

Extra-capsular Dissection Versus Superficial Parotidectomy for Clinically Benign Parotid Tumors

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ABSTRACT

Introduction: Surgical techniques for parotid gland tumor removal have been shaped over the years by the importance of the gland's relationship with the facial nerve, recurrence rates with specific techniques and, histologic behavior of parotid tumors. Parotidectomy with facial nerve dissection has become the procedure of choice in removal of parotid gland tumors because of the associated low recurrence rate. However, the extensive dissections associated with this procedure can cause significant postoperative complications and cosmetic disfigurement. In order to avoid these complications, extracapsular dissection technique can be used in the management of benign lesions of the parotid gland. **Objective:** The aim of this study is to compare extra-capsular dissection (ECD) with superficial parotidectomy (SP) in a group of patients suffering from clinically benign parotid tumors, and to see whether ECD may represent an alternative option to SP or it can be rather, its evolution. **Patients and methods:** 36 patients with clinically benign parotid tumors were included in this prospective study. their ages ranged from 32 years to 63 years. These patients were managed over a period of 5 years. They were managed between November 2012 and December 2016, at Ain Shams university hospitals in Egypt. The patients were divided into two groups: the superficial parotidectomy group (SP) involved 19 patients while the extra-capsular dissection group (ECD) involved 17 patients. All patients were assessed clinically and investigated by ultrasonography, computerized tomography (C T) and fine needle aspiration cytology ((FNAC). **Results:** thirty six patients with benign parotid tumor were included. nineteen cases underwent superficial parotidectomy and 17 cases underwent extracapsular dissection. twenty one patients were male and 15 patients were females. The histopathological results included 26 cases of pleomorphic adenoma, 8 cases of Warthin's tumor, and 2 cases of simple cyst. There was no post-operative permanent facial nerve injury, Frey's syndrome or salivary leak within the extracapsular dissection group. however within the superficial parotidectomy group there were 2 cases of Frey's syndrome, 1 case of salivary fistula and 5 cases of cosmetic deformity in the form of depressions in the parotid region. No recurrence was detected in either group. **Conclusion:** Extracapsular dissection for benign parotid tumors has low postoperativemorbidity and good cosmetic results, compared to superficial parotidectomy.

INTRODUCTION

Parotid neoplasms are uncommon. They correspond to 80% of salivary gland tumors and 3% of all tumors of head and neck ⁽¹⁾. Eighty percent of parotid tumors are benign, mostly pleomorphic adenomas, where approximately 90% are located within the superficial lobe of parotid gland ^(2,3).

Parotid surgery started in the early 1800s with the enucleation of the tumor masses leaving the capsule in situ. This was associated with low rate of post-operative complications, but a high recurrence rate up to 30% ⁽⁴⁾.

This fact gave rise to more radical procedures such as total and superficial parotidectomy, reducing tumor recurrence, but at the same time

increasing complications such as facial nerve palsy, cosmetic alterations and Frey's syndrome ^(5,6).

Although superficial parotidectomy is regarded as the treatment of choice for benign parotid tumors, a general trend adopted by many surgeons in the last two decades has been towards minimal invasive surgery, in order to reduce postoperative morbidity without affecting the rate of cure. In an attempt to reshape this procedure, the extracapsular dissection technique (ECD) was described by Gleave ⁽⁷⁾. It involves careful dissection around the tumor capsule without pre-identification of the facial nerve ⁽⁸⁾.

The extracapsular dissection technique differs from enucleation as the tumor is removed with an intact capsule, while enucleation involves

removal of the tumor tissue and leaving the capsule behind. However, the extracapsular dissection technique may not be appropriate for the malignant parotid neoplasms. The potential risk in ECD is encountering a malignant neoplasm masquerading as a benign lump, if this is common at all and subsequently the course of cancer may be adversely affected. this would prohibit the use of ECD as an alternative to SP for a simple parotid lump⁽⁹⁾.

PATIENTS AND METHODS

Thirty six patients who were diagnosed clinically with benign parotid tumor and underwent surgery at Ain Shams university hospitals were included in this prospective study.

These patients were managed over a period of 5 years between November 2012 and December 2016. All patients with malignant pathology were excluded from this study.

seventeen patients underwent extra-capsular dissection (ECD), (9 males and 8 females, with a mean age of 47 years; ranging from 32 to 57 years) on the other hand, 19 patients underwent superficial parotidectomy, (12 males and 7 females, with a mean age of 49 years; ranging from 34 to 63 years).

All patients were assessed clinically, underwent soft tissue ultrasound, computerized tomography (CT) and fine needle aspiration cytology (FNAC).

All patients were followed up postoperatively, and the mean follow up period was 29 months (ranging from 11–53 months). An Informed consent was taken from all patients included in this study.

The surgical techniques applied were: a) Superficial parotidectomy, involving removal of superficial parotid lobe with complete facial nerve exposure. b) Extra-capsular dissection, involving selective resection of the tumor with safety margin. Exposure of the parotid gland in both techniques was done by raising the skin flap. The parotid capsule was incised with the plane of dissection being within a compartment of loose areolar tissue approximately 2-3 mm from the neoplasm without disturbing the tumor capsule (fig 1). Bipolar diathermy was used to prevent injury to the branches of the facial nerve that can be adjacent to the tumor capsule. Closure of the parotid capsule was done after the neoplasm was removed.

The choice of technique was decided intra operatively according to the degree of mobility at surgery after raising the skin flap.

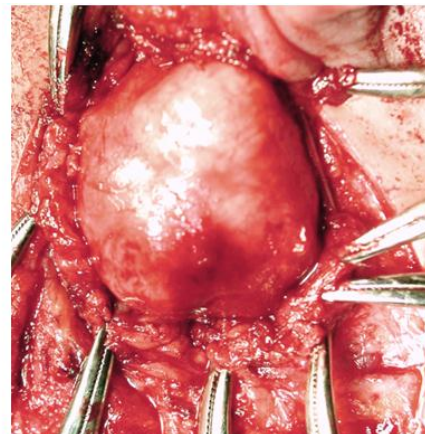
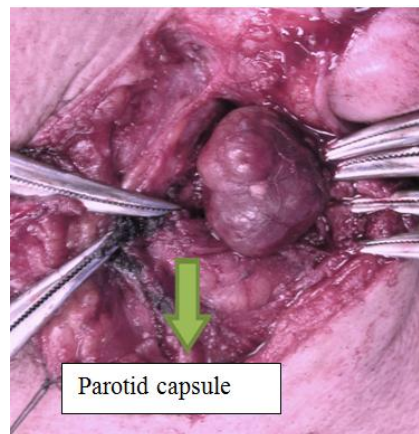


Fig (1): Dissection through glandular tissue around the tumor after incision of the parotid capsule

RESULTS

Between 2012 and 2016, a total of 36 patients with benign parotid tumors underwent parotidectomy in Ain Sham university hospitals.

nineteen cases had superficial parotidectomy (SP), while 17 cases were treated utilizing extracapsular dissection (ECD). As for pathology, the most frequent tumors were pleomorphic adenoma (72% of cases), followed by Warthin's tumor (22%) and finally benign epithelial cyst (6%) [table 1].

All tumors were located in the superficial lobe of the parotid gland, and maximum dimension of the masses ranged from 1.7 to 5.0 cm (mean 2.8 cm).

Transient facial palsy in the immediate postoperative period appeared in 4 cases of SP group (21%) while one case was recorded in the ECD group (5.8%). No permanent facial palsy was recorded in both groups.

Salivary fistula and Fray's syndrome were recorded in one patient and two patients respectively in SP group, while none was reported in ECD group. four patients presented with periauricular dysesthesia, three in SP group and one in ECD group.

In SP group, 6 patients (31.5%) presented with cosmetic dissatisfaction. 5 of them presented with depression of operative bed, and one patient was dissatisfied with her scar. however only one patient was recorded in ECD group. In both groups, no recurrence has been reported up till now.

Table (1): Demographic characteristics of the patients and complications in both groups.

	SP	ECD	P value
Number of patient	19	17	
Sex (male : female)	12 : 7	9 : 8	0.5 NS
Age (Mean) /year [range]	49[34-63]	47 [32-57]	
Histopathology:			0.6 NS
Pleomorphic adenoma	14	12	
Warthin's tumor	5	3	
Epithelial cyst	0	2	
Tumor maximum dimension /cm [range]	3.1[2.3-5]	2.5[1.7-4.2]	
Complications:			
Transient facial nerve palsy			
Fray's syndrome	4	1	0.2 NS
Salivary fistula	2	0	0.6 NS
Periauricular dysesthesia	1	0	0.9 NS
Cosmetic deformity:	3	1	0.3 NS
- Scar dissatisfaction			
- Operative bed	1	1	0.9 NS
Depression	5	0	0.1 NS

DISCUSSION

Parotid neoplasm surgery has developed in the last century. It passes from minimally invasive techniques to extensive radical surgery with high incidence of complications^(10, 11)

Over the years, efforts have aimed at finding a technique that has all the benefits of both procedures with limited post operative complications and avoid long term recurrence.

Most benign parotid tumors are either pleomorphic adenoma (71%) or Warthin's tumor (22%)⁽¹²⁾, unfortunately pleomorphic adenoma has a reputation for recurrence that has continued since the 1940s and 50s. The nature of pleomorphic adenoma was then unclear for, as its name implies, it has a variable appearance and so was thought to be a hamartoma rather than a neoplasm⁽¹³⁾.

Treatment was by enucleation, with obvious high recurrence rate, or involved an extensive

approach causing serious disfigurement and facial nerve injury. Recurrence and nerve dysfunction were the main causes that prompted change in the surgical management of parotidneoplasms^(14, 15).

Patey and Thackray reported that the standardization of parotidectomy techniques had revolutionized surgery of the parotid glands. The recommendation was that, the standard operation for parotid tumors should be superficial parotidectomy⁽¹⁶⁾. since that time, superficial parotidectomy is considered the gold standard parotid gland surgery for pleomorphic adenoma.

The justification for superficial parotidectomy with facial nerve dissection was the common surgical concept that the best means of protecting the facial nerve was complete dissection and exposure of the nerve⁽¹⁷⁾. However, multiple studies have now demonstrated that the nerve conduction can be weak post-operatively despite anatomical confirmation of its integrity due to factors including traction, the conduction block due to diathermy current during flap elevation or devascularization^(18,19). As the need for reducing postoperative morbidity and maintaining facial aesthetics increase, extracapsular dissection which was described by Gleave in 1979, represents the current limit of conservative parotid surgery^(20,21).

The most frequent benign parotid neoplasms in our study were pleomorphic adenoma (72%), followed by Warthin tumor (22%); this corresponds to what is written in literatures⁽¹²⁾.

Post-parotidectomy complications include facial nerve palsy, both transient and permanent, aesthetic alterations resulting from facial scarring and the possibility of surgical bed depression, hematomas, seromas, neuromas, Frey's syndrome and recurrence. One of the most feared complications of parotidectomies is facial nerve palsy, whether transient or permanent. To avoid this complications, reference points are used to identify the trunk and then follow the path of the nerve. Some teams also monitor its function during surgery. in spite of these efforts, facial nerve injury still takes place^(18,19).

The incidence reported for facial nerve injury varies markedly according to the type of surgery, with higher incidence following extensive surgery. A systematic review by Umopathy et al⁽²²⁾ showed that transient facial nerve paralysis occurred between 8.8 and 76% of patients, while

permanent paralysis was observed in 0 to 14% of them with different surgical procedures.

From the series of 630 patients, the incidence of transient facial nerve palsy was significantly lower with Extra-capsular dissection versus superficial parotidectomy (10% vs. 32%, respectively)⁽²⁰⁾, while, a meta-analysis of nine studies with 1,882 patients showed a mean reduction of 75% in the rate of transient facial nerve paralysis (ECD 8% vs. SP 20.4%)⁽²¹⁾. In this study we observed a significant reduction of transient facial nerve palsy with ECD compared to SP (6% and 21%, respectively).

The incidence of Frey's syndrome ranged from 17-50% with SP and 0-5% with ECD^(21, 23-25). In our study, 2 cases occurred in SP group while no cases were reported in the other group.

Frey syndrome is based on aberrant regeneration of sectioned fibers of autonomic nerve for the parotid gland to the cutaneous facial sweat glands. During a superficial parotidectomy (SD), the raw surface of the deep gland and the facial nerve are exposed to the subcutaneous layer and hence the direct contiguity of the autonomic nerve allows this aberrant regeneration to occur. When the ECD technique is utilized such a large raw surface exposure does not occur⁽²⁶⁾.

The operative bed depression caused by removal of the parotid gland is most noticeable immediately after the operation, when the surrounding skin is slightly edematous, enhancing the contrast. This operative bed depression also decreases with time, but does not disappear completely. The magnitude of this depression depends on the amount of gland removed⁽²⁷⁾.

In our study, surgical bed depression occurred in 5 cases of SP group (26%) and no cases in ECD group. In addition, scar disfigurement was noted in one case of each group. There was significant reduction of cosmetic deformity in ECD group compared to SP group.

Other complications include Periauricular dysesthesia, which was reported in 3 cases of SP group(16%) and 1 case of ECD group(6%). Salivary fistula was recorded in one patient of SP group .this was closed spontaneously.

As regards recurrence, McGurk et al⁽²⁰⁾ reported 2% recurrence rate in both SP and ECD with median follow up of 12.5 years. Witt⁽²⁸⁾ published a meta-analysis to evaluate the effect of surgical resection margins of pleomorphic adenoma on recurrence. He concluded that:

recurrence rate in extracapsular dissection is comparable with that of superficial parotidectomy

Finally, when analyzing the recurrence of the lesions operated in our study, in spite of having no recurrence in both groups, it is not possible to draw conclusions, because the follow-up time is somewhat short making it insufficient to determine the long-term result. However, the results recorded with our patients makes us optimistic.

CONCLUSION

The study have shown that extracapsular dissection (ECD) is a safe, reliable and oncologically safe approach, and can accordingly be an alternative approach to superficial parotidectomy (SP) for benign parotid neoplasms, ECD was found to have similar efficacy and lower complication rates in comparison to SP. However, more cases and longer follow-up are required to reveal significant advantages of ECD over the traditional procedure of superficial parotidectomy

Disclosure

This article is not sponsored by any company, so the authors have no competing interests as defined by Nature Publishing Group, or other interests that might be perceived to influence the results and/or discussion reported in this article

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