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Original Research Article

Comparison of antegrade versus retrograde facial nerve dissection in cases of superficial parotidectomy for pleomorphic adenoma of parotid gland

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ABSTRACT

Background: Pleomorphic adenoma being the most common benign tumor of the major salivary gland, parotid in particular, attracts attention. Facial nerve anatomically separates the superficial lobe from deeper lobe. Superficial Parotidectomy, commonly practiced surgical technique carries high risk of nerve injury causing long term functional and esthetic deficits. This prospective study was to designed to compare required time of surgery and facial nerve injury in antegrade versus retrograde dissection.
Methods: Total of 32 patients who underwent superficial parotidectomy between June 2010 to June 2013 included in this study in which 18 patients were in retrograde dissection group and 14 subjects were in antegrade facial nerve dissection group. Time from the incision till closure is noted along with post operative facial nerve palsy for statistical analysis.
Results: This study shows that retrograde facial nerve dissection in superficial parotidectomy requires statistically significant lesser time duration with no difference in facial nerve injury when compared to antegrade nerve dissection.
Conclusions: This study approves retrograde facial nerve dissection over antegrade nerve dissection in cases of superficial parotidectomy for betterment of the patient.

Keywords: Antegrade facial nerve dissection, Facial nerve injury, Pleomorphic adenoma, Retrograde facial nerve dissection, Superficial parotidectomy

INTRODUCTION

Parotid gland tumors represent 2-3% of head and neck tumors and 0.6% of all tumors of the body. About 40-70% of all major and minor salivary gland tumors attribute to pleomorphic adenoma.[1,2] Pleomorphic adenoma accounts for 53-77% of parotid tumors, 44-68% of submandibular tumors and 33-43% of minor salivary gland tumors.[3] In parotid it arises in the superficial lobe and present as slow growing painless swelling. It is the benign tumor consisting of cells capable of differentiating to epithelial (ductal and non ductal) cells.[4] Its morphologic complexity results from the ability of tumor cells cells to differentiate in to fibrous, hyalinized, myxoid, chrondroid and osseous areas, as result of metaplasia or actual products of tumor cells per se.[5] Pleomorphic adenoma occurs in peoples of all ages, and the highest incidence is seen in the fourth to sixth decades most commonly occurs in females when compared to males. These tumors are most often treated when the tumor is small (less than 3-4 cm), mobile, and located in the superficial lobe. The parotid gland is divided in to superficial and deep lobe by virtue of the facial nerve,

which passes through its substance. The purpose of parotid surgery for pleomorphic adenoma is to remove the diseased gland while preserving the facial nerve. However, facial nerve palsy can occur in any patient by any surgeon 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.[6]

The surgical procedure of superficial parotidectomy is a common procedure used for superficial parotid tumors.[7] It is essential to preserve the facial nerve when ever possible, so its identification and careful dissection is importance. There are two basic approaches for the dissection of the facial nerve; one is the 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, then followed by the bifurcation or the main trunk.[8]

The purpose of this study is to compare the extensiveness and the effectiveness of anterograde and retrograde identification and dissection in superficial parotidectomy for pleomorphic adenoma of the parotid gland.

METHODS

This prospective study included 32 patients who underwent superficial parotidectomy in M.P Shah medical college and hospital, Jamnagar, India between June 2010 to June 2013. Patients were randomly selected in each group irrespective of age, sex, size and extension of the lesion or side effected.

All patients were medically fit for surgery and no history of previous surgery on the parotid gland. Subjects were divided in two groups in which first group consisted of 18 patients on whom retrograde superficial parotidectomy was performed. Second group consisted of 14 patients on whom much practiced antegrade superficial parotidectomy was done. Patient was assigned in each group purely on surgeons wish and all were clinically diagnosed with benign tumor of parotid after FNAC. One patient was excluded from the study after post operative histopathological report turns out to be mucoepidermoid carcinoma. All cases were performed by the same team of surgeons.

Time taken for the surgery (From the point of incision till completion of closure) and incidence of facial nerve injury (temporary or permanent) were recorded in each case as parameters of the study. Statistical analysis was made for these two parameters only. Other details like age, sex, side effects and size, histopathological nature of the lesion recorded for documentation purpose of the institution. All other treated complications were also recorded.

Surgical technique

The classical antegrade approach for superficial parotidectomy is performed by modified Blair incision with preauricular incision. The skin flap is raised, and blunt dissection done just anterior to the external auditory meatus in an inferior direction. Anterior border of the sternocleidomastoid muscle is mobilized, retracted inferiorly to expose the posterior belly of digastric muscle that is traced upward and backward to its insertion on to the mastoid. This attachment lies just below stylomastoid foramen leading the surgeon to trunk of facial nerve. Once 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.

For retrograde facial nerve dissection same 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 greater auricular nerve, which is considered to be typically feasible during parotidectomy procedure therefore avoiding the patient permanent sequelae of altered sensation in the ear lobe and infra auricular region.[9] Stenson's duct was used as a landmark for the identification of the buccal branch. Retromandibular vein is used as landmark for the marginal mandibular branch, and the zygomatic arch for the identification of the zygomatic branch of the facial nerve. Once the branch is identified, dissection proceeds using fine tipped haemostats to create tunnel in the parotid tissue immediately above the nerve, then the bridges of the parotid tissue overlying the nerve are gently cut by the scalpel. As the birfucation and main trunk of the facial nerve is exposed, the gland is resected at the posterior border en bloc along with tumor.

Preservation of the facial nerve was given higher importance. The sheath of the facial nerve was not opened in all the cases and wet gauze was used to cover the exposed nerve to avoid exposure to dry air.

Patients were examined clinically for facial nerve function by evaluating facial expressions pertaining to all branches of the facial nerve. All patients were reviewed on 7th day, 30th day, 90th day and 6 months post operatively.

RESULTS

Mean time taken in antegrade facial nerve dissection was 134.6 min and for retrograde it was 103.8min. This difference was significant in statistical analysis. P value of this analysis was 0.001 suggestive of Highly significance (Table 1).

Table 1: Comparison of duration of surgery between group 1 and 2.

Groups	Mean	Standard deviation	t-value	p-value
Group1	103.88	10.08	-9.359	0.001 HS
Group 2	134.64	7.96		

HS-highly significant

Facial nerve paralysis was noted in four patients in group 1 who underwent retrograde facial nerve dissection. Three patients showed significant improvement on 90th post operative day review were as all the four patients recovered completely by 6 months. Group 2 had 3 cases of facial nerve paralysis of which all of them recovered by 6 months. Facial nerve paralysis was transient in both the groups and there was no statistical difference between two groups on incidence (Table 2).

Table 2: Comparison of nerve paralysis between group 1 and 2.

Groups	Nerve paralysis		Total
	Yes	No	
1.00	4	14	18
	22.2%	77.8%	100.0%
2.00	3	11	14
	21.4%	78.6%	100.0%

Chi square value- 0.003; p-value-1.000 NS

There was no statistical significance in the Age and Gender between the two groups. This comparison was done only for the sake of data analysis, since authors of this study firmly believe our sample size is too small to conclude on incidence of Pleomorphic Adenoma based on Age and Gender (Table 3 and Table 4).

Table 3: Comparison of age between group 1 and 2.

Groups	Mean	Standard deviation	t-value	p-value
Group1	40.72	5.66	1.315	0.199 NS
Group 2	38.21	4.91		

NS - Not significant

Table 4: Comparison of gender between group 1 and 2.

Groups	Nerve paralysis		Total
	Male	Female	
1.00	6	12	18
	33.3%	66.7%	100.0%
2.00	5	09	14
	35.7%	64.3%	100.0%

Chi square value- 0.20; p-value-1.000 NS

DISCUSSION

Indications for superficial parotidectomy includes excision of the benign tumors, low grade malignant tumors, chronic inflammation of parotid which is resistant to conservative treatment and other diseases like Sjogrens syndrome.[10,11] Superficial parotidectomy is preferred surgical method for pleomorphic adenoma of parotid gland.[12] Several techniques of identification and dissection of the facial nerve have been reported including antegrade and retrograde dissection.[8,13]

Facial nerve is at high risk of injury during parotidectomy when compared to any other head and neck surgery due to obvious reason. Parotid surgery attains high significance due to same reason with far reaching functional and cosmetic consequences. It is the complex topography of the parotid 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, that the basic goal in parotid gland surgery is providing an approach that helps reducing the surgical time. Strict preservation of the facial nerve is still achieved during the en bloc resection of a tumor along with surrounding tissue.

Present study demonstrated the same fact that significantly lesser duration of time was required in retrograde nerve dissection. Even though no significant statistical difference in incidence of transient facial nerve palsy in both the groups irrespective of time taken. This observation is similar to the study conducted by Bhattacharya et al who stated the importance of retrograde superficial parotidectomy which is more efficient and spares normal parotid tissue without compromising surgical margins.[14]

Latest advances such as laser cutting technologies, water-jet dissection, diathermy scissors, ultra sound scalpels are advised which may further reduce the risk of facial nerve injury.[10] These equipments may reduce the injury to facial nerve by technique per se but basic approach to superficial parotidectomy remains the same.

CONCLUSION

This study demonstrated uncommonly used retrograde approach for superficial parotidectomy proved to be more efficient in term of lesser duration of surgery with no statistical difference in incident of facial nerve injury. This also contributes to the fact that lesser surgical time further reduces the chances of facial nerve injury. It may be safe to conclude that retrograde dissection of the facial nerve in superficial parotidectomy can be practiced over antegrade dissection even after fewer literature is available to support this fact.

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