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Artigo Original

Parotidectomia: morbilidade a curto e médio prazo e factores preditivos para lesão iatrogénica do nervo facial

Parotid gland surgery: short and medium-term results of morbidity and predictive factors for iatrogenic facial nerve injury

Isabel Esteves Costa, António Fontes Lima, Cátia Azevedo, Fernando Mar, Berta Madureira Rodrigues, Luís Dias

Otorhinolaryngology and Head and Neck department.
Hospital de Braga, Portugal.

Correspondencia: Isabel Esteves Costa.
Hospital de Braga.
Correo electrónico: isabelcostaorl@gmail.com

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Resumo

Objectivo: Análise do impacto de variáveis clínicas e cirúrgicas na incidência de complicações pós-operatórias em doentes submetidos a cirurgia parotídea nos últimos 5 anos na nossa instituição.

Materiais e métodos: Estudo retrospectivo através da colheita de dados sociodemográficos, clínicos e cirúrgicos, tais como género, idade, sintomas de apresentação, tipo de cirurgia realizada, complicações pós-operatórias e taxas de recorrência/cura.

Resultados: Trinta indivíduos foram submetidos a parotidectomia por patologia benigna (76.7%) ou maligna (23.3%), com uma média de 55.3 (*DP* 17.7) anos de idade. O Adenoma Pleomórfico foi o diagnóstico mais frequente (*n*=17). A parotidectomia parcial foi realizada em 83.7% dos casos (*n*=26). A extensão da cirurgia esteve associada a maior morbilidade pós-operatória (*p*=.038). O esvaziamento ganglionar cervical (EGC) foi realizado em 33% do doentes, sendo que estes não apresentaram maior risco de complicações. As complicações pós-operatórias estiveram presentes em 33.3% (n=10) e, destes, 6 indivíduos descreveram hipostesia transitória na região da incisão cirúrgica. A lesão permanente do nervo facial (LPNF) verificou-se em 10% dos casos (*n*=3), sendo que este grupo em particular apresentou lesões parotídeas significativamente maiores (*p*=.01).

Conclusões: Pela preservação da função glandular e pela menor taxa de complicações, os autores recomendam que a cirurgia parotídea minimamente invasiva deve ser sempre considerada, sobretudo no caso de benignidade. A LPNF é uma das complicações mais preocupantes, sendo que a lesão temporária e permanente do nervo facial está descrita em 18-65% e 0-19% dos casos, respectivamente. No presente estudo, a LPNF parece ser influenciada pelas dimensões do tumor. Na patologia maligna, e comprovado pelo nosso estudo, o risco de metástases ganglionares ocultas justifica a realização de EGC electivo, sem morbilidade significativa associada.

Palavras-chave:

Cancro parotídeo; procedimentos cirúrgicos minimamente invasivos; complicações pós-operatórias; lesões do nervo facial

Abstract

Objective: Analysis of the impact of clinical and surgical variables on post-operative complications in patients submitted to parotid surgery in the last 5 years in our institution.

Methods: Retrospective study through collection of sociodemographic, clinical and surgical data, such as age, gender, presenting symptoms, extent of surgery, post-operative complications and recurrence/cure rates.

Results: Thirty patients underwent parotidectomy due to benign (76.7%) or malignant (23.3%) pathology, with an average age of 55.3 years (*SD* 17.7). Pleomorphic adenoma was the most common diagnosis (n=17). Partial parotidectomy was performed in 83.7% of cases (n=26). The extent of surgery was correlated with more postoperative morbidity (p=.038). Neck dissection (ND) was performed in 33% of patients, who did not presented higher risk of post-operative complications. Post-operative complications were seen in 33.3% (n=10), and of these, 6 patients described a transitory cutaneous sensory deficit of the incision area. Permanent facial nerve injury (FNI) was seen in 10% of cases (n=3) and this particular group had significantly larger parotid lesions (p=.01).

Conclusions: Because of function preservation and less complication rates, the authors advice that minimally invasive surgery should always be considered, especially in benign tumors. FNI is one of the most concerning complications, with temporary and permanent FN dysfunction incidence reports of 18-65% and 0-19%, respectively. In this study, permanent dysfunction of the FN seemed to be influenced by dimensions of tumor. In parotid gland carcinoma, our study and other reports suggests that the risk of occult nodal disease is high enough to warrant elective ND, without significant associated morbidity.

Keywords:

Parotid cancer, minimally invasive surgical procedures, postoperative complications, facial nerve injuries

Introduction

Although benign, pleomorphic adenoma (PA), also called mixed tumor, is the most common neoplasm of the salivary glands and, particularly, of the parotid gland (PG). Malignant neoplasms of the salivary glands are relatively rare, accounting for less than 5% of tumors of the head and neck region. The annual incidence rate is 1.1-6.2 cases per 100.000 for benign lesions and 0.2-1.3 cases per 100.000 for malignant tumors[1-4]. Of these, mucoepidermoid carcinoma is the malignant entity that most often affects PG. While PA and Warthin's tumors represent the most frequent entities, there are several other lesions that can affect PG, such as monomorphic adenoma, adenoid cystic carcinoma, acinic cells carcinoma, squamous cell carcinoma or adenocarcinoma[1].

All parotid tumors are preferably treated with surgery, usually curative. Surgical techniques, morbidity and adequate extent of surgery are still the most concerning topics, especially with regard to the treatment of benign tumors. Because of PG function preservation and less complication rates, over the past decades, partial superficial parotidectomy (PSP) and extracapsular dissection or tumorectomy have emerged as more conservative approaches. These techniques consists on removal of only the peri-tumor area of the parotid parenchyma after careful dissection and preservation of the main trunk of the facial nerve (FN), preserving as less uninvolved parotid parenchyma as possible and avoiding the need for more extensive FN dissection[5].

Major complications of parotidectomy include facial nerve paresis, Frey's syndrome, salivary fistula, wound healing problems and tumor recurrence. Minor morbidity is usually associated with loss of sensitivity of the great auricular nerve (GAN), pain and cosmetic deformity. Reports suggest a lower frequency of complications, such as facial nerve paresis, with more limited surgical approaches, such as PSP or ED[6].

The present study was performed in order to review five-years of clinical experience of our institution with parotid neoplasms and parotid surgery, and to assess what are the factors associated with higher risk of post-operative complications and morbidity. At the end, the authors reflect on possible strategies for diminish the overall risk of post-parotidectomy complications, proposing some changes on our surgical routine and behaviors.

Material and Methods

This descriptive and retrospective study was conducted at Otorhinolaryngology and Head and Neck department of a tertiary care hospital (Hospital de Braga) in Portugal. Patients with lack of information in the clinical process or with insufficient follow-up time were excluded. Overall, thirty patients submitted to tumorectomy, partial parotidectomy (PP) and total parotidectomy (TP) between January 2015 and December 2019 were selected. The authors collected all socio-demographic, clinical and surgical data, such as gender, age, medical history, presenting symptoms, imaging features, fine-needle aspiration cytology (FNAC) biopsy results, staging, extension of surgery, neck dissection, macroscopic and histopathological results of surgical specimens, postoperative complications and rates of cure and recurrence.

All operations were performed by the same surgeon. Modified Blair and lazy-S incisions were the most often used approaches. After surgical procedure, a drain (with high negative pressure drain, usually a redivac drain) was inserted in all patients which was usually removed 2 or 3 days after surgery. All the enrolled cases were restaged using the AJCC 8th edition anatomic and prognostic staging system. Facial nerve function was measured post-operatively by means of the House–Brackmann system (ranging from grade I to grade VI). The degrees of FN dysfunction according to this scale are specified in the table 1. Depending on its duration, it was classified as temporary or permanent[7]. Other types of complications were qualitatively assessed.

For statistical analysis, Statistical Package for the Social Sciences (SPSS®), version 26.0 was used. Continuous and categorical variables were analyzed and compared between groups through *t-test*, *chi-square* and *Pearson*'s correlation tests. The level of significance considered was 5% ($p<0.05$).

Results

Thirty patients with diagnosis of parotid tumor submitted to parotid surgery were selected. Our population comprised 18 males (60%) and 12 females (40%). The overall mean age was 55.3±17.7 years (range: 28-91years). The most common presenting symptom was parotid/cervical swelling (90%), pain (80%) and limitation of neck movements (13.3%). Asthenia, loss of appetite, weight loss, torticollis and headache were also present with the same frequency (3.3%). Facial nerve paresis was not present in any case. One case was considered an incidental diagnosis, since no symptoms were present. The average duration of symptoms was of approximately 10 months (range 22 days to 48 months), but was higher in males than females (10.8 vs 7.9 months). Right and left sides were affected in the same proportion. In 21 cases (70%), lesions were located at superficial lobe and in 4 cases (13.3%) the lesion spread to both superficial and deep lobes. Mean age, presenting symptoms and lesion location, side and size categorized by gender are listed in table 2.

Benign diagnosis was obtained in 80% (*n*=24) of cases. Within this group, pleomorphic adenoma (56.7%, *n*=17) was the most common benign parotid tumor, followed by Warthin's tumor (13.3%, *n*=4). Malignant tumors comprised adenoid cystic carcinoma (*n*=1/6), sebaceous carcinoma (*n*=1/6), primary squamous cell carcinoma (*n*=1/6) and acinic cells carcinoma (*n*=1/6). Table 3 shows histopathological diagnosis frequency and distribution. Older age was significantly associated with higher risk of malignant disease ($p<.001$) but there was no impact of gender on histopathological types ($p=.170$).

Of all 26 pre-operative FNAC biopsies performed, 85% (*n*=22) were in agreement with the histopathological result of the surgical specimens. The lowest concordance was found in malignant group (*n*=2/6). However, there were no significant differences in FNAC biopsies and surgical specimen histopathological results concordance between malign and benign groups ($p=.333$).

Partial superficial parotidectomy was performed in 21 patients (70%). On the other hand, 5 patients (16.7%) underwent partial deep parotidectomy (PDP) and TP was performed in 3 patients (10%). Tumorectomy was performed in one case (a 33mm right-side superficial lobe PA). For benign tumors, the most common type of surgery was PSP (*n*=18/24); in the malign group both PSP and PDP was performed in 3 patients each. Selective neck dissection was performed in 36,7% of cases at the same surgical time (*n*=11). Type of surgery performed according to histopathological data and tumor dimensions are listed in table 4. The patient with histologic diagnosis of a malignant peripheral nerve sheath tumor (MPNST) showed positive cervical nodes on histopathologic examination. All the other were negative for cervical nodes regional disease - pN0 (tables 6 and 7). Two patients, one with diagnosis of sebaceous adenocarcinoma and other with squamous cell carcinoma underwent post-operative adjuvant radiotherapy. The patient with the MPNST underwent adjuvant chemoradiotherapy after surgical excision. Pathological post-operative TNM staging of malignant group is listed in table 7.

About 33% (*n*=10) of patients presented post-operative complications (table 8). Of these, majority of patients described a sensory deficit of the area supplied by the GAN in the early postoperative phase (*n*=6), but complains decreased with time. Permanent facial paralysis happened in 3 cases (10%), wound healing problems, such as infection, seroma formation and wound dehiscence, were present in 2 cases (6.7%) and hemorrhage happened in one case. Clinical Frey's syndrome did not occur in any case. We found no significant impact of age ($p=.218$), time of symptoms evolution (p=.77) and neck dissection ($p=.064$) on post-operative complications. On the other hand, tumor size was associated with higher risk of post-operative complications ($p=.001$). Particularly, the group with postoperative facial nerve injury had significantly larger parotid lesions ($p=.01$). Proportion of post-operative complications was higher in malign disease (4 patients of 6 presented complications), although we found no significant differences between benign and

malign groups (p=.116). We also found that the rate of complications was significantly associated with the type of surgery: the group undergoing total parotidectomy was the one with more postoperative morbidity and there were significant differences on morbidity between superficial partial parotidectomy and total parotidectomy groups (p<.001). Smokers did not present higher post-operative morbidity comparatively to non-smokers (p=.77). Overall, we found that there were statistically significant differences of FN permanent dysfunction incidence between malign and benign disease (p=.001). Superior diameters of surgical specimens were also associated with significant risk of FN dysfunction (p=.001). On the other hand, neck dissection (p=.082) and positive margins on histopathological exam (p=.07) were not associated with higher rates of FN lesion. Curiously, we found that this type of complication was not influenced by the extent of the surgery or the location of the tumor.

The maximum follow-up period was 2 years and the minimum was 2 months. Mean follow-up time did not differ significantly between both groups. At the time of writing this article, there were any cases of local and regional recurrence.

Discussion

The goal of this study was to assess the incidence of minor and major complications after parotid gland surgery of varied extent in benign and malign PG diseases and to analyze the predictive value of some variables on post-operative morbidity, particularly on facial nerve dysfunction.

The authors found a male dominancy for both benign and malign parotid lesions (ratio 3:2) which was in concordance with other studies[2-3]. Also, we know that malignant lesions are always more common in older ages than benign ones. Predictably, we found that our population with a malign histopathological diagnosis presented a mean age significantly superior to those patients with benign diagnosis.

Superficial lobe is the parotid area where majority of the tumors are found, which is consistent with our findings. For anatomical and surgical reasons, tumors located in the deep parotid lobe are usually associated with higher risk of post-operative complications and morbidity[8]. Simultaneous involvement of the superficial and deep lobes was associated with higher rates of postoperative complications, when compared to the unique and exclusive involvement of the superficial lobe group (p=.046). However, when we focused only on FN paralysis, we found that it was not influenced by the extent of the surgery or the location of the tumor. Besides, sudden and acute swelling of the PG, pain and facial nerve paresis are notable and alarming reported signs of malignity and only one third of the malignant tumors present initially with a skin infiltration or obvious neck metastasis[9-11]. In fact, swelling and pain were the most prevalent presenting symptoms in our population. Besides, we found that constitutional symptoms such as anorexia, asthenia and loss of weight (p=.043) and rapid growing tumefaction (p=.011) were significantly more prevalent on malign diagnosis group. One case was considered an incidentaloma, because the patient had no presenting symptoms. Literature reports that PG incidentalomas occur in less than 14% of PET/CT scans. In those cases, Whartin's tumor seems to be the most frequent histology of parotid incidentalomas and only 4% are malignant[11].

Short and long-term post-operative complications, morbidity and quality of life after parotidectomy have been studied in several retrospective and prospective reports[5,12-15].

Nowadays, partial superficial parotidectomy and total parotidectomy have been considered the standard procedures for benign and malign tumors of PG[16]. Because of lower rates of complications and equivalent recurrence rates, majority of centers advocates now PSP and tumorectomy (also denominated as extracapsular dissection or limited partial parotidectomy). On the other hand, TP is favored by some centers because of a lower risk of tumor recurrence. However, due to the satisfying results after treatment of PG diseases, specially benign ones, there is a recent trend toward minimally invasive surgical procedures[5,17].

A prospective and randomized study of 2007 compared 101 patients with benign tumors of PG submitted to conventional and minimally invasive parotid surgery (limited partial parotidectomy) and concluded that function-preserving surgery improved cosmetic, sensory and salivary functions, and reduced the duration of surgery and operative morbidity[5]. Michael Koch and colleagues (2010) also studied retrospectively 170 patients in order to evaluate and determine the incidence of major and minor complications and their impact on patients' comfort after parotid surgery in benign disease. The authors found that incidence of post-operative pain, sensory deficit of the auricle, postoperative facial nerve paresis and Frey's syndrome were significantly higher in TP in comparison with PSP (p=.001). A significant positive correlation was also observed between duration of facial nerve paresis and extent of the operation. The incidence of salivary fistula and permanent paresis were also lower after PSP but no significant differences were detected after comparing it between different surgical groups. Besides, no significant differences between the different types of surgery and wound healing could be detected[15].

Reports suggest that almost all patients describe a sensory deficit of the area supplied by the GAN after parotidectomy in the early postoperative phase. However, intensity of these complains tends to decrease with time. These facts are in line with our results, since majority of our population reported a transitory cutaneous sensory deficit in the area. Some authors believe that quality of life and/or sensory deficit seem to be significantly better in patients in which the GAN was preserved during the surgery[18-20].

Literature reports an overall incidence of temporary and permanent postoperative facial nerve paresis of 18-65% and 0-19%, respectively. This is one of the most concerning complications for the parotid surgeon, because of significant associated morbidity and impact on daily activity and cosmetic appearance. Again, the extent of tissue resection seems to be correlated with FN injury. Several reports have shown that after limited parotid gland resection, rates of facial nerve paresis were substantially lower[21-23]. Although we found no cases of reported temporary FN paresis, all cases of permanent dysfunction were seen in malign group (n=3/3). Therefore, the authors found a statically significant difference of FN permanent dysfunction incidence between malign and benign disease (p=.001). Also, we found that superior diameters of surgical specimens were associated with significant risk of FN dysfunction (p=.001). On the other hand, we found that neck dissection (p=.082) and positive margins on histopathological exam (p=.07) were not associated with higher rates of FN lesion. From that, the authors conclude that the more extensive, aggressive and technically difficult the surgery is, the greater the likelihood of accidental injury to the facial nerve. Thielker and colleagues (2018) stated that, if detected intra-operatively, immediate reconstruction of the facial nerve directly after parotidectomy gives the best functional results. Reconstruction can be performed with an interpositional graft (for simpler defects), with a hypoglossal-facial nerve anastomosis, a masseteric nerve transposition, or a combinations of all these techniques (for more complex defects)[11].

The reported incidence of Frey's syndrome varies from 2% to 80%, depending on how the diagnosis was established. Again, one of the most recognized risk factors for this complication is the amount of gland tissue removed and the lowest incidence of this complication is usually reported after more limited approaches[6]. Nitzan et al. (2004) reported that 57% of patients who underwent parotidectomy for malignant and benign disease complained about Frey's syndrome, although it had no significant impact on quality of life[24].

Due to retrospective nature of the present study, post-operative cosmetic impact was not assessed. Although, reports suggest that majority of patients are not satisfied with their cosmetic appearance after PG surgery. However, this seemed to have no correlation with the extent of surgery[6].

Local recurrence rates of benign disease reported in literature are very low and ranges from 0-0.8%, suggesting that prolonged follow-up is unnecessary in these cases. For malign disease, the oncological outcome is depending on various patient, tumor, and treatment characteristics. Age, gender, pain, comorbidity, TNM stage, skin invasion, facial palsy, perineural growth, positive surgical margins and adjuvant radiotherapy are the most important prognostic factors[11]. During follow-up, local and regional recurrence did not happen in any case, regardless of histologic type and adjuvant treatment.

Cervical lymph node involvement is of upmost importance for prognosis of PG malignancies. Histologic grade has been found to be a significant predictor of nodal metastasis for high-grade parotid tumors. Some authors advocate that this is only true for mucoepidermoid carcinoma and adenocarcinoma but not for acinic cell carcinoma and other subtypes. Others suggest that high-grade tumors, regardless of histologic type, have a significant risk of occult nodal metastases[25-27]. What is obvious is that when there is clinical or radiographic evidence of nodal neck metastases, neck dissection should be undertaken. On the other hand, indications for elective neck dissections in a clinically N0 neck remains a controversial topic. It is important to emphasize that, until now, there is no evidence that elective nodal dissection for malignant

salivary histologies confers any survival benefit[27]. A review recently published (2018) recommends that elective neck dissection should not be routinely performed for all salivary gland cancers. However, through a standard parotidectomy incision, surgeons can expose levels IB, II and superior level III neck node compartments and look for suspicious signs of tumor aggressiveness and nodal involvement, which can easily be incorporated into the surgical resection[28]. Lim et al (2013) showed that presence of intraparotid positive lymph nodes is associated with higher rates of pathologically positive cervical disease in a clinical N0 neck, superior rates of locoregional recurrence and worse survival. This suggests that this marker can be used to predict the risk of metastasis of parotid cancer, especially in high grade cancers[29]. In our serie, selective neck dissection (area II, mostly) was performed in 36,7% of cases at the same surgical time. Of these, about 63% presented a post-operative histologic diagnosis of benign disease and only about 37% had malign disease. In our population, neck dissection was not associated with more post-operative morbidity (p=.064) or higher recurrence rates, so the authors believe that it may be a reasonable practice in cases where there is doubt about nodal involvement or tumor behavior.

Conclusions

Because of function preservation and less complication rates, the authors conclude that minimally invasive surgery should always be considered, especially in benign parotid tumors. These advantages are accompanied by equivalent cure rates. Our study reinforced the idea that some complications, such as permanent dysfunction of the FN, seem to be influenced by dimensions of the tumor and complexity of the surgery. As such, and in order to maintain these success rates, these approaches must be always carried out by experienced surgeons. We also reinforce the importance of a previous discussion with the patient regarding possible complications, so that he can make the most informed decision possible. This is particularly important in cases of larger tumours or more extensive approaches.

Conflict of interests:

None.

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Tables

Table 1. House-Brackmann facial nerve function scale[7]

Grade	Impairment
I	Normal
II	Mild dysfunction (slight weakness, normal symmetry at rest)
III	Moderate dysfunction (obvious but not disfiguring weakness with synkinesis, normal symmetry at rest) Complete eye closure w/ maximal effort, good forehead movement
IV	Moderately severe dysfunction (obvious and disfiguring asymmetry, significant synkinesis) Incomplete eye closure, moderate forehead movement
V	Severe dysfunction (barely perceptible motion)
VI	Total paralysis (no movement)

Table 2. Socio-demographic and clinical data of patients submitted to parotid surgery (categorized by gender)

	Male	Female	Total
N	18	12	30
Mean age±SD (years)	**55.2±20.4**	**55.5±13.5**	**55.3±17.7**
Smokers	**5 (16.7%)**	**2 (6.7%)**	**7 (23.3%)**
Presenting symptoms, n(%)			
Swelling	16(88.9%)	11(91.7%)	**27(90%)**
Pain	3(16.7%)	3(25%)	**6(20%)**
Facial nerve paresis	0(0%)	0(0%)	**0(0%)**
Limitation of neck movements	3(16.7%)	1(8.3%)	**4(13.3%)**
Asthenia	1(5.5%)	0(0%)	**1(3.3%)**
Loss of appetite	1(5.5%)	0(0%)	**1(3.3%)**
Weight loss	1(5.5%)	0(0%)	**1(3.3%)**
Torticollis	1(5.5%)	0(0%)	**1(3.3%)**
Headache	1(5.5%)	0(0%)	**1(3.3%)**
Incidentaloma	0(0%)	1(8.3%)	**1(3.3%)**
Mean evolution time of symptoms (months)	**10.8±13.3**	**7.9±4.1**	**9.8±11.1**
Side			
Right	8 (26.7%)	7 (23.3%)	**15 (50%)**
Left	10 (33.3%)	5 (16.7%)	**15 (50%)**
Affected lobe			
Superficial	11 (36.7%)	10 (33.3%)	**21 (70%)**
Deep	1 (3.3%)	0 (0%)	**1 (3.3%)**
Superficial and deep	2 (6.6%)	2 (6.6%)	**4(13.3%)**
Inferior	1 (3.3%)	0 (0%)	**1(3.3%)**
Superficial, deep and inferior lobes	3 (10%)	0 (0%)	**3(10%)**
Mean maximum tumour size (mm)	**24.9±10.7**	**22.9±6.3**	**24.1±9.1**

Table 3. Histopathological diagnosis frequency and distribution

	Male n (%)	Female n (%)	Mean age* ±SD (years)	Smokers (*n*)	Total n (%)
Benign					
Pleomorphic adenoma (mixed tumor)	8 (26.7%)	9 (30%)	50.53±16	3	17 (56.7%)
Whartin's tumor	3 (10%)	1 (3.3%)	50.25±9.6	3	4 (13.3%)
Basal cells adenoma	0 (0%)	1 (3.3%)		0	1 (3.3%)
Non specific reactive lymphadenitis	2 (6.7%)	0 (0%)	42.5±17.7	1	2 (6.7%)
Total	**13 (43.3%)**	**11 (36.7%)**	**50±14.5***	**7**	**24 (80%)**
Malign					
Cystic adenoid carcinoma	1 (3.3%)	0 (0%)	72	0	1 (3.3%)
Sebaceous adenocarcinoma	1 (3.3%)	0 (0%)	89	0	1 (3.3%)
Acinic cell carcinoma	0 (0%)	1 (3.3%)	66	0	1 (3.3%)
Squamous cell carcinoma	1 (3.3%)	0 (0%)	91	0	1 (3.3%)
Mioepithelial carcinoma	1 (3.3%)	0 (0%)	83	0	1 (3.3%)
Malignant peripheral nerve sheath tumor	1 (3.3%)	0 (0%)	58	0	1 (3.3%)
Total	**5 (16.7%)**	**1 (3.3%)**	**76.5±13.2***	**0**	**6 (20%)**

* $p<.001$

Table 4. Type of surgery performed according to histopathological data and tumor dimensions

	n	% (total)	% (subgroup)	Mean maximum tumor size (mm)	Operation type* *n*		
					PP	Tu	TP
Benign							
Pleomorphic adenoma (mixed tumor)	17	56.7%	70.8%	24.3±1.4	16	1	0
Whartin's tumor	4	13.3%	16.7%	26.3±6.3	4	0	0
Basal cells adenoma	1	3.3%	4.2%	19	1	0	0
Non specific reactive lymphadenitis	2	6.7%	8.3%	10.4±1.6	2	0	0
Total	**24**	**80%**	**100%**	**23.2±7.8**	**23**	**1**	**0**
Malign							
Cystic adenoid carcinoma	1	3.3%	16.7%	13	1	0	0
Sebaceous adenocarcinoma	1	3.3%	16.7%	47	0	0	1
Acinic cell carcinoma	1	3.3%	16.7%	17	1	0	0
Squamous cell carcinoma	1	3.3%	16.7%	36	0	0	1
Mioepithelial carcinoma	1	3.3%	16.7%	18	1	0	0
Malignant peripheral nerve sheath tumor	1	3.3%	16.7%	35	0	0	1
Total	**6**	**20%**	**100%**	**27.7±13.6**	**3**	**0**	**3**

PP: partial parotidectomy; Tu: Tumorectomy; TP: total parotidectomy
*$p<.001$

Table 5. Tumor dimensions and histologic surgical margins results according to type of surgery performed

	PSP	PDP	Tu	TP	Total n (%)
n (%)	**21 (70%)**	**5 (16.7%)**	**1 (3.3%)**	**3 (10%)**	**30**
Mean maximum tumor size (mm)	**21±7.4**	**26.4±7.4**	**33**	**39.3±6.7**	**24,1+-9.1**
Surgical margins					
Negative/Complete exeresis	15 (50%)	2 (6.7%)	0 (0%)	0 (0%)	**17 (56.7%)**
Intercepted	1 (3.3%)	1 (3.3%)	0 (0%)	3 (10%)	**5 (16.7%)**
Adjacent	5 (16.7%)	2 (6.7%)	1 (3.3%)	0 (0%)	**8 (26.7%)**

PSP: partial superficial parotidectomy; PDP: partial deep parotidectomy; Tu: Tumorectomy; TP: total parotidectomy

Table 6. Clinical and pathologic cervical lymph node involvement and type of neck dissection performed.

	Mean maximum tumor size (mm)	cN+	cN0	*ND*	Type of ND	pN+
Benign	23.2±7.8	8	16	7	Area II (n=6) Area II and III (n=1)	0
Malign	27.7±13.6	3	3	4	Supraomohyoid (n=1) Area II, III and IV (n=1)	1
Total	**24.1±9.1**	**11**	**19**	**11**		**1**

cN+: clinical positive node; cN0: clinical negative node; ND: neck dissection; pN+: pathologic positive node

Table 7. Pathological TNM staging of parotid malignant neoplasms (AJCC 8th edition)

	T	N	M	R
Cystic adenoid carcinoma	**1**	**0**	**0**	**0**
Sebaceous adenocarcinoma	**3**	**0**	**0**	**1**
Acinic cell carcinoma	**1**	**x**	**0**	**0**
Squamous cell carcinoma	**2**	**0**	**0**	**1**
Mioepithelial carcinoma	**1**	**x**	**0**	**0**
Malignant peripheral nerve sheath tumor	**2**	**1**	**0**	**1**

Table 8. Post-operative complications frequency and distribution

	Male n (%)	Female n (%)	Mean age	Smokers (*n*)	Mean maximum tumor size (mm)*	**Total n (%)**
No	**11**	**9**	**52.45±15.6**	**5**	**20.6±6.6**	**20 (66.7%)**
Yes	**7**	**3**	**61±21**	**2**	**31.2±9.7**	**10 (33.3%)**
Hiposthesia	3 (10%)	3 (10%)	60.5±19.8	2	32±6.4	**6**
Permanent facial nerve paresis	3 (10%)	0 (0%)	79.3±18.5	0	39.6±6.7**	**3**
Transitory facial nerve paresis	0	0	-	0	-	**0**
Hemorrhage	1	0	28	0	25	**1**
Wound healing problems	2	0	50±31.1	0	19±8.5	**2**
Frey's syndrome	0	0	-	0	-	**0**
Salivary fistula	0	0	-	0	-	**0**
Total	**18**	**12**	**55.3±17.7**	**7**	**24.1±9.1**	**30**

*p=.001
**p=.01

Captions:

Table 1. House-Brackmann facial nerve function scale.

Table 2. Socio-demographic and clinical data of patients submitted to parotid surgery (categorized by gender).

Table 3. Histopathological diagnosis frequency and distribution.

Table 4. Type of surgery performed according to histopathological data and tumor dimensions.

Table 5. Tumor dimensions and histologic surgical margins results according to type of surgery performed.

Table 6. Clinical and pathologic cervical lymph node involvement and type of neck dissection performed.

Table 7. Pathological TNM staging of parotid malignant neoplasms (*AJCC 8th edition*)

Table 8. Post-operative complications frequency and distribution.