

Peripheral neurectomies in the treatment of trigeminal neuralgia

Altaf H Malik^{1*} and Shabnum Majeed²

¹Consultant Oral and Maxillofacial Surgery, Government Dental College, Shreen Bagh Karan Nagar, Srinagar-190010, Jammu and Kashmir, India and ²Consultant Anesthesia and Critical Care Health and Medical Education department, Srinagar-190001, Jammu and Kashmir, India

Received: 04th April 2020; **Accepted:** 25th November 2020; **Published:** 01st January 2021

Abstract: *Introduction:* Trigeminal neuralgia (TN) is a commonly diagnosed neurosensory disease of orofacial region involving the fifth cranial nerve. Patients on multiple drug therapies want drug cessation and alternative strategies. *Aim:* The study was designed to evaluate the efficacy of peripheral neurectomy as a surgical procedure in the treatment of trigeminal neuralgia. *Materials and Methods* A retrospective study was designed to study the effectiveness of peripheral neurectomy in the patients of trigeminal neuralgia: The factors analyzed were the demographic details of the patients, side of involvement, branch of nerve involved and procedure used, postoperative complications, prognosis and any additional procedure used in cases of recurrences were recorded. *Results:* Our study had 7 males and 13 females ranging from 45 to 68 years of age. Inferior alveolar nerve was involved 11 times (55%). The second division (infra-orbital) was afflicted 5 times in patients (25%), second and third division were involved in only in one patient (5%). Infra-orbital and supra-orbital involvement was in 3 patients (15%). The right side was affected in 13 patients (65%), while left side in 7 patients (35%). The mean follow up period was 3.1 years (range 2-5 years). 13 patients (65%) showed good outcome. *Conclusion:* Peripheral neurectomy is one of the oldest, minimal invasive forms of surgery, well tolerated by the patient and can be done under local anesthesia.

Keywords: Neurectomy, Recurrence, Trigeminal Neuralgia.

Introduction

Trigeminal neuralgia (TN) is sudden, brief, shock like electric pain unilaterally along the distribution of nerve, which terminates spontaneously [1]. There are various reasons suggested for the origin of pain. The commonest cause is vascular compression by tortuous vessel (superior cerebellar artery). Meningitis, an inflammatory cause can also cause trigeminal neuralgia [1]. Most of the times various drug therapies and injections are exploited for the relief of pain. The numerous surgical procedures are advocated for the treatment of trigeminal neuralgia [2].

Peripheral neurectomy is a simple, low-risk procedure that involves avulsion of the postganglionic portion of the branches of trigeminal nerve after it exits from cranium and has been suggested as one of the treatments for the trigeminal neuralgia. The study aims to study the effectiveness of peripheral neurectomy as an

alternative procedure in the patients refractory to the drug therapy.

Material and Methods

This was a retrospective study conducted in the department of Dentistry and Maxillofacial surgery Noora Hospital Srinagar Kashmir. The study was registered with the registration no 254 (D) 2020 and approved by the department of Dentistry and maxillofacial surgery and Helniski declaration was followed in letter and spirit. Twenty patients refractory to drug therapy like carbempanzine were enrolled in the study. The diagnosis was based on a detailed history, clinical examination like localization of pain and confirmation by local injection of lignocaine 2% (1:100000). Orthopantomogram was taken for every patient to exclude any local pathology. MRI and CT scan was used to rule out any underlying brain or bone pathology.

We used International Headache Society (IHS) diagnostic criteria as well as Sweet's criteria for the diagnosis of classical TN. The IHS diagnostic criteria for the diagnosis of classical TN are as follows:

- A. Paroxysmal attacks of pain lasting from a fraction of a second to 2 min, affecting one or more divisions of trigeminal nerve and fulfilling criteria B and C.
- B. Pain has at least one of the following characteristics;
 - a. Intense, sharp, superficial, or stabbing.
 - b. Precipitated from trigger areas or by trigger factors.
- C. Attacks are stereotyped in the individual patient.
- D. There is no clinically evident neurological deficit.
- E. Not attributed to another disorder [3].

Sweet's criteria have been commonly used worldwide for the diagnosis of TN. The criteria emphasize five major clinical features that in essence define the diagnosis of TN. They are described as follows:

1. The pain is paroxysmal.
2. The pain may be provoked by light touch to the face (trigger zone).
3. The pain is confined to trigeminal distribution.
4. The pain is unilateral.
5. The clinical sensory examination is normal.

The factors analyzed were: the demographic details of the patients, side of involvement, branch of nerve involved, procedure used, postoperative complications, any additional procedure used in cases of recurrences. Patients intolerant to drug therapy were selected for the neurectomy. An informed consent was obtained from the patients. The peripheral neurectomy was carried out either in local anesthesia or general anesthesia:

- (a) The infraorbital nerve was approached through intra oral approach. After taking upper vestibular incision infra orbital foramen was visualized & infra orbital nerve and its peripheral branches were identified & avulsion of the nerve was performed from the soft tissues and from the infra orbital canal by reeling on haemostat.

- (b) The Inferior alveolar nerve was approached intra orally by Dr Ginwalla's incision [4] and the nerve was identified, avulsed from the distal end. Vestibular incision in premolar region was taken; the mental nerve was identified & avulsed from the mental foramen and from the soft tissues.
- (c) The Supra orbital nerve was approached extra-orally by upper eyebrow incision, the nerve was identified and peripheral neurectomy was performed by avulsing the nerve.

Patient was put on anti-inflammatory and antibiotics and followed for 3 years. Complications like dehiscence, bleeding, recurrence or need for additional procedure were recorded. Outcome was graded as good, fair or poor. Good when there was no recurrence of pain, Fair when there was recurrence of pain after certain period of time, Poor when there was no improvement in pain after neurectomy. The following patients were excluded from study;

1. Previously treated cases of neurectomy.
2. Patients having contraindications for local anesthesia and general anesthesia.
3. Cases with atypical presentation such as bilateral involvement, uncommon distribution, and longer than usual pain.
4. Insufficient records and/or follow-up.
5. Patients unwilling to give consent for the study.

Results

The 20 patients who underwent 25 neurectomies were evaluated for the study. The study included 13 females and 7 males ranging from 45 to 68 years of age. 11 times (55%) inferior alveolar nerve was involved. The second division (infra orbital) was afflicted in (25%) of patients, second and third division were involved in only in one patient (5%). Infra-orbital and supra-orbital involvement was found in 3 patients (15%). The right side was affected in 13 patients (65%), while left side in 7 patients (35%). The mean follow-up period was 3.1 years (range 2-5 years). 13 (65%) patients showed good outcome after surgery and were able to

discontinue the medication. About 5 (25%) patients showed fair outcome and needed supplemental measures like drugs or injections while 2(10%) patients didn't respond to surgery (table1).

Table-1: The patient characteristics and site of involvement with outcome of neurectomy

Patient	Sex	Age (years)	Site of face	Type of nerve involved	Follow up (years)	Outcome
1	Female	52	Right	Inferior alveolar	4	Good
2	Female	51	Right	Inferior alveolar	3	Fair
3	Male	62	Right	Infra-orbital	2	Good
4	Male	64	Left	Inferior alveolar	3	Good
5	Female	54	Right	Infra-orbital	4	Good
6	Male	57	Right	Infra-orbital /supra-orbital	3	Good
7	Female	55	Right	Infra orbital and supra-orbital	2	Fair
8	Female	45	Left	Infra-orbital	3	Poor
9	Female	56	Right	Inferior-alveolar	4	Good
10	Female	54	Right	Inferior-alveolar /infraorbital	5	Good
11	Male	68	Left	Inferior alveolar	4	Good
12	Male	64	Right	Infra/supra orbital	3	Good
13	Female	59	Left	Inferior- alveolar	2	Poor
14	Male	62	Right	Inferior alveolar	3	Fair
15	Female	67	Right	Infra-orbital	4	Good
16	Male	65	Left	Inferior alveolar	2	Fair
17	Female	63	Left	Inferior alveolar	3	Good
18	Female	61	Right	Infra-orbital	2	Good
19	Female	56	Right	Inferior alveolar	4	Good
20	Female	59	Left	Inferior-alveolar	2	Fair

Discussion

The peripheral neurectomy as a surgical procedure was carried out in the 18th century with limited success for the first time [5-6]. Most of the times it provides complete and long lasting effects. The supraorbital, supratrochlear, infratrochlear, lacrimal nerves, infraorbital nerve, and inferior alveolar, lingual, and mental nerves can be teased out to provide the long lasting effects. Most of the times the peripheral neurectomy is a safe and simple procedure and can be performed in local anesthesia. Most of the procedures and literature thereof dates back to 20-50 years or before.

Quinn and Weil reported a retrospective case series of 63 patients with 112 neurectomies in 1965 [7], pain relief period of 24-32 months was

reported within a follow-up period of 0-9 years. In our study the mean follow up has been 3.1 years which is in conformity with the most of the studies. About 65% of our study had good results and were able to discontinue the medication. 25% of our patients recorded fairer outcome and needed little adjuvant measures but 2 of our patients didn't respond to the surgical procedures.

We didn't record any untoward complications. Grantham [5] performed 55 neurectomies on 55 patients with, follow-up of 6-months to 8 years. Average pain relief period was 33.2 months. Not all patients were followed up for 3 years, one was for 2 years only. The treatment of idiopathic neuralgia is successful only if it eliminates the pain [8-9]. Most of the

times the pharmacological and injection therapies fail and necessitate surgical intervention, in the form of neurectomy of peripheral divisions of the trigeminal nerve and various neurosurgical procedures [9-12].

The infraorbital (V2) & inferior alveolar nerve are accessed intr-orally. The access is simple and doesn't produce any scars. Some authors use trans-facial access to the V2 division [13] most probably because of lower risk of the post operative wound and reduced post operative edema. The surgical procedure is followed by obturation of the foramen with fat [14], titanium screws [15], gold foils [16], and silicone [17] are also tried with variable success rates.

A recent comparative study was done by Fareedi Mukram Ali [17] and his group. Post surgical pain relief varied between 15 months and 24 months in cases without placing stainless screws in the foramen. In our study we used titanium screws or gutta percha sticks or points to obliterate the foramina. The current study showed no response in two patients which is in conformity with the study of Shah et al [19]. In 1886, Geo R Flower pointed in his article that in cases of peripheral origin, after neurectomy, the pain would sometimes persist for few days and then gradually disappear [18]. This is explained by the fact that the morbid condition also involved some

communicating or anastomosing twigs. The literature discusses the number of repeated neurectomies of peripheral divisions of the trigeminal nerve [2]. We encounter 1 recurrence after period of 1 year in a patient of inferior alveolar neurectomy but was managed with the carbamazepine for which he responded well. Some authors state that the response of their patients to carbamazepine when the recurrence of pain appears is better after neurectomy [19] and lower doses of the medications are needed [2].

Our observations weren't different. No major complications of these procedures other than some facial swelling and bruising in the early postoperative period were noted in the literature [19]. We could not record any complications. The procedure is simple and safe and can be carried out in outpatient setting.

Conclusion

Trigeminal neuralgia is the, most commonly reported neuralgia. Most of the cases of neuralgias of fifth nerve are refractory to drug therapy and hence can be taken care of by minor surgical procedure like peripheral neurectomy which is safe and can be carried in out-patient settings.

Financial Support and sponsorship: Nil

Conflicts of interest: There are no conflicts of interest.

References

1. Obermann M. Treatment options in trigeminal neuralgia. *Ther Adv Neurol Disord* 2010; 3:107-115.
2. Cerovic R. Neurectomy of the trigeminal nerve branches: clinical evaluation of an obsolete treatment. *J Cranio-Maxillofac Surg* 2009; 37:388-391.
3. Stiles MA, Mitirattanakul S, Evans JJ. Clinical Manual of Trigeminal Neuralgia. 1st ed. *United Kingdom: Informa Healthcare* 2007; 102.
4. Ginwala MSN. Surgical treatment of trigeminal neuralgia of third division. *Oral Surg* 1961; 14:1300.
5. Grantham EG, Segerberg LH. An evaluation of palliative surgical procedures in trigeminal neuralgia. *J Neurosurg* 1952; 9:390-394.
6. Khanna JN, Galinde JS. Trigeminal neuralgia Report of 140 cases. *Int J Oral Surg* 1985; 14:325-332.
7. Quinn JH, Weil T. Trigeminal neuralgia: Treatment by repetitive peripheral neurectomy. Supplemental report. *J Oral Surg* 1975; 33:591-595.
8. Chole R, Patil R, Degwekar S, Bhowate R. Drug treatment of trigeminal neuralgia: a systemic review of the literature. *J Oral Maxillofac Surg* 2007; 65:40-45.
9. Hassan Salama et al. Outcome of medical and surgical management in intractable idiopathic trigeminal neuralgia. *Ann Indian Acad Neurol* 2009; 12(3):173-178.
10. Nurmikko TJ, Eldridge PR. Trigeminal neuralgia-pathophysiology, diagnosis and current treatment. *Br J Anesth* 2001; 87(1):117-132.
11. Toda K. Operative treatment of trigeminal neuralgia: review of current techniques. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 2008; 106:788-805.
12. Prasad S, Galetta S. Trigeminal neuralgia: historical notes and current concepts. *Neurologist* 2009; 15(2):87-94.
13. Brito AJ. Trigeminal neuralgia. *Acta Med Port* 1999; 12:187-193.

14. Freemont AJ, Millac P. The place of peripheral neurectomy in the management of trigeminal neuralgia. *Postgrad Med J* 1981; 57:75-76.
15. Mason DA. Peripheral neurectomy in the treatment of trigeminal neuralgia of the second and third divisions. *J Oral Surg* 1972; 30:113-120.
16. Sung RR. Peripheral neurectomy as treatment for incipient trigeminal neuralgia. *Oral Surg Oral Med Oral Pathol* 1951; 4:296-302.
17. Ali FM, Prasant M, Pai D, Aher VA, Kar S, Safiya T. Peripheral neurectomies: A treatment option for trigeminal neuralgia in rural practice. *J Neurosci Rural Pract* 2012; 3:152.
18. Fowler GR. The operative treatment of facial neuralgia. *Ann Surg* 1886; 3:269-320.
19. Shah SA, Khattak A, Shah FA, Khan Z. The role of peripheral neurectomies in the treatment of Trigeminal neuralgia in modern practice. *Pak Oral Dent J* 2008; 28(2):237-240.

Cite this article as:Malik AH and Majeed S. Peripheral neurectomies in the treatment of trigeminal neuralgia. *Al Ameen J Med Sci* 2021; 14(1):72-76.

This is an open access article distributed under the terms of the Creative Commons Attribution-Non Commercial (CC BY-NC 4.0) License, which allows others to remix, adapt and build upon this work non-commercially, as long as the author is credited and the new creations are licensed under the identical terms.

*All correspondences to: Dr. Altaf Hussain Malik, Consultant Oral and Maxillofacial Surgery, Government Dental College, Shreen Bagh Karan Nagar, Srinagar-190010, Jammu and Kashmir, India. E-mail: drmalikaltaf@gmail.com