Acta Otorrinolaringol Esp. 2010;**61(1):**1-5

Acta Otorrinolaringológica Española

www.elsevier.es/otorrino

ORIGINAL ARTICLE

Parotidectomies in benign parotid tumours: "Sant Pau" surgical extension classification

Miquel Quer,[a,*] Albert Pujol,[a] Xavier León,[a] Montserrat López,[a] Jacinto García,[a] César Orús,[a] and José Ramón Sañudo[b]

[a]*Servicio de ORL y Patología Cervicofacial, Hospital de la Santa Creu i Sant Pau, Universitat Autònoma de Barcelona, Barcelona, Spain*
[b]*Departamento de Anatomía Humana I, Facultad de Medicina, Universidad Complutense, Madrid, Spain*

Received September 28, 2009; accepted October 5, 2009
Available online December 3, 2009

KEYWORDS
Parotid neoplasms;
parotid gland; parotid gland surgery

Abstract
Introduction and goals: At present different options co-exist for treating benign tumours of the parotid gland, which has led to some confusion about the extent of resection performed in each case. In an effort to improve this situation, we created a classification system to define the areas removed. We started using this classification in July 2006, and this article reviews its applicability and usefulness.
Methods: We analysed 44 patients who underwent surgery for clinically benign tumours of the parotid gland in our department between July 2006 and December 2008. Our classification was applied in all resections, dividing the parotid gland into five areas: I (lateral superior), II (lateral inferior), III (deep superior), IV (deep inferior), V (accessory).
Results: The classification was easily applied and presented no practical problems in the 44 patients operated on. When analysing the areas excised in surgery, the most common surgery was lateral inferior partial parotidectomy (removal of Area II), in 47% of the cases. Lateral parotidectomy (removal of Areas I and II) was the next most frequent, with 14 cases (33%). The remaining 20% was distributed among the other options.
Conclusions: Our classification system appears to be a simple, easy way to define the surgery performed in each case, which simplifies the description of the resection performed, even in unusual resections.

*Corresponding author.
E-mail address: mquer@santpau.cat (M. Quer).

0001-6519/$ - see front matter

PALABRAS CLAVE
Tumores de la parótida;
Glándula parótida;
Cirugía de la glándula parótida

Parotidectomías en tumores benignos: clasificación "Sant Pau" de la extensión de la resección

Resumen
Introducción y objetivos: En la actualidad coexisten diferentes opciones para tratar un tumor benigno de la glándula parótida, lo que ha llevado a una cierta confusión sobre la extensión de la resección que se realiza en cada caso. Para intentar mejorar dicha información, se creó en nuestro servicio un sistema de clasificación por áreas para definir la parte extirpada. Se empezó a utilizar en julio de 2006 y en este artículo se revisa su aplicabilidad y utilidad.
Métodos: Se analizan 44 pacientes operados en nuestro servicio de tumores clínicamente benignos de la glándula parótida, en el periodo comprendido entre julio de 2006 y diciembre de 2008. A todas las resecciones se les aplicó el sistema de clasificación de nuestro centro, que divide la parótida en 5 áreas: I (lateral craneal), II (lateral caudal), III (profunda craneal), IV (profunda caudal), V (accesoria).
Resultados: La clasificación ha sido de fácil aplicación y no ha presentado ningún problema práctico en los 44 pacientes operados. Al analizar las áreas resecadas en la cirugía, destaca el alto porcentaje (47%) de parotidectomías laterales parciales caudales (resección del área II). La parotidectomía lateral (resección áreas I-II) ha sido la segunda en número con 14 casos (33%). El 20% restante se ha repartido entre las demás opciones.
Conclusiones: El sistema de clasificación por áreas ha permitido definir con claridad la cirugía realizada en cada caso y ha permitido explicar de forma fácil la resección realizada, incluso en aquellos casos de resecciones poco habituales.

Introduction

The evolution of surgery of benign tumours of the parotid gland from the late eighteenth century has followed the fortunes of the various advances in technical and diagnostic knowledge. The progress went from very limited surgery in the nineteenth century (enucleation) with rates of recurrence in benign tumours of about 25%, to a progressive introduction, in the first half of the twentieth century, of more extensive surgery that obtained significant improvement in the rate of recurrence.[1-3] This wider surgery consisted mostly of lateral parotidectomy (also called superficial or suprafacial) as a minimum technique for the majority of schools. However, for a few schools, the minimum surgery was total parotidectomy with facial preservation.[2]

This move towards more extensive surgery was contested from the 1980s. Different authors again proposed more limited surgery (with the intention of reducing the sequels), based on the aid offered by the progress in imaging studies, fine needle aspiration biopsy (FNAB) and facial nerve monitoring.[1,3-10] Of these various less extensive techniques, the most widely used at present are partial lateral parotidectomy and extracapsular resection.[4-8,10,11]

Thus, at present, all these options mentioned coexist (the most ancient and the most modern) for the treatment of a benign parotid tumour. Such options, from least to highest volume of resection are: enucleation (seldom used), extracapsular resection, partial lateral parotidectomy, lateral parotidectomy and total parotidectomy with preservation of the facial nerve. In our centre we have been introducing partial lateral parotidectomy and very timely, extracapsular resection; thus the techniques currently coexist with lateral parotidectomy, total parotidectomy and different intermediate resections depending on the tumour.

Such a variety of techniques, along with certain dispersion in the criteria that define them, has led to some confusion about the surgery performed in each situation and about the extent of resection. To try to improve this situation, we created a rating system to define the areas excised from the parotid gland, which we started using in July 2006. In this article we review its applicability and usefulness.

Material and methods

Patients

We analysed the patients operated in our department for clinically benign parotid gland tumours during the period between July 2006 and December 2008. Data from all patients and surgeries were entered prospectively into a computerised database and analysed retrospectively for this study. The diagnostic study prior to surgery included cytology by fine needle aspiration and an imaging test (CT or MRI) in all cases. From the clone study, cytology and imaging tests, all lesions were classified as presumptively benign.

During the period mentioned, 44 surgeries for presumptively benign tumours of the parotid gland were carried out. The average age of these patients was 46 years, with ages ranging from 14 to 83. The decade with the highest incidence was that between 30 and 40 years (10 cases). In terms of gender, the cases were distributed very similarly between the two: 21 were males and 23 females.

Table 1 shows the final histology. It should be noted that in 4 cases the definitive diagnosis was that of malignant process (1 acinar cell carcinoma and 3 MALT-type lymphomas), whereas in the remaining 40 cases the process was confirmed to be benign, one of them being a simple cyst. In the benign tumours, the usual prevalence of pleomorphic adenomas (24 cases) and Warthin's tumours (13 cases) was observed.

Classification system

In 2006 we decided to create an area classification system of parotid resection, based on our previous experience. Our classification divides the parotid into 5 areas (Table 2, Figures 1-3): Area I or lateral cranial, Area II or lateral caudal, Area III or deep cranial, Area IV or deep caudal, and Area V or accessory.

The separation between caudal and cranial is established from an imaginary line connecting the bifurcation of the facial nerve trunk in its two major branches (temporofacial and cervicofacial) with the exit of the parotid from the Stenon duct (Figure 3). Basically, the cranial part is that corresponding to the branch of the temporofacial nerve and the caudal to the cervicofacial branch.

Table 1 Definitive histology of the 44 operated patients

Definitive histology	No.	%
Pleomorphic adenoma	24	55
Warthin's tumour	13	30
Monomorphic adenoma	2	4
Simple cyst	1	2
Acinar cell carcinoma	1	2
MALT-type lymphoma	3	7
Total	44	100

Table 2 Classification of parotid areas

Anatomical zone	Area
Lateral (superficial or suprafacial) cranial	I
Lateral (superficial or suprafacial) caudal	II
Medial (deep) cranial	III
Medial (deep) caudal	IV
Accessory	V

Results

Our classification has been applied in 44 cases of parotid surgery in clinically benign tumours. In all of them, it has been easy to apply and no practical problem have presented themselves in the interpretation of the resected region.

Table 3 lists the various surgical techniques, depending on the extent of resection and their nomenclature according to the resected areas. We highlight the high percentage of partial caudal lateral parotidectomies (resection of Area II), which was the most frequent surgery (47% of cases). The lateral parotidectomy (resection of Areas I-II) was the second in number, with 14 cases (33%). The remaining 20% is distributed among the other options (1, 2, or 3 cases each). It is noteworthy that classifying into areas allows the extent of resection to be understood easily, even in those cases in which less common resections were performed. We should also mention a case of resection of only the deep lobe (Areas III-IV) while preserving the lateral lobe.

Discussion

The evolution of resection in the treatment of benign tumours of the parotid gland has ranged from limited

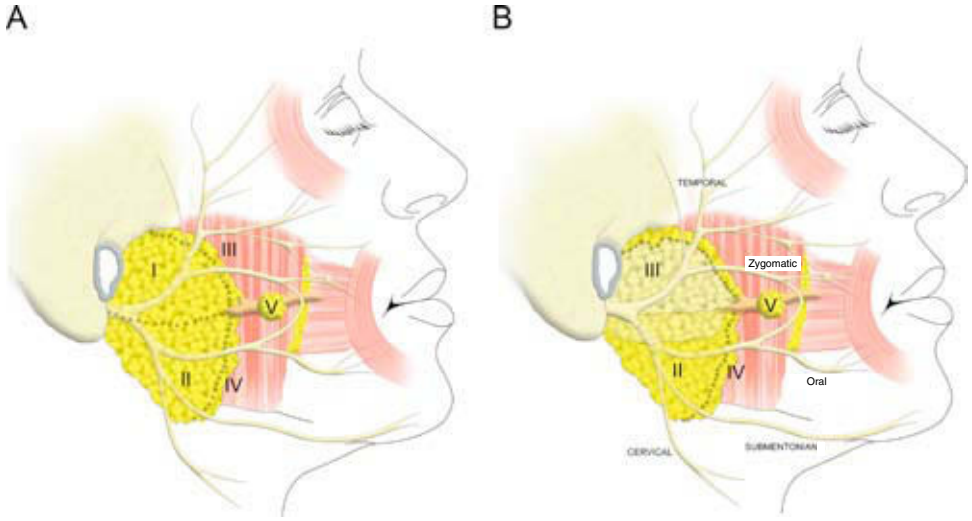

Figure 1 Drawing of the 5 proposed areas. A) The complete parotid gland can be observed. Areas I and II correspond to the lateral part, while III and IV are the deep. The craniocaudal division marks the line connecting the bifurcation of the facial nerve with the Stenon duct. B) Area I has been resected to better expose the situation of the deep areas (III and IV).

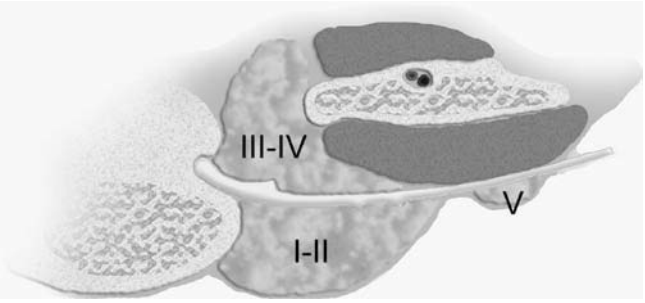

Figure 2 Drawing of a cross-section at the level of the parotid gland showing the facial nerve crossing from the fallopian canal to its location above the masseter muscle. It enables visibility of the disposition of the superficial areas (I and II) and the deep areas (III and IV). It also presents Area V, corresponding to the accessory area.

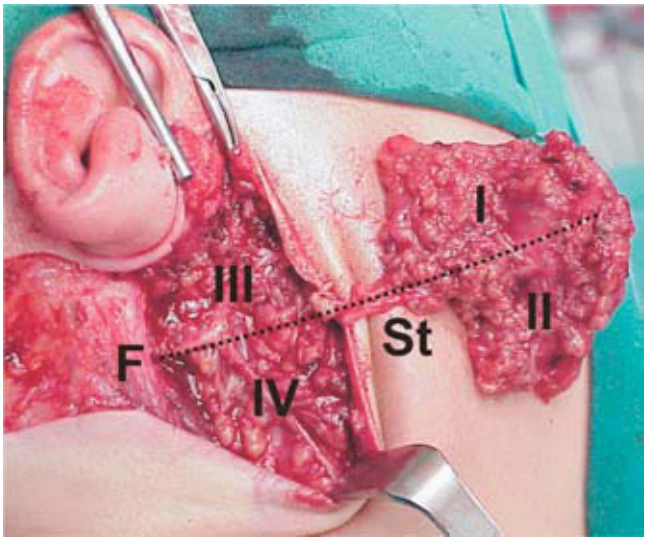

Figure 3 Intraoperative location in which Areas I and II (lateral) have already been separated from the deep lobe and the facial nerve (F), being fixed only by the Stenon duct (St). In the deep region, Areas III and IV are exposed. The dotted line marks the craniocaudal separation from the bifurcation of the facial nerve to the Stenon duct.

resections to the total parotidectomies.[1-4] At present there is a tendency to use limited surgeries, especially in small tumours. A recently published clinical trial has concluded that more functional surgery in benign tumours of the parotid gland enables better cosmetic results, with better sensitivity, less morbidity and equal tumour control.[5]

However, in practice there are still various coexisting surgical options, which can be summarized (from less to more resection) as: enucleation, extracapsular dissection, partial lateral parotidectomies, lateral parotidectomies and total parotidectomies.[5-11] In addition, each of these surgeries is subject to different interpretations. As a consequence of the current situation, it is difficult to exchange information on the extent of surgery and to compare the results obtained. A proposed classification system of parotid surgery was recently published[12] that was based on five types of resection: total parotidectomy, complete superficial parotidectomy, partial superficial parotidectomy (which divides the cranial, middle and caudal segments into resections), selective parotidectomy of the deep lobe and extracapsular dissection. Although this provides an illuminating and well-structured view, we feel that our classification system by areas is easier to implement and allows a clear view of the resection performed.

A similar situation occurred with cervical emptying a few years ago and, in the end, the classification by levels unified the nomenclature of the emptyings themselves.[13,14]

Therefore, for the sake of standardising resections, a classification of parotid resection into 5 areas was proposed in our centre. Our system has its greatest advantages in its easy applicability and the use of easily recognisable anatomical landmarks. Obviously, the division into these areas does not intend to and cannot establish "lobes" or well-defined anatomical entities. In fact, the search for well-defined anatomical landmarks (facial nerve bifurcation and Stenon duct) pursues a greater ease in defining the areas, in the awareness that this is an arbitrary division, from an anatomical point of view.

However, from clinical and surgical points of view, this division is of clear interest. Most benign parotid tumours currently diagnosed are located in what is generally known as the "tail" of the parotid gland, that is, the inferolateral part, which has been defined as Area II. In fact, at the present time, the size of the tumours treated has decreased dramatically (thanks to early diagnosis facilitated by modern

Table 3 Resection performed in the 44 cases analysed according to our classification

Amplitude of resection	Denomination of parotidectomy	No.	%
I	Lateral partial cranial	1	2
II	Lateral partial caudal	20	47
I+II	Lateral	14	33
III+IV	Deep or medial (preserving lateral)	1	2
II+IV	Caudal complete	3	6
I+II+III	Lateral extended to cranial medial region	1	2
I+II+IV	Lateral extended to caudal medial region	2	4
I+II+III+IV (7V)	Total	1	2
V	Partial (only accessory part)	1	2
Total		44	100

imaging studies); therefore, resection of only this Area II has become one of the most common surgeries.

The extent of resection depends on tumour location and size. Tumours with large volumes often require total or lateral parotidectomies, but tumours smaller than 3 cm can be treated (according to different opinions) with more limited surgeries that are not always easy to systematise.

The interest in dividing the parotid gland into 5 areas lies in an attempt to provide language that is easily understood and applied, from which to systematise the most demanded surgeries for lesions that will become increasingly more common.

Conclusions

Our system of classifying the parotid gland by areas has helped to easily define the surgery performed in each case and has enabled an explanation of the resection performed in each case. Surgery carried out at present requires resections that are more tailored to the extension of the tumour. In this series at our service, in 47% of cases there was resection of only Area II, while in 33% of cases, there was resection of Areas I and II (lateral parotidectomy). The remaining 20% were ‘custom’ resections depending on the location and extent of the benign tumour.

Conflict of interests

The authors declare no conflict of interests.

References

1. Witt RL. The significance of the margin in parotid surgery for pleomorphic adenoma. Laryngoscope. 2002;112:2141-54.
2. Laccourreye H, Laccourreye O, Cauchois R, Jouffre V, Mónard M, Brasnu D. Total conservative parotidectomy for primary benign pleomorphic adenoma of the parotid gland: a 25-year experience with 229 patients. Laryngoscope. 1994;104:1487-94.
3. Witt RL. Minimally invasive surgery for parotid pleomorphic adenoma. Ear Nose Throat J. 2005;84:310-1.
4. Johnson JT, Ferlito A, Fagan JJ, Bradley PJ, Rinaldo A. Role of limited parotidectomy in management of pleomorphic adenoma. J Laryngol Otol. 2007;1:1-3.
5. Roh JL, Kim HS, Park CI. Randomized clinical trial comparing partial parotidectomy versus superficial or total parotidectomy. Br J Surg. 2007;94:1081-7.
6. Yamashita T, Tomoda K, Kumazawa T. The usefulness of partial parotidectomy for benign parotid gland tumors. A retrospective study of 306 cases. Acta Otolaryngol Suppl. 1993;500:113-6.
7. Leverstein H, Van der Wal JE, Tiwari RM, Van der Waal I, Snow GB. Surgical management of 246 previously untreated pleomorphic adenomas of the parotid gland. Br J Surg. 1997;84: 399-403.
8. Rea JL. Partial parotidectomies: morbidity and benign tumor recurrence rates in a series of 94 cases. Laryngoscope. 2000; 110:924-7.
9. Smith SL, Komisar A. Limited parotidectomy: the role of extracapsular dissection in parotid gland neoplasms. Laryngoscope. 2007;117:1163-7.
10. López M, Quer M, Leon X, Oms C, Recher K, Vergós J. Utilidad de la monitorización del nervio facial en la cirugía de la glándula parótida. Acta Otorrinolaring Esp. 2001;52:418-21.
11. Lahoz Zamarroa MT, Galve Royo A, Galve Royo F. Afección tumoral de las glándulas salivales. Nuestra experiencia. Acta Otorrinolaringol Esp. 2009;60:120-5.
12. Tweedie DJ, Jacob A. Surgery of the parotid gland: evolution of techniques, nomenclature and a revised classification system. Clinical Otolaryngology. 2009;34:303-8.
13. Shah JP, Strong E, Spiro RH, Vikram B. Surgical grand rounds. Neck dissection: current status and future possibilities. Clin Bull. 1981;11:25-33.
14. Robbins KT, Medina JE, Wolfe GT, Levine PA, Sessions RB, Pruet CW. Standardizing neck dissection terminology. Official report of the Academy’s Committee for Head and Neck Surgery and Oncology. Arch Otolaryngol Head Neck Surg. 1991;117: 601 -5.