

THE ROLE OF PERIPHERAL NEURECTOMIES IN THE TREATMENT OF TRIGEMINAL NEURALGIA IN MODERN PRACTICE

¹SYED AMJAD SHAH, BDS, FCPS, ²ADNAN KHATTAK, BDS

³FAISAL ALI SHAH, BDS, ³ZAHID KHAN, BDS

ABSTRACT

50 patients were analyzed for indications, advantages and complications of peripheral neurectomies from June 2003 to September 2008 reported to the Department of Dentistry and Maxillofacial Surgery, Lady Reading Hospital, Peshawar. WE selected only those patients who were above 40 years. After neurectomies, 35 (70%) patients had excellent pain relief lasting 2-5 years without any medication; 4 (8%) patients experienced occasional pain but no medication required; in 5 (10%) patients pain controlled with medication; whereas in 6 (12%) patients, recurrence of pain appeared in 0-2 years which could not be controlled with medication. These patients were referred to neurosurgeon for MVD (Microvascular Decompression). Both surgical and medical therapies are effective for trigeminal neuralgia. However, factors such as pain relief, recurrence rates and morbidity and mortality rates should be taken into account when considering which technique to use. It seems proper to start a patient suffering from trigeminal neuralgia with medical therapy but proceed early with surgical treatment if pain control is poor or side effects of medication are intolerable. The loss of sensation along the branch of the trigeminal nerve and recurrence rate are associated with peripheral neurectomy. But it is an effective and safe procedure for elderly patients; particularly those who have short life span. And in centers where facilities are not available for major neurosurgical procedures or patient is not fit for such procedures, neurectomy is the best choice. It is possible even under local anesthesia.

Key words: Trigeminal neuralgia, Peripheral neurectomy, Infra-Orbital, Inferior alveolar, Mental, Long buccal neurectomy

INTRODUCTION

Neurectomy is the oldest of all procedures. This procedure on various peripheral branches of the trigeminal nerve, such as supraorbital, infraorbital, mental and inferior alveolar nerves (ID) has long been known to play a beneficial role in the management of trigeminal neuralgia. It gives pain relieve up to 33 months¹. These peripheral procedures are not commonly used presently, primarily because of high incidence of pain recurrence and complete sensory loss of the area supplied by that particular nerve. Postoperative neuroma formation is another complication of neurectomy. Neurectomy has been superseded by more complex procedures such as microvascular decompression and radio frequency thermocoagulation². However, in the centers where these facilities are not available or patient is not fit for major neurosurgical procedures, or life span of the patient is short (in older patients) neurectomy has its role in the treatment of trigeminal neuralgia³.

METHODOLOGY

This study was carried out on fifty patients presenting with the features of trigeminal neuralgia in the Department of Dentistry and Maxillofacial Surgery, Lady Reading Hospital, Peshawar from Jun 2003 to Sept 2008. The Lady Reading Hospital is a tertiary care hospital.

The diagnosis was based on a detailed history, clinical examination and control of pain by carbamazepine. Orthopentograph (OPG) was taken for every patient to exclude any local pathology. The branch of nerve involved was identified according to the site of pain and confirmed with diagnostic local anesthetic 2% lignocain with adrenaline 1: 200,000 injection at the identified site and repeated three times on consecutive days. An early morning appointment was given to the patients. Before being considered for surgical treatment, all patients had been placed on maximum pharmacological therapy, especially a course of carbamazepine, gabapentine. All patients had become refractory to

¹ **Correspondence author:** Dr Amjad Shah, Oral Maxillofacial Surgeon, Department of Dentistry and Maxillofacial Surgery PGMI/Lady Reading Hospital, Peshawar Mobile No: 0333-9107122, E-mail: amjadshahsyed@yahoo.com

² Resident, Oral Surgeon, Department of Dentistry and Maxillofacial Surgery, PGMI/ Lady Reading Hospital, Peshawar

³ Senior House Surgeon, Department of Dentistry and Maxillofacial Surgery, PGMI/ Lady Reading Hospital, Peshawar

medical therapy or had clinical and/or laboratory side effects sufficient to demand drug cessation. All patients were investigated pre-operatively with computerized tomography scanning (CT) or magnetic resonance imaging (MRI), which revealed no underlying structural abnormalities such as tumors. The follow-up period covered by this study ranged from 0-5 years.

Inclusion criteria

All patients of either gender presenting with the features of trigeminal neuralgia reported to the Department of Dentistry & Maxillofacial Surgery, PGMI/Lady Reading Hospital, Peshawar were included in the study.

Exclusion criteria

- 1 The patients below 40 years.
- 2 Previously treated cases for neurectomy.
- 3 Patients having contra-indications for local & general anesthesia.

Surgical Technique

Infraorbital neurectomy was performed via an intra-oral incision in the labingival sulcus. The infraorbital nerve was avulsed well into the infraorbital foramen. The remnants of the nerve were cauterized deep in the foramen.

Sectioning of mental nerve was performed by triangular gingivocrevicular incision in premolar area. The nerve was avulsed well into the mental foramen and was cauterized deep in foramen.

The transoral approach for inferior alveolar nerve via an incision similar to triangular incision for third molar surgery but slightly extended posteriorly along the anterior border of ramus of the mandible. Here, the anterior most fibers of temporalis and masseter in the vicinity of incision were cut. The nerve was identified by identifying lingula on medial surface of mandible. The nerve was cauterized.

The long buccal nerve was explored through intraoral incision in buccal sulcus at or just above the occlusal level of molars across anterior border (external oblique ridge) of mandible. The incision was approximately 1-1.5 cm below parotid duct. Main trunk was identified and dissected well posteriorly as far as possible. The nerve was also dissected anteriorly and terminal branches were identified. The nerve was cauterized.

RESULTS

The results of the treatment were classified into four groups as follows:

- Group 1 Excellent – pain relief was defined as total loss of pain without requiring a course of carbamazepine.
- Group 2 Good – Occasional pain; no medication required.

- Group 3 Fair – mild to moderate pain but relieved with modest amount of carbamazepine
- Group 4 Poor pain relief as no significant relief even with carbamazepine treatment.

Out of sixty patients 50 patients were selected. The remaining ten patients did not report back to our department at different stages of treatment and proper follow-up was not completed. The age of the patients varied from 40 to 79 years with a mean age 59.5 years at the time of presentation. Twenty-eight were males and twenty-two were females with ratio of 1.3:1.

The neurectomies performed for various branches of trigeminal nerve were as follows: mental (n=5); Inferior Alveolar (n=20); Long buccal (n=9); Infra-Orbital (n=16). No case of the neurectomy of lingual, supra-orbital and Supra-trocheal nerve was recorded in this study. All neurectomies were performed as primary procedures.

35 (70%) patients had excellent pain relief lasting 2-5 years without any medication as shown in Table 1. In 6 (12%) patients, recurrence of pain appeared in 0-2 years that could not be controlled with medication (in group-IV). In these patients, second neurectomy of the same branch was not attempted because circumstances were not suitable for second surgery and it was considered better to refer the patient to neurosurgeon for MVD. However two patients opted for MVD. They were pain free for one-year follow-up period and were satisfied with the MVD procedure. One patient refused to neurosurgical procedure. Appointment for MVD to one patient was given but before the due date for surgery, the patient became pain free and she has been pain free for the last sixth months. Two patients didn't return back after referral to neurosurgeon for MVD.

The distribution of neurectomy of nerve branch in different group is shown in Table 2. The number of patients with pain recurrence was more in neurectomy of ID and long buccal nerve. But it was found that pain recurrence after ID nerve followed the path of long buccal nerve and vice versa. So second neurectomy for long buccal nerve or ID nerve was performed. However, at the time of diagnosis for neurectomy of one nerve it was made sure that the other nerve was not involved simultaneously. It means that recurrence of pain was not in ID nerve in real sense, but it was involvement of long buccal nerve and vice versa. In such combination cases (n=3), neurectomies were performed one after the other within less than one-year period. Out of three patients, two were symptom free after follow-up of two years whereas one was referred to neuro-surgeon for MVD (one of the case for MVD mentioned above). To avoid confusion between number of patients and number of procedures in combination cases, only the primary neurectomies are show in tables.

Duration of pain relief	Group I	Group II	Group III	Group IV
Less than 1 year	—	—	—	02
1 year	—	—	—	02
2 years	10	01	01	02
3 years	11	01	02	—
4-5 years	14	02	02	—
Total: 50	35 (70%)	4 (8%)	5 (10%)	6 (12%)

TABLE 1: DURATION OF PAIN RELIEF IN EACH GROUP

Neurectomy of nerve	Group I	Group II	Group III	Group IV	Total
Inferior Alveolar	15	01	02	02	20
Infra-Orbital	13	01	01	01	16
Long buccal	05	01	01	02	9
Mental	02	01	01	01	5
Total	35 (70%)	4 (8%)	5 (10%)	6 (12%)	50 (100%)

TABLE 2: DISTRIBUTION OF NEURECTOMY OF NERVE BRANCH IN EACH GROUP

DISCUSSION

All new patients are treated medically as response to treatment is, in part, diagnostic⁴. If the patient responds to medical treatment, the clinician can be fairly confident that the correct diagnosis has been made. A recent meta-analysis has shown that anticonvulsants are effective for the treatment of trigeminal neuralgia⁵. Carbamazepine was found to be the drug of choice in the management of trigeminal neuralgia. The dose according to efficacy and side effects is clinically feasible. When carbamazepine cannot be used, the alternative evidenced-based medical treatments are lamotrigine and beclufen⁶. In case of lack of effect of a single drug, a combination of two or more drugs may be used. Only the lamotrigine-carbamazepine combination is evidenced based treatment for trigeminal neuralgia^{6,20}. Considering the evidence-based benefits of gabapentine in other neuropathy and postherpatic neuralgia, this relatively new drug may represent an advance in treatment⁶. A good understanding of mechanism of action of these drugs will ensure good pain control with minimal side effects. Hematological and biological chemical reactions do occur in some patients⁴.

Surgical management of trigeminal neuralgia is associated with increased morbidity and mortality. But it has been stated that the results of surgical treatments for trigeminal neuralgia is so good that the patients are often better served by surgery rather than persevering for prolong periods with either pain or

bothersome adverse effects from medications⁷. As trigeminal neuralgia is a protracted disorder, any medication may need to be given for extended periods of time, thereby multiplying the potential for toxicity of the drug. In addition to the considerable side effects, the pain may become more intractable as the disease progresses. In 30% of the cases, medical treatment fails through inadequate pain control, or because of intolerable side effects^{8,9}. In these cases, surgical management is the only viable option.

Most of the studies done for neurectomy were published 20-50 years ago^{10,15}, with only one recent paper by Murali and Rovit³ found in literature. Quine¹¹ reported a retrospective case series of 63 patients with 112 neurectomies. A follow-up period of 0-9 years was noted, and the pain relief period of 24-32 months was reported. Grantham¹⁰ also reported a case series of 55 patients with 55 neurectomies. A follow-up of 6-months to 8 years was noted, and an average pain relief period of 33.2 months was achieved. In our experience with 50 neurectomies and 0-5 years follow-up period, the pain relief of 2-5 years was noted.

A recent study by Murali and Rovi³ reported on a case series of 40 patients, 12 with neurectomies performed as the primary procedure, and 28 as a second procedure to treat pain recurrence after radiofrequency thermocoagulation. The follow-up period was 2-10 years. It was reported that 79% had excellent pain relief (defined as total loss of pain without need of medication) lasting 5-years or more, and some had excellent pain relief until their deaths. The mean age of their patients was 72 with an age range of 50-94. Our observations are more or less close to this study. We found 70% patients with excellent pain relief lasting for 4-5 years. The mean age in our study was 59.5 years (40-79years). Despite excellent results to date, it is probable that some of these patients will again experience pain recurrence if they live enough years.

Our previous study¹⁶ showed the age of the patients varied from 21 to 79 years with a mean age 50 years at the time of presentation. Thirty-eight patients were above forty years and only six patients were from the age group 21-40 years. In present study we selected only those patients who were above 40-years. We are of the opinion that peripheral neurectomy may be done in elderly and MVD should be preferred for younger patients unless specific reason is there for neurectomy in such patients. Peripheral neurectomy may be the last option in younger patients.

We observed several advantages of peripheral neurectomy procedures. They were easy to performed, well tolerated by elderly or debilitated, or cognitively impaired patients, and can often be performed while the patient is under local anesthesia. Murali and Rovit³ were of the view that corneal sensation is left intact in patients with first division trigeminal neuralgia. The patient can be sent home either the day of operation or

1 day later. Assuming the diagnosis is correct, pain relief is assured and occurs immediately following operative procedures or very soon later.

In our study neuralgic pain attacks have been observed in three patients along the same branch of nerve immediately after its neurectomy in first 24-48 hours but interestingly disappeared afterward. In 1886 Geo R Flower²² pointed in his article that in cases of peripheral origin, after neurectomy the pain would sometimes persist for few days and then gradually disappear. This is explained by the fact that the morbid condition also involved some communicating or anastomosing twigs. As the process of degeneration goes on in these, after resection, the symptoms abate and finally cease together. However, further study is needed to find out the exact cause.

One interesting finding in our study was recurrence of pain along the course of long buccal nerve after the neurectomy of ID nerve and vice versa. We made sure that this was not the case of wrong diagnosis. It means that recurrence of pain was not in ID nerve in real sense, but it was involvement of long buccal nerve and vice versa. We are of the opinion that at the time of diagnosis of one nerve, the other branch was not involved. It was involved later on after the neurectomy of first one. The reason for such change may be investigated. And we suggest to all who are working in this field that when recurrence occurs in these two branches of mandibular division of trigeminal nerve after neurectomy of one, they should attempt the neurectomy of the second one after proper diagnosis. Otherwise, we can commit mistake in labeling the recurrence of that particular nerve branch and also to increase the agony of the patient.

There are no major complications of these procedures other than some facial swelling and bruising in the early postoperative period and the expected loss of sensation in the appropriate distribution of the trigeminal nerve. Three patients in our series complained of dysesthesias: but they preferred this inconvenience to the pain they had previously experienced.

CONCLUSION

Trigeminal neuralgia is the most common neuralgic cause of facial pain. The first step is to make correct diagnosis. Initial therapy should be low dose carbamazepine, with upward titration of the dose to relieve pain. Surgery is advised for the patients whose pain is refractory to drug therapy or adverse effect sufficient to mandate drug cessation. 70% patients had excellent pain relief lasting 2-4 years or more without any medication. In 12% patients, recurrence of pain appeared in 0-2 years that could not be controlled with medication. These patients were referred to neurosurgeon for MVD. Peripheral neurectomy procedures seem to be associated with recurrence rate and the loss of sensation along the branch of the trigeminal nerve.

But they can be useful in elderly patients with limited life span.

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