

Avoiding the complications of parotidectomy for benign disease: Intraoperative techniques

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Abstract

Parotidectomy for benign disease is the most common indication for parotidectomy. Surgical treatment of benign parotid disease remains a challenging undertaking that is associated with significant postoperative morbidity. The aim of this study is to present our experience with a series of 29 cases of superficial parotidectomies, regarding the incidence of the common complications and the techniques we used to reduce the incidence of these complications. We encountered 2 cases (6.9%) of facial nerve dysfunction; both were of a mild degree. We used Ligasure, loupes, nerve monitoring and certain intra operative techniques to achieve such a low incidence of facial nerve dysfunction. No case of Frey syndrome was encountered, due to the use of expanded poly tetrafluoroethylene sheets. Only 3 cases suffered partial anaesthesia of the ear pinna, as we preserved the trunk or the posterior branch of the great auricular nerve. Salivary fistula occurred in 17.2% of cases, and was mild and was treated conservatively. We recommend sticking to our techniques to decrease the postoperative complications of parotidectomy.

Key words: Parotidectomy, complications, operative techniques.

Introduction:

Parotidectomy for benign disease is the most common indication for parotidectomy,¹ and superficial parotidectomy (entailing the removal of the parotid tissue lateral to the facial nerve and its branches,² is the most frequently performed type of parotidectomy.³

Parotid gland surgery is problem-prone due to two main facts: firstly, the indication is usually benign, hence the patients expect no complications post-operatively,⁴ and secondly: it is a technically sensitive surgery because of the close relationship of the gland with the extra-cranial facial nerve which is a motor supply to the muscles of facial expression.⁵

Complications of parotid surgery may be intra-operative or post-operative., early or late. Intra-operative complications of parotid gland surgery comprise injury of the facial nerve or one of its branches, rupture of the pseudo-

capsule of a parotid tumour or incomplete surgical resection thereof.⁴

A few of the expected consequences following parotidectomy are ear numbness that may be temporary or permanent,² and occasional problems with mastication (gustatory sweating, flushing, itching...),^{6,7}

Surgical treatment of benign parotid disease remains a challenging undertaking that is associated with significant postoperative morbidity. Some complications are inherent in the nature of the pathology for which the operation is undertaken; and these need to be taken into account in preoperative decision making and patient counselling. Others, however, can result from variations in surgical practice and could potentially be avoided.⁸

In this article we present our experience with a series of 29 cases of superficial parotidectomies, regarding the incidence of

the common complications and the techniques we used to reduce the incidence of these complications.

Patients and methods:

A retrospective review of 29 consecutive superficial parotidectomies, conducted at the hospitals affiliated with Qassim College of medicine, Qassim, KSA, between the January 2009 and January 2012. The pathology reports, operative data and the postoperative course of each patient were studied.

None of the surgeries was a redo parotid surgery and none of the patients had preoperative facial nerve affection on clinical basis.

Surgical technique:

Hypotensive anaesthesia was used whenever possible. Long-acting paralytic agents are avoided to allow for facial nerve monitoring.⁹ The operator used a magnifying loupe in all cases (x2.5-3.5). Intra operative facial nerve monitoring through a nerve stimulator was used in every case and to facilitate this, transparent drapings were used.¹⁰ Typically four electrodes are placed trans-cutaneously in the facial musculature to correspond to the temporal, zygomatic, buccal, and marginal mandibular branches of the facial nerve.²

The surgery was carried out through a modified Blair incision or a modified face-lift incision.¹¹ The skin in the parotid area was infiltrated with 1:80,000 adrenaline.⁵

Methylene blue was used to mark points along the proposed incision and to facilitate proper wound alignment and closure. The skin incision is made with a scalpel and carried down through the subcutaneous tissues and platysma muscle.

An anterior flap was raised trying to keep it as thick as possible, avoiding violation of any neoplasm at the surface of the gland.

A posterior, inferior flap is also elevated to expose the tail of the parotid gland. Silk sutures were used to retract these flaps.

Every effort was made to preserve the great auricular nerve, but if its division was judged to be imperative for a safe identification & dissection of the facial nerve; or to prevent tumour cell dissemination, it was sacrificed

preserving its posterior branch.¹² We employed the techniques advised by Vieira et al in 2002.¹³

The posterior belly of the digastric muscle is exposed with further elevation of the tail of the parotid gland. During elevation of the tail of the parotid, the continuity of the posterior facial vein is preserved if possible.

The posterior belly of the digastric muscle serves as a landmark for the facial nerve. The facial nerve is identified using anatomic landmarks, which include the posterior belly of the digastric muscle, the mastoid tip, the tragal cartilage pointer, and the tympanomastoid suture.²

Anterior retraction of the parotid gland was kept gentle, to avoid traction injury of the facial nerve and its branches. Traction was suggested by Nouraei et al to be the main cause of injury to the marginal mandibular branch, the most commonly injured branch.⁸

After identification of the facial nerve trunk, the parotid gland superficial to the nerve is divided carefully. This was achieved by passing a fine mosquito forceps above and parallel to the nerve, spreading it open, elevating it and then, the parotid tissue above it is removed using a Ligasure Precise®.¹⁴ This was repeated tracing the facial nerve branches distally till removing the whole parotid gland lateral to the nerve. Anatomic distortion by a neoplasm or operative manipulation was constantly considered. In no case we needed to do a retrograde facial nerve dissection.

After the gland was removed, the wound was carefully inspected and bleeding sites were controlled, if any. The integrity of the facial nerve is confirmed both visually and by electrical stimulation of the main trunk of the facial nerve and its peripheral branches.

Before skin closure, defect filling in the parotid area was performed in all patients. An expanded polytetrafluoroethylene (e-PTFE) (GoreTex®) sheet was used. Parotid duct was not sought nor ligated routinely. The wound is irrigated, realigned, and closed in layers on a suction drain.

Results:

Data were presented either as means with standard deviations or as percentages when appropriate.

Demographic data:

Out of the 29 patients included in this study there were 18 men (62%) and 11 women. The average age was 51 ± 11.6 years (range: 29-73 years). The right side was affected in 56% of cases. Benign parotid neoplasms (pleomorphic parotid adenoma, adenolymphoma and parotid lipoma) were the cause of surgery in 26 patients and chronic inflammation in 3 patients. The average operative time was 151 ± 40.2 minutes (range: 120-223 minutes). In no case the intra operative blood loss exceeded 140ml.

Post operative facial nerve affection:

Facial nerve function was evaluated at 1 day, 1 month and 6 months postoperatively, using the House-Brackmann grading system.¹⁵

A degree of facial nerve affection was found in 2 cases (6.9%) in the study group. According to the House-Brackmann grading system, the affection was mild in both cases (i.e. grade 2 and 3), and both regained normality by the end of the 6 months follow-up period. Both cases were inflammatory not neoplastic cases.

Frey syndrome (gustatory sweating):

All the patients were assessed clinically for the presence of Frey syndrome at one and six month's visits. None of the patients complained of Frey syndrome or other problems related to mastication.

Anaesthesia/parathesia in the ear pinna:

3 patients (10.3%) complained of a degree of anaesthesia in the ear pinna that was tolerable and were improving on the 6 month follow up visit.

No post operative haemorrhage nor infection were reported. Transient salivary fistula was noted in 5 patients (17.2%) and both settled within a few weeks of conservative treatment. Seroma was reported in 4 cases, and all were treated with repeated aspiration and disappeared within 3 weeks of surgery. 1 case developed a keloid at the scar site. Recurrence of the tumour was not evaluated due to the short follow up period.

Discussion:

The incidence of facial nerve dysfunction in our study was 2/29 (6.9%), and both cases were mild affection that improved completely within few months of surgery (1 case resolved in 6 weeks, and 1 case in 16 weeks). The

incidence and severity of facial nerve affection in the current study is lower than that reported by many authors. Nouraei et al in 2008 wrote: "Postoperative facial nerve dysfunction is a common finding, affecting 30-60% of patients following parotidectomy, and although most cases are transitory in nature, it can, nevertheless, be associated with significant morbidity and distress".⁸

According to Wang and Eisele, temporary facial nerve paralysis involving all or just one of the branches of the nerve occurs in 10-30% of parotidectomies.² In 2011, Amin et al reported that 2 cases out of 23 (8.7%) developed transient facial nerve affection.¹⁷

The relatively low incidence in the current study was the cumulative effect of many factors. Hypotensive anaesthesia helped in maintaining a dry field as did the local infiltration with adrenaline. The use of a surgical loupe allowed better identification of the tissues, a subtle step overlooked by quite a few surgeons; for example Sharma and Sirohi in 2010 reported 5/17 (29.4%) of facial nerve dysfunction postoperatively when no magnification was used.⁵ The value of using the loupe was also pointed out by Papadogeorgakis et al¹⁸ and Pai.¹⁹

Identification of the main trunk of the facial nerve was a crucial step. One should avoid going directly to the facial nerve trunk area before identifying the anatomic landmarks.²⁰ In this study we followed the time-honoured classical 4 landmarks.² There are more than 15 landmarks that can be used for identification of the main trunk of the facial nerve,²¹ however, we found the classic four ones more consistent, specially the tragal pointer. This was in accordance with Rea et al, who studied these four landmarks extensively.²² A modification of the use of these 4 landmarks was proposed by Pereira et al, and we also found this technique helpful.²³ The advices of O'Brien et al were also honoured.²⁴

Intra-operative facial nerve monitoring helped in decreasing the incidence of facial nerve dysfunction. It was pointed out by Pienkowski et al in 2010 that intra-operative facial nerve monitoring should be a standard procedure during parotid gland surgery in most clinical situations.¹⁰ Lowry et al also found

that the use of facial nerve monitoring reduced the likelihood of the surgeon being sued by more than 20%.²⁵ Another subtle step is ignoring the parotid duct. It is better not to be sought for nor ligated. Olsen in 2004 advised “do not look for the parotid duct or try to isolate it after raising the cheek flap as this puts an unnecessary risk of injuring the small buccal nerve branches that often accompany the duct”.²⁶ We also believe that using the Ligasure Precise® for dissection was a crucial step. The incidence of facial nerve injury in this study (6.9%) is comparable to that reported by Michel et al (4%), who used a tissue welding forceps for dissection during parotidectomy.²⁷ An interesting finding in our study is that both cases of facial nerve affection were encountered in inflammatory cases. This is in accordance with Gaillard et al., 2005.²⁸ We depended on the clinical-based system for evaluation of facial nerve function because it is evident that there is no subclinical affection of facial nerve following parotidectomy,¹⁶ hence no need for electro-physiological evaluation.

Frey syndrome is a quite common and unpleasant complaint, observed in up to 40% of patients after parotidectomy and is a potential cause of patient embarrassment, and may limit the patient's quality of life.⁷ We encountered no cases suffering clinically from Frey syndrome within the 6 months follow up period. The factors contributing to this in our opinion are mainly two factors: keeping the raised flaps as thick as possible without risking opening the tumour pseudo-capsule, and more importantly, the mechanical barrier we used, i.e. the e-PTFE sheet. The insertion of the mechanical barrier virtually eliminates any possibility of Frey syndrome, as it prevents the cross regeneration of nerve fibers, the hypothesis agreed to be the cause of this syndrome.²⁹ Guo et al in 2005 reported also a zero percent incidence of Frey syndrome in e-PTFE-implanted cases.³⁰

Many types of mechanical barriers were described (Oxidized regenerated cellulose,³¹ Lyophilized Dura and polyglactin & polydioxanone mesh,³² dermofat graft,³³ fat injection,⁷ superficial temporal artery fascia flap³⁴ & superiorly based superficial sternocleidomastoid flap,¹⁷) but in many

respects, e-PTFE implants represent the ideal solution since they are not resorbed, exhibit good biocompatibility, and low tissue reactivity.³⁵ We also agree with Guo et al that the aesthetic effects of the use of e-PTFE were very good. The advantage of being non-absorbable was also a disadvantage of e-PTFE, as it acts as a foreign body in the wound, thus causing salivary fistula. We encountered 5 cases (17.2%), a percentage that is lower than that reported by Dulguerov et al in 1999, who reported a 25% incidence of salivary fistula in the e-PTFE-implanted patients.³² All the fistula cases in our study, as in theirs', eventually closed with conservative treatment.

We managed to preserve the great auricular nerve main trunk in 26 cases (89.6.1%). The trunk had to be sacrificed in 3 cases (10.3%), due to the close proximity with the tumour and in these three cases; we managed to preserve the posterior branch alone. This may had been one of the causes for a relatively longer operation time than reported.

Sensory disturbance of the pinna as a result of excising the great auricular nerve often reduces the quality of life of the patients who have undergone parotidectomy.³⁶ We agree with Vieira et al that preservation of the great auricular nerve or its branches is technically feasible during parotidectomy.¹³ The average operative time was comparable to that reported in the literature¹³ and this could be explained by the time saving using Ligasure³⁷ compensated for the time loss of both great auricular nerve preservation and e-PTFE insertion.

Conclusion:

The use of facial nerve monitoring, Ligasure as well as sticking to the fine operative details can decrease post operative facial nerve dysfunction. The use of e-PTFE is advisable to eliminate the incidence of Frey syndrome; however transient salivary fistula is to be anticipated. Great auricular nerve can be saved in the majority of cases.

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