

Role of Partial Superficial Parotidectomy in the Management of Parotid Benign Tumors in Egypt, A Multicenter Study

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Introduction: There has been a debate concerning the proper surgical treatment of benign parotid tumors during the last century, but the main argument remains whether to perform formal parotidectomy (superficial parotidectomy (SP) or total parotidectomy) or performing limited surgery (partial superficial parotidectomy (PSP)).

Aim of the study: Reporting our experience in treating benign parotid tumors by either SP or PSP with a long follow-up duration (5 years).

Patients and methods: All patients were managed by one form of parotidectomy; most had PSP (47 cases (64.38%)), while SP was done in 26 cases (35.62%).

Results: Transient facial nerve palsy was significantly more frequent after superficial parotidectomy (23.08%; $P=0.004$) than after partial superficial parotidectomy (2.13%).

Conclusion: PSP could be an important surgical technique in benign parotid tumors treatment with limited morbidity and recurrence rate.

Key words: Partial parotidectomy, facial palsy, parotid benign tumors.

Introduction

Besides being the most commonly encountered tumor of the parotid gland, pleomorphic adenoma (PA) represents about 80% of all benign tumors.¹ Eighty percent of all parotid gland tumors arise in the inferior pole of the superficial lobe and rarely in the deep lobe or accessory parotid tissue, so proper surgical removal is a must to prevent recurrence and the possibility of malignant transformation.² Diagnosis of benign parotid tumors occurs at any age and tends to increase gradually until reaching the golden age of initial diagnosis which is between 46 & 51 years of age, and women are affected more than men.³ The main problem of Warthin's tumor is multifocality, yet recurrences are very rare with a rare risk for malignant transformation.⁴ Malignant transformation is often associated with pain, facial nerve weakness, skin fixation, tumor fungation, or cervical lymph node involvement. However, the absence of these signs does not exclude malignancy.⁵ Over the last century, there has been a debate in the proper surgical treatment of benign parotid tumors, and the main argument is whether to do formal parotidectomy (Superficial parotidectomy (SP) or total parotidectomy) or performing limited surgery (Partial superficial parotidectomy (PSP)).² However recently, the surgical treatment of benign tumors has developed in the direction of less invasive options.^{6,7}

Some centers favor PSP, which has the advantages of less time needed (± 40 min), less incidence of facial nerve palsy both temporary (10–40%) and permanent (1–5%), less probability of postoperative

Frey's syndrome, and lastly low incidence of sensation loss (Injury of the great auricular nerve).^{8,9} Besides, PSP helps in decreasing the incidence of postoperative salivary fistula and thus the duration of wound healing.¹⁰

This study aims to report our experience in treating benign parotid tumors by either SP or PSP with a long follow-up duration (5 years).

Methodology

A prospective clinical trial for a 73 patients with benign parotid tumors had surgery at Aswan University hospital (Aswan, Egypt), 15th May Model hospital (Cairo, Egypt), and Helwan University hospital (Cairo, Egypt) from March 2013 to August 2019. The preoperative diagnosis was based on ultrasonography and fine-needle aspiration cytology (FNAC). The data were prospectively collected and entered into all hospitals' database by the authors.

Patients' demographics, clinical tumor size, type of operation, FNAC result, facial nerve status, final histopathology report, and intra-operative and postoperative complications were recorded and analyzed. The performed operation was either partial superficial parotidectomy (PSP) or superficial parotidectomy (SP) depending on the size of the tumor and the number of facial nerve branches in close association with the tumor.

The study received approval from the research and ethics department of all hospitals, besides a written consent was obtained from every patient. Statistical analysis to evaluate differences among both types

of parotidectomy concerning surgical complications was performed with the χ^2 test for categorical variables and independent t-test for numerical variables. A P value of less than .05 was considered the level of statistical significance.

Operative technique

Intubation was performed under general anaesthesia with a short-acting smooth muscle relaxant. Patients were positioned with their heads hyperextended and their faces turned to the opposite side of the table, with the table head raised 30-45 degrees. To monitor facial movements, the corners of the eye and mouth were kept uncovered. The skin flap was raised deep to the superficial musculo-aponeurotic system superficial to the parotid fascia and the neck flap was raised deep to the platysma in a modified Blaire incision. When possible, the flap was deepened to the sternomastoid muscle and the posterior branch of the great auricular nerve was preserved. The tragal pointer, the level of the posterior belly of the digastric muscle, and the tympano-mastoid suture were used to locate the facial nerve trunk.

The major facial nerve trunk was discovered and traced to its branches using the SP method. In all cases, the parotid duct was thereafter ligated. Following that, the entire superficial parotid tissue region was removed together with the tumour. Only the branches surrounding the tumour were revealed in the PSP procedure, and the parotid tumour was removed with a 0.5 to 1-cm cuff of normal parotid tissue. All of the patients' parotid ducts were maintained. Only the tumor-bearing region was removed, avoiding the need for more extensive facial nerve dissection.

Results

Seventy-three patients with parotid tumors were included, with one patient having bilateral Warthin's tumor. 37 (55%) of the patients were females, while 36 (45%) were males. The mean age was 55.14 yrs. old with a wide age range (25-80) yrs. The mean for tumor size was 2.34 cm. All the demographic data are presented in **(Table 1)**.

FNAC was ordered in all cases, with a provisional diagnosis in 100% of the patients. All patients were managed by one form of parotidectomy. Most had PSP (47 cases (64.38%)). SP was done in 26 cases (35.62%)

Both shorter operative time and hospital stay were statistically significant for PSP patients **(Table 2)**. Postoperative histopathology reports are presented in **Table 3**. Most tumors were pleomorphic adenomas (56.16%), followed by Warthin's tumor (38.36%). **(Table 4)** presents the postoperative complications associated with all procedures. Postoperative infection was statistically significant more in SP patients, with no statistically significant difference in bleeding complications that necessitated intra-operative homeostasis. Transient facial nerve palsy was significantly more frequent after superficial parotidectomy (23.08%; $P=0.004$) than after partial superficial parotidectomy (2.13%). Frey syndrome was significantly more common in superficial parotidectomy (7.69%) than in partial parotidectomy ($P=0.046$). No patients had permanent palsy; however, one patient (1.4%) of SP group had permanent weakness affecting the lower trunk of the dissected facial nerve.

After at least 2 years of follow-up (Mean=2.21±0.86, range (2-5)), no benign tumor recurrence was encountered.



Fig 1: A) Closure of PSP incision, B) complete healing after PSP.



Fig 2: A) Trifurcated facial nerve trunk, B) PSP for pleomorphic adenoma.

Table 1: Demographic data of all cases

		PSP (47)	SP (26)	p-value
Age		53.70±7.83	57.73±9.93	0.373
Gender	Male	24 (51.06%)	12 (46.15%)	0.688
	Female	23 (48.94%)	14 (53.85%)	
Tumor size		2.33±0.81	2.57±1.14	0.732

Table 2: Operative Details

	PSP (47)	SP (26)	p-value
Operative time (Min)	92.75±4.03	107.92±22.70	0.000
Hospital stay (Day)	3.72±0.45	4.69±1.78	0.001

Table 3: Post-operative Histopathology Report

Pleomorphic adenoma	41 (56.16%)
Warthin's tumor	28 (38.36%)
Miscellaneous	4 (5.48%)

Table 4: Postoperative Complications

	PSP(47)	SP (26)	p-value
Infection	0	4 (15.38%)	0.006
Hematoma & Hemorrhage	0	1 (3.85%)	0.356
Temporary palsy	1 (2.13%)	6 (23.08%)	0.004
Frey syndrome	0	2 (7.69%)	0.287

Discussion

Recently, there are different surgical operations for treating PAs. However, there is no agreement on the best option.¹¹ The surgical decision is highly influenced by the anatomical criteria, including; tumor size (More or less 4 cm), tumor location

(Cranial or caudal), mobility of the tumor, and finally the relation between the tumor and parotid gland surface, retromandibular vein, facial nerve, and Stensen's duct.^{4,12} The data of preoperative histological diagnosis is considered the corner stone for the surgeons during the surgical procedure. Level of the surgical techniques and their timing

could be altered and tailored according to the preoperative FNAC and perioperative histology. Furthermore, preoperative outcomes help the surgeons to do less invasive procedures in older, co-morbid patients who can be only selected by a non-doubtful ultrasound and cytological reports.¹³ Therefore, clinical examination with the preoperative US are very important to choose the proper technique. Moreover, the surgeon's flexibility and experience are a must for intraoperative switching in more extended surgical technique, if unusual findings occurred.⁵ The exact analysis of histopathology outcomes are subjected to the skill of the sonography and histopathology physicians. Their close collaboration is critical. Cytology has to constantly associate with the clinical problem, and other imaging conclusions.¹⁴ Schmidt et al. in a meta-analysis found more overall accuracy of FNAC in differentiating the neoplastic from non-neoplastic lesion.¹⁵ Stathopoulos et al, in 2017, mentioned that preoperative FNAC had an incidence of false-negative results (1.3%),⁵ But in this series, FNAC showed a 100% sensitivity and specificity that helped us in case selection.

In two meta-analyses (Albergotti et al. in 2012 & Foresta et al. in 2014),^{16,17} SP had a higher recurrence rate and side effects than limited surgeries. Facial palsy, the main side effect, is directly related to the extent of dissection, so PSP could be a viable alternative solution to SP in selected cases with the following criteria,¹⁷ tumor size (2:4 cm), tumors of the anterior superficial and the caudal (Whatever the size) parts of the gland, and tumors located near to Stensen's duct.¹⁶ In our study, the mean tumor size is 2.34 cm with a significantly shorter operative time and hospital stay for PSP (47 cases (64.38%)), than SP patients (26 cases (35.62%)). Also, the side effects, particularly the transient facial nerve palsy, were highly significant in SP (23.08%; P = .004), then after partial superficial parotidectomy (2.13%). The incidence of permanent facial palsy varies between 0% and 13.3% after limited dissection and 0% and 8.9% after SP.¹⁸ Because the resected volume of the gland is lower in PSP than SP (**Figure 1**), there is no need for muscle flap usage with a limited sunken cheek deformity and better esthetic outcomes (**Figure 2**). Stathopoulos et al, in 2017, mentioned that preoperative FNAC had an incidence of false-negative results (1.3 %),⁵ but in this series, FNAC showed a 100% sensitivity and specificity that helped us in case selection. on the other hand, the most important challenge in the surgery is the incidence of tumor rupture in PAs that significantly increase the recurrence rate by eight percent on long follow-up.^{19,20} in this study there was no incidence of tumor rupture with no incidence of tumor recurrence.

Conclusion

By following the mentioned selection criteria, PSP could be an important surgical technique in benign parotid tumors treatment with limited morbidity and recurrence rate.

Conflict of interest

There is no conflict of interest.

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