

RETROGRADE FACIAL NERVE DISSECTION IN SUPERFICIAL PAROTIDECTOMY VERSUS STANDARD APPROACH: A COMPARATIVE STUDY

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ABSTRACT

Objective: This study was conducted to determine whether the retrograde approach in parotidectomy is more efficient than standard anterograde parotidectomy without compromise of surgical effectiveness.

Methods: A prospective analysis of 48 patients undergoing superficial parotidectomy was conducted. Cases were divided into those undergoing retrograde facial nerve dissection and those undergoing standard anterograde facial nerve dissection. The following had been monitored: surgical time, estimated blood loss, and incidence of either temporary or permanent facial nerve injury. Statistical comparisons were conducted for the two approaches comparing the three different mentioned variables.

Results: The average patient age was 48.5 years with a female preponderance (71%). There were 23 standard superficial parotidectomies and 25 retrograde approaches. Compared to standard superficial parotidectomy, retrograde superficial parotidectomy consumed less operative time (1.80 versus 2.10 hours), decreased intraoperative blood loss (88.00 ml versus 50.00 ml). No significant difference in incidence of either temporary or permanent facial nerve injury was observed.

Conclusion: In appropriately selected cases, compared with standard anterograde parotidectomy, retrograde parotidectomy is more efficient in terms of lower operative time and less blood loss, with no added risk to facial nerve injury.

Key words: Facial nerve, Parotid tumour, Superficial parotidectomy

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Introduction

The most common indication for parotidectomy is a parotid mass necessitating a histological diagnosis. The most common cause of parotid mass in adults is a benign tumor, the incidence of which is estimated to be 2.4 per 100 000,⁽¹⁾ while in children the

incidence of parotid neoplasms is considered to be as extremely rare,⁽²⁾ but they do have a much higher incidence of malignancy in this type of tumours.⁽³⁾ The aim of parotid surgery for benign disease is to remove the diseased gland while preserving the facial nerve function. However, facial nerve palsy

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can occur even in the best hands because of the intimate relationship of the facial nerve to the parotid gland. Several factors have been implicated in the etiology of transient nerve palsy, which includes the extent of surgery, size and histological features of the mass, sectioning of the facial nerve or its branches, duration of the operation, surgeon's experience, and age of the patient.⁽⁴⁾

The surgical procedure of superficial parotidectomy is a common procedure used for superficial parotid tumors.⁽⁵⁾ It is essential to preserve the facial nerve where possible, so its identification and careful dissection is of paramount importance. There are two basic approaches for the identification and dissection of the facial nerve; one is the forward or anterograde dissection, where the main trunk is first identified then followed by tracing of the bifurcation and peripheral branches. The other technique is the retrograde dissection, where the peripheral branches are identified first, then followed by the bifurcation or the main trunk.⁽⁶⁾

The aim of this study is to compare the retrograde parotidectomy to the standard anterograde parotidectomy in terms of the surgical time needed, blood loss, and incidence of either temporary or permanent facial nerve injury.

Methods

A prospective analysis of 48 patients undergoing superficial parotidectomy at the hospitals of the Royal Medical Hospitals of Jordanian Armed Forces in the period between January 2004 to January 2006 was conducted. Cases were divided into two groups regardless of their age or gender. Group I comprised 25 patients were undergoing retrograde facial nerve dissection. Group II comprised 23 patients who were undergoing standard anterograde facial nerve dissection. Patients were divided randomly to either group on a simple alternating basis, i.e. patient number one was assigned to group one, and the second patient was assigned to group two and so on.

Our inclusion criteria for both groups were the same, as only patients who are not operated on them before for any parotid pathology, and with benign conditions of the superficial lobe of the parotid gland as proved by FNA were included. Medical fitness for surgery was assessed in liaison with our specialist anesthesiologist, and only patients with ASA (American Association of Anesthesia) scoring of 1-3 were enrolled in our trial. All surgeries were

performed under general anesthesia by the same team.

The following parameters were monitored: Surgical time, estimated blood loss, and incidence of either temporary or permanent facial nerve injury. Statistical comparisons were conducted between the two clinical approaches for those three suggested parameters. Postoperative complications were also recorded.

The following technique for retrograde facial nerve dissection was used. A modified Blair incision with a preauricular incision was made in the preauricular crease. The skin flap was raised under the periparotid fascia to the superior, anterior and inferior borders of the gland. The anterior border of the gland was exposed by blunt dissection, as the distal branches of the facial nerve emanate from the anterior border of the gland on the masseter muscle. Caution was employed in an attempt to preserve the posterior branch of the great auricular nerve, which is considered to be technically feasible during parotidectomy procedure therefore avoiding the patient permanent sequelae of altered sensation in the ear lobe and infra auricular region,⁽⁷⁾ considering that this procedure does not result in significant increase in operative time and is not associated with major complications.⁽⁸⁾

Stenson's duct (parotid gland duct) was used as a landmark for the identification of the buccal branch of the facial nerve, as it lies across the duct in most cases, this will help in preserving the duct, but if the nerve is found to be below it, the duct had to be ligated and cut, and should be traced towards the mouth to excise its traces, the nerve is easily differentiated from the duct as it is white and shiny, while the duct is gray and dull. Also, the retromandibular vein is used as a landmark for the marginal mandibular branch, and the zygomatic arch for the identification of the zygomatic branch of the facial nerve. Once a nerve branch is identified, dissection proceeds using fine tipped haemostats to create tunnels in the parotid tissue immediately above the nerve, then the bridges of parotid tissue overlying the nerve are gently cut by scalpel. As the bifurcation and main trunk of the facial nerve is exposed, the gland is resected at the posterior border en bloc along with the tumour.

Preservation of the facial nerve is definitely the main aim of any surgeon and every attempt needs to be employed to preserve it; the sheath of the facial nerve should not be opened to avoid any damage of

the nerve fibers, wet gauze is preferable to dry gauze, the nerve should always be covered by wet gauze instead of leaving it exposed to air, also application of gentle pressure with a wet gauze is the best way to stop bleeding from capillary vessels so as to avoid damage to the nerve.⁽⁹⁾

For the classical anterograde approach for superficial parotidectomy, again a modified Blair incision was used with preauricular incision made in the preauricular crease, the skin flap is raised, and the facial nerve main trunk identification performed by blunt dissection just anterior to the external auditory meatus in an inferior direction until the main trunk of the facial nerve is identified. The anterior border of the sternocleidomastoid muscle is mobilized and retracted inferiorly to display the posterior belly of digastric muscle that is traced upward and backwards to its insertion onto the mastoid which lies immediately below the stylomastoid foramen leading the operator to the facial nerve from below. Once the facial nerve is identified, the superficial lobe is exteriorized by opening up the plane in which the branches of the facial nerve run between the two lobes by blunt dissection.

Results

The average patient age was 48.5 years with a female preponderance (34 females, 70.8% and 14 males 29.2%). There were 23 standard superficial parotidectomies and 25 retrograde approaches. The three suggested parameters i.e. surgical time, estimated blood loss, and incidence of either temporary or permanent facial nerve injury were compared in both groups of the two different approaches, the standard superficial parotidectomy and the retrograde superficial parotidectomy. For the first variable, the time needed to perform surgery, the retrograde parotidectomy procedure consumed less operative time (mean= 1.80 in retrograde superficial parotidectomy versus 2.10 hours in the standard anterograde approach), this difference found to be statistically significant ($p < 0.05$). Also, a statistically significant decrease of intraoperative blood loss found between the two approaches (mean= 50.00 ml in retrograde superficial parotidectomy versus 88.00 ml in standard superficial parotidectomy) ($p < 0.05$). No significant difference in incidence of either temporary or permanent facial nerve injury found between the

two approaches, as only three cases of transient facial nerve weakness occurred, two of them encountered in the retrograde group and one in the standard approach group (see Table I).

Table I. Analysis of the results

	Retrograde Approach	Anterograde Approach
No. of Patients	23	25
M: F	6:15	8:19
Mean Age	48.5	46.2
Mean Blood Loss*	50.00 ml	88.00 ml
Mean Op. Time**	1.80	2.10
F. N. Palsy***	2	1

* ($p < 0.05$), ** ($p < 0.05$), *** ($p > 0.05$)

Discussion

The indications for superficial parotidectomy include the excision of benign tumours or low-grade malignant tumours of small size and without involvement of the facial nerve in the superficial lobe of the parotid gland, chronic inflammation of the parotid gland that is resistant to conservative treatment and tumour-like lesions in the parotid, such as nodular Sjogrens syndrome or oxyphilic lymphogranuloma.^(10,11)

No doubt that the facial nerve is more likely to be injured during parotidectomy than during any other procedure in head and neck surgery, with far-reaching functional and cosmetic consequences. It is the complex topography of parotid gland disease, with tumors often neighboring the facial nerve, as well as the anatomy of the nerve itself, with its sometimes extremely thin branches that contribute to the risk of injury during surgery. At the same time, the well-perfused gland parenchyma makes surgical dissection difficult, so no wonder that the basic goal in parotid gland surgery is providing an approach that helps reducing the surgical time at the time when strict preservation of the facial nerve is still achieved during the en bloc resection of a tumor along with surrounding tissue. In our trial we could demonstrate that the retrograde approach provided a significantly less operative time, which fulfills the advantage of minimizing the operative time, and this also comes in agreement with a study performed by Bhattacharyya and his colleagues who investigated the advantages of the retrograde approach and stated that in appropriately selected cases, compared with standard anterograde parotidectomy, retrograde parotidectomy is more efficient and spares normal

parotid tissue without compromising surgical margins.⁽¹²⁾ For that purpose there are some remarkable advances such as providing an alternative surgical dissection techniques e.g. laser-cutting technologies, ultrasound scalpel, water-jet dissection, the diathermy scissors, microscopic dissection and others. These tools may facilitate dissection or may decrease likelihood for facial nerve injury, but still the basic approach for superficial parotidectomy is the same.

In this study, we provided a revision for an unfortunately uncommonly used approach for superficial parotidectomy which is the retrograde dissection of the facial nerve. Few literature is available about this, but still we believe that it provides a very delicate manipulation of the facial nerve, avoiding the surgeon the hassle and the long time that might be needed for identifying the main trunk of the facial nerve first, then tracing it peripherally. The retrograde approach for facial nerve dissection proved to consume significantly less time to fulfill that purpose and therefore less chance for facial nerve injury is achieved.

Conclusion

In appropriately selected cases, compared with standard anterograde parotidectomy, retrograde parotidectomy is more efficient in terms of lower operative time and less blood loss, without adding any risk of facial nerve injury. We believe that reducing the operative time is an essential factor in reducing chances for facial nerve injury.

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