

ORIGINAL ARTICLE

Management of the surgical pathology of the parotid gland: A review of 54 cases

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Abstract

Introduction and aim of the study: The management of the surgical pathology of the parotid gland and its results are relatively uniform. However, in both the diagnostic and the therapeutic aspects, there are some controversial issues that we discuss from the point of view of recent experience at our department.

Methods: A descriptive and retrospective study was conducted on patients who underwent parotidectomy for any indication between July 2004 and June 2009 (5 years).

Results: Fifty-four parotidectomies were performed in 52 patients. CT was the most commonly used preoperative diagnostic imaging study. The accuracy of fine needle aspiration (FNA) biopsy was 93.3%. Seventy six percent were benign processes; among them 7.3% with inflammatory causes. All of the surgical procedures from April 2005 onwards were performed with electrophysiological monitoring of the facial nerve. Superficial parotidectomy was performed in 75.6% of benign cases. The incidence of transient facial paresis in benign pathologies was of 14.6% (all of them of grades II and III). Two cases (both with total parotidectomy) had permanent facial mobility sequelae. The rhytidectomy incision was used preferentially in young women.

Conclusions: The controversial issues identified, due either to discrepancies or lack of enough evidence, were: the diagnostic role of MRI, the validity and usefulness of FNA, the indications of surgical treatment, the need for facial nerve monitoring and the consideration of cosmetic aspects, in particular the indications of rhytidectomy incision.

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PALABRAS CLAVE

Quirugía parotídea;
Monitorización
del nervio facial;
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Manejo de la patología quirúrgica de la glándula parótida: revisión de 54 casos**Resumen**

Introducción y objetivos: El abordaje de la patología quirúrgica de la glándula parótida y los resultados obtenidos son relativamente uniformes. Sin embargo, tanto en la vertiente diagnóstica como en la terapéutica, existen algunos aspectos controvertidos cuya discusión planteamos a partir de la experiencia reciente de nuestro servicio.

Métodos: Se realizó un estudio descriptivo retrospectivo sobre pacientes sometidos a parotidectomía por cualquier indicación entre julio de 2004 y junio de 2009 (5 años).

Resultados: Se realizaron 54 parotidectomías en 52 pacientes. La TC fue el estudio de imagen preoperatorio más utilizado. La validez de la PAAF fue del 93,3%. El 76% fueron procesos benignos; entre ellos el 7,3% de causa inflamatoria. Todas las intervenciones se realizaron con monitorización electrofisiológica del nervio facial a partir de abril de 2005. Se realizó parotidectomía superficial en el 75,6% de los procesos benignos. La incidencia de paresias faciales transitorias en patología benigna fue del 14,6% (todas grados II y III). Dos casos (ambos con parotidectomía total) tuvieron secuelas permanentes de movilidad facial. La incisión de ritidectomía se utilizó preferentemente en mujeres jóvenes.

Conclusiones: Identificamos como puntos de controversia, bien por discrepancia con la evidencia científica, bien por evidencia insuficiente: el papel diagnóstico de la RM, la validez y utilidad de la PAAF, las indicaciones del tratamiento quirúrgico, la necesidad de monitorización del nervio facial, y la consideración de los aspectos cosméticos, en particular las indicaciones de la incisión de ritidectomía.

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Introduction

The diagnosis and treatment of parotid gland pathology is distinctive. Parotid neoplastic processes are relatively rare but represent a major percentage of the pathologies of this region.¹ The most relevant diagnostic information in a parotid node comes from the clinical history (anamnesis and examination). However, it is common to carry out an imaging study, which depending on the context may be an ultrasound, a CT scan or an MRI, and to obtain a cytology sample by FNA. The validity of FNA as a diagnostic test is nearly 80%² so there can be differences in the histological type regarding the preoperative diagnosis in analysing surgical specimens, including changes regarding the existence or absence of malignancy. However, joint assessment of the clinical, radiological and pathological information should make final diagnoses that are unexpected or that cause changes in therapeutic approach, something exceptional.

In most parotid lymph nodes, surgery is the treatment of choice. The most common surgical procedure on the parotid gland is superficial parotidectomy. It is the treatment of choice for benign tumours located in the superficial lobe of the gland.³ However, there is currently a trend towards more conservative excisions.⁴

As in other kinds of interventions in which the incidence of complications is generally low, and with surgical indication being for benign pathology in the majority of cases, interest in recent years has focused on improving functional and aesthetic results. It is pertinent to note here that the most important factor for good cosmetic results in parotid surgery is avoiding facial paralysis.

We present the recent experience in our service in parotid gland surgery, targeting the exposure towards two

specific aspects of the management of this pathology, the first diagnostic, and the second therapeutic:

- Review of the diagnostic protocol for parotid nodes to reassess the role of diagnostic imaging and FNA.
- Assess, through the aesthetic and functional results, the introduction of two technical resources involving new perspectives in the surgical management of this pathology: intraoperative electrophysiological monitoring of the facial nerve (as a concept of patient safety) and the approach through rhytidectomy incision or facial lifting (as a concept of aesthetic design).

Patients and methods

We performed a retrospective study on a series of cases. The criterion for inclusion in the study was the performance of parotidectomy in the ENT service for any indication. We included patients treated between July 2004 and June 2009. Since our service is the only one that treats this disease in our health area, this is a sample with a relative absence of selection bias. The average population of the area in the study period was approximately 170,000 inhabitants.⁵ Cases were identified through the operating room reports.

Data for the study were obtained by reviewing medical records. For this procedure, a protocol was set up to input the surgical data archive into a form that attempted to ensure the introduction of all relevant information.

A database was generated that included:

- Clinical and radiological data: gender, age, classification in the American Society of Anesthesiologists Physical Scale (ASA PS), imaging study (ultrasound, CT or MRI scan).

- Pathological data: FNA and final anatomical pathology, size and location of the lesion (superior lateral, inferior lateral or medial portion of the gland), multifocality or bilaterality.
- Surgical data: procedure, surgeon, details of surgical technique (incision, Superficial Musculoaponeurotic System (SMAS), greater auricular nerve), surgical wound complications, preoperative and postoperative facial mobility.
- Monitoring data: cosmetic outcome (satisfactory or unsatisfactory according to the surgeon's subjective opinion), permanent sequelae of facial mobility, Frey's syndrome, other complications.

Since the review was focused on diagnostic and therapeutic aspects, we required only minimal follow-up for surgical wound stabilisation (or facial paresis if any). Although other monitoring data are discussed, complications that may arise in the medium term, such as Frey's syndrome, cannot be assessed very well for the last patients in the series. Evaluating possible recurrence was not a question for any of the patients in the time period defined.

Through agreement in our service, MRI is indicated as a routine imaging study in parotid lymph nodes.⁶ Until December 2004, the technique used was the "classic" parotidectomy, with cervico-preauricular incision (Blair incision) and SMAS lifting if possible, in addition to carrying out efforts to preserve the posterior branch of the greater

auricular nerve. At that time, the rhytidectomy incision was introduced in cases of benign pathology and for superficial lobe lesions, at the discretion of the surgeon responsible for each case.⁷ Facial nerve dissection was always performed with an anterograde approach from the prior identification of the main trunk, and no means of magnification (microscope or magnifying glasses) were routinely used. We did not carry out intraoperative biopsies in parotid pathology. The facial nerve (Figure 1) was monitored systematically in all patients from April 2005. The procedures were performed by any of the ENT specialist surgeons in the service indistinctly.

Facial mobility was described according to the new classification proposed as a review of the classic House-Brackmann scale, which we found particularly useful in this disease, as it allowed us to rate different branches separately.⁸

We have used the SPSS 16.0 statistical package. The descriptive statistics include the centralization (average or median) or dispersion (SD or other) indices of the different variables, with respect to the data distribution. Parametric or nonparametric tests indicated in each contrast were applied in the analytical statistics.

Results

During the 5-year period included in the study, 54 parotid glands in 52 patients were intervened. Of these, 28 (54%) were male and 24 (46%) were female. Considering the final pathological diagnoses, parotidectomy was indicated for a benign disease in 39 patients (75%); the other 13 indications (25%) were caused by malignancies. The pathological diagnoses of surgical specimens are detailed in Table. No association was found between gender and the presence or absence of malignancy ($P=.521$), but the presence of malignancy was associated with age: patients treated for malignant disease had a significantly higher average age (76 years [$SD=9.6$ years] versus 53.9 years [$SD=13.5$ years], $P<.0005$). Likewise, the ASA classification of patients with malignant disease was significantly higher ($P<.015$), although no patient was classified with an ASA over III in any of the groups.

Both parotids were operated on (non-simultaneously) for two bilateral Warthin's tumours in two patients. Another patient was reoperated on the same side due to recurrence of a parotid oncocytoma (the first intervention taking place 4 years before the second, outside the study period). In the following discussion, cases will refer to the number of glands and not to the number of patients.

Diagnostic tests in the parotid lymph nodes

The preoperative imaging study was MRI in 32% of cases; the rest of the patients were studied with CT scans. However, MRI was the technology chosen in 6 of the last 10 cases (chronologically). All patients with suspected malignancy were studied with CT and MRI was also performed in 3 cases. Ultrasound was requested for 2 patients, but was in no case the single imaging test.

Of the 49 cases clinically presented as parotid nodes (excluding the series of cases of affection by continuity of skin malignancies and the melanoma extension study),

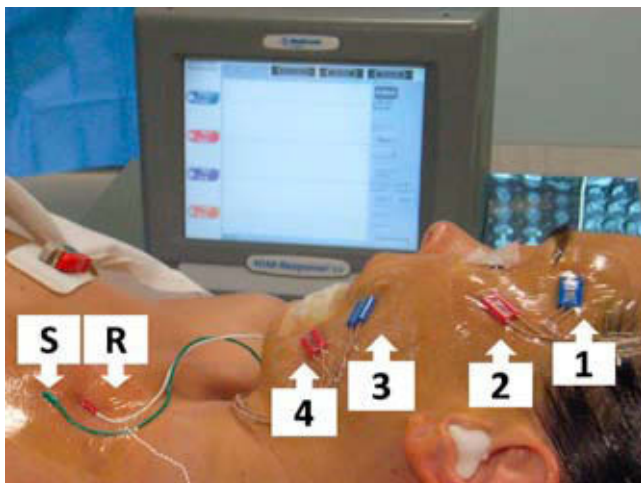


Figure 1 Intraoperative electrophysiological monitoring of facial nerve with 4-channel monitor. Double needle electromyogram electrodes were used for each channel according to the programmed settings for "parotidectomy": 1) frontalis in the frontal muscle; 2) oculi in the orbicularis of the eyelid; 3) oris in the orbicularis of the lips; and 4) mentalis in the region of the chin (mental muscle and depressor muscles of the lower lip and the corners of the mouth). In addition, 2 simple needle electrodes were placed in the upper chest region: the subdermal reference electrode (R) and the 'return' of the monopolar stimulator (S). The electrodes were covered with a sterile adhesive bandage to keep them from moving during surgery. Muscle relaxation was prevented by the anaesthesiologist.

Table Numerical distribution of cases of parotidectomy on the basis of postoperative anatomopathological diagnosis (July 2004-June 2009)

Benign pathology		Malignant pathology	
Pleomorphic adenoma	20	Acinar cell carcinoma	1
Warthin's tumour*	12	Squamous cell carcinoma	1
Eccrine hidrocystoma	1	Parotid A metastasis (SCC)	5
Myoepithelioma	1	Parotid A metastasis (melanoma)	1
Oncocytoma	3	Local extension (SCC recurrence)	4
Inflammatory pathology	3	Melanoma extension study	1
Epidermoid cyst	1		
<i>Total cases</i>	41	<i>Total cases</i>	13

A indicates adenopathy; SCC, squamous cell carcinoma (skin).

*Two glands recorded for each of the two patients operated bilaterally.

preoperative FNA was available in 45 cases. The report suggested a benign condition in 36 of them and malignancy in 9. Only in 3 of the 45 studies did the analysis of the surgical specimen provide a discordant diagnosis. In the first, a neoplasm with FNA suggestive of pleomorphic adenoma turned out to be a myoepithelioma. A second patient with FNA reported as inflammatory tissue turned out to have a Warthin's tumour. A final patient with an FNA suggestive of carcinoma was revealed to be an inflammatory pathology in the end.

Aesthetic and functional results in benign surgical pathology of the parotid gland

The 41 interventions for benign disease were divided evenly between the 2 sides: 20 on the left side and 21 on the right. The lesions were ipsilateral multicentric in 2 cases, and multicentric and also bilateral in another 2; the histology of all multiple lesions was Warthin's tumour.

Superficial parotidectomy was performed in 31 cases (75.6%), subtotal parotidectomy in 4 and total in 5 cases; in the last case in our series, the removal was less than a superficial parotidectomy ("partial" parotidectomy corresponding to the inferolateral quadrant of the gland).

In 17 cases we used the rhytidectomy incision (48.6% of the 35 interventions performed after this technique was introduced) (Figure 2). We performed a multivariate analysis using binary logistic regression to assess the factors on which the decision depended whether to use this incision or not (dichotomous outcome variable). To do this, we introduced patient gender, age and ASA classification, as well as the lesion size and location, and the surgeon responsible as predictor variables. Only age reached significance in the model ($P=0.007$). The population in whom the rhytidectomy incision was used had a median age of 44 years compared with almost 20 years more (median 63 years) for the conventional incision group. On the other hand, the lifting incision was used in 64.7% of women, and only 33.3% of men.

There were surgical wound complications in 2 patients with the classic approach and in 2 patients with rhytidectomy



Figure 2 In the "classic" parotidectomy incision, the cervical line is identifiable even in the best of cases. In the rhytidectomy incision, the preauricular line is completed with a retroauricular incision that rises until it crosses towards the back of the head with a gentle curve over the border of hair covered by the ear, leaving the rest of the line in the lower direction in the hair area (shaved in the patient in the image.) The first postoperative treatment is shown, 24 hours after the intervention. Drainage also exists through a "hidden" area. The preauricular incision is sutured with 4/0 silk and the postauricular with staples.

incision, with no differences in incidence. However, the only patient in the series in whom the long-term aesthetic result was considered unsatisfactory was one of the patients with complications in the classic incision. In 17 patients we could document preservation (10 cases) or section (7 cases) of the posterior greater auricular nerve, which did not correlate with complaints about earlobe hypoesthesia. SMAS flap raising and subsequent suturing were reflected in only 19 (50%) patients. Two patients had to be treated for Frey's syndrome. No patient developed salivary fistula.

None of the patients undergoing surgery for benign disease presented preoperative facial palsy. Six cases presented

transient postoperative paresis (grade II in 4 cases and grade III in 2 cases), which most frequently affected the mental branch. There were permanent mobility sequelae in 2 cases, both with total parotidectomy: grade III in a 61-year-old male intervened for a multifocal Warthin's tumour, and grade V in a 73-year-old patient with inflammatory pathology (albeit with prior FNA of carcinoma). In no case was there macroscopic disruption of any of the branches. The incidence of transient paresis (present at any time after surgery) was therefore 14.6%, and that of definitive paresis (persisting beyond 12 months), 4.9%. We also examined potential predictive factors of postoperative facial paresis, considering: gender and age, ASA classification, lesion size, monitoring, extent of resection, and surgeon. Only the performance of total parotidectomy ($P=0.006$) reached statistical significance as a risk factor.

Discussion

Parotidectomy is a very common surgical procedure. Quality standards have been proven valid in centres that are not super-specialised, even being performed by diverse surgeons, although the ethical duty to review and communicate the results from centres with a smaller volume of cases is indicated.⁹ The degree to which the most appropriate technical resources are implemented in the diagnosis and treatment of parotid nodules may be, however, uneven. In certain respects this is due to insufficient scientific evidence to guide towards one option or another, but in other cases there is no justified cause.

The differential diagnosis of parotid nodules is based on anamnesis, physical examination and, usually, imaging and FNA techniques. Although radiological documentation would not be strictly necessary in most cases (potential exceptions are noted, such as deep lobe tumours, facial paralysis or other data suggestive of malignancy, recurrence, etc.), it is common practice to obtain an image study. MRI is undoubtedly the choice over CT due to its superior definition of soft tissue and its higher sensitivity.⁶ Among the grounds for conducting an imaging study would be to obtain anatomical information (such as the relation of mass with the facial nerve), data on the radiological behaviour of the injury to support the diagnosis of cytological suspicion, and the simultaneous study of the contralateral gland (particularly important in lesions with high frequency of bilaterality such as Warthin's tumour). It is noted that in clinical practice both tests (CT and MRI) may be equally valid, with the choice being dictated by the availability of each, their cost and the surgeon's personal preference. This preference is often tilted towards the CT, a technique generally more familiar for the ENT specialist. This has been our case even with the prior agreement in favour of the MRI, and despite the fact that the latter can be available in a much shorter time period. In our opinion, the preferential indication of MRI should be insisted on, and this is in fact the tendency which we have observed in our own practice.

The fundamental limitation of FNA comes from the possibility of obtaining a non-representative lesion sample. However, its ability to distinguish between benign and malignant lesions is between 80%-90%.¹⁰ Knowing the specific figure for each centre might be interesting in the

decision-making process. In our case, the predictive value of benignity was 100% and of malignancy, 88.8%. The validity regarding diagnostic accuracy was 93.3%. Discrepancies must therefore be isolated events, although in some cases they may have significant implications, as has been described previously. Indicating FNA in parotid lymph nodes has proven to be cost-effective compared to direct surgical management, since the information provided by FNA leads to a non-surgical management in some cases; other benefits include its use in informed consent, surgical planning and the relief from anxiety for the patient.¹¹

The data regarding benign tumours of the parotid gland are uniform in the different series and ours follow the same line.^{1,3,9,12} There are, however, discrepancies in relation to inflammatory pathology, which in our series represented 7.3% of benign pathologies. Traditionally, in this indication the procedure is more complex because the surgery is done on fibrous tissue, which is more difficult to dissect. There is therefore more risk to the facial nerve, as well as an increase in the incidence of other complications such as salivary fistula. Nevertheless, this disease accounted for up to 22% of cases in some series.¹² It is possible that there are currently alternative treatments beyond drug therapy, such as sialendoscopy and the use of botulinum toxin. The first is undoubtedly a promising technique,¹³ which should probably be considered, particularly in obstructive pathology (due to lithiasis or other duct abnormalities).¹⁴ The second has proven effective in the treatment of recurrent parotiditis¹⁵ and, in fact, in our experience the functional "muting" of the gland has been a significant change in the treatment of several diseases associated with salivary secretion.¹⁶ It therefore seems probable that indicating parotidectomy for inflammatory pathology will tend to decrease.

In our service the intraoperative monitoring of the facial nerve is currently used systematically and throughout the entire procedure, whether or not the sacrifice of the facial nerve or one of its branches is expected. Although some series show that monitoring could improve the incidence of postoperative facial paralysis,¹⁷ particularly in revision surgeries,¹⁸ other studies do not confirm this.¹⁹ In our series, we have not confirmed its behaviour as a protective factor. However, the subjective impression of all surgeons involved in this review is that the monitoring procedure does not delay or interfere in it. It is useful in the identification of the main trunk of the facial nerve, as a functional control after the intervention; it is generally useful as an aid for the surgical gesture, in that it helps in learning what types of manoeuvres are less traumatic in dissecting nerve structures. The use of monitoring is very uneven, although the natural tendency is toward its generalisation.²⁰ Our policy is that the impossibility of monitoring (due to logistical problems or otherwise) is grounds for the suspension (postponement) of the intervention. The use of monitoring has no binding implications in intraoperative attitudes or decisions. It is a (redundant) safety mechanism, but given that preserving the facial nerve is the most important aspect of the surgery in most parotid excision procedures, it seems reasonable to use all possible means to achieve this end. In any case, it is evident that with current data, monitoring cannot be considered as a standard.

The rhytidectomy incision, along with the SMAS flap, improves the cosmetic outcome,²¹ even raising facial

rejuvenation as a second primary objective of surgery.²² The approach through the lifting incision was used in our service from January 2005 and has been comfortable for the surgeon in all cases, tending to become a standard. We have observed highly satisfactory medium-term aesthetic results. However, the clear trend is to offer this type of incision to young patients, particularly women. The criteria for selecting patients for this incision are not well established, but do not explicitly include age or gender. Serious reasons to consider its exclusion would be malignant disease, expected difficulty in dissection (arteriovenous malformations are mentioned), and parapharyngeal masses and relapses.⁷ The remaining patients would be susceptible of being intervened using a rhytidectomy incision, whose main advantage is that it leaves no cervical scar. The disadvantages would be its poor adaptability to adapt the surgery to include cervical surgery (which should be exceptional and not foreseen), theoretically worse flap vascularization and, potentially, worse exposure of the anterior portion of the gland. Like other authors, we have not encountered problems with exposure or with the flap. On the other hand, the retroauricular scar is formed in an area making scar appearance almost irrelevant.

Preserving the posterior branch of the auricular nerve appears to reduce postoperative sensory disturbances of the earlobe.²³ However, more recent studies indicate that this sensory deficit improves over time and, in any case, no differences are reflected in questionnaires of quality of life between those patients in whom it is preserved and those in whom it is not.²⁴ This technical detail has not acquired importance in our series.

We observe, as described, a probable underdiagnosis of Frey's syndrome.²⁵ The incidence presented (3.7%) reflects symptomatic cases in which the patient has sought treatment. However, quality of life studies show that Frey's syndrome is the major concern of long-term patients, and steps should therefore be taken to prevent it.²⁶

The aim of this study was to highlight some controversial issues in the management of parotid surgical pathology, which have in fact been reflected in our daily practice. Each of the aspects considered would require the design of studies aimed at providing a higher level of scientific evidence concerning the most appropriate approach in each case.

Conclusions

Within the relative uniformity in the diagnostic and therapeutic management of surgical pathology of the parotid gland, there are still opportunities for improvement, which we have aimed to highlight through our own experience. Scientific evidence indicates that the MRI must acquire a more important role in imaging diagnosis of parotid nodules. On the other hand, we have attempted to define FNA validity in our environment, to properly assess its results. The discussion as to whether or not monitoring is essential still suffers from the lack of sufficient evidence in either direction. Finally, considering issues related to the overall improvement of patients' quality of life is inevitable. Of course, this has to include the avoidance of complications, but should also have a greater focus on cosmetic aspects.

Conflict of interests

The authors declare no conflict of interests.

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