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Extracapsular Dissection versus Superficial Parotidectomy for Treatment of Benign Parotid Tumors

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Abstract **Objective:** The current study aimed to compare extracapsular dissection (ED) versus superficial parotidectomy (SP) in surgical treatment of benign parotid tumors. **Methodology:** Thirty two patients with benign parotid tumors were included in this study. The patients divided into two groups: the ED group (16) patients (5 males and 11 females) and SP group 16 patients (7 males and 9 females). Patients were followed up for 2 years. **Results:** Sixteen were included in (ED) group and 16 in (SP) group, twelve patients were males (37.5%) and 20 patients were females (62.5%). The mean age was 47.2 years (range 21 to 69 years) in both groups. No complications developed in (ED) group except wound infections in 2 patients (12.5%). Many cases complicated in (SP) group: two cases of temporary facial paresis, (12.5%), 3 cases of salivary fistula (18.7%), 10 cases (62.5) of cosmetic deformity in the form of depressions in the parotid region and one patient (6.2%) developed Frey's syndrome. No recurrence in either group. **Conclusion**: Extracapsular dissection is safe and reliable procedure compared to superficial parotidectomy with reduced morbidity and good cosmetic results.

Keywords: *extracapsular dissection, parotid, superficial parotidectomy*

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1. Introduction

Salivary gland tumors comprise of less than 3% of all head and neck tumors [1]. Eighty percent of these are benign, mostly pleomorphic adenomas [2]. Approximately 90% of the parotid gland neoplasms are located within the superficial lobe, lateral to the facial nerve [3]. The majority of parotid tumors presented as discrete lumps arising within the superficial portion of the gland [4]. Conventional teaching prescribes removal of these tumors by superficial parotidectomy, with encompasses facial nerve identification and enblock removal of the superficial portion of the gland [5]. Extracapsular dissection (ECD) is an alternative approach to the removal of such lumps, involving meticulous dissection immediately outside the tumor capsule while still preserving the facial nerve, and is distinct from enucleation [6]. Based on the traditional view that many parotid tumors (notably pleomorphic adenomas) breach their capsule and so are theoretically at risk of recurrence from surgery close to the capsule [7]. In the past, benign parotid tumors were often treated by (intracapsular) enucleation, in which the tumor was exposed, the tumor capsule opened and the tumor tissue lifted out of the capsule in its entirely. Because with this technique capsular structures were lift in situ and tumor cells could be distributed over the operative field, the rate of tumor recurrence was relatively high (20-45%) [8]. The technique of parotidectomy was refined first in the sense that the tumor was removed with surrounding glandular tissue, and second that the facial nerve was fully dissected [9]. The resulted in a lateral or superficial parotidectomy if only the outer part of the gland was removed or a total parotidectomy if the inner part of the gland was also removed this now largely standard operative technique accepted by many surgeons for treatment of benign parotid tumors. The recurrence rate of 0% to 5% reported with the use of this technique is regarded as acceptable [10]. However the dissection of the facial nerve and its branches lead to postoperative complications that cannot be ignored. The rate of temporary and permanent facial nerve paresis are reported to be 15-25% and 5-8% respectively after superficial parotidectomy and as high as 20-25% and 5-10% respectively after total parotidectomy [11]. There is also a risk of Frey's syndrome recorded to be over 10% after superficial parotidectomy and over 30% after total parotidectomy for the treatment of benign parotid tumors [12]. The present study aimed to compare the results of extracapsular dissection (ED) with superficial parotidectomy (SP) in the surgical treatment of benign parotid tumors which includes: recurrence rate, Frey's syndrome, temporary or permanent facial paralysis, salivary fistula and cosmetic deformities.

2. Methods

Patients with benign parotid tumors were admitted to the surgery department, Assiut University Hospital, between March 2012 and January 2014. The study was approved by the medical research Ethics committee of

faculty of medicine and informed consent was taken from all participants. After detailed history about the nature and duration of their symptoms, patients underwent a clinical examination. An ultrasound scan of the head and neck with particular attention to the parotid glands was carried out in all patients. Additional imaging as CT scanning and MR imaging were dispensable because of superficial position of the tumors.

Extracapsular dissection procedure (Figure 1)

All operations were done under general anesthesia with endotracheal intubation. After skin preparation and draping, a curved skin incision around the earlobe was made starting at the tragus and ending in skin fold in the neck. The skin flap and subcutaneous tissue were dissected and the anterior border of the sternocleidomastoid muscle, the great auricular nerve, and finally the capsule of the parotid gland were exposed. The parotid capsule was incised and the dissection extended toward the tumor, however the tumor capsule itself was never opened. The dissection was extended through the healthy glandular tissue around the tumor so as to gradually separate the tumor from the gland. With this technique a rim of about 2-3 mm of health glandular tissue was left on the tumor, without damaging the facial nerve (Figure 1). After the tumor had been removed the parotid capsule was sutured back together. A rubber drain was inserted and subcutaneous and skin sutures applied. A pressure bandage was then applied with changed daily and kept in place for 5-7 days.

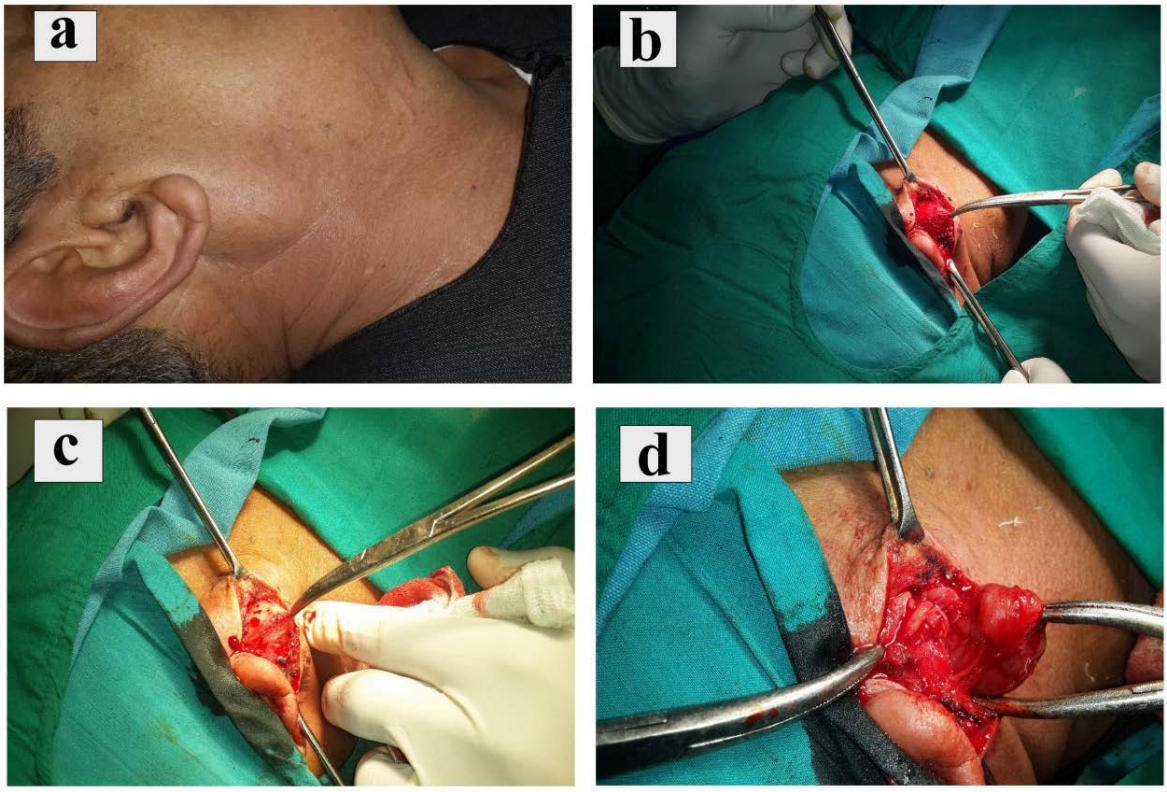

Figure 1. a Patient with benign parotid tumors**. b** curved skin incision around the earlobe was made and skin flap and subcutaneous tissue were dissected**. c** the capsule of the parotid gland were exposed**. d** dissection was extended through the healthy glandular tissue around the tumor and gradually separate the tumor from the gland

Statistical Analysis: Statistical calculations were carried out by one way Analysis Of Variance (ANOVA), using the software Statistical Package for Social Sciences (SPSS 16) for Windows. Chi-square test for categorical data and the Rank-Sum test for continuous data. P-values of <0.05 were considered significant.

3. Results

The clinical and demographic characteristics of the patients in the two groups are shown in Table 1. We observed that no significant differences in gender distribution mean age, tumor size or site between the two groups, indicating that the location and size of the tumor not affect the type of the dissection used.

Table 1. Clinical and demographic characteristics of the patients in the two groups: extracapsular dissection (ED) and superficial parotidectomy (SP)

Variables	ED	SP	P-value
Gender (male : female)	5 : 11	7 : 9	0.733
Age (year), median range	(21-69)	(20-70)	0.380
Diagnosis:			
Pleomorphic adenoma	13	12	
Warthin's tumor	3	2	
Lipoma	1	1	
Size of the tumor (cm), median range	(1-6)	(1.2 - 4.1)	0.589
Site of the tumor:			
Anterior	5	6	
Inferior	4	3	
Central	5	4	
Deep	2	3	

Table 2 shows the operation time, transient or permanent facial palsy, Frey's syndrome and satisfaction

score for cosmetic results. There is a difference in the mean operative time between the two groups, in the form of short operative time in the (ED) group as there was no need for facial nerve dissection. In the two groups, the incidence of transient facial palsy appeared in two cases of (SP) group while no cases recorded in the (ED) group. No permanent facial palsy recorded in both groups. Salivary fistula recorded in 3 (18.7%) cases in the (SP) group and Frey's syndrome in one (6.2%) case of (SP) group. In (ED) group, two cases (12.5%) of wound infection recorded while sound healing occurred in the (SP) group. As regards cosmetic outcome, Ten (62.5%) cases out of 16 complained depression (dimpling) in the parotid region while good cosmetic satisfaction were good cosmetic satisfaction were recorded in the (ED) group, No recurrence has been noted to date.

Table 2. Correlation between operative time, complications and cosmetic outcome in the two groups: extracapsular dissection (ED) and superficial parotidectomy (SP)

Variable	ED	SP	P-value
Mean operative time (minute)	60	90	
Fascial palsy (%)			
Transient	-	2 (12.5%)	0.735
Permanent	-	-	-
Frey's syndrome	-	1 (6.2%)	< 0.001
Salivary fistula	-	3 (18.7%)	
Wound infection	2 (12.5%)	-	
Cosmetic outcome depression (dimpling)	-	10 (62.5%)	< 0.001

4. Discussion

The justification for superficial parotidectomy with facial nerve dissection was the prevailing surgical concept that the best means of protecting the nerve was complete dissection and exposure of the nerve [13]. It is imperative to emphasize that the capsular dissection technique is different to the enucleation of the parotid lesions which involves a shelling out of the lesions which involves a shelling out of the lesion. Local extracapsular dissection performed with a slow and precise bloodless technique allows these lesions to be removed with a cuff of normal parotid tissue without capsular breach [14].

Our study demonstrate that there is a difference in the mean operative time between the two groups in the form of short operative time in the ED group as there were no need for facial nerve dissection. Transient facial nerve injury appeared in 2 cases of (SP) group while. No cases recorded in (ED) group this was in agreement with Dell' Aversana et al. [15] who mentioned that, transient nerve injury, facial paralysis and Frey's syndrome were significantly more frequent after superficial parotidectomy than after extracapsular dissection (26.8% vs. 3.9% [P=0.001], 8.9% vs. 0% [P<0.001], and 5.3% vs. 0% [P<0.001] respectively). In our study, permanent facial palsy not recorded in both groups. Frey's syndrome recorded in one case (6.2%) in (SP) group and also salivary fistula recorded in 3 cases (18.7%) of (SP) group which is closed spontaneously with conservative treatment. The incidence of permanent facial nerve palsy following ECD returns to expected incidence (2%) in high volume centers [16]. ED performed by experienced surgeons is not associated with higher risk of permanent facial nerve dysfunction compared to superficial parotidectomy. The incidence of frey's syndrome averaged 47% with total parotidectomy, 17% with superficial parotidechomy and 3% with ED [17]. The incidence of transient facial nerve dysfunction averaged, 30% for total parotidectomy, 25% for (SP). 18% for (PSP) and 11% for (ED), Improved results are reported in high volume centers undertaking ED with rate of 3-6% transient nerve dysfunction compared to 16% using (SP). ED offers and advantage over (SP) as the facial nerve is not dissected and so the risk of stretch injury and inadvertent effects are reduced.

5. Conclusion

Extra capsular dissection (ED) is a safe and reliable procedure compared to superficial parotidectomy with advantages in the reduction of permanent and transient facial nerve palsy, Frey's syndrome and contour defects are minimized.

Conflict of Interest Statement

The authors declared no potential conflicts of interest.

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