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ORIGINAL ARTICLE

Surgical management of salivary gland tumours

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KEYWORDS

Facial palsy;

Parotidectomy;

Salivary neoplasm;

Pleomorphic adenoma

Abstract

Introduction and objectives: Salivary gland tumours account for 3% of head and neck tumours. The aim of this study is to analyze our series of tumours of the salivary glands requiring surgical treatment at our centre from 2004 to 2007.

Material and methods: This study is a retrospective review of 49 patients diagnosed as having tumours of the major and minor salivary glands or ectopic salivary tumours, and surgically treated at our hospital between 2004 and 2007. We reviewed their clinical characteristics, imaging findings, fine-needle cytology results, surgical charts (sub-maxillectomies, parotidectomies, palatal tumour excisions, and cervicotomies), final pathology findings, and course with at least 1 year follow-up.

Results: Forty-nine salivary tumours were treated, including 43 parotid tumours (87%), 3 submandibular tumours (6%), 1 palatal tumour (2%), and 2 ectopic tumours (4%). Sixteen percent of the tumours were malignant. Fine-needle cytology sensitivity was 40% whereas specificity was 100% Out of 43 parotidectomies, 40 (93%) were primary parotidectomies, and 3 were review parotidectomies. Most parotidectomies (81%) were superficial or partial and 8 (19%) were total. Parotidectomies complications are similar to those described previously in the literature: permanent facial palsy in superficial or partial parotidectomy (5%), wound dehiscence or necrosis (13%), post-operative bleeding (4%), fever or wound infection (7%), sialoceles (44%) and Frey's syndrome (2%).

Conclusions: Parotid tumours are the most common salivary gland tumours. Most of them are benign, but Warthin's tumour is more frequent than usual in our series. Early and late complications from parotidectomy are uncommon, although sialocele is a common transitory complication in our series.

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PALABRAS CLAVE

Parotidectomía; Neoplasia salival; Parálisis facial; Adenoma pleomorfo

Tratamiento quirúrgico de los tumores de glándulas salivales

Resumen

Introducción y objetivos: Los tumores derivados del tejido salival son el 3% de los tumores de cabeza y cuello. El objetivo de este estudio es analizar una serie de tumores derivados de tejido salival que han requerido tratamiento quirúrgico en nuestro hospital en el periodo 2004-2007.

Material y método: Pevisión retrospectiva de 49 tumores derivados de glándulas salivales mayores o menores o de estirpe salival de localización ectópica. Se analizan datos relativos a la historia clínica, pruebas complementarias, datos quirúrgicos (submaxilectomías, parotidectomías y otras intervenciones), anatomopatológicos y de evolución del paciente, con un seguimiento mínimo de 1 año.

Pesultados: De los 49 tumores salivales, 43 (87%) eran parotídeos; 3 (6%), submaxilares; uno en mucosa oral palatina, y 2 ectópicos cervicales. El 16% de los tumores fueron malignos. La punción aspirativa con aguja fina tuvo una sensibilidad del 40% y una especificidad del 100%. De las parotidectomías, 40 (93%) fueron parotidectomías primarias, y 3 (7%), revisiones de parotidectomías; en 35 (81%) casos fueron parotidectomías superficiales o parciales, y en 8 (19%) fueron totales. Las complicaciones posquirúrgicas en las parotidectomías fueron similares a las descritas en la literatura: parálisis facial permanente tras parotidectomía superficial (5%), necrosis o dehiscencia de herida quirúrgica (13%), hemorragia postoperatoria (4%), fiebre o sobreinfección de la herida (7%), sialoceles transitorios (44%) y síndrome de Frey (2%).

Conclusiones: Los tumores parotídeos son los más frecuentes, siendo en su mayoría benignos. En nuestra serie el tumor de Whartin es más frecuente que en otras series. Las complicaciones precoces y tardías de las parotidectomías son poco habituales, aunque en nuestra serie el sialocele es una complicación transitoria frecuente.

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Introduction

Tumour processes of the salivary glands account for 3% of all tumours of the head and neck.^{1,2} The incidence of these tumours is increasing with respect to epithelial lesions of the upper aerodigestive tract. Moreover, while in the parotid gland only 1 in 6 tumours is malignant, in the submandibular gland and minor salivary glands, this percentage is higher and makes up over one third of cases.

Snce many parotid diseases are manifested as a localized tumour, exploration gives us very useful data as an initial diagnostic approach. To reach a more accurate diagnosis it is necessary to combine clinical findings with complementary tests such as ultrasound, computed tomography (CT), magnetic resonance imaging (MRI), and fine needle aspiration (FNA).

Surgical resection is the treatment 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.³ 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 are of the opinion that partial superficial parotidectomy, or even extracapsular dissections, produce less morbidity with similar figures of recurrence.^{1,4-6}

The aim of this study is to review the data from all tumours derived from salivary tissue that have required surgical

treatment during the period 2004-2007 at our hospital, with special emphasis on the parotid surgeries.

Material and method

We retrospectively reviewed the histories of all patients on whom surgery has been performed, for both benign and malignant aetiology, in the major or minor salivary glands, or by salivary cell tumours of ectopic location, in the period between April 2004 and December 2007. This period has been selected to provide data for at least 1 year of postoperative follow-up. We did not include small interventions in this study, such as minor salivary gland biopsy or excision of mucoceles. We reviewed 66 medical records of salivary surgery that met this criterion, 49 of which had a final pathological diagnosis of salivary tumour or with a salivary gland origin (74%).

Parotidectomy, submaxillectomy, excisions of palatal tumours, and cervicotomies with a histopathology resulting in salivary origin were included. Within the parotidectomies we included cases of superficial or partial parotidectomy and total parotidectomy. In both groups all interventions have been performed with electromyographic monitoring control of the facial nerve to reduce the incidence of postoperative facial paresis.⁷ The group of superficial or partial parotidectomy includes all the interventions of parotid tumours in which surgery was performed in the superficial lobe, extracting the tumour in a block with the surrounding parotid tissue, exposing the facial nerve

branches necessary to successfully complete the surgery with certainty as to the surgical limit and management of the nerve. This group includes, therefore, complete superficial parotidectomies and partial surgeries.⁸ The total parotidectomy group includes surgery in which a complete resection of the salivary tumour and the whole parotid with both lobes was carried out, respecting the facial nerve and its branches.

We reviewed the medical records of patients, including the electronic history (Selene®), surgical protocols, evolutionary notes of service admission and reviews at consultations. All information relating to the anatomical pathology (both of preoperative FNA and the final histopathology of the surgical specimen) was obtained from the database of the pathology service.

We analyzed data from the clinical history (age, gender, duration of the clinic before the patient arrived at our service), additional tests (FNA report, biopsies, ultrasound, CT, and MRI and their correlation with the final pathological diagnosis), pathological data of the surgical specimen (tumour size, surgical margins), patient outcome (average time of hospitalization), immediate (within 1 month) and late (persistence 1 year after surgery) postoperative complications. 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. The facial nerve function was evaluated prior to any surgery to confirm its integrity, at the service, at 24 h after surgery, and in subsequent checks for the following 12 months.

Results

In the period from April 2004 to December 2007, there were 66 surgeries in salivary glands. Of the 66 interventions, in 49 (74%) the final pathological diagnosis was salivary tumour or with origin in a salivary gland, and in 17 (26%) it was of non-tumour aetiology. While most of the sub-maxillectomies were performed by non-neoplastic processes (13 of 16 cases; 81%), most of the parotid surgeries were due to tumours (43 of 47 cases; 91%). Of the 49 salivary tumours, 43 (87%) were parotid, 3 (6%) submaxillary, 1 (2%) palatal, and 2 (4%) ectopic. Of the salivary tumours operated on, 8 (16%) cases were malignant.

Of the 43 parotidectomies performed by tumour aetiology, 35 (81%) were superficial or partial (all of them primary surgeries) and 8 (19%) were complete (3 of which corresponded to reviews of parotidectomies). Among patients who underwent primary parotidectomy, there were 5 cases of malignant tumours (5/40): two acinar cell carcinomas, 2 carcinomas ex pleomorphic adenomas, and 1 low grade mucoepidermoid carcinoma. Among patients who underwent a review of parotidectomy, there was a single case of malignant tumour, which was a basal cell adenocarcinoma (Table 1). With respect to the laterality of the lesions, of the 43 cases of parotid tumours, the interventions were on the right side in 21 cases and on the left in 22 cases. The average age of the patients was 44 years, with an interval of 19-72 years. The male/female ratio was 20/23. The average time of evolution of the tumour before reaching the otolaryngology consultation was 2 years and 2 months, with an interval of 1 month to 15 years.

FNA was performed in 42 of the 43 parotid tumours, with concordance between the diagnosis given by the FNA in terms of specific tumour type (pleomorphic adenoma, Warthin, etc), with the final histopathologic diagnosis of the surgical specimen in 29/42 (70%) cases. As for the correlation of the FNA as indicative of malignancy, and final histopathologic diagnosis of the surgical specimen, of the 6 malignant parotid tumours, FNA was performed in 5, of which 3/5 (60%) of the FNA were informed of benign result, and 2/5 (40%) of malignant; however, in none of the cases of benign parotid tumour, was the FNA indicative of possible malignancy. In our series, FNA had a sensitivity of 40% a specificity of 100% a positive predictive value of 100% and a negative predictive value of 90%

We performed some type of imaging test in all cases: twenty-eight ultrasounds, 26 CT and 2 MRI. The focus on the particular tumour type was concordant with final pathology in 12/28 (42%) ultrasounds, in 8/26 (30%) CT, and in 2/2 (100%) MRI scans. Ultrasound was performed in 4/6 malignant tumours, and only in 1 case did the diagnosis point to a possible malignancy. A CT scan was requested in 5/6 cases and one of them reported possible malignancy.

Table 1 Final pathology of parotidectomy specimens and review of parotidectomies									
	Parotidectomies (44 cases)	Review of parotidectomies (3 cases)							
Benign tumours									
Pleomorphic adenomas	19	2							
Warthin tumour	14								
Lipoma	1								
Myoepithelioma	1								
Sclerotic nodule	1								
Duct cysts	1								
Benign lymphoepithelial cyst	1								
Chronic lymphocyte sialoadenitis	1								
Malignant tumours									
Carcinoma	5	1							

Preoperative MRI was performed in 2 cases, one carcinoma ex pleomorphic adenoma with parapharyngeal tumour extension, and a pleomorphic adenoma affecting the deep lobe.

The average size of the operated parotid tumours was 24 (range, 2-55) mm and the resection margin was reported as close (<3 mm from the edge of tumour resection) in 13 benign tumours (1 myoepithelioma, 11 pleomorphic adenomas, and 2 Warthin tumours) and in 2 malignant (2 acinar cell carcinomas and 1 carcinoma ex pleomorphic adenoma). In 3 cases of pleomorphic adenoma there was capsular rupture, and 1 case was found of multifocal Warthin tumour.

In the parotidectomies, the average hospital stay was 2 days. In 28/43 (65%) of parotidectomies performed, facial paresis was evident in the immediate postoperative period (24 h after, in the first control at the service): of these, 17/28 (60%) were isolated marginal; 2/28 (7%), isolated frontal, and 9/28 (32%), of more than one facial branch.

Permanent facial paralysis occurred in 5% (2/35) of superficial parotidectomies and in 25% of the total (2/8, all due to malignant tumours). Of those occurring in superficial parotidectomies, both were by excision of pleomorphic adenomas, one of them affecting only the marginal branch and the other affecting more than one branch, with partial improvement before the annual monitoring; of those produced by total parotidectomies, both were due to surgery for carcinomas with involvement of several branches, one of the 2 presented partial improvement before the annual review.

As for other immediate postoperative complications, in 19/43 (44%) of parotidectomies performed, transients sialoceles were evident, which were treated on an out patient basis, without complications, through repeated punctures. In 6/43 (13%) cases there was some degree of necrosis or wound dehiscence, but only one of them required review surgery. In 2/43 (4%) cases there was postoperative bleeding which necessitated a surgical review of the wound, and 3/43 (7%) cases developed fever or superinfection of the wound. As late complication, only 1 (2%) patient in consultation referred a clinic of Frey syndrome.

Of the 16 submaxillectomies made in that period, only 3 were due to tumours affecting the submaxillary gland (Table 2); none of which presented complications, either by marginal nerve injury or by postoperative infection or bleeding.

Regarding evolution, with a minimum follow up of 12 (average, 20; median, 16) months, there were no recurrences in any of the tumours, regardless of their location (submaxillary, parotid, palatal, or ectopic).

Discussion

The intervention of the salivary glands represents 2% of total surgical activity developed in our department during the period between April 2004 and 2007 (66 surgeries from a total of 3133). Like for other authors, in our data there is a predominance of processes in the major salivary glands with respect to the minor, especially in the parotid region (71%), which explains that most of our surgeries were tumoural (80%), compared to other published series.^{1,9,10}

In our series of parotidectomies, malignant neoplasms account for 12% which is consistent with the classical findings in the literature.^{1,2,10} Parotid pleomorphic adenomas correspond to 51% (21/41) of benign cases and Warthin tumours to 34% (14/41). Compared with other recent series, which include benign and malignant processes, we have a somewhat higher percentage of Warthin tumours and malignant parotid tumours.^{1,2,9,10} Although the most common malignant tumour in the parotid gland, in most published series, is the mucoepidermoid carcinoma, in our series the most common were acinar gland carcinomas (2 cases) and carcinoma ex pleomorphic adenoma (2 cases) rather than mucoepidermoid (only 1 case).

Table 2 Submaxillary tumours of minor and ectopic salivary glands											
Location	No.	Pathological anatomy	Male/ Female	Age, average	Months of clinic	FNA/ biopsy	Image	Complication			
Submaxillary	3	1 pleomorphic adenoma, 1 Warthin tumour, 1 MALT lymphoma	1/2	48	9	indicated All FNA benign tumours	Ultra-sound	No			
Palatal	1	Cystic adenoid carcinoma	1/ 10	39	2	Biopsy indicated benign tumour	СТ	Small dehiscence			
Cervical	2	2 Warthin tumours	2/0	45	30	FNAª	CTa	No Marginal paresis of less than 1 month in 1 case			

CT indicates computed tomography; FNA, fine needle aspiration.

^aIn both cases of cervical location, both CT and FNA suggested a suspicion of branchial cyst, although in reality they were ectopic salivary gland tumours.

With respect to FNA in the parotid tumour affectation, as in other studies, ¹¹ sensitivity is clearly lower than specificity; in other words, it is easier for the parotid malignancy to be confused when performing FNA on benign processes (false negative) than to diagnose a benign process as malignant (false positive). ¹² Therefore, we believe, like other authors, ⁷ that in surgical planning the possibility of being faced with a malignancy should always be taken into account, despite the outcome of the FNA; intraoperative biopsy is very useful if there are discrepancies between the clinical impression, the cytology and the imaging tests.

As for imaging tests, they are very useful to determine the size, extraglandular or intraglandular location of the tumour, features suspicious of malignancy, local extension or cervical metastasis or systemic involvement. However, in our series, the ability of these tests to distinguish malignant tumours (in the case of ultrasound and CT) and among the various histological entities, has been less than in other series.¹³ Like other authors, ^{14,15} we believe that imaging tests alone are not useful in terms of predicting the final anatomy or grade of parotid tumours.

The average hospital stay was 2 days, which is comparable to that described by other authors.^{2,4,16} With respect to postoperative complications, a transient facial paresis was evidenced in 65% of parotidectomies performed, on the first day of admission, which is a higher figure than those given by some authors, such as Guntinas-Lichius et al,¹⁷ although comparable with those of others. 18-20 These differences are based on the fact that the evaluation of temporary facial paralysis in our department is recorded at 24 hours after surgery, whereas most of the series do it after 1 week, when many patients have improved. In fact, our number of permanent facial paralysis (5% superficial or partial and 25%total) is comparable with that of other authors.^{1,2,7} The permanent paralysis in total parotidectomies occurred in patients with malignant tumours. Despite being permanent paralysis, 50% of them had a partial improvement in facial mobility with respect to the immediate postoperative period.

Transient sialoceleswere evident in 44% of parotidectomies performed and were treated on an outpatient basis by repeated punctures; these figures are higher than those generally described in literature,²¹ although similar to those offered by other authors, who find them in 39% of partial parotidectomies,²² which is the most common type of surgery in our series. The presence of more residual salivary tissue in partial surgery may be the cause of these sialoceles, which are resolved in a few days.²³ Our figures of necrosis or wound dehiscence, postoperative bleeding, fever or superinfection of the wound and Frey's syndrome are comparable to others described in the literature.⁸⁻¹⁰

Finally, no evidence of recurrence has been observed in any of the tumours in this series, regardless of the location (parotid, submaxillary, or others), but it is important to note that it is a series with a short follow-up.

Conclusions

In our series, the most common surgical salivary pathology is the parotid, with a higher frequency of benign tumours and a higher incidence of Warthin tumours than in the literature. The most common malignant tumour is not the mucoepidermoid carcinoma, but the carcinoma ex pleomorphic adenoma and the acinic cell carcinoma.

The long-term sequelae, such as permanent facial paralysis (5%) or Frey's syndrome (2%), are similar to those described in the literature. However, almost half of all parotidectomies in our series presented transient sialocele, in connection with the current trend towards partial parotidectomy, which is resolved with repeated punctures of the surgical site.

Conflict of interests

The authors have indicated there is no conflict of interests.

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