Occurrence of Facial Neurapraxia after Superficial Parotidectomy- A Prospective Study

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ABSTRACT

BACKGROUND

Parotidectomy was first written about by Berard in 1823 who expelled a parotid tumour of 8 years' duration. From that point forward the methodology has been altered and applied to an assortment of considerate and harmful conditions influencing the organ. Superficial parotidectomy, subtotal parotidectomy, and total parotidectomy are presently the choices accessible to the head and neck specialist. The essential objective of parotid medical procedure is the finished expulsion of tumours while saving facial nerve. In spite of endeavours to safeguard the anatomic and utilitarian trustworthiness of the facial nerve, facial nerve loss of motion keeps on being an overwhelming difficulty of parotidectomy. We wanted to assess our involvement with parotid medical procedure, meaning to bring down the occurrence of facial nerve paralysis and concentrate on postoperative confusions.

METHODS

This study was conducted among 20 patients with parotid swelling of more than 1 year duration, from July 2017 to June 2019. Patients were submitted to cautious history taking, total clinical assessment, and assessment of facial nerve before medical procedure. Over a period of 2 years, these 20 patients with parotid swelling underwent parotidectomy by methods for an antegrade strategy of whom all 20 underwent superficial parotidectomy (sixteen men and four women).

RESULTS

All patients (20) experienced superficial parotidectomy. 11 patients had impermanent facial nerve loss of motion (55%) of whom six were HB II (30%), three were House-Brackmann Scale HB III (15%), and two were HB IV (10%). In this study, the majority of patients (9/11 patients) showed significant functional recovery within 3-6 months after surgery (median time for recovery- 6 months) and all affected patients recovered within 9 months after surgery.

CONCLUSIONS

In our investigation, we embraced certain safety measures to bring down the occurrence of brief facial nerve paresis. One of these safety measures is vertical withdrawal to diminish the danger of traction injury. When the nerve trunk was distinguished, we didn't utilize diathermy; haemostasis was achieved with careful ligatures (5/0 polyglactin).

KEYWORDS

Superficial Parotidectomy, House-Brackmann Scale, Facial Nerve Paresis

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BACKGROUND

Parotidectomy was first written about by Berard in 1823 who expelled a parotid tumour of 8 years' duration. From that point forward the technique has been altered and applied to an assortment of kind and threatening conditions influencing the organ; superficial parotidectomy, subtotal parotidectomy, and total parotidectomy are presently the alternatives accessible to the head and neck specialist.[1]

In spite of endeavours to protect the anatomic and practical respectability of the facial nerve, facial nerve loss of motion is an overwhelming difficulty of parotidectomy[2] Postoperative complexities following parotidectomy are all around archived and incorporate difficulties, for example, facial nerve paresis or loss of motion, salivary fistula, Frey's disorder, contamination, and repeat of the tumour.[3]

The frequency of impermanent facial nerve weakness might be very high, with certain authors detailing occurrences in up to 76% of patients. Lasting facial nerve loss of motion happens considerably less regularly; in 'encountered hands' the frequency would be relied upon to be around 3% or less.[4]

Progressively traditionalist parotid medical procedure has brought about diminished facial nerve horribleness without oncologic trade off[5] It was discovered that a more noteworthy pace of transitory facial nerve brokenness was seen with the changed Blair cut (64%) contrasted and the facelift cut (28%), and subsequently the altered Blair cut is utilized distinctly in cases thought to be improper for facelift entry point; huge tumours that stretched out past the front fringe of the parotid organ were the fundamental sign for the adjusted Blair cut.[6]

Two methods are utilized for dissection of the facial nerve in parotid medical procedure: the antegrade system and the retrograde system. In the antegrade system the nerve trunk is distinguished as it leaves the stylomastoid foramen and analyzation at that point continues incidentally; in the retrograde procedure the fringe nerve branches are recognized at first and dismemberment happens toward the nerve trunk.[7,8]

Nerve checking is an adjunctive strategy that a specialist can decide to use during parotid medical procedure to help with the utilitarian conservation of the facial nerve[9] Antegrade dissection is utilized most generally. In a national study directed in 2007 utilizing a uniquely prepared questionnaire, 87% of reacting specialists announced utilizing it routinely. Practically 50% of the specialists joined the two procedures in modification parotid medical procedure, showing their recognition with the two methodologies.[10]

METHODS

This prospective study was led more than 2 year from July 2017 to June 2019 on 20 patients with parotid swelling; patients were exposed to cautious history taking, including age, sex, occupation, term of the swelling (regardless of whether short or long, or inadvertently found), advancement of pain (either nearby or alluded), ensuing improvement of lymph node expansion in the neck, and history of diabetes mellitus or neurological issue.

The patients were submitted to finish clinical assessment, assessment of facial nerve uprightness before medical procedure, and the accompanying research facility and radiological examinations-

1) Neck Ultrasound (US): to distinguish whether the growth is shallow or profound flap expanding, strong or cystic, and all around characterized or poorly characterized, and to recognize augmented Lymph node (LNs).
2) Computerized tomography (CT): to acquire clear insights concerning the degree of growing (regardless of whether it stretches out to the profound flap) and metastasis to LN.
3) Pathological determination (FNAC): to analyse whether the sore is dangerous or considerate.

Patients satisfying at least one of the accompanying criteria were barred from the study.

Procedure[11,12]

An altered Blair incision is utilized for access to the parotid organ (Figure 1). Antegrade dissection is performed by distinguishing the facial nerve trunk utilizing the tragal pointer technique. After beginning distinguishing proof of the nerve trunk, dissection continues toward the fringe branches with concurrent assembly of parotid tissue anteriorly and along the side. The length and number of branches analysed rely upon the ailment that required evacuation of the parotid organ.

Technique of Nerve Protection[13,14]

1) The flap dissection was kept in the correct subcutaneous plane outside the parotid container, with cautious dissection when the terminal branches were come to.
2) Skin snares were utilized to apply vertical footing. To diminish the danger of traction damage, tissue was spread opposite to the cut and in this way parallel to the heading of the main trunk of the nerve.
3) Vertically arranged blunt dissection limits the danger of damage to the distal parts of the facial nerve.
4) Once the nerve trunk was recognized we didn't utilize diathermy by any means; haemostasis was performed with careful ligatures (5/0 polyglactin).
5) For parenchymal division, we partitioned the substance of the parotid organ forcefully and utilized ligatures as proper when draining was experienced (Figs 3 and 4).
6) Gentle withdrawal and fine bended supply route forceps were applied. The course forceps were put quickly over the nerve and afterward opened to painstakingly partition the spanning tissue over the nerve.

7) Heavy weight ought not to be applied on the dismembered facial nerve by method for a dry swab or an unreasonably hot pack in light of a legitimate concern for haemostasis.
8) Saline irrigation of the dismemberment field was completed as the nerve dissection progressed.
9) One suction channel was left and the injury was shut in two layers subcutaneously with Vicryl 3/0 and proline 5/0 for skin.
10) The suction channels ought to be put in such manner that they don't overlie the storage compartment or any part of the facial nerve as scattering of the suction channels may likewise prompt neuropraxia.
11) The channel was generally left for 24-48 h and the sutures were evacuated on the fifth postoperative day.

Modified Blair Incision

Identification of Main Trunk

Parenchymal Dissection

Removal of Superficial Lobe and Tumour

Figure 1. Procedure of Superficial Parotidectomy

Follow-Up

Postoperative follow-up of facial nerve work was completed utilizing the House-Brackmann reviewing framework. This scoring framework incorporates six evaluations dependent on the level of FN work: grade I is ordinary nerve work; grade II shows gentle nerve brokenness not discernible very still; and grades III-VI demonstrate logically extreme paresis of the nerve in work and very still.

Statistical Analysis

Plots and figures were created with Microsoft Office Excel 2007 chart editor.

RESULTS

Age and Sex Distribution

During the investigation, 20 superficial parotid techniques were done to treat parotid swellings. There were 16 male (80%) and 04 female (20%) in the arrangement. The normal age at introduction was 35 year (21-55). Every one of these cases was new. M: F proportion is 4:1

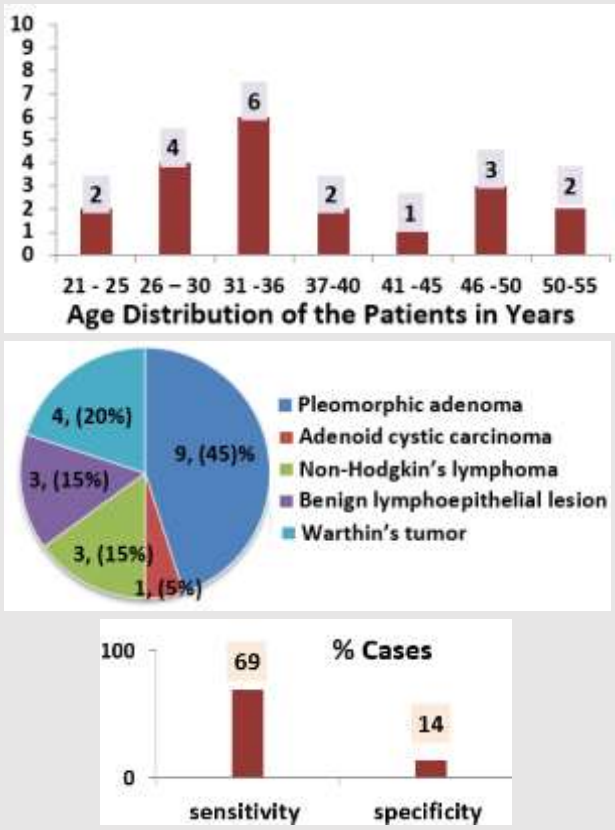


Figure 2. Age Distribution, Distribution of Tumours and FNAC Results

Distribution of Tumour

The patients were divided dependent on their pathologies. The most well-known was pleomorphic adenoma, as found in nine cases. One case was Adenoid cystic carcinoma. Three cases each of Non-Hodgkin's lymphoma and Benign

lymphoepithelial sores separately. As respects Warthin's tumour was in four cases. Pathologically these injuries were assembled into three general classes of benign and Malignant. Right now, the benign tumours pleomorphic adenoma comprised 43% of the tumours and among the threatening tumours, Adenoid cystic carcinoma established 05% of the harmful parotid tumours. Considerate tumours were normal in male (M:F - 4:1). There was no sex separation in malignant tumours (M:F - 1:1).

Preoperative Pathology

Preoperative FNAC was completed for 20 cases in our examination. Of the 20 cases of FNAC reports, around 6 cases demonstrated not quite the same as the last histopathological report. There were 03 false positive cases, 04 false negative cases. True positives were around 09 and true negatives 01. Taking these qualities and registering affectability and particularity, our investigation demonstrates FNAC to be 69% sensitive and 14% specific.

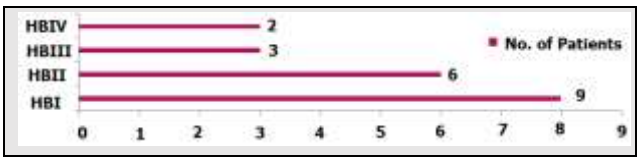
Preoperative radiology Neck US The 30 patients remembered for our examination experienced neck US, of whom 17 had well-characterized growing and 13 had badly characterized expanding; 12 cases were cystic and four cases were strong; as respects LN status, nine cases indicated no amplified cervical LN, while 21 cases demonstrated broadened cervical LN, of which eight cases indicated suspicious LNs and the other 13 cases indicated incendiary LNs.

Facial Nerve Dysfunction Grading[15,16]

According to House Brackmann Grading framework. The most well-known was pleomorphic adenoma, as found in 9 cases, of which 3 cases were with normal postoperative facial nerve work (HB I) and 6 cases had temporary facial nerve paralysis 3 cases with mild dysfunction (HB II) and three cases with moderate nerve dysfunction HBIII. As respects Warthin's tumour (four cases), three were HB I and one case was HB IV. For Benign lymphoepithelial injuries (3) all were HB I. One case was Adenoid cystic carcinoma with postoperative reasonably extreme facial nerve dysfunctions (HB IV). Three cases were Non-Hodgkin's lymphoma with postoperative gentle dysfunctions (HB II)

In Relation to Operative Time

In relation to operative time, nine cases were operated with in 120 mins, 08 cases with in 160 mins and 3 cases in excess of 160 mins. Out of 20 cases, the cases operated with in 120 mins had no facial nerve weakness while, most cases of postoperative temporary facial nerve paresis (3/11) occurred when operative time prolonged for more than 160 mins.



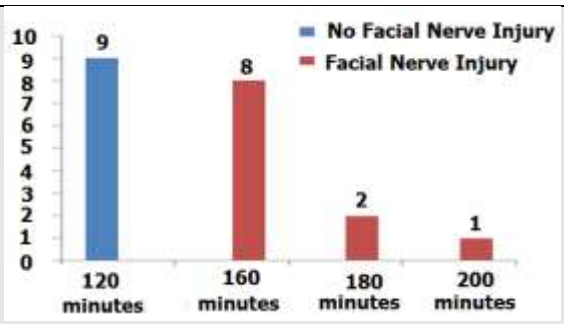


Figure 3. Facial Nerve Dysfunction Grading in Relation to Operative Time

Branches of Facial Nerve Affected Post-Surgery

All the branches were significantly influenced. In this study, temporary facial nerve weakness including all branches of the facial nerve happened in 25% of cases with temporary nerve dysfunction, single branch association happened in 20% of cases, and multiple branch affection occurred in 10% of cases.

In this study, seven (63%) patients had marginal mandibular branch paralysis (two as single branch and five as multiple branches). This might be on the grounds that it is the longest of all facial nerve branches, and consequently dismemberment along its course takes longer.

The higher occurrence of marginal mandibular branch contrasted with different branches may reflect a relatively progressively dissection of this branch in the tumours of the parotid, the scarcity of anastomotic associations of this branch as contrasted and others, or an expanded affectability to insignificant injury auxiliary to a littler breadth or longer course.

It is realized that even limited quantities of nerve stretch can prompt postoperative temporary dysfunction.

Type	Branch Affected	No. of Patients
Single branch	Temporal (T)	0
	Zygomatic (Z)	0
	Buccal (B)	1
	Marginal mandibular (M)	2
	Cervical (C)	1
Multiple branches	Buccal, marginal mandibular (B + M)	0
	Buccal, Marginal mandibular and cervical(B + M + C)	2
	Buccal, marginal mandibular and zygomaticotemporal (B + M + Z)	0
	Marginal mandibular and zygomaticotemporal (M + Z)	0
All branches	All branches (T + Z + B + M + C)	5

Table 1. Branches of Facial Nerve Affected Post-Surgery

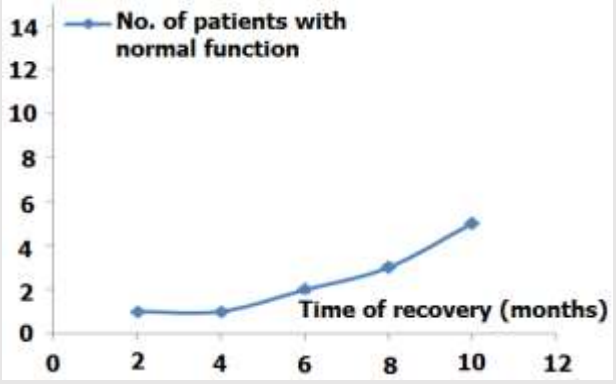


Figure 4. Follow-Up

Follow-Up

Patients with temporary facial nerve weakness were followed week after week for multi month, and afterward month to month until recuperation of patients. In this study, majority of patients (9/11 patients) indicated significant functional recovery inside 3-6 months after medical procedure (median time for recovery = a half year) and every single affected patient recovered inside 9 months after medical procedure.

DISCUSSION

During the study, different results of facial neuropraxia was broke down to explore the rate of, chance variables related with, and modalities to bring down the improvement of postoperative brief facial nerve weakness. This was attempted to improve preoperative arranging and planning and to identify potentially modifiable risk factors for better careful practice.

Superficial parotidectomy was the adopted technique in this study. In current study postoperative facial nerve dysfunction occurred in 55% of the patients in this study, although the patient may have normal facial nerve function on recovery from anaesthesia, facial nerve function subsequently deteriorates, before eventual full recovery.

Upton et al expressed that temporary postoperative facial nerve weakness ranges somewhere in the range of 18 and 65%. Comparative outcomes are accounted for by Bron LP[17] in whose review 40% of patients had some level of postoperative facial nerve dysfunction.

In this study benign parotid tumours establish 95% where harmful malignant is just 05%. In another examination where 85% of parotid tumours were benign and just 12% were malignant reported by Tsai HM et al.[18] Hence, the recurrence of benign tumours was fundamentally higher than that of malignant tumours.

In current investigation Pleomorphic adenoma was found in 43% cases and Warthin tumour was 22%. Rahman et al.[19] additionally detailed that the most widely recognized favourable parotid tumour was pleomorphic adenoma (84%) trailed by Warthin's tumour (10%).

As respects operative time, in present study facial nerve weakness happened in 11 cases out of 20 situations when the usable time expanded more than 160 mins. Mohyuddin N, et al[20] detailed that in nine of 10 cases postoperative transitory facial nerve paresis happened when operative time delayed for in excess of 140 min (mean usable time = 132.5 min); in this way, statistical investigation shows that the frequency of brief loss of motion increments with increment in usable time.

In this study, the 11 cases having temporary facial nerve paralysis, six cases were HB II (30%), three cases were HB III (15%), and two cases were HB IV (10%). Measurable investigation shows that most cases (half) with temporary facial nerve palsy in our arrangement are in the HB II (mild nerve affection) gathering. In another investigation revealed by Witt RL et al[21] by HBII was found in 65% of the cases.

In this study, it was found that seven (63%) patients had marginal mandibular branch weakness (Two as single branch affection and five as a part of multiple and all branch affection). This might be on the grounds that it is the longest of all facial nerve branches, and thus analyzation along its course takes longer.

In another study by Thomson PJ et al[22] marginal mandibular nerve was involved in 90% of cases and zygomatic in 54%.

In this study, greater part of patients (9/11 patients) showed significant functional recovery within 3-6 months after medical procedure (median time for recovery = 6 months) after surgery (median time for recovery = 6 months) and all affected patients recovered within 10 months after surgery. In a relative report it was referenced that a large portion of the patients with postoperative facial nerve paresis recovered their ordinary capacity inside 12-14 months after medical procedure, regardless of the pathology.[23,24]

The best methods for lessening iatrogenic facial nerve damage in parotid gland surgery despite everything stays an away from of the life systems, great careful strategy with the utilization of numerous anatomic land marks, and the utilization of present day instruments like symphonious surgical tool and nerve screen as to simply careful variables, ischaemia was believed to be the most significant, with oedema and stretching, particularly of the finer branches of the nerve, as conceivable auxiliary components. Albeit a few specialists advocate the utilization of haemostatic gadgets for parenchymal division, it is progressively liked to partition the substance of the parotid organ forcefully and use sutures as suitable when draining is experienced.[25]

In this study, precautionary measures were embraced to bring down the rate of impermanent facial nerve paresis. One of these precautionary measures is vertical withdrawal to lessen the danger of traction injury. When the nerve trunk was distinguished, we didn't utilize diathermy by any stretch of the imagination; haemostasis was done with careful sutures (5/0 polyglactin). Saline water system of the dismemberment field was done as the nerve dissection progressed. Finger palpation was not utilized neither to the stem nor to the parts of the facial nerve. One suction channel was left, and the injury was shut in two layers subcutaneously with Vicryl 3/0 and proline 5/0 for skin. The channel was typically left for 24-48 h and the sutures were evacuated on the fifth postoperative day.

CONCLUSIONS

In this study, following precautions were adopted to lower the incidence of temporary facial nerve paresis.

- vertical retraction to reduce the risk of traction injury.
- once the nerve trunk was identified, bipolar diathermy was used; haemostasis was achieved with surgical sutures (5/0 polyglactin).

FNAC still is the investigation of choice with a sensitivity of 69% and specificity of 14% The numerical results of the various parameters analysed prove to be in concurrence with medical literature and other studies.

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