2.1%

Table 3: Duration of symptoms in 49 patients with parotid swellings

Duration of symptom		Frequency	%
	<1year	19	38.7%
	1-5	18	36.7%
	>5 years	12	24.5%
Total		49	100%

Table 4: Lump size and in 49 patients with parotid swellings

Parotid Size		Frequency	Percentage
	<5cm	22	44.9%
	5-10cm	17	34.7%
	>10cm	10	20.4%
total		49	100%

Figure 1: Huge Pleomorphic Adenoma

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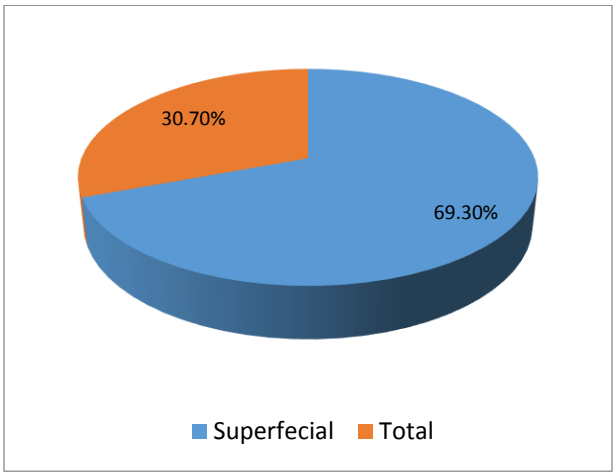

Figure 2: Type of Parotidectomy

Table 5: **Post operative histology of parotid tumors**

Histology		Frequency	Percentage
Benign N=37 75.5%	Pleomorphic adenoma	34	69.3%
	Warthin's tumor	2	4.1%
	Lipoma	1	2%
Malignant N=12 24.4%	Acinic cell tumor	1	2%
	Adenoid cystic	4	8%
	Mucoepermoid	5	10%
	Lymphoma	1	2 %
	Oncocytic carcinoma	1	2 %
Total		49	

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Table 6: Post operative complications

Complications	Frequency	Percentage
bleeding	2	4%
Infection	3	6.1%
Facial palsy	15	30.6%
Frey syndrome	0	0
Flap necrosis	4	8.2%
recurrence	3	6.1%
non	22	44.8%
total	49	100%

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Table 7: Relation between facial nerve palsy and histological type (P value = 0.094)

Facial nerve palsy		Benign	Malignant	Total
Facial nerve affected	transient	9(81.1%) 24.3%	2(18.2%) (16.6%)	11(100%) 22.4%
	Permanent	0(0%) 0%	4(100%) 33.3%	4(100%) 8.1%
Not affected		28(82.3%) 75.6%	6(17.6%) 50%	34(100%) 69.3%
Total		37(75.5%) 100%	12(24.4) 100%	49(100%) 100%

Table 8: Relation between facial nerve palsy and surgery type (p value = 0.003)

Facial nerve palsy		Superficial	Total removal	Total
Facial nerve affected	Transient	**5**(45.4%) 14.7%	**6** (54.5%) 40%	**11**(100%) 22.4%
	Permanent	**1**(25%) 2.9%	**3**(75%) 20%	**4**(100%) 8.1%
Not affected		**28**(82.3%) 82.3%	**6**(17.6%) 40%	**34**(100) 69.3%
Total		**34**(69.3%) 100%	**15**(30.6%) 100%	**49**(100) (100%)

Benign and malignant parotid tumors present as an asymptomatic mass in the gland [9.10]. In this review all of our patients presented with a mass as the primary symptom .In our study the next common symptom was facial pain (26.5%). It is reported in the literature that 10 to 15 % of patients of malignant parotid neoplasms present with facial pain and it is usually suggestive of malignancy

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[10.16]. The other symptom that is highly suggestive of malignant diagnosis is facial nerve paralysis at presentation or lymph node enlargement. This occurred in 4.1% and 16.3 % of our patients respectively and all, except one with lymph node enlargement, were found to have malignant tumors. However not all patient with malignant parotid tumors do present with facial nerve paralysis. The reported incidence of facial nerve paralysis in malignant parotid tumors is between 15-23% usually associated with poor outcome. [16-17]

The overall incidence of facial dysfunction was reported as 36.4% for temporary and 3% for permanent dysfunction [9]. Rates of facial weakness were 16.5% in patients treated with superficial parotidectomy, while it is 31% and 100%, respectively, for benign and malignant lobe tumors treated with near-total parotidectomy [18]. Our four patients with permanent facial nerve paralysis (8.1%) occurred in patients with malignant tumors and 3 of them had total parotidectomy, while only 1 patient underwent superficial parotidectomy for malignant tumor (Table 3.4). We have also done an immediate nerve repair for one of the patients with adenoid cystic carcinoma in whom the main trunk has been severed while performing a total parotidectomy. The postoperative histology and MRI showed complete excision and the nerve complete clinical recovery within the first year. Facial electroneurography (ENoG) is an established and reliable method for assessing neural degeneration in various conditions affecting the facial nerve [19]. We concluded that facial nerve is at greater risk in patients with malignant swelling undergoing total parotidectomy.

One of our patients with benign conditions proved to have a lipoma in the parotid gland. This was reported by Levan *et al* in France as a case report. [20].

Three of our patients developed recurrence of swelling within 12 months. They proved histologlically to be pleomorphic adenoma and malignant lymphoma (Figure 3) which was described as presenting symptom by Watkin and Hobsley 3 decades ago[21].

Lymphomas are relatively common in Sudan and showing consistent increasing incidence with mixed cellularity variant as a dominant type. [22]

The incidence of recurrence in other studies was found to be 3.4% when operating on benign [19,20] and reaches 15-25% when operating on malignant conditions [23] [24]. The recurrence is usually slow growing and requires lengthy follow up. Although radiotherapy for benign tumor is controversial it was applied to 2 of our patients with benign condition. Some authors report that it should be considered if there has been tumor spillage following reoperation [24] Hobsley and Watkins did not approve the use of postoperative radiotherapy for treatment of even recurrent benign parotid neoplasms [25,26]. This was also well documented by Takeichi *et al* who studied the atomic bomb survivors in Hiroshima [27] However since recurrent disease tend to be multi focal in origin, prolonged routine follow up is required [28]. This situation was adopted in patients who live far away from medical service and were not amenable for follow up, we, although they were benign we sent them to the oncologist to decide about them.

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Figure 3: Histological appearance of malignant lymphoma of a parotid

Conclusion:

Parotid gland tumors are rare tumors however they require utmost knowledge of anatomy to preserve the facial nerve. Although facial nerve dysfunction occurs in post operative period it is usually transient with permanent damage usually occurring after total parotidectomy for malignant tumors.

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