ROUND TABLE 91ST NATIONAL CONGRESS S.I.O.

Extended parotidectomy

Parotidectomie allargate

M. DE VINCENTIIS, G. MAGLIULO, P. SOLDO, V. MANCIOCCO, G. PAGLIUCA, R. DEL GAIZO, A. GALLO
"Giorgio Ferreri" Department of Otolaryngology, Audiology and Phonation, "La Sapienza" University, Rome, Italy

Key words

Parotid gland • Malignant tumours • Treatment • Extended parotidectomy

Parole chiave

Ghiandola parotide • Tumori maligni • Trattamento • Parotidectomia allargata

Summary

Malignant tumours of the parotid gland represent a group of relatively rare lesions. The medical records of 363 patients with parotid swelling treated between 1974 and 2003 at the "G. Ferreri" Department of Otorhinolaryngology, "La Sapienza" University in Rome were retrospectively analysed. Clinical presentation, pre-operative investigations, surgical procedure, histopathology report, post-operative complications, and the oncological results of 19 patients who underwent extended radical parotidectomy for malignant neoplasm of the parotid gland are discussed. Extended radical parotidectomy, reserved for neoplasms in an advanced stage, involves the removal of the entire parotid gland, with sacrifice of the facial nerve and the resection en bloc of the adjacent structures affected by neoplastic infiltration, such as the temporal bone, the mandibular bone, the skin, blood vessels and nerves. In addition to this surgical treatment, a cycle of adjuvant radiotherapy is also necessary. The overall rate of survival at 10 years depends mainly on the histological characteristics of the tumour, and, in this series, is reported to be approximately 58%. These data indicate that total extended radical parotidectomy combined with post-operative radiotherapy, represents the best therapeutic approach with regard both to quality of life and life expectancy, in patients with an advanced stage of malignant neoplasm of the parotid gland.

Riassunto

I tumori maligni della ghiandola parotide rappresentano un gruppo di lesioni eterogenee e relativamente rare. Partendo da una casistica di 363 pazienti con tumefazione parotidea trattati presso il Dipartimento di Otorinolaringoiatria, Audiologia e Foniatria "G. Ferreri" dell'Università di Roma "La Sapienza" tra il 1974 ed il 2003, abbiamo retrospettivamente analizzato i risultati oncologici di 19 pazienti sottoposti ad intervento di parotidectomia radicale allargata per una neoplasia maligna della ghiandola parotide. La parotidectomia radicale allargata, riservata a neoplasie in stadio avanzato, associa all'asportazione di tutto il parenchima ghiandolare parotideo compreso il nervo facciale, la resezione in blocco delle strutture contigue alla ghiandola interessate da infiltrazione neoplastica come l'osso temporale, l'osso mandibolare, la cute, i vasi ed i nervi. È necessario associare alla terapia chirurgica un ciclo di radioterapia adiuvante. La sopravvivenza globale a dieci anni è condizionata principalmente dalle caratteristiche istologiche del tumore ed è del 58%. Questo dato indica che la parotidectomia totale allargata associata a radioterapia post-operatoria, rappresenta l'approccio terapeutico migliore per qualità ed aspettativa di vita nei pazienti con stadio avanzato di neoplasia maligna della ghiandola parotide.

Introduction

Diseases affecting the salivary glands include traumatic lesions, congenital diseases, acute and chronic infections, as well as neoplastic lesions [1-3].

Tumours of the salivary glands are rare, and account for between 0.4 to 6.5 cases per 100,000 persons per year and represent from 2% to 6.5% of neoplasms of the head and neck. They may appear in the major salivary glands (90% cases) or in the minor salivary glands (10% cases). The parotid gland is by far the most frequently affected site, while the submandibular (9%) and the sublingual glands (1%) are much less frequently involved. Malignant tumours of the salivary glands represent 0.7% of all malignant tumours: approximately 3% of those affecting the head and neck, and 30% of all salivary neoplasms. The rate of malignancy varies greatly in the different sites: 15-32% in the parotid, 41-45% in the submandibular, 70-90% in the sublingual and approximately 50% in the minor salivary glands. As far as concerns male/female incidence, a slight prevalence of benign tumours is found in females, while malignant tumours show a greater incidence in males. Due to the multiplicity and complexity of neoplastic histotypes which may involve the salivary glands, neoplasms in these organs cannot be associated with other sites in the head and neck [1-3]. The most recent proposals for classification have been submitted by the World Health Organization [4], which has a greater following in the European environment. Pleomorphic adenoma is the most frequent benign neoplasm of the

salivary glands, representing between 45% and 80% of all tumours of the salivary glands. Warthin's tumour (cysto-adenolymphoma) represents 10%, while the remaining 10% consists in monomorphic adenomas. Of the malignant tumours, mucoepidermoid carcinoma represents 30% of malignant neoplasms, followed by adenoid-cystic carcinoma (25% of cases), carcinoma on pleomorphic adenoma (15% of cases) and acinic-cell carcinomas (5%-10% of cases) [2]. Tumours of the parotid gland are benign in 80% of cases, the pleomorphic adenoma being the most common (80% of cases). The incidence of these tumours increases after the third decade, reaching a peak in the sixth decade, without any significant male/female differences [2]. Malignant neoplasms of the parotid develop initially in a nodular form with an asymptomatic growth expansion. In a second phase, malignancy becomes manifest assuming infiltrate aspects with invasion of the adjacent structures, associated with the appearance of related symptoms. Paralysis of the facial nerve, which is the main symptom of malignant infiltration, occurs in only 14% of cases of parotid carcinoma [3]. Other signs of malignancy are rapid growth with infiltration into the skin and appearance of lymph node metastases. Lymph node metastases are, nevertheless, quite rare in primary malignant neoplasms of the salivary glands [3].

Diagnostic procedures currently indicate ultrasonography (US) as being the technique of choice, combined with fine needle aspiration biopsy (FNAB) and cytological examination [5 6]. FNAB has now reached a high level of diagnostic accuracy, allowing a reliable diagnosis and a more rational treatment programme. In addition to US, Magnetic Resonance (MR) and Computed Tomography (CT) are considered the more reliable imaging techniques in defining the exact location of the neoplasm in the glandular context (intrinsic or extrinsic), as well as the extension of the disease to the adjacent structures (bone, blood vessels, nerves). Positron Emission Tomography (PET) imaging [5 6] which has recently started to be used, still awaits evaluation.

Treatment of neoplasms of the parotid gland is traditionally surgical, even if recent clinical studies have contributed to modifying the concept of the radio-resistance of these tumours, demonstrating that different histotypes are relatively sensitive to radiation therapy [7 8]. Post-operative radiotherapy is used in cases of residual disease or advanced stage disease. Chemotherapy is generally used in advanced stages of the disease, mostly as a palliative measure [9]. In establishing therapeutic strategies, attempts have been made [10 11] to use prognostic factors for the identification of a class at low risk in which there are indications, exclusively, for conservative surgery. Histological tumour type and tumour stage determine the extent of the surgical procedures, which range from superficial parotidectomy, with preservation of the facial nerve, to radical parotidectomy with or without reconstruction of the facial nerve. Superficial parotidectomy is performed in the case of benign neoplasms of the superficial lobe; conservative total parotidectomy is performed in the case of large benign neoplasms or malignant neoplasms with no infiltration of the facial nerve; radical parotidectomy, with sacrifice of the facial nerve, is performed when neoplastic involvement of the facial nerve is present. In the case of malignant tumours extended to the temporal bone or to the mandibular bone or to the skin, an extended radical parotidectomy is performed. Dissection of the neck is performed in cases of suspected lymph node metastases. Radical parotidectomy and radical extended parotidectomy are reserved for advanced stages of disease, aimed at total excision of the neoplastic mass with free-margins of resection. Extended parotidectomy involves complete removal of the entire parotid gland, including also excision of the facial nerve, sectioned at the level of extra-cranial emergence, associated with resection of the adjacent structures (skin, temporal bone, mandibular bone and mandibular joint, blood vessels, and nerves) invaded by the neoplasm, choice depending on each individual case. Survival of patients with malignant tumours of the parotid gland depends mainly on the histological characteristics and the stage of the tumour. The histological types with the best prognosis are acinic-cell carcinoma and the mucoepidermoid carcinoma, which, according to some Authors [7-9], reach an overall survival rate at 10 years of 80%, unlike adeno carcinoma, undifferentiated carcinoma and squamous cell carcinoma (SCC) for which the prognosis is often unfavourable, even after excision and/or radiotherapy.

Material and methods

A retrospective analysis has been made of a group of 19 patients (9 female, 10 male, mean age 54.5 years) with primary malignant parotid tumour of different histological types, submitted to extended radical parotidectomy, between 1974 and 2003 at the Department of Otorhinolaryngology, "La Sapienza" University, Rome. The patients came to our Department complaining of a swelling in the parotid region, generally not accompanied by pain. Only in a few cases was intense pain reported, and trisma or paralysis of the facial nerve was observed. Patients were submitted to the standard diagnostic protocol used in our Department for the treatment of parotid swellings, consisting in US and FNAB. If US revealed lesions with deep or extraglandular extension, CT or MR were performed. Of the 363 patients taken into consideration in our study, 54 (15%) were af-

Table I. Extended parotidectomy.

Surgical treatment	Patients
Extended parotidectomy to skin	6
Extended parotidectomy to skin and mandibular bone	2
Extended parotidectomy to mandibular bone	3
Partial mastoidectomy	4
Total mastoidectomy	3
Extended petrosectomy	1
Total	19

fected by malignant neoplasms of the parotid gland, 19 of which submitted to extended parotidectomy (Table I). In 6 cases, the parotidectomy was extended to the skin, in 2 cases to the skin and mandibular bone, in 3 cases only to the mandibular bone, in 8 cases to the temporal bone (4 partial mastoidectomy, 3 total mastoidectomy, 1 petrosectomy. In those cases in which lymph node involvement is suspected at diagnosis or during the surgery following intra-operative histological examination, neck dissection was carried out (Table II). Post-operative radiation therapy was performed in all cases.

Table II. Lymph node metastases and neck dissection.

Histotype	Neck dissection	Total
High grade mucoepidermoid	10 (41.7%)	24
Acinic cell carcinoma	0	3
Adenoid cystic carcinoma	0	3
Adenocarcinoma	1 (12.5%)	8
Squamous cell carcinoma	1 (33.3%)	3
Total	12	41

Results

Of the 363 patients taken into consideration in our study, 54 (15%) were affected by malignant neoplasms of the parotid gland. As far as concerns benign tumours, the most frequent histological type is pleomorphic adenoma (33.8% of cases) and cystic-adenoma (33% of cases) whilst the most frequent histological type, in malignant neoplasms, is mucoepidermoid carcinoma (6.6% of cases) followed by adenocarcinoma and lymphoma (2.5% for both histological types) (Table III). Pathological staging of the neoplasm is outlined in Table IV. The survival rate after 10 years, based on the treatment performed and the histological type treated, are shown in Table V.

Table III. Parotid swellings.

Histotype	Patients	%
Pleomorphic adenoma	141	33.8
Adenolymphoma	120	33
Mucoepidermoid carcinoma	24	6.6
Adenocarcinoma	9	2.5
Lymphoma	9	2.5
Adenoma	3	0.8
Acinic cell carcinoma	3	0.8
Squamous cell carcinoma	3	0.8
Adenoid cystic carcinoma	3	0.8
Malignant schwannoma	3	0.8
Others	45	12.4

Table IV. Pathological TNM staging.

Histotype	Patients	pTNM
Adenoid-cystic carcinoma	6	pT4a pN0
Adenocarcinoma	2	pT4a pN0
Acinar cell carcinoma	2	pT4a pN0
High grade mucoepidermoid carcinoma	3	pT4a pN3
Low grade mucoepidermoid carcinoma	1	pT4a pN0
Squamous cell carcinoma	2	pT4a pN0
Mucoepidermoid carcinoma	1	pT4a pN0
Basalioma	1	pT4a pN0
Malignant myo-epithelioma	1	pT4a pN0
Total	19	

Discussion

Tumours of the salivary glands are relatively less frequent neoplasms, accounting for approximatley 3% of all tumours of the head and neck [1-3]. The occurrence in Western countries is 0.4-6.5 cases per 100,000 persons per year. The parotid gland represents the most common site for this type of lesion, being involved in around 80% of all cases [2]. Of these neoplasms, approximately 80% consist in benign lesions, and of these, approximately 80% are pleomorphic adenomas [2].

As also demonstrated by the present study, of the malignant tumours which may occur in these sites, the most frequent histological type is mucoepidermoid carcinoma, which accounts for approximately 10% of

Table V. Overall survival rate after 10 years.

Surgical treatment	N. cases	Overall survival at 10 years
Extended parotidectomy to skin		
Adenoid cystic carcinoma	2	50%
Acinic cell carcinoma	2	
Adenocarcinoma	2	
Extended parotidectomy to skin and mandibular bone		
Adenoid cystic carcinoma	1	100%
Mucoepidermoid carcinoma	1	
Extended parotidectomy to mandibular bone		
Mucoepidermoid carcinoma	3	0%
Extended parotidectomy to temporal bone		
Adenoid cystic carcinoma	3	75%
Mucoepidermoid carcinoma	1	
Squamous cell carcinoma	2	
Basalioma	1	
Malignant myoepithelioma	1	

all tumours of the parotid and approximately 35% of malignant tumours. Less frequent is the adenoid cystic carcinoma which represents the most common tumour of the submandibular, the sublingual and the minor salivary glands, whereas, it represents only 15% of malignant neoplasms of the parotid gland [11]. The presence of symptoms, such as pain, rapid growth of swelling, paralysis of the facial nerve or skin infiltration are predictive signs of a malignant neoplasm of the parotid gland [6 7]. The treatment of choice for malignant tumours of the salivary glands is surgery and, depending on the tumour type, post-operative irradiation [6 7]. Chemotherapy is, at present, still of minor importance. Histologic tumour type and tumour stage determine the extent of the surgical procedures, which range from partial parotidectomy with preservation of the facial nerve to radical parotidectomy with or without reconstruction of the facial nerve. Post-operative radiation therapy is indicated in cases of microscopic residues of disease or for tumours with particularly aggressive histological characteristics (nerve infiltration, extension to soft tissues or diffuse loco-regional lymph node metastases). The most common complications observed after parotidectomy are Frey syndrome, paralysis of the facial nerve and salivary fistulas [6].

Extended parotidectomy is a surgical procedure aimed at the eradication of malignant tumours involving the parotid gland and adjacent structures such as the temporal bone, the mandibular bone or the skin. Surgical procedures include resection en bloc of the parotid gland, skin, muscles and vessels, mandidular bone, and temporal bone. Where necessary, radical or functional neck dissection and reconstruction of the facial nerve, through anastomosis, are carried out. Reconstruction of the loss of substance is usually carried out with a myocutaneous pectoralis major flap or with adjacent flaps. The surgical techniques to be used are selected on the basis of the infiltration of the neoplasm to the adjacent anatomic structures, as well as the primary site of the lesion. In that event, surgical resection will also include a portion of the cheek, temporal or cervical skin in parotidectomy extended to the skin. In parotidectomy extended to the mandibular bone, surgical resection involves the osteo-myo-articular structure infiltrate and the temporo-mandibular joint. When the tumour has reached, but not invaded, the mastoid and the lower portion of the tympanic anulus, it is possible to carry out partial mastoidectomy. This involves, together with total parotidectomy and traditional or modified neck dissection, also partial mastoidectomy with preservation of the external auditory canal and middle ear and sacrifice of the superior and inferior peripheral branches of the facial nerve. When the tumour has invaded the lower portion of the tympanic anulus, total mastoidectomy is carried out. Lastly, when the tumour involves the glenoid fossa, petrosectomy is performed. In these cases, resection of soft tissues in the parapharyngeal space, IX cranial nerve, pterigoid process and internal pterigoid muscles is carried out. Anastomosis of the facial nerve trunks and closure of the surgical defect with the appropriate flap is usually carried out.

It clearly emerges from observations of the cases described herewith, that this type of surgery is reserved for the treatment of advaced stage lesions involving several structures. The size of the tumour, the histotype, TNM stage, involvement of the facial nerve and tissues in close proximity to the gland, constitute im-

portant prognostic markers for patients with primary carcinoma of the parotid [11]. Long-term survival depends mainly on the histologic characteristics and stage of the tumour. For particularly widespread neoplasms, radical extended parotidectomy, associated with post-operative radiotherapy, is the treatment of choice which provides a positive benefit to the life expectancy of these patients.

References

1 Dorairajan N, Periyasamy S, Muthayya P, Manikandan R, Srinivasan T, Siddharth D. *Salivary gland tumors: a 10-year retrospective study of survival in relation to size, histopathological examination of the tumor, and nodal status*. Int Surg 2004;89:140-9.

2 Luna, MA. *Pathology of tumors of the salivary glands*. In: Thawley SE, Panje WR, Batsakis JG, Lindberg RD, editors. *Comprehensive management of head and neck tumors.* Philadelphia: WB Saunders Co. 1999. p. 1106-46.

3 Spiro RH. *Salivary Neoplasms: Overview of a 35 year experience with 2807 patients.* Head Neck Surg 1986;8:177-84.

4 Seifert G, Sobin LH. *World Health Organization international histological classification of tumors: histological typing of salivary gland tumours.* Berlin: Springer-Verlag; 1991.

5 Orell SR, Sterrett GF, Walters MNI, Whitaker D. *Manual and atlas of fine needle aspiration cytology*. New York, NY; Orlando, FL: Churchill Livingstone, Harcourt Brace; 1999. p. 41-3.

6 Hoffman H, Funk G, Endres D. *Evaluation and surgical treatment of tumors of the salivary gland.* In: Thawley SE, Panje WR, Batsakis JG, Lindberg RD, editors. *Comprehensive management of head and neck tumors.* Philadelphia: WB Saunders Co; 1999. p. 1147-81.

7 Katsantonis GP, Friedman WH, Rosenblum BN. *The surgical management of advanced malignancies of the parotid gland*. Otolaryngol Head Neck Surg 1989;101:633-40.

8 Corcoran MO, Cook HP, Hobsley M. *Radical surgery following radiotherapy for advanced parotid carcinoma*. Br J Surg 1983;70:261-3.

9 Johns ME, Goldsmith MM. *Current management of salivary gland tumors*. Part 2. Oncology (Huntingt) 1989;3:85-91; discussion 94, 99

10 Speight PM, Barrett AW. *Salivary gland tumours*. Oral Dis 2002;8:229-40.

11 Hamper K, Lazar F, Dietel M, Caselitz J, Berger J, Arps H, et al. *Prognostic factors for adenoid cystic carcinoma of the head and neck: a retrospective evaluation of 96 cases.* J Oral Pathol Med 1990;19:101-7.

■ Address for correspondence: Prof. M. de Vincentiis, Dipartimento di Otorinolaringoiatria, Università di Roma "La Sapienza", Policlinico "Umberto I", via del Policlinico 155, 00161 Roma, Italy - Fax +39 06 4460378