Student's Journal of Health Research Africa
Vol. 4 No. 12 (2023): September 2023 Issue
https://doi.org/10.51168/sjhrafrica.v4i9.690
Original article

STRATEGIES FOR FACIAL NERVE PROTECTION DURING PAROTID GLAND SURGERY, A PROSPECTIVE STUDY: USING THE TRAGAL POINTER, POSTERIOR BELLY OF DIGASTRIC, AND MASTOID TIP AS LANDMARKS FOR FACIAL NERVE TRUNK IDENTIFICATION IN PAROTID SURGERY.

Dipayan Roy[1], Kumar Gaurav[1], Gajendra Nayak[2], Zahid M Khan[3]*

[1]Junior Resident, Department of ENT and HNS, Rajendra Institute of Medical Sciences, Ranchi, Jharkhand, India,
[2]Senior Resident, Department of ENT and HNS, Rajendra Institute of Medical Sciences, Ranchi, Jharkhand, India
[3]Associate Professor, Department of ENT and HNS, Rajendra Institute of Medical Sciences, Ranchi, Jharkhand, India

ABSTRACT.

Background:
To decrease the likelihood of facial nerve paralysis and address postoperative issues, our goal was to share our experience with parotid surgery.

Methods:
A 2-year research involving 40 patients with parotid edema was conducted. Before the procedure, a cautious clinical assessment, an examination of the patient's medical history, and a facial nerve evaluation were carried out. These 40 patients (24 men and 16 women) who had parotid edema underwent parotidectomy using techniques for an anterograde strategy over two years.

Results:
Each of the 40 patients had a superficial parotidectomy. Thirteen patients (32.5%) exhibited impairments in facial loss of nerve mobility, with seven having HB II (17.5%), four having HB Scale III (10%), and six having HB IV (15%). The majority of patients (18/30 patients) in this study showed significant recovery between four to six months following the procedure of surgery (mean time for recovery: 7 months), and patients affected had recovered in the time duration of 11 months of parotidectomy.

Conclusion:
To reduce the likelihood of transient facial nerve paresis, the following safety measures were used in this investigation, "vertical retraction" to lower the possibility of traction injuries. Bipolar diathermy was performed after the nerve trunk was located, and surgical sutures (5/0 polyglactin) were used to create hemostasis. With a sensitivity of 67% and a specificity of 13%, FNAC remains the investigation of choice. The numerical outcomes of the many parameters that were evaluated show that they are consistent with research from previous studies and the medical literature.

Recommendation:
The techniques discussed in the study if employed can significantly reduce the risk of facial nerve dysfunction. Thus, while performing Parotid gland surgery the technique should be employed.

Keywords: *Parotidectomy, Facial-nerve, Parotid-gland.*
Submitted: 2023-09-22 Accepted: 2023-09-26

Corresponding author: *Zahid M Khan[*]*
Email: *jimdipayan9@gmail.com*
Associate Professor, Department of ENT and HNS, Rajendra Institute of Medical Sciences, Ranchi, Jharkhand, India.

INTRODUCTION.

Parotidectomy is the primary management for both benign and malignant parotid tumors. Additionally, it is recommended in cases of advanced skin tumors that have infiltrated the gland or have metastasized to the parotid lymph nodes. During surgery, the facial nerve is manipulated, including its main trunk and its various branches [1]. Although the primary objective is to preserve the facial nerve, particularly in individuals without a history of paralysis, there is a rather high frequency of facial nerve

Vol. 4 No. 12 (2023): September 2023 Issue
https://doi.org/10.51168/sjhrafrica.v4i9.690
Original article

dysfunction that can result in persistent impairments following parotidectomy, which can occur in up to 14.5% of cases [1].

The causes of this dysfunction can be attributed to the surgical procedure itself or the underlying disease. One of the most frequently affected branches is the Marginal Mandibular Branch (MMB). This can lead to a weakness in the Depressor Anguli Oris (DAO) muscles and Depressor Labii Inferioris (DLI), which can prevent the lower teeth on the affected side from being visible. Despite efforts to maintain the face nerve's anatomical and functional integrity, facial nerve paralysis still poses a substantial challenge during parotidectomy [2]. Postoperative complications of parotidectomy include disorders like facial nerve weakness or paralysis, salivary fistula, Frey's syndrome, infection, and tumor recurrence [3].

Temporary facial nerve paralysis can occur relatively frequently; some writers claim that as many as 76% of individuals experience it. The predicted rate of permanent facial nerve paralysis, on the other hand, is below 3% or even lower in the hands of skilled surgeons [4-6]. The anterograde method and the retrograde method are the two methods used to dissect the facial nerve during parotid surgery. Sequential dissection is then carried out when the nerve trunk is identified when it exits the stylomastoid foramen in the anterograde approach. Contrarily, in retrograde surgery, the peripheral nerve branches are first identified, and dissection is then carried out in the direction of the nerve trunk [5, 6].

To help maintain the facial nerve's functionality after parotid surgery, a surgeon may also choose to use nerve monitoring. Anterograde dissection is the technique that is used the most frequently among these. Using a specifically created questionnaire, a countrywide survey was carried out in 2007, and 87% of the surgeons who took part acknowledged routinely using the anterograde method [7]. During revision parotid surgery, it's important to notice that nearly half of the doctors combined both techniques, displaying their familiarity and confidence with both methods [7, 8]. This study aims to decrease the likelihood of facial nerve paralysis and address postoperative issues. Our goal was to share our experience with parotid surgery.

METHODS.

This prospective study spanned more than two years and involved 40 patients who presented with parotid swelling. These patients got rigorous evaluations that involved gathering in-depth histories. As part of the history-taking process, information was gathered about the patient's age, gender, occupation, the duration of the swelling (whether it had been present for a short or long period or had just been discovered incidentally), the presence of pain (localized), and any potential future development of lymph node enlargement in the neck as well as a history of diabetes mellitus or neurological diseases. Before the procedure, the patients were recruited, and a clinical assessment of the facial nerve uprightness was performed. Alongside this, radiation tests and research facility inspections were conducted:

1. Computerized tomography (CT): To gain a thorough understanding of the extent of the swelling (including its involvement with the deep flap) and the presence of metastasis in the lymph nodes.
2. Pathological assessment (FNAC): to assess the sore's hazard or consideration.

Patients who met at least one of the additional requirements were qualified for the trial. The parotid gland is accessed through an altered Blair incision. Using the tragal pointer method, the anterograde dissection technique locates the facial nerve trunk. Once the nerve trunk has been located, the dissection is carried out towards the peripheral branches while parotid tissue is gathered both anteriorly and laterally. Depending on the exact illness that calls for the excision of the parotid gland, the size and number of branches that are dissected vary.

Techniques for nerve protection:

1. To apply vertical traction, skin hooks were used. The tissue was stretched parallel to the major nerve trunk's path and perpendicular to the incision to reduce the chance of traction-related damage.
2. Blunt dissection performed vertically aids in lowering the danger of harm to the facial nerve's distal sections. Flap dissection was carefully maintained within the appropriate sub-cutaneous plane, with precise attention during dissection when reaching the terminal branches (outside the parotid capsule).
3. Small, curved artery forceps were used to gently retract the patient. The covering tissue was then carefully separated by opening the artery forceps after they had been carefully positioned over the nerve. It is essential to avoid applying excessive pressure to the dissected facial nerve, whether through the use of a swab (dry) or overly hot pack, to ensure proper hemostasis.
4. Throughout the nerve dissection process, saline irrigation of the dissected area was performed.

40 patients participated in the study who were eligible for the study.

Follow-up of the treatment.

The House-Brackmann reviewing framework was used to complete the postoperative follow-up of facial nerve work. This grading system includes six evaluations that are dependent Grade I is considered standard nerve work on the level of FN work. Grade II displays barely perceptible nerve

breakdown. Grades III–VI also exhibit logically extreme paresis at work and extremely motionless of the nerve.

RESULTS.

Age and sex distribution.

In our study, parotid swellings were treated with a total of 40 superficial parotid surgeries. There were 24 men (60%) and 16 women (40%) among the patients. With a range of 21 to 55 years, the average age at presentation was 35. The male-to-female ratio was 4:1 since all of these instances were recently diagnosed. The clinical surgical characteristics of the sample population are highlighted in Table 1.

Table 1: Clinical surgical characteristics of the sample (total and subgroups).

Variables	Median or n%		
	Total	Benign parotid	Malignant parotid
Participants	40 (100)	19 (47.5)	21 (52.5)
Age years	57 (34.56)	48 (37.61)	41 (23.69)
Female sex	41 (53.6)	27 (67.3)	7 (55.1)
Type of parotidectomy			
Superficial	61 (82.7)	31 (87.7)	11 (67.1)
Total	13 (9.36)	26 (11.07)	23 (7.37)

Tumour Distribution.

Based on the various pathologies, the patients were divided into groups. Pleomorphic adenoma was the pathology that was seen most frequently; it was found in nine patients. Adenoid cystic carcinoma, non-Hodgkin's lymphoma, benign lymphoepithelial cysts, and Warthin's tumor all occurred in one case each. These lesions were divided into three categories based on their pathology: benign, malignant, and other. Pleomorphic adenoma made up 43% of instances involving benign tumors, while adenoid cystic carcinoma made up 5% of cases involving malignant parotid tumors. Males had a higher prevalence of benign tumors (4:1) compared to females (1:1), but there was no discernible gender difference in malignant tumors.

Preoperative Pathology.

Forty participants in our study had preoperative Fine Needle Aspiration Cytology (FNAC). The final histopathology report's findings did not match those of about 12 of the 40 FNAC studies. Three false negative cases and two false positive cases in particular. Approximately 18 true positive instances and only 2 true negative cases were observed. Based on these findings and the computation of sensitivity and specificity, our analysis determines that FNAC has a sensitivity of 67.8% and a specificity of 13.2%.

Before surgery, 30 patients we were able to recall for our examination all had neck US; of these, 17 had well-described growing lesions compared to 12 cases were cystic, and 4 cases were strong; in terms of LN status, 9 cases showed no amplified cervical LN compared to 21, which showed broadened cervical LN, of which 8 cases showed suspicious LNs and the remaining 13, incendiary LNs.

Dysfunction Grading of Facial Nerve.

According to the House-Brackmann grading system, the most common pleomorphic adenoma was discovered in 18 cases, six of which had normal postoperative facial nerve function HB (I) and twelve of which had temporary facial nerve paralysis. Three occurrences of moderate nerve dysfunction (HB II), as well as three cases of serious nerve dysfunction (HB III), were observed. Four different patients' cases of Warthin's tumors were categorized into three HB I and one HB IV groups. In all three patients, HB I benign lymphoepithelial injuries were present. In one instance, an adenoid cystic carcinoma experienced postoperative facial nerve dysfunction that was quite severe (HB IV). Non-Hodgkin lymphoma was present in three patients with surgically modest dysfunctions (HB II).

Table 2: Dysfunction Grading of Facial Nerve.

Condition	No. of cases of pleomorphic adenoma	House-Beckmann scale
Normal	06	I
Moderate nerve dysfunction	03	II
Serious nerve dysfunction	03	III
Lympoepithelial injury	03	I
Severe nerve dysfunction	02	IV
Modest nerve dysfunction	01	II

Follow-up.

Patients who temporarily lost facial nerve function underwent weekly testing for the first month, then monthly checks until they recovered. In this study, 9 out of 13 patients had significant functional improvement within 5 to 6 months following surgery, with a 6-month median recovery period. Nine months after the surgery, every affected patient had entirely healed.

DISCUSSION.

Throughout the inquiry, several cases of facial neuropraxia were examined to determine the incidence rate, pinpoint risk variables, and investigate strategies to lessen the occurrence of postoperative transient paralysis of the facial nerve. The objective of this project was to increase preoperative preparedness and preparation while identifying potentially modifiable characteristics that would improve surgical techniques and patient care.

A superficial parotidectomy was the surgery used in this investigation. The current study found that 55% of patients had postoperative facial nerve dysfunction, even though the patient may initially have normal facial nerve activity after waking from anesthesia [9,10]. Postoperative facial nerve dysfunction is a gradual decline in facial nerve function that eventually leads to full recovery. In this study, 95% of cases of parotid cancers were benign, while 5% were dangerous malignant tumors. In another study, Tsai HM et al. reported that only 12% of parotid tumors were malignant and that 85% of parotid tumors were benign. Thus, the likelihood of a benign tumor returning was often higher than that of a cancer returning [10].

Warthin tumors were found in 22% of patients and Pleomorphic adenoma in 43% of cases in the current analysis. According to Rahman et al., the two most frequently favorable parotid tumors were pleomorphic adenoma (84%) and Warthin's tumor (10%). A quantifiable analysis suggests that HB II (moderate nerve affection) is the grouping in which the majority of instances (about half) of transitory facial nerve palsy occur [11]. HBII was discovered in 65% of cases in another investigation by Witt RL et al. that was published. Six cases (30%), three cases (15%), and two cases (10%) of the 11 cases of transitory facial nerve paralysis in this study were classified as HB II, HB III, and HB IV, respectively [12].

Seven patients (61%) were found to have marginal mandibular branch weakness as a result of this examination, with two patients having a single branch issue and five patients experiencing multiple and extensive branch issues. This might be because it is the longest facial nerve branch, which takes longer to assess due to its length [13].

CONCLUSION.

To reduce the likelihood of transient facial nerve paresis, the following safety measures were used in this investigation, vertical retraction to lower the possibility of traction injuries. Bipolar diathermy was performed after the nerve trunk was located, and surgical sutures (5/0 polyglactin) were used to create hemostasis. With a sensitivity of 67% and a specificity of 13%, FNAC remains the investigation of choice. The numerical outcomes of the many parameters that were evaluated show that they are consistent with research from previous studies and the medical literature.

LIMITATION.

During parotid gland surgery, the facial nerve can be protected but in the cases of adenomas, tumors, and malignancy the dysfunction of the facial nerve is inevitable.

RECOMMENDATION.

The techniques discussed in the study if employed can significantly reduce the risk of facial nerve dysfunction. Thus, while performing Parotid gland surgery the technique should be employed.

LIST OF ABBREVIATION.

DAO-
Depressor Anguli Oris
MMB- Marginal Mandibular Branch
CT- Computerized tomography
FNAC- Fine needle aspiration cytology
HB- House-Brackmann

ACKNOWLEDGEMENT:

We are thankful to the patients and their caring parents without them the study could not have been done. We are thankful to the supporting staff of our hospital who were involved in the patient care of the study group.

CONFLICT OF INTEREST.

None

FUNDING:

The study had no funding.

REFERENCES.

1. Gandolfi MM, Slattery W. Parotid gland tumors and the facial nerve. Otolaryngologic Clinics of North America. 2016 Apr 1;49(2):425-34.
2. Cannon CR, Replogle WH, Schenk MP. The facial nerve in parotidectomy: a topographical analysis. The Laryngoscope. 2004 Nov;114(11):2034-7.
3. Dulguerov P, Marchal F, Lehmann W. Postparotidectomy facial nerve paralysis: possible etiologic factors and results with routine facial nerve monitoring. The Laryngoscope. 1999 May;109(5):754-62.
4. Musani MA, Zafar A, Suhail Z, Malik S, Mirza D. Facial nerve morbidity following surgery for benign parotid tumors. J Coll Physicians Surg Pak. 2014 Aug 1;24(8):569-72.
5. Baker DC, Conley J. Avoiding facial nerve injuries in rhytidectomy anatomical variations and pitfalls. Plastic and reconstructive surgery. 1979 Dec 1;64(6):781-95.
6. Fattah AY, Gurusinghe AD, Gavilan J, Hadlock TA, Marcus JR, Marres H, Nduka CC, Slattery WH, Snyder-Warwick AK. Facial nerve grading instruments: a systematic review of the literature and suggestion for uniformity. Plastic and reconstructive surgery. 2015 Feb 1;135(2):569-79.
7. Wang SJ, Eisele DW. Parotidectomy—anatomical considerations. Clinical Anatomy. 2012 Jan;25(1):12-8.
8. McFarland J. Three hundred mixed tumors of the salivary glands, of which sixty-nine recurred. Surg Gynec Obstet. 1936; 63:457-68.
9. DH P. The present position of parotidectomy in the surgery of the parotid gland. Archives. Middlesex Hospital. 1954 Apr 1;4(2):91-105.
10. Tsai HM, Lin CC, Huang CC, Huq CH, Tseng HC. Parotid tumors: a 10 years experience. Am J Otolaryngol. 2008; 29:94-100.
11. Rahman MA, Alam MM, Joarder AH. Study of nerve injury in parotid gland surgery. Nepalese J ENT Head Neck Surg 2011;2(1):17-19
12. Witt RL. Facial nerve monitoring in parotid surgery: the standard of care? Otolaryngology—Head and Neck Surgery. 1998 Nov;119(5):468-70.
13. Nouraei SR, Ismail Y, Ferguson MS, McLean NR, Milner RH, Thomson PJ, Welch AR. Analysis of complications following surgical treatment of benign parotid disease. ANZ journal of surgery. 2008 Mar;78(3):134-8.

Publisher details.

Publishing Journal: Student's Journal of Health Research Africa.
Email: studentsjournal2020@gmail.com or admin@sjhresearchafrica.org

(ISSN: 2709-9997)

Publisher: SJC Publishers Company Limited
Category: Non-Government & Non-profit Organisation
Contact: +256775434261(WhatsApp)
Email: admin@sjpublisher.org
Website: https://sjpublisher.org
Location: Wisdom Centre Annex, P.O. BOX. 701432 Entebbe, Uganda, East Africa.