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Original Research Article

Outcome of retrograde facial nerve dissection in superficial parotidectomy

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Abstract

Background: Using retrograde dissection for doing parotidectomy is technically easier avoiding injury to the facial nerve trunk or other branches. The goal is to remove just the part of the parotid gland where the tumor is. This method can lead shorter surgery times and less blood loss. Plus, it doesn't add extra risk for facial nerve damage.
Aims and Objectives: Is to observe the results of Retrograde Facial Nerve Dissection during Superficial Parotidectomy at our institution.
Materials and Methods: The study is a clinical observational study comprises of 30 patients attending the outpatient department of General surgery, VIMSAR Burla, Sambalpur between November 2019 to October 2021. The data collected from all the 30 patients after taking the due consent and were evaluated to determine the various intra and post op complication, average duration of surgery, average blood loss and the importance of soft tissue markers for identification of facial nerve.
Results: In our study Male to Female ratio is 10:20 i.e., 1:2 with Prevalence of disease is more between the age group 45-55. Maximum 16 cases presented within 1.5 yr. duration of swelling presentation. Mean duration of surgery is 88 minutes with Standard deviation 5.5 and Mean blood loss 68.34ml with Standard deviation 8.34. No significant intra operative complication noted. Out of 30 patients 23 patients did not develop any complications. Four patients showed temporary weakness in their facial nerves, and three had wound infections.
Conclusion: Our study suggests that Retrograde Facial Nerve Dissection for Superficial Parotidectomy is easy to do with fewer complications. This technique take short surgical time and minimal blood loss with keeping the risk of facial nerve injury low. It's especially useful when finding the nerve directly is difficult.

Keywords: Retrograde, Parotid gland, Superficial Parotidectomy, Facial nerve injury.

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1. Introduction

Salivary gland tumours come under rare group head and neck tumour. Parotid is the largest of the three paired salivary glands.[1] Each parotid gland is shaped like an inverted pyramid and about 25 gms in weigh.[2] It is the most common site for salivary gland tumour.[3] Parotid gland is divided by the facial nerve into[4] 1. Superficial lobe 2. Deep lobe. Tumours mostly arise from superficial lobe. Most parotid tumours are benign in nature. Parotidectomy is a well-known operation used to treat both benign and malignant issues in this gland. A Superficial Parotidectomy involves removing part or all of this gland that's above the facial nerve using dissection techniques for safe navigation. As several important structure like Facial nerve, External carotid artery with terminal branches, retromandibular vein, intraparotid lymph node run through parotid the chances of injury during surgery is very high. Facial nerve status is the main pivoting factor in concluding a successful parotid surgery as any damage to it may cause facial disability. There are two method to identify and dissect the facial nerve 1. Antegrade approach/Standard. 2. Retrograde approach. In antegrade approach we first identify the main trunk of facial nerve then look for peripheral branches but in retrograde approach we first identify one of terminal branch then dissect towards the

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main trunk. Starting from dissecting from nerve trunk to branches, the facial nerve is deeper at its origin and highly vascular leading to profuse bleeding and damage to the nerve, but in retrograde facial nerve dissection, a peripheral branch is identified first and then the main trunk is identified and dissected. The advantage of retrograde approach are better operative field of vision, higher chance of facial nerve preservation, less blood loss, less operative time and can be used for obese patient also. Recent findings show that using this technique for Superficial Parotidectomy has delivered good results with fewer problems while maintaining effective surgical outcomes.[5]

2. Materials and Methods

The present study comprises of 30 patients attending the outpatient department of General surgery, Veer Surendra Sai Institute of Medical Sciences and Research Institution, Burla, Sambalpur between November 2019 to October 2021. Non probability convenience sampling technique was used to obtain sample size. The data collected from all the 30 patients were analysed by SPSS data analysis method and outcome were analysed by means of various intra and post op complications, average duration of surgery, average blood loss and the importance of soft tissue markers for identification of facial nerve after taking due consent.

Ethical committee clearance was done as per VIREC Decision 19205/dt 30.11.19/IST-213/19 with minimal risk category without involving vulnerable group.

2.1. Inclusion criteria

All cases of patients undergoing retrograde facial nerve dissection in superficial Parotidectomy

2.2. Exclusion criteria

Malignancy, Immunocompromised, Patients not willing, Recurrence cases. Our aim was to check how often the facial nerve trunk or its main branches got injured (either temporary or permanent). We also classified injuries using the House Brackmann score (**Table 4**). Plus, we looked into whether Frey's syndrome and salivary fistula occurred during follow-up. We compared our findings with other recent studies. The keywords we searched for included superficial parotidectomy, retrograde technique & pleomorphic adenoma. We left out studies that focused on recurrent issues in the parotid gland or those that didn't deal with retrograde superficial parotidectomies.

Pre-operative and post-operative clinical features and intra operative findings were studied.

Figure 1: Showing cervico-mastoid component of modified blair's incision

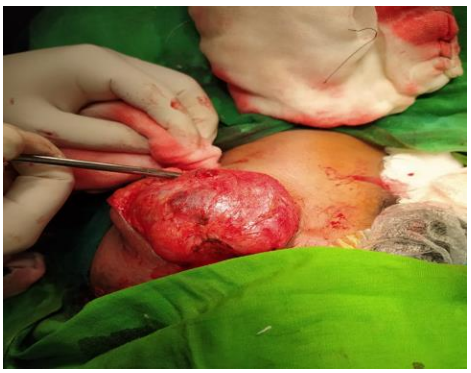


Figure 2: Showing tumor after raising the flaps

Figure 3: Showing main trunk of facial nerve with its branches

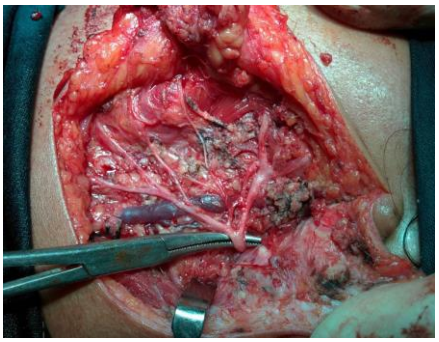


Figure 4: Showing tumor after excision

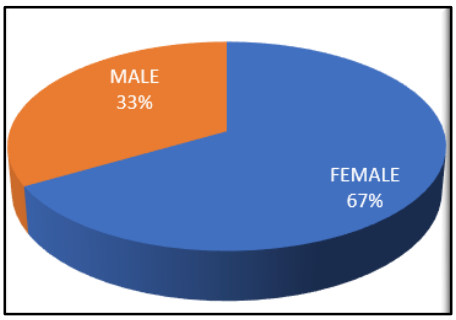
2.3. Surgical technique

For each surgery, we began with a modified Blair incision (**Figure 1**). Then we raised a fascio-cutaneous flap until reaching the front edge of the parotid gland (**Figure 2**). The greater auricular nerve was located, moved around & kept safe. We didn't use a nerve stimulator during this process. Next, dissected according to landmarks like the zygomatic

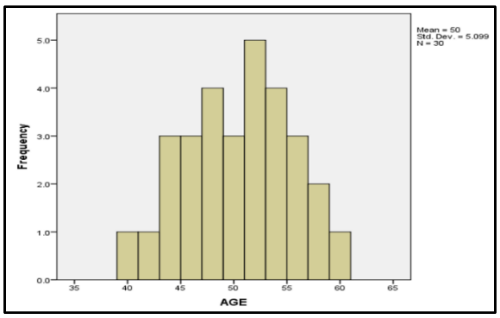
branch of the facial nerve over the zygomatic arch, Stenson duct for buccal branch, retromandibular vein for marginal mandibular branch etc; we carefully dissected through some of the parotid tissue to reach it. After that, we traced the zygomatic branch backward using both blunt & sharp dissection so we could find the facial nerve trunk (**Figure 3**). Finally, we carefully dissected each branch of the facial nerve while lifting up the superficial lobe along with any lesion present (**Figure 4**). After every surgery, we placed a Minivac closed drain which was usually taken out around post-operative days 3 to 5.

3. Results

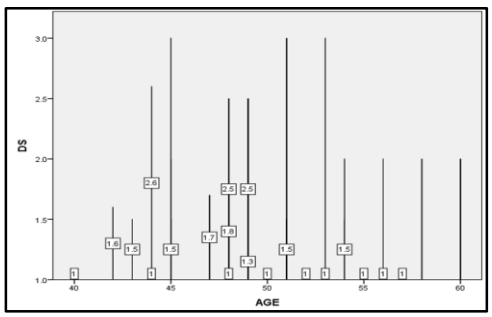
Evaluating data from all patients helped us check various complications as well as duration of surgeries among other factors. In our study MALE are of 10 and Female 20 with ratio M:F=1:2.(**Graph 1**)



Graph 1: Pie diagram showing Sex distribution



Graph 2: Histogram showing age with no. of patients duration of swelling



Graph 3: Showing the age wise distribution of swelling

Duration of swelling varied from about a year to three years total with maximum presentation seen within a year and a half. Sixteen cases recorded here with mean duration approximately at 1.68 years, standard deviation being ~0.66.(**Graph 2**, **Graph 3**)

All cases are evaluated clinically, radiologically, and provisionally diagnosed as Pleomorphic adenoma.

3.1. Averge duration of surgery

Duration of surgery varies from 75 to 100 minutes

Table 1: Showing avg. duration of surgery according to gender

ADSM	Mean	SD
Male	89	5.16
Female	87.5	5.73
Total	88	5.5

Mean duration of surgery is 88 minutes
Standard deviation 5.5

3.2. Averge blood loss IN ML

Blood loss varies from 60 to 90 ml

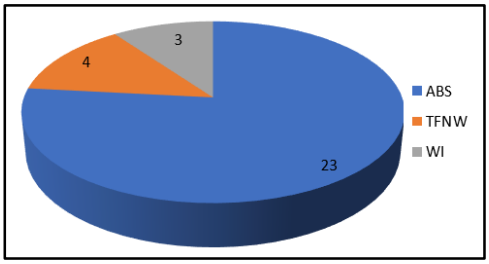
Table 2: Showing average blood loss in ml with gender

ABML	Mean	SD
Male	68	6.32
Female	68.5	9.3
Total	68.34	8.34

Mean blood loss 68.34ml, Standard deviation 8.34
No significant intra operative complication noted.(**Table 2**)

3.3. Post-operative complication

Across these cases only a few faced notable complications — specifically four individuals showed temporary weakness on their face while three experienced infection around wounds.(**Graph 4** and **Table 3**)



Graph 4: Showing early postoperative complications

Table 3: Showing patients with complications in percentage

Complications	Number of patients	Percentage
Temporary facial nerve weakness	4	13.33
Wound infection	3	10
Permanent facial nerve weakness	0	0
Freys syndrome	0	0
Parotid fistula	0	0

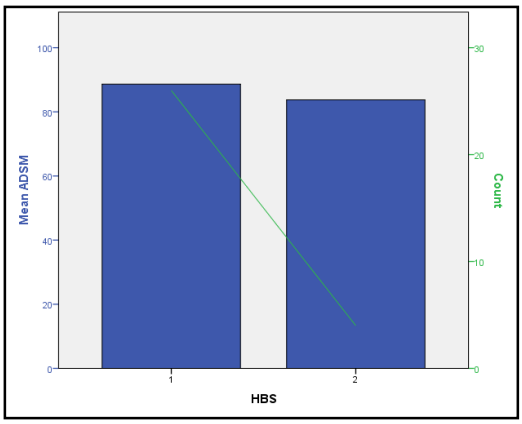
3.4. The house brackmann score

Facial nerve function accessed by the score.

1. Score 1 given to 26(86.67 %) patients.
2. Score 2 given to 4 (13.33 %) patients.

Table 4: Showing HBS grading with gender

HBS	Male (N)(%)	Female (N)(%)	Total (N)(%)
Grade 1	9(90)	17(85)	26(86.7)
Grade 2	1(10)	3(15)	4(13.3)
	10(100)	20(100)	30(100)



Graph 5: Showing relationship between Average HBS Score with Mean duration of surgery.

Complications on POD-7

Out of thirty patients' Temporary weakness in facial nerve persists in 3 patients out of 30 patients postoperatively evaluated on day 7 revealing no complication. Temporary facial nerve injury rates are 25% with superficial Parotidectomy.[6] (**Table 4** and **Graph 5**)

4. Discussion

Salivary gland tumors are relatively uncommon and account for less than 2% of all head and neck neoplasm. Parotid gland tumors make up about 85% of all salivary tumors, with 80% of those being benign.[7] Superficial parotidectomy is often the go-to treatment for benign lesions in the parotid gland.[8,9] So, why is this surgery important? Well, taking care to identify and protect the facial nerve is crucial for successful outcomes in parotid surgery. When we talk about why a superficial parotidectomy is done, we include reasons like removing benign tumors or small low-grade malignant tumors that don't bother the facial nerve in the superficial lobe. Also, if there's chronic inflammation in the gland that doesn't heal with regular treatment—or odd tumor-like issues such as nodular Sjogren's syndrome—this surgery is really helpful.[14] Now, here's a big deal: The risk of injuring the facial nerve during this surgery is higher than in other head and neck surgeries. Why? It all comes down to how complicated the anatomy around the parotid gland is. Often, tumors sit right next to these fragile nerve branches. Plus, working with a well-supplied gland can make surgical dissection challenging. So, a key goal in any parotid surgery must be to find ways to minimize surgical time while keeping that delicate facial nerve safe. Surgeons usually use two main techniques to find and work around the facial nerves: antegrade and retrograde dissection. The antegrade method starts by identifying the facial nerve where it exits the stylomastoid foramen, often using structures like the tympanomastoid suture or tragal point or the posterior belly of diagastrics as landmarks. However, even experienced surgeons can find this tricky, especially with obese patients or larger tumors. On the flip side retrograde dissection focuses on finding the peripheral branches of the facial nerve by using soft tissue landmarks. Interestingly enough studies have shown that these soft tissue references are easier to spot than many expect especially when aided by a facial nerve stimulator.[12,13] In our research at vimsar burla we had 30 patients undergo superficial parotidectomy using retrograde nerve dissection techniques similar findings came from patel dk et al[15] who looked at 214 cases of benign parotid tumors treated with retrograde approaches.[10] Another study by O'regan B et al[16] noted complications where 66% of patients faced some weakness in their facial nerves after one week however most fully recovered within six months. These observations are consistent with our study since we also found 10% showing weakness during the first week post-surgery. Then there's Scarpini M et al[17] who discovered that retrograde methods can allow less removal of healthy parotid tissue while keeping complication rates and effectiveness steady when compared to standard surgeries plus Masahiro et al reported shorter surgical times with retrograde techniques.[18] In another study Furuska et al[19] demonstrated that retrograde method is associated with lesser number of facial nerve weakness, less surgical time and less blood loss compared with antegrade parotidectomy.

Study showed that using retrograde techniques significantly cut down on operative times supporting findings from Bhattacharyya et al[21] who also claimed it was superior overall. Chow[20] chows work further confirms that it generally leads to less blood loss and lower transient facial palsy rates while still achieving good surgical outcomes. 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. Taken account, all of these studies including our study showed that retrograde facial nerve dissection technique had low complication rate.(**Table 5**)

Table 5: Showing outcome of major complications following superficial parotidectomy in various series

Study	Temporary facial nerve weakness (%)	Complete facial nerve weakness (%)	Frey's syndrome (%)	Parotid fistula (%)	Recurrence
Roh et al[10]	34.7	0	0	0	Nil
Chatterji[11]	5.4	2.7	18.2	2.7	Nil
Kumar et al[22]	25	0	0	0	Nil
My study	13.3	0	0	0	Nil

5. Conclusion

Retrograde dissection for superficial parotidectomy is very easy and safe with plenty of benefits. This technique take short surgical time and minimal blood loss with keeping the risk of facial nerve injury low .This technique really shines when nerves are tricky to spot by just looking directly at them.

6. Limitations

Our calculated sample size was 45 but during the course of the study 30 cases were studied due to covid 19 pandemic. It is planned to continue to recruit patients beyond the stipulated time frame, to get statistically significant results. Long term incidence rate of facial nerve palsy was not compared within the scope of this study. The patients are kept under follow up to identify the same.

7. Source of Funding

None.

8. Conflict of Interest

None.

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