

Major salivary gland diseases. Multicentre study

Patologia delle ghiandole salivari maggiori: studio multicentrico

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Parole chiave

Ghiandole salivari maggiori • Tumori maligni • Tumori benigni • Terapia • Studio multicentrico

Summary

This multicentre study involved 28 Italian ORL Centres responding to a questionnaire sent by us which allowed recruitment of a high large number of cases of parotid neoplasms observed over a 10-year period. Statistical data obtained partly confirmed previous findings. Benign tumours account for 80% of case histories with a relationship 1:4 M/F, the most frequent being pleomorphic adenoma (57.3% of cases), followed by Warthin's tumour (32.4%), this rating not having been confirmed in case histories (8 - 10%) in the literature. Malignant tumours instead were fewer in number compared to the literature (14% vs 25-30%); the most frequent being mucoepidermoid carcinoma (18.2%) of which 44% G1, 33% G2 and 23% G3. Adenoid-cystic carcinoma was observed in 15.3% and $\leq 10\%$ for all the other most frequent histological malignant neoplasms. Diagnostic work-up included echotomography and fine-needle aspiration biopsy, less used imaging techniques were computed tomography, magnetic resonance imaging, Sialo-computed tomography. During this multicentre investigation more widespread use of imaging techniques has, however, been observed. The greater use of ecotomography and of fine-needle aspiration biopsy was due to simplicity of application and low cost offering good sensitivity and specificity. Surgical treatment of benign tumours consisted, in 50% of cases, in superficial parotidectomy and in $\sim 30\%$ of total parotidectomy. Enucleoresection was limited to $\sim 15\%$ of neoplasms, enucleation to $<10\%$ of cases with only 2% of pleomorph adenoma due to the well-known anatomo-pathological characteristics which may lead to relapse. For malignant neoplasms, total parotidectomy was performed in $\sim 50\%$ of cases, while in the remaining 50% an almost equal rate of superficial parotidectomy was carried out and enlarged parotidectomy, with or without sacrificing the facial nerve, which was rebuilt in 60% of cases. The lateral neck dissection most frequently carried out was of functional type in 54% and selective type in 46% with removal of levels I-III and II-IV in $\sim 60\%$ of cases. Sentinel lymph node was observed in a limited number of centres. When no clinically evident lymph nodes were present (NO) considering the tumour histotype, two thirds of patients underwent surgery or radiotherapy, while in the remainder the wait-and-see attitude

Riassunto

Lo studio policentrico ha coinvolto 28 Centri ORL italiani che hanno risposto al questionario da noi inviato consentendo di reclutare un numero elevato di neoplasie parotidiche osservate in un periodo di dieci anni. I dati statistici ottenuti hanno confermato in parte quanto già riportato in Letteratura. I tumori benigni rappresentano l'80% della casistica con un rapporto M/F di 1/4, fra questi il più frequente in assoluto è risultato l'adenoma pleomorfo con il 57.3% dei casi, seguito dal tumore di Warthin con il 32.4%, percentuale che non trova riscontro in Letteratura dove viene riportata una incidenza dell'8-10%. I tumori maligni sono risultati invece in un numero inferiore rispetto ai dati della letteratura (14% contro il 25-30%); il più frequente è stato il carcinoma mucoepidermoide (18,2%) di cui 44% di G1, il 33% di G2 ed il 23% di G3. Il carcinoma adenoidocistico è stato osservato nel 15,3%, ed intorno all'10% o meno per tutte le altre più frequenti forme istologiche di neoplasie maligne. Le indagini diagnostiche maggiormente eseguite sono state: l'ecotomografia e la FNAB, meno utilizzate la tecniche di imaging: CT, MRI, ScialoCT. In realtà, l'arco di tempo preso in esame in questa indagine multicentrica ha visto una progressiva diffusione delle metodiche di imaging. Il più largo impiego dell'ecotomografia e della FNAB è dovuto alla semplicità di esecuzione ed ai costi contenuti, con un buon livello di sensibilità e di specificità. Il trattamento chirurgico dei tumori benigni è consistito nella metà dei casi nella parotidectomia superficiale e nel 30% circa nella parotidectomia totale. L'enucleoresezione è stata limitata al 15% circa delle neoplasie ed infine l'enucleazione a meno del 10% dei casi, con un impiego di solo il 2% per l'adenoma pleomorfo a causa delle ben note caratteristiche anatomopatologiche di questa neoplasia, che possono essere responsabili dell'insorgenza di una recidiva per l'assenza di una vera capsula di contenimento che separi il tessuto neoplastico da quello ghiandolare. Per le neoplasie maligne il trattamento chirurgico più eseguito è stato la parotidectomia totale in quasi il 50% dei casi, mentre nell'altra metà dei pazienti si è proceduto in quasi uguale proporzione alla parotidectomia superficiale ed alla parotidectomia allargata con o senza il sacrificio del nervo facciale, che è stato ricostruito nel 60% dei casi. Lo svuotamento linfonodale latero-cervicale più frequentemente eseguito è stato nel 54% di tipo funzionale e nel 46% di tipo selettivo con asportazione dei livelli I-III e II-IV nel 60% circa dei casi. Solo in numero limitato di Centri è in atto lo studio del linfonodo sentinella. In assenza di linfonodi clini-

was preferred. Post-operative - complementary radiotherapy was very frequently performed instead of chemotherapy. Oncological results obtained were compared with those reported in the literature: in fact for all benign neoplasms relapse ratings are about 5%, while for malignant tumours the worst prognosis was in squamous cell carcinoma with median of 37.7 on survival and metastasis rate of 16.5%. Finally, mucoepidermoid carcinoma tumours showed best survival, followed by adenoid-cystic carcinoma with ranges, respectively, 83 and 81.

Introduction

Parotid disorders, from a surgical viewpoint have, for several reasons, always been of particular interest in the field of head and neck diseases, namely: multiple pathological patterns, which means non-univocal clinical and histomorphological interpretations, no defined diagnostic guide-lines, variability in the surgical indications. These diagnostic and therapeutic uncertainties can be justified, first of all, by the low range of parotid swelling in the field of ORL disorders requiring surgery. Swelling of the parotid gland is caused primarily by benign neoplasms or chronic inflammation rather than malignant tumours, which account for 14-30% of head and neck gland disorders with < 300 new cases/year in Italy. Indeed, malignant parotid neoplasms account for only 4% of neoplasms in the head and neck regions.

The parotid, moreover, has a complex histomorphological structure that generates a wide variety of histotypes both in benign and malignant neoplasms; for the latter, for each of the well-known histotypes, potential malignancy and natural history have been recorded. Bearing in mind these considerations and the dispersion of the few existing cases, it is impossible to draw up reliable guide-lines.

The S.I.O. officially focused attention on this aspect on two occasions, the last, over 20 years ago, at the Round Table National Congress, in 1984, at S. Margherita di Pula coordinated by Prof. A. Bosatra. We, therefore, considered it more useful to carry out an inquiry regarding the most recent advances made in diseases of the major salivary glands involving several Authors with a multicentre study analysing the diagnostic and therapeutic approaches used in Italy, in the attempt to define the most controversial aspects to be taken into consideration in the setting up of "Guide-lines".

Methodology

A questionnaire, based on the main problems regarding epidemiologic, clinical and instrumental

camente evidenti (NO), tenuto conto dell'istotipo del tumore, i 2/3 dei pazienti sono stati sottoposti a chirurgia o radioterapia, mentre negli altri casi è stato preferito l'atteggiamento di wait and see. Infine la radioterapia complementare postchirurgica è stata utilizzata molto frequentemente al contrario della chemioterapia. I risultati oncologici ottenuti sono in linea con quelli riportati in Letteratura, infatti per tutti i tipi di neoplasie benigne le percentuali di recidive sono del 5% circa, mentre per i tumori maligni quelli a peggior prognosi sono risultati i carcinomi squamosi con una mediana di sopravvivenza di 37.7 ed una incidenza di metastasi del 16.5%. Infine i tumori mucoepidermoidi sono quelli con la migliore sopravvivenza, seguiti dai carcinomi adenoidocistici con mediane rispettivamente di 83 ed 81.

diagnostic procedures, as well as therapeutic and prognostic aspects of parotid disease, was elaborated, with special attention being focused on malignant neoplastic lesions. The results, based on the number of cases eligible for each single question, have been elaborated as range, mean and median. When the data given were provided only in terms of percentage, they have been developed through range and median. As far as concerns the data requiring a follow-up period (malignant neoplasms) only those with a clinical study of at least 5 years have been recorded.

Useful answers derived from 28 centres were received, these being distributed throughout Italy and providing data on over 5911 cases, for the period from 1993 to 2002.

Results have been elaborated according to the individual questions.

Results of Questionnaire

INFLUENCE OF PAROTID NEOPLASMS (BENIGN AND MALIGNANT) IN THE FIELD OF HEAD AND NECK NEOPLASMS, IN THE LAST 10 YEARS AND YEAR BY YEAR

In the 5911 cases, studied, 79.8% were benign neoplasms, 13.8% malignant neoplasms while 6.4% presented other types of tumour (Table I). The distribution over the years showed an increase in the number of cases observed, averaging between 5-10% except for the period from 2001 to 2002 when a slight decrease, from 725 to 620 new cases, was detected.

INFLUENCE AND RELATIONSHIP BETWEEN BENIGN AND MALIGNANT PAROTID NEOPLASMS PER YEAR

Limiting the observation field merely to tumoural lesions, the number of cases is reduced to 5538, of which 4718 (85.2%) were benign neoplasms and 820 (14.8%) malignant tumours. In these groups, the annual epidemiologic increase (averaging 5-10% new cases) showed no variations in the pattern of tumour type (Table II).

MAIN EPIDEMIOLOGIC FEATURES (SEX, AGE, RANGE; BOTH OVERALL DATA AND ACCORDING TO NUMBER OF BENIGN AND MALIGNANT NEOPLASMS)

Parotid diseases were shown to occur more frequently in men than in women, but with no significant difference between benign and malignant forms. The mean age at onset is 53.6 years; benign neoplasms occur at an earlier age, namely 51.6 vs 60.2 in malignant lesions, but however, it must be underlined that the range for these neoplasms is very broad, from 2 to 94 years of age (Table II).

NEOPLASMS: HISTOTYPES EXAMINED

Benign tumours: as shown in Table III, the most numerous were pleomorphic adenomas (57.3%) followed by Warthin's tumour (32.4%), simple adenomas (3.7%) and last of all by lipomas (0.9%); a series of other benign forms follows, with very low percentages. In this case series, it should be pointed out that in as many as 200 cases, the histology was not well defined thus confirming that the histology of this pathological condition is sometimes extremely complex. Furthermore, the rate of pleomorphic adenomas under observation is slightly lower than that in the literature which is reported to be at a level between 60- 75%^{1,2}. As far as concerns the 820 cases of malignant neoplasms, the following histological types were found: mucoepidermoid carcinoma 18.2%, adenoid-cystic carcinoma 15.3%, adenocarcinoma 10.9%, acinic cell carcinoma 9.3%, squamous cells carcinoma 7.3%, malignant mixed tumours 6.95, non Hodgkin lymphoma (LNH) 5.6%, metastasis of a carcinoma at a parotid level from other sites 5.4%, ductal carcinoma 5.1% (Table IV).

MOST FREQUENT EXAMINATION USED IN THE DIAGNOSTIC PROTOCOL

In the questionnaire, some questions regarding instrumental diagnostic protocol received a wide range of answers. The two most frequent tools referred to echography (median 100) and FNAB (median 90). Routine use of tools such as imaging, CT and RNM, were much lower, with a median of 24 and 10 each; scialography shows a median of 0, implying that this method is no longer in use.

Table I. Parotid tumefactions (1993-2002). N. cases 5911.

	N. of cases	
Benign tumours	4718	79.8%
Malignant tumours	820	13.8%
Other	373	6.4%
Total	5911	

Only some centres reported PET, scintigraphy and echo guided FNAB among the diagnostic technology used (Table V).

The relatively lesser use of imaging-techniques (CT, MR) may be explained by the analysis of a ten-year period; if this were to be referred to the last 5 years, a greater use of these techniques would emerge showing that they represent not only a useful diagnostic tool predicting the need for surgery, but are also of great importance from a medical and legal viewpoint.

Table III. Benign tumours (histotypes).

	N. cases	
Pleomorphic adenoma	2704	(57.3%)
Cystic adenolymphoma	1529	(32.4%)
Adenoma	178	(3.7%)
Lypoma	45	(0.9%)
Myoepithelioma	6	
Oncocytoma	13	
Schwannoma	4	
Haemangioma	7	
Neurinoma	8	
Sebaceous lymphoadenoma	2	
Fibrohistiocytoma	2	
Mesenchymal tumour	2	
Benign lymph. infiltration	18	
Others	200	
Total	4718	

Table II. Epidemiologic features of parotid neoplasms (1993-2002) N. cases 5538.

	N. of cases (%)	Benign tumours (%)	Malignant tumours (%)
Males	3275 (59)	2776 (85)	499 (15)
Females	2263 (41)	1942 (85.8)	321 (14.2)
Total	5538	4718 (85.2)	820 (14.8)
Mean age (yrs)	53.6	51.6	60.9
Range	2-94	2-92	10-94

INDICATIONS FOR THE EXECUTION OF FNAB (ROUTINE, GENERICAL SUSPICION OF NEOPLASM, CLINICAL SUSPICION OF MALIGNANCY)

As far as concerns the use of FNAB, this is routinely used in 66% of the centres; only when a neoplasm is suspected, in 30 % of cases; only in the presence of clinical doubt of malignancy, in 4 %. This technology has, therefore, been shown to be widely used.

INFLUENCE OF FACIAL PARALYSIS DETECTED DURING DIAGNOSTIC PHASE

Detection of paralysis of the facial nerve, observed in the diagnostic phase, ranges between 0.96 and-27%, median 1.6. This finding proves, therefore, on the one hand, the rarity of this clinical occurrence and, on the other, the rarity of delayed diagnosis in the case of malignant neoplasms.

TYPE OF CUTANEOUS INCISIONS USED

The frequency of the various types of surgical incisions used is outlined in Table VI. The incision of Redon is used in 73% of cases, followed by that of Lotte and of other types. The face-lifting incision was found to be the less frequent, even if it led, under the same conditions of exposure of the gland, to excellent aesthetical results as the post-operative scar is almost invisible.

MODALITY USED IN PERFORMING ON-THE-SPOT INTRA-OPERATIVE HISTOLOGICAL EXAMINATIONS (ROUTINE, OTHER CASES)

Intra-operative histological examinations on frozen specimens are routinely used in only 4% of cases in the centres, in 17% it is never carried out, while, in all the other centres, the examination is performed for a suspected malignancy or, lastly, for intra-operative evaluation of the resection margins. The technique was found, in fact, to be routinely used, as the parotid tumefaction reach similar clinical characteristics. Thus, in the case of malignant neoplasms, a lateral neck dissection could be planned, in those cases NO in which it is mandatory and, therefore, not delayed.

SURGICAL TREATMENT PROTOCOLS USED (ACCORDING TO HISTOTYPE)

As far as concerns the most frequently adopted surgical protocols, related to benign neoplasms, the three 3 most common forms were referred to, i.e., pleomorphic adenoma, Warthin's tumour and simple adenoma. The most used surgical procedure is esofacial parotidectomy, in general, average 50% of cases, followed by total functional parotidectomy from 23% of Warthin's tumour to 36% of pleomorphic adenomas (Table VII).

Table IV. Histotype of malignant tumours.

	N. of cases	
Mucoepidermoid carcinoma	150	(18.2%)
Grade1	66	
Grade 2	50	
Grade 3	34	
Adenoid cystic carcinoma	126	(15.3%)
Adenocarcinoma	90	(10.9%)
Acinic cell carcinoma	77	(9.3%)
Squamous cell carcinoma	60	(7.3%)
Malignant mixed tumour	58	(6.9%)
NH Lymphoma	46	(5.6%)
Metastatic tumours	45	(5.4%)
Salivary duct carcinoma	42	(5.1%)
Low grade carcinoma	12	
Malignant myoepithelioma	12	
Malignant schwannoma	3	
Melanoma	3	
MALT Lymphoma	1	
Infiltration by epidermic tumours	15	
Unclassified	80	
Total	820	

Table V. Diagnostic protocol.

	Range %	Median
Echotomography	17-100	100
CT	7-100	24
MRI	3-100	10
FNAB	5-100	90
Sialography	0-65	0
Rarely performed: PET, bone scintigraphy, ultrasound guided-FNAB		

Enucleoresection and enucleation are used in fewer cases, the former ranging from 11-16%, the latter from 2-12%.

The surgical techniques used for all malignant neoplasms are outlined in Tables VIII-X. In >50% of cases, total parotidectomy was performed (54%), esofacial parotidectomy in 18% of patients, total parotidectomy, with sacrifice of the facial nerve, in the 15%, total enlarged parotidectomy in 10%, other non-specified surgical techniques in 3%. The finding of total parotidectomy with sacrifice of the facial nerve in 15% is somewhat surprising as, with the exception of cases with severe infiltration of the nerve, in case series in the literature, every attempt is made to save the nerve, as whatever the recon-

Table VI. Cutaneous incision.

Redon	73%
Lotte	3%
Ad "Y"	3%
Miehlke	15%
Bailay	3%
Face lifting	3%

struction used, it never leads to a satisfactory result and shows no substantial difference in survival.

As far as concerns the different operations on the various histotypes of malignant neoplasms, total functional parotidectomy varies from 42% of mucoepidermoid carcinoma to 44% of adenoid-cystic carcinoma, to 54% of acinic cell carcinoma; 28% in mucoepidermoid carcinoma, 31% in adenoid-cystic carcinoma; total parotidectomy with sacrifice of facial nerve, 13% of mucoepidermoid carcinoma, 14% of adenoid-cystic carcinoma, 4% of acinic cell carcinoma. With regard to other malignant histotypes, total functional parotidectomy is carried out in the 47% of adenocarcinomas, 48% of squamous carcinomas, 51% of malignant mixed tumours; esofacial parotidectomy is used in 24% of adenocarcinomas, 28% of squamous cell carcinomas, 19% of malignant mixed tumours; total parotidectomy with sacrifice of the facial nerve is performed in 17% of adenocarci-

nomas, 17% of squamous cell carcinomas, and 15% of malignant mixed tumours.

LATERAL NECK DISSECTION IN MALIGNANT NEOPLASMS: IF SO, FOR WHICH HISTOTYPES

Treatment of cervical lymph-nodes through lateral neck dissection is practiced in 92% of the centres, but not in the remaining 8%. All malignant neoplasms with clinical N+ undergo surgical treatment of N. In a few centres, in the case of NO, this type of treatment is not taken into consideration.

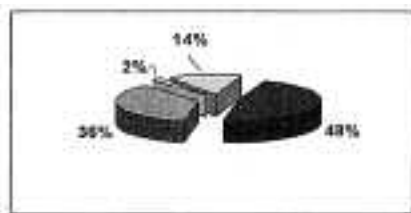
SELECTIVE LATERAL NECK DISSECTION

Selective lateral neck dissection is practiced in 46% of cases, functional in 54%. From these data, it emerges that selective lateral neck dissection is increasingly used, the rate being comparable to that of functional lateral neck dissection. Of the various types of lateral neck dissection, that of levels I-II-III is practiced in 28%, followed by levels II-III-IV, in 18% of cases. Some centres study the sentinel lymph node.

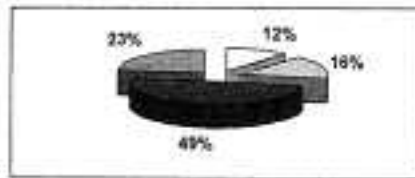
THERAPEUTIC PROGRAMME OF N IN NO MALIGNANT NEOPLASMS (SURGERY, RADIOTHERAPY, WAIT-AND-SEE) AND POSSIBLE MODIFICATION DEPENDING UPON HISTOTYPE

An attempt has been made to define the approach used in the various centres in cases with malignant neoplasms NO. A large percentage of surgeons (32%) adopt a wait-and-see attitude, 49% perform surgical

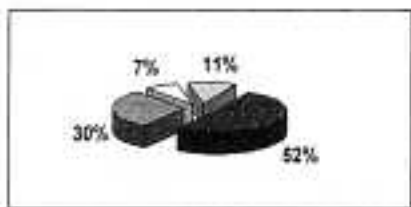
Table VII. Surgical protocol for benign tumours.



PLEOMORPHIC ADENOMA



WARTHIN'S TUMOR



ADENOMA

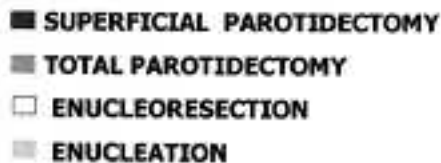


Table VIII. Malignant tumours and surgical procedures.

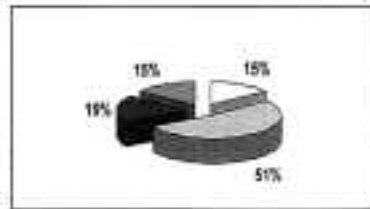
Total parotidectomy	54%
Partial parotidectomy	18%
Total parotidectomy and VII nerve sacrifice	15%
Enlarged total parotidectomy	10%
Others	3%

treatment, while 19% submit patients to radiotherapy.

EARLY POST-OPERATIVE COMPLICATIONS FOLLOWING PAROTIDECTOMY (HAEMORRHAGE, INFECTION, GATHERINGS, PARESIS, PARALYSIS, DIASTASES)

As far as concerns post-operative complications, although data was not provided by all the centres in-

Table IX. Surgical procedures for malignant tumours.

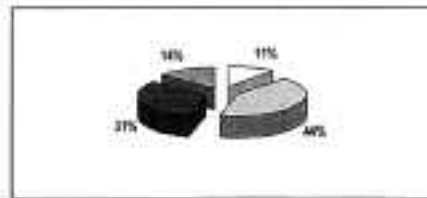
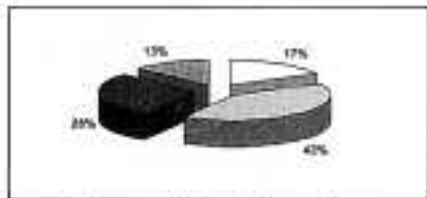


SQUAMOUS CARCINOMA

MALIGNANT MIXED TUMOURS

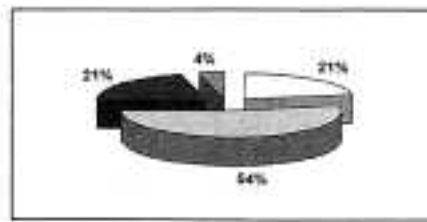
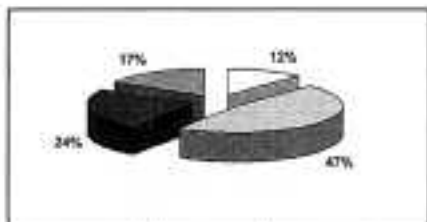
- SUP. PAROTIDECTOMY
- TOT. FUNCT. PAROTIDECTOMY
- ▒ TOT. PAROTIDECTOMY AND VII NERVE SACRIFICE
- ░ TOT. ENLARG. PAROTIDECTOMY

Table X. Surgical procedures for malignant tumours.



Mucoepidermoid carcinoma

Adenoid cystic carcinoma



Adenocarcinoma

Acinic Cells carcinoma

- SUPERFICIAL PAROTIDECTOMY
- TOT. FUNCT. PAROTIDECTOMY
- ▒ TOT. PAROT. AND VII NERVE SACRIFICE
- ░ TOT. ENLARG. PAROTIDECTOMY

volved in the investigation, the most frequent adverse effect was facial paresis (median 10%, for the 19 centres assessable) followed by the formation of gatherings (4% of median) and other less frequent complications.

INCIDENCE OF FREY SYNDROME, TREATMENT AND RESULTS

The incidence of Frey syndrome ranges from 0.6 to 40% (median 4.8) and can, therefore, be considered a relatively rare disorder.

IN THE CASE OF SACRIFICE OF THE VII C.N., CAN IT BE RECONSTRUCTED?

Reconstruction of the nerve, in the event of sacrifice, is performed in 60% of the cases.

INDICATION OF RADIOTHERAPY (YES, NO, AS A PRINCIPLE OR COMPLEMENTARY)

Post-operative radiotherapy is carried out in 88% of cases, and is not performed in 12%. Radiotherapy alone is usually performed in 4%, complementary in function of histotype in 84%, not specified in 12%.

ROLE OF CHEMOTHERAPY (YES, NO, INTEGRATED WITH RT, PALLIATIVE)

Chemotherapy, in malignant neoplasms, is not used in 62% of cases, is used in the remaining 38% with the following modality: integrated with RT in 42%, complementary in 29%, palliative in the 29%.

FOLLOW-UP PROGRAMME

For the benign forms, follow-up is usually scheduled for every 2-3 months, then every 6-12 months, with an annual echography; the length of the follow-up period was not specified. In our opinion, a follow-up every 3 months, for the first two years, and then every 6 months, thereafter, seems reasonable.

For malignant neoplasms, patients are controlled every 1-2 months for the first 2-3 years, then every 3-6 months up to 5 years, some even for 10 years, CT is carried out every 12 months. In our opinion, CT examinations of the head, neck and breast are advisable for these neoplasms and, furthermore, routine annual imaging should also be performed for 10 years given the slow evolution and case history of these tumours.

ONCOLOGICAL RESULTS AT 5 YEARS, GLOBAL AND ACCORDING TO HISTOTYPE AND, INFLUENCE OF RECURRENCES OR METASTASIS OVER 5 YEARS

The percentage of recurrences, after 5 years, for benign neoplasms ranges from 0 to 12% for pleomorphic adenomas, from 0 to 4.7% for simple adenomas, from 0 to 9.1% for Warthin's tumour. As far as concerns the results of treatment of ma-

lignant neoplasms, these have been listed according to histotype, on the basis of a follow-up of at least 5 years, referred to a study population of 300 cases.

The NED survival in absence of disease percentage range after 5 years is 65-87% for acinic cell carcinoma, 35-90% for mucoepidermoid carcinoma, 34-78% for malignant mixed tumours, 60-92% for adenoid-cystic carcinoma, 22-50% for squamous cell carcinoma, 38-80% for adenocarcinoma (Table XI).

The percentage of metastases at distant follow-up was 16% for the squamous cell carcinoma, 11% for adenocarcinoma, 9.5% for adenoid-cystic carcinoma, 4.5% for mucoepidermoid carcinoma, 4% for acinic cell carcinoma, 9% for malignant mixed tumours (Table XII).

Conclusions

This multicentre report, which involved 28 Italian ORL Centres responding to the questionnaire sent by our group, has allowed an analysis to be made of a very large number of parotid neoplasms observed over a period of 10 years and the statistical data obtained have confirmed, to a large extent, findings reported in the literature. Benign tumours account for 80% of the cases with a M/F relationship of 1:4, the most frequent being the pleomorphic adenoma in 57.3% of cases, followed by Warthin's tumour in 32.4% unlike case histories in the literature where an incidence of 8-10% has been reported^{1,2}.

Malignant tumours, on the contrary, were fewer than case histories referred to in the literature: 14% vs 25-30%; the most frequent, as is well known, was the mucoepidermoid carcinoma with 18.2% (44% of G1, 33% of G2, 23% of G3). Adenoid-cystic carcinoma was observed in 15.3% and approximately 10% or less for all the other most frequent histological forms of malignant neoplasms.

The diagnostic technique most practiced was, as already shown, the echotomography and FNAB, less used were imaging techniques (CT, MRI, SialoCT, etc.)³. Albeit, during the period of time under consideration, in this multicentre investigation, the use of imaging techniques has become progressively more widespread due to the growing endowment to Hospital centres of the very expensive radiological equipment. The wider use of echotomography and of FNAB was due to the fact that these are easy, low-cost techniques, offering good sensitivity and specificity^{4,7}.

Surgical treatment of benign tumours consisted in approximately 50% of cases in superficial parotidectomy and in approximately 30% in total parotidectomy. Enucleoresection was limited to approximately 15%

of the neoplasms and enucleation to less than 19% of cases, with lateral neck dissection for only 2% of the pleomorphic adenomas due to the well-known anatomopathological characteristics of this neoplasm, which may be responsible for relapse due to the absence of a real capsule to separate the neoplastic from the gland tissue⁸⁻¹³.

For malignant neoplasms, the most used surgical treatment was total parotidectomy in almost 50% of cases, while in the remaining 50% of patients, there was an almost equal proportion of superficial parotidectomy and enlarged parotidectomy, with or without sacrifice of the facial nerve¹⁴⁻¹⁶, which was rebuilt in 60% of cases^{8 17}.

The most frequent lateral neck dissection performed was functional type in 54% and selective type in 46% with removal of levels I-III and II-IV in approximately 60% of the cases¹⁸. Only in a limited number of the centres is a search made for the sentinel lymph node. In the absence of clinically evident lymph nodes (NO), considering the histotypes of the neoplasm, two thirds of the patients underwent surgery or radiotherapy, while in the other cases the attitude of wait-and-see was preferred. Finally, complementary post-operative radiotherapy was very frequently used instead of chemotherapy^{19 20}.

The oncological results obtained are comparable to those reported in the literature. In fact, for all the types of benign neoplasms, the relapse rates was approximately 5%, while for the malignant tumours those with the worst prognosis were squamous cell carcinoma with a median of 37.7 on survival and an incidence of metastasis of 16.5%. Lastly, mucoepidermoid tumours^{21 22} are those with the best survival, followed by adenoid-cystic carcinoma, respectively, 83 and 81²³⁻²⁷.

In conclusion, the analysis of a representative sample of a large number of University and ENT Cen-

Table XI. Range percentage of NED patients after 5 years for malignant histotype.

	Median	Range
Adenocarcinoma	65	38-80%
Mucoepidermoid carcinoma	83	35-90%
Adenoid cystic carcinoma	81	60-92%
Acinic cell carcinoma	72.8	65-87%
Squamous cell carcinoma	37.7	22-50%
Malignant mixed tumour	71	34-78%

Table XII. Percentage of metastasis over 5-year follow-up.

Squamous cell carcinoma	16.5%
Adenocarcinoma	11%
Adenoid-cystic carcinoma	9.5%
Mucoepidermoid carcinoma	4.5%
Acinic cell carcinoma	4%
Malignant mixed tumour	9%

tres all over Italy made it possible to study the different diagnostic and therapeutic approaches used in the management of parotid neoplasms, that, owing to their very low incidence, do not permit a large number of cases to be taken into consideration, leading to results which are difficult to accept from a statistical viewpoint. The data collected have shown good homogeneity as far as concerns diagnostic strategies as well as the pathological conditions studied, the results obtained being comparable to those of the most significant case histories reported in the literature.

References

- 1 Evenson JW, Cawson RA. *Salivary gland tumors: A review of 2410 cases with particular reference to histologic types, site, age and sex distribution.* J Pathol 1985;146:51-8.
- 2 Spiro Rh. *Salivary neoplasms: overview of 35 year experience with 2807 patients.* Head Neck Surg 1986;8:177-84.
- 3 Witt RL. *Major salivary gland cancer.* Surg Oncol Clin N Am 2004;13:113-27.
- 4 King AD, Ahuja AT, To EW, Chan EC, Allen PW. *Carcinoma of the parotid gland: ultrasound and computed tomography findings.* Australas Radiol 1999;43:520-2.
- 5 Urquhart A, Hutchins LG, Berg RL. *Preoperative computed tomography scan for parotid tumor evaluation.* Laryngoscope 2001;111:1984-8.
- 6 Cohen EG, Patel SG, Lin O, Boyle JO, Kraus DH, Singh B. *Fine-needle aspiration biopsy of salivary gland lesions in a selected patient population.* Head Neck Surg 2004;130:773-8.
- 7 Bialek EJ, Jakubowski W, Karpinska G. *Role of ultrasonography in diagnosis and differentiation of pleomorphic adenomas: work in progress.* Arch Otolaryngol Head Neck Surg 2003;129:929-33.
- 8 Gruppo Alta Italia di Otorinolaringoiatria e Chirurgia Cervico-Facciale. *XLIX – Tavola Rotonda: problematiche chirurgiche della parotide e degli spazi parafaringei.* Milan, 27 November 2004.
- 9 Guntinas-Lichius O, Kick C, Klussmann JP, Jungehulsing M, Stennert E. *Pleomorphic adenoma of the parotid gland: a 13-year experience of consequent management by lateral or total parotidectomy.* Eur Arch Otorhinolaryngol 2004;261:143-6.
- 10 Witt RL. *The significance of the margin in parotid surgery for pleomorphic adenoma.* Laryngoscope. 2002;112:2141-54.

- ¹¹ O'Brien CJ. *Current management of benign parotid tumors - the role of limited superficial parotidectomy*. Head Neck 2003;25:946-52.
- ¹² Harney M, Walsh P, Conlon B, Hone S, Timon C. *Parotid gland surgery: a retrospective review of 108 cases*. J Laryngol Otol 2002;116:285-7.
- ¹³ Ord RA. *Surgical management of parotid disease*. Atlas Oral Maxillofac Surg Clin North Am 1998;6:1-28.
- ¹⁴ Zhao HW, Li LJ, Han B, Liu H, Pan J. *A retrospective study on the complications after modified parotidectomy in benign tumors of parotid gland*. Hua Xi Kou Qiang Yi Xue Za Zhi 2005;23:53-6.
- ¹⁵ Ellingson TW, Cohen JJ, Andersen P. *The impact of malignant disease on facial nerve function after parotidectomy*. Laryngoscope 2003;113:1299-303.
- ¹⁶ Tsai SC, Hsu HT. *Parotid neoplasms: diagnosis, treatment, and intraparotid facial nerve anatomy*. J Laryngol Otol 2002;116:359-62.
- ¹⁷ Stennert E, Wittekindt C, Klussmann JP, Guntinas-Lichius O. *New aspects in parotid gland surgery*. Otolaryngol Pol 2004;58:109-14.
- ¹⁸ Longo F, Manola M, Villano S, De Vivo S, De Maria G, Pascale A. *Treatment of the facial nerve and the neck in malignant parotid gland tumors*. Tumori 2003;89(Suppl.4):257-9.
- ¹⁹ Spiro JD, Spiro RH. *Cancer of the parotid gland: role of 7th nerve preservation*. World J Surg 2003;27(7):863-7.
- ²⁰ Bragg CM, Conway J, Robinson MH. *The role of intensity-modulated radiotherapy in the treatment of parotid tumors*. Int J Radiat Oncol Biol Phys 2002;52:729-38.
- ²¹ Friedrich RE, Bleckmann V. *Adenoid cystic carcinoma of salivary and lacrimal gland origin: localization, classification, clinical pathological correlation, treatment results and long-term follow-up control in 84 patients*. Anticancer Res 2003;23:931-40.
- ²² Kokemuller H, Eckardt A, Brachvogel P, Hausamen JE. *Adenoid cystic carcinoma of the major and minor salivary glands. Retrospective analysis of 74 patients*. Mund Kiefer Gesichtschir 2003;7:94-101.
- ²³ Marshall AH, Quraishi SM, Bradley PJ. *Patients' perspectives on the short- and long-term outcomes following surgery for benign parotid neoplasms*. J Laryngol Otol 2003;117:624-9.
- ²⁴ Guntinas-Lichius O, Kick C, Klussmann JP, Jungehuelsing M, Stennert E. *Pleomorphic adenoma of the parotid gland: a 13-year experience of consequent management by lateral or total parotidectomy*. Eur Arch Otorhinolaryngol 2004;261:143-6.
- ²⁵ Zbaren P, Schupbach J, Nuyens M, Stauffer E, Greiner R, Hausler R. *Carcinoma of the parotid gland*. Am J Surg 2003;186:57-62.
- ²⁶ Mercante G, Makeieff M, Guerrier B. *Recurrent benign tumors of parotid gland: the role of the surgery*. Acta Otorhinolaryngol Ital 2002;22:80-5.
- ²⁷ Catania A, Falvo L, D'Andrea V, Biancafarina A, De Stefano M, De Antoni E. *Parotid gland tumours. Our experience and a review of the literature*. Chir Ital 2003;55:857-64.

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