Extracapsular dissection with facial nerve dissection for benign parotid tumors

Robert L. Witt, MD

Keywords
extracapsular, parotid, facial nerve

Received November 28, 2015; revised December 23, 2015; accepted December 30, 2015.

Extracapsular dissection with facial nerve dissection (ECD-FND) uses standard surgical landmarks to identify and antegrade dissect the facial nerve trunk at the onset of the procedure. The branches of the facial nerve are dissected up to the anterior extracapsular margin of the tumor; then, the tumor is dissected with a thin layer (1-2 mm) of parenchyma and fascia around it (Figure 1).

Extracapsular dissection (ECD) does not dissect the facial nerve.1-3 The parotid tumor is dissected in an extracapsular plane with 1 to 2 mm of parotid parenchyma and fascia around the tumor (Figure 2). Enucleation, an abandoned technique, is an intracapsular dissection.

Partial superficial parotidectomy (PSP) uses standard surgical landmarks to identify the facial nerve trunk in an antegrade approach at the onset of the procedure. It is distinguished from ECD-FND in that in PSP peripheral branches of the facial nerve are dissected anterior as well as posterior to the tumor. The tumor is removed with a 1- to 2-cm margin of normal parotid parenchyma around the tumor except where the tumor abuts the facial nerve (Figure 3).

Lower complication rates at selected high-volume parotid centers1-3 performing ECD for transient facial nerve dysfunction and sialocele, as compared with superficial parotidectomy and PSP, have led to debate regarding the amount of parotid parenchyma to resect around the parotid pleomorphic adenoma (PPA).

Figure 1. Extracapsular dissection with facial nerve dissection. Intraoperative image with parotid parenchyma retracted with Allis forceps to expose the facial nerve (arrow).

Figure 2. Extracapsular dissection. The facial nerve is not exposed.
I modified my previously reported technique from PSP4 to ECD-FND primarily to further reduce the rate of postoperative transient facial nerve paralysis and yet to not increase the risk of permanent facial nerve paralysis or tumor rupture by controlling the nerve. ECD, particularly with novice and low-volume parotid surgeons, may result in tumor rupture, incomplete tumor removal, subsequent recurrence, and permanent injury to the facial nerve.

Methods
Christian Care (Newark, Delaware) Institutional Review Board approval was obtained for this study. This is a single-surgeon, single-institution retrospective review of 108 patients who underwent ECD-FND for benign parotid tumors, including 44 PPAs, between 2006 and 2015. Thirty-seven PPAs were followed for a mean of 4.5 years (range, 1-9). All patients in this series of ECD-FND had preoperative imaging (ultrasound, computed tomography, or magnetic resonance imaging), fine-needle aspiration cytology, intraoperative nerve monitoring, frozen section, and final histology. Chi-square analysis compared ECD-FND and PSP for transient facial nerve dysfunction and sialocele.

Results
There were no recurrences in 37 PPAs during the study period, with a mean follow-up of 4.5 years (range, 1-9; Table 1). There were no cases of permanent facial nerve dysfunction (0 of 108, 0%). There were 4 of 108 (4%) patients with minimal transient lower facial nerve dysfunction lasting <3 months, House-Brackmann grade II. Sialocele occurred in 9 of 108 (8%) patients. Rates of transient facial nerve dysfunction ($P < .05, P = .007555$) and sialocele ($P < .05, P = .000032$) as calculated with chi-square analysis were significantly less for ECD-FND when compared with my previously published rates based on PSP.4,5

Discussion
As long-term low recurrence rates are now generally the norm for PPA, there is an emerging trend toward low-morbidity surgery. There were no recurrences during the study period (mean, 4.5 years). Recurrent PPA can occur beyond 4 to 5 years, and 10 to 20 years would be a better reflection of true recurrence rates.

ECD-FND has a minimal amount of normal parotid parenchyma around the tumor, similar to ECD; however, ECD-FND comes with the advantage of dissecting the facial nerve initially, with control of the facial nerve and its relationship to the tumor, potentially reducing the risk of rupture compared with ECD. Additionally, without regularly dissecting the facial nerve, a surgeon may not maintain the skill to perform this surgical maneuver. ECD reduces the exposure for teaching residents to learn facial nerve dissection.

Without dissection of the facial nerve, it can be difficult to determine the softer hypocellular tumor and identify its extracapsular plane, even with experienced surgeons. Manipulation of the soft pleomorphic adenoma can lead to rupture and spillage when pressure and retraction on the tumor occur.

There were no cases of permanent facial nerve paralysis in this series of ECD-FND or in my previous published

| Table 1. Current Author’s Outcomes for ECD-FND and Previously Published Outcomes for PSP as Compared with Other High-Volume Centers with Published Outcomes for ECD. |
|---------------------------------|---------------------------------|------------------|
| ECD-FND, n (%)                 | PSP,4,5 n (%)                   | ECD,1-3 %        |
| Recurrence for PA              | 0 of 37 (0)                     | 0 of 18 (0)      | 0-2 |
| Permanent facial paralysis     | 0 of 108 (0)                    | 0 of 59 (0)      | 2   |
| Temporary facial paralysisa    | 4 of 108 (4)                    | 10 of 59 (17)    | 6-10 |
| Sialocelea                     | 9 of 108 (8)                    | 39 of 100 (39)   | 9   |

Abbreviations: ECD, extracapsular dissection; FND, facial nerve dissection; PA, pleomorphic adenoma; PSP, partial superficial parotidectomy.

aSignificantly less for ECD-FND vs PSP ($P < .05$).
Without dissection and control of the facial nerve, there is a potential higher risk of permanent facial nerve paralysis on primary surgery. Specifically, the peripheral orbital branches of the facial nerve are delicate and lack of recognition without facial nerve dissection can lead to a devastating outcome.

There was a significantly ($P < .05, P = .007555$) lower rate of transient facial nerve dysfunction with ECD-FND (4%) in this series as compared with my previously published series of PSP (10 of 59, 17%).$^4$ Published rates for transient facial nerve dysfunction for superficial parotidectomy and PSP are 17% to 64%.$^4$ This higher rate of facial nerve dysfunction may result because more facial nerve is more fully dissected with PSP. This rate is lower than, although comparable to, the 6% to 10% reported for ECD.$^{1,2}$

There was a significantly ($P < .05, P = .000032$) lower rate of sialocele with ECD-FND (9 of 108, 8%) compared with the my previously published series on sialocele of PSP (39 of 100, 39%).$^5$ Lesser parotid parenchymal excision may account for the lower rate of sialocele.

There were no cases of ECD-FND that had a malignant final pathology. Fine-needle aspiration cytology and frozen section were performed in all cases.

**Conclusions**

ECD-FND for benign parotid tumors resulted in significantly lower rates of transient facial nerve dysfunction and sialocele when compared with PSP, without increasing permanent facial nerve dysfunction and, thus, far recurrence. Longer follow-up is necessary for a definitive recurrence rate of this technique.

**Author Contributions**

Robert L. Witt, conceived the conception of this work, drafted the work, gave final approval to the version to be published, and agreed to be accountable for the work.

**Disclosures**

**Competing interests:** None.

**Sponsorships:** None.

**Funding source:** None.

**References**


