

Parotid Gland Surgery for Benign Tumours: Have we Come Full Circle?

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ABSTRACT

Parotid gland surgery has been described for over two centuries. The surgical philosophies in management of parotid gland tumors started off in the 18th century from a conservative approach of simple enucleation so as to minimize post-operative facial nerve palsy rate. This occurred, as there was a lack of understanding of surgical anatomy of the parotid gland and facial nerve. However unacceptably high recurrence rates ensued and this encouraged the further study of parotid gland anatomy till the 1950s when, deriving from a better understanding of the surgical anatomy, superficial parotidectomy with facial nerve identification and preservation became the new standard of care. This method then evolved to a partial superficial parotidectomy as this slightly more conservative approach allowed adequate parotid tumour resection with low recurrence rates and yet minimising post-operative complication such as Frey's syndrome. Over the last two decades, a more conservative approach known as an extracapsular dissection of parotid tumour emerged in certain high-volume centers as an alternative to a partial superficial parotidectomy. These centers published better post-operative results with lower post-operative facial nerve palsy rates, less Frey's syndrome and faster patient recovery. Dissection of parotid tumours via this technique involves following a plane close to the tumour and is similar to enucleation in terms of its conservative approach with very significant differences post-operatively. This article presents a summary on the surgical philosophies pertaining to parotid gland surgery since its inception two centuries ago.

Keywords: Parotid gland surgery, Parotid tumour, Parotidectomy

SIMPLE ENUCLEATION OF PAROTID TUMOURS

Parotid gland tumours are the most common salivary gland tumours. The most common histological subtype is a pleomorphic adenoma, which accounts for 65%, followed by Warthin's tumour, which accounts for about 25% of all parotid tumours. Other adenomas, such as basal cell adenomas and oncocytomas, are far less common¹.

Formal descriptions on parotid gland surgery arose since the end of the 18th century. From then till the 1950s, simple enucleation of a parotid tumour was the standard of care. This occurred due to a lack of understanding of the facial nerve and parotid gland anatomy. However, recurrence rates after simple enucleation of pleomorphic adenomas, ranged between 21% and 70%^{2,3}.

The reason for the high recurrence in simple enucleation for pleomorphic adenomas is believed

to be the violation and spillage in cutting of micro-projections of the tumour that protrude through its pseudocapsule⁴. The seminal work of Patey and Thackray in 1965 showed that the capsule that encased the pleomorphic adenoma was partly incomplete with pseudopodia⁵. During a simple enucleation, dissection occurs immediately next to the capsule or pseudocapsule of a pleomorphic adenoma and results in violation of the pseudopodia of the pleomorphic adenoma with resultant tumour left behind. Therefore, simple enucleation has no benefits other than providing a false sense of security for the surgeon in terms of seemingly avoiding the facial nerve with resultant breach of the pseudocapsule of the tumour. The Hybbinette procedure for parotid surgery, whereby incision of the capsule of the tumour with curettage and subsequent removal of the capsule is attempted, also resulted in incomplete excisions accompanied by gross spillage in many

cases with unacceptably high recurrence rate^{2,3}. Other benign lesions such as Warthin's tumours, the second commonest benign parotid tumour, may be multicentric, as well as synchronous or metachronous bilateral lesions⁶. Some believe that their surgical approach should not differ from that for pleomorphic adenomas, with wide surgical excision, owing to unacceptable recurrence rates as a result of inadequate removal⁷⁻¹⁰.

THE BEGINNING OF SUPERFICIAL PAROTIDECTOMIES AS THE NEW GOLD STANDARD

It was not till Beahrs and Adson's (1958) eloquent publication on the relevant anatomy and surgical technique of current parotid gland surgery that revolutionised parotidectomies¹¹. They stressed surgical landmarks for avoiding injury to the facial nerve and advocated complete removal of the superficial portion of the parotid gland for noninvasive lesions confined to that portion of the gland¹¹. This concept was improved upon and has resulted in a refinement of parotid surgery to include the following principles: Firstly, the parotid tumour should be more aggressively removed with an adequate margin of normal parotid tissue to minimise tumour recurrence. Secondly, the facial nerve was to be identified either in an antegrade or retrograde manner to minimise injury to the facial nerve¹². These surgical philosophies have resulted in a decrease in the recurrence rate of post superficial parotidectomy for benign parotid lesions to between 0–5%^{13,14}. Superficial parotidectomies thus became the standard of care after the detailed understanding of parotid gland anatomy.

However, in the 1970s and 1980s, numerous publications appeared advocating enucleation once more with postoperative radiation, providing comparable recurrence rates^{6,15}. The rationale appeared to be a lower incidence of permanent facial nerve injury as well as Frey's syndrome (gustatory sweating) with a more conservative approach. However, comparison of both operative techniques in 12 series published between 1973 and 1982 shows that the facial nerve is at greater risk when enucleation is performed although Frey's syndrome is higher with the more aggressive approach¹⁶. Moreover, the use of post-operative radiation exposes the patient to the risk of radiation-induced malignancy, especially in younger patients with a longer remaining life span. Moreover, the

side effects of radiation itself can be troublesome and unnecessary.

Subsequently over the last 50 years, most benign parotid tumours are removed with a superficial parotidectomy and facial nerve dissection and preservation. This more aggressive approach has resulted in a lower recurrence rate as mentioned. Many surgeons have tried to minimise Frey's syndrome and facial nerve palsy rate post-operatively by performing a more conservative partial superficial parotidectomy instead, adhering to oncological principles of adequate normal tissue margin just around the parotid tumour¹⁷. The reason that undermined the rationale behind superficial parotidectomy was that the capsule is by necessity exposed during operation in 47–60% of patients with pleomorphic adenomas because one or more of the branches of the facial nerve are in contact with the capsule¹⁸. As a consequence, en bloc resection is not possible and so there is little logic in removing the entire superficial lobe for a small discrete tumour. With dissection of only the involved branch of facial nerve abutting the tumour and avoiding removal of excessive normal parotid tissue, this has resulted in a lower rate of Frey's syndrome with less facial nerve paresis and a shorter operating time from less tissue dissection¹⁷. The advantages of partial superficial parotidectomy can thus be summarised as below: rates of recurrence are similar to those of superficial parotidectomy; it is a simpler operation than conventional superficial parotidectomy, takes less time, and is therefore more cost-effective; there is also less risk of damaging the facial nerve as fewer branches are dissected; it has a lower incidence of Frey's syndrome and has good cosmetic results as far as facial contouring is concerned; it is an organ-preserving procedure where there is no need to unnecessarily remove normal parotid tissue. This has now become the new standard of care for a benign parotid tumour.

Simple enucleation has fallen out of favor with its disadvantages and should not be performed. However, an alternative, more conservative approach that is gaining popularity in certain areas in Europe is the extracapsular dissection of parotid tumours performed usually for single, mobile parotid lesions located within the superficial lobe of the parotid gland¹⁹. The surgical technique is described below to aid understanding.

SURGICAL TECHNIQUE OF EXTRACAPSULAR DISSECTION OF PAROTID TUMOURS

The surgical preparation includes the use of a facial nerve monitor since facial nerve identification would not be performed intra-operatively. The skin incision for extracapsular dissection is the same as for conventional parotidectomy with a modified Blair's incision. The skin flap is raised in the usual fashion till the whole parotid gland is exposed. The location of the tumour is then palpated and if the exact position cannot be determined accurately, an ultrasound scan can be performed intraoperatively.

The parotid capsule is then incised and the dissection extended toward the tumour; however what's important to note is that the tumour capsule itself is never opened. The dissection is now extended through the healthy glandular tissue around the tumour so as to gradually separate the tumour from the surrounding normal parotid tissue, with care being taken at all times to dissect away from the tumour. A facial nerve monitor and the stimulating probe are used at all times during dissection through the healthy parotid gland tissue to ensure safety of the facial nerve branches. If the facial nerve branches are not encountered, they are not specially dissected out for identification. With this technique a rim of about 2 to 3 mm of healthy glandular tissue is left on the tumour, without damaging the facial nerve as far as possible. After the tumour has been removed the parotid capsule is then sutured back together. No loupes or microscopes are necessary to aid in visualization with this technique.

POST-OPERATIVE RESULTS OF EXTRACAPSULAR DISSECTION OF PAROTID TUMOURS

The post-operative results from a large series of 377 patients who underwent extracapsular dissection over an 8-year period revealed a lower post-operative facial nerve palsy rate for both temporary and permanent palsies compared with the published literature¹⁹. The temporary

facial palsy rate was 6.1% compared with 15–25% reported. The permanent facial palsy rate was 2.1% in his series compared with 5–10% reported^{20–22}(Table 1). The less tissue dissection as compared with superficial parotidectomies with facial nerve identification has also led Klintworth N et al to suggest that in the event a revision surgery is necessary, better tissue planes with less scar tissue will be encountered due to less tissue dissection especially since the facial nerve main trunk and branches were never dissected out in an extracapsular dissection of parotid tumours¹⁹. This method is also believed to result in a much lower Frey's syndrome post-operatively. McGurk et al reported in 1996 on 380 patients who underwent an extracapsular dissection of parotid tumours that their post-operative Frey's syndrome rate was 5% compared with 38% after a conventional superficial parotidectomy²⁰. More recently, George et al published his data on 156 patients and reported only one patient with Frey's syndrome. This is believed to be due to the fact that parotid fascia after an extracapsular dissection is approximated and therefore almost eliminates Frey's syndrome. With less tissue dissection, they have also done their cases as day surgery cases thus minimizing healthcare costs²³.

In terms of recurrences, both extracapsular dissection and superficial parotidectomy seems to be comparable in the right hands. McGurk et al who has the longest follow-up showed that after a mean follow-up period of 12.5 years, there was a recurrence rate of 2% both with extracapsular dissection (n=380) and with superficial parotidectomy (n=95)²⁰.

With all the purported advantages of extracapsular dissection of parotid tumours, it is important to note that the low rates of facial nerve palsies and recurrences quoted have been achieved in these centers with high volume of parotidectomies performed annually by very experienced surgeons and the results may not be replicated easily

Table 1. Facial nerve palsy rates.

	Extracapsular dissection of parotid tumour (Klinworth et al)	Superficial parotidectomy (Reported in literature)
Temporary facial nerve palsy rate	6.1%	15–25%
Permanent facial nerve palsy rate	2.1%	5–10%

elsewhere. It therefore represents an alternative in the standard of care for benign parotid lesions but remains to be seen if it will eventually be the new standard of care.

CONCLUSION

Parotid gland surgery has a long history, with manuscripts describing it since two centuries ago. It has undergone an evolution beginning with a conservative approach of simple enucleation before progressing to a more aggressive approach of a superficial parotidectomy to tackle the high recurrence rate that was observed after enucleation. A more conservative approach of partial superficial parotidectomies then ensued with a lower post-operative morbidity rate but equally low recurrence rate, which is currently the standard of care. An even more conservative approach, the extracapsular dissection of parotid lesions was popularised in some high volume centers by experienced surgeons and it seemed to be a promising technique for small, mobile, superficial tumours of the parotid gland with low post-operative morbidities. However, it remains to be seen if it will eventually be the standard of care for these parotid tumours.

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