ORIGINAL ARTICLE

A COMPARISON BETWEEN CRYOSURGERY AND NEURECTOMY IN MANAGEMENT OF TRIGEMINAL NEURALGIA

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ABSTRACT

Aim of this study was to compare the effectiveness in terms of restoration of sensory sensations of cryosurgery and neurectomy in the management of trigeminal neuralgia. Randomized control trial was conducted on eighty (80) patients diagnosed with Trigeminal neuralgia were selected from the Oral and Maxillofacial Surgery Department, Nishter Institute of Dentistry, Multan from March 2017 to March 2018. Forty (40) patients were treated with cryosurgery and forty (40) were treated with neurectomy. Final outcome was assessed after 2 months. Statistical analysis was done through Statistical Package for Social Sciences 24.

Among the 40 patients treated with neurectomy only in 5 patients sensory sensations re-appeared within 2 months follow up period. Among the 40 patients treated with cryosurgery in 14 patients sensory sensations re-appeared within 2 months follow up period. Probability (p) value was found 0.018. Mean age of patients in cryosurgery group was 56.4 ± 7.8 years with an age range of 36-67 years. Among the 4o patients treated with neurectomy, mean age of patients was 56.7± 8.2 years with an age range of 38-71 years.

This study reveals that cryosurgery is significantly more effective as compared to neurectomy in the management of trigeminal neuralgia in term of restoration of sensory sensations.

Key Words: *Trigeminal Neuralgia, Cryosurgery, Neurectomy, Dental Surgery.*

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INTRODUCTION

Trigeminal neuralgia (TN) is a condition of trigeminal nerve damage which leads from mild to severe facial pain.[1] Patients with TN presents with severe unilateral paroxysmal facial pain and often complaint about world's worst pain they are facing.[2] International association for the study of pain describe it as severe, stabbing, brief and sudden pain which is recurrent in nature. Most probably it is due to damage of fifth cranial nerve or its branches .[3]

Most of the time trigger zone of pain is ipsilateral; coincide with area of pain. Common extra oral trigger zone occurs above the supra orbital foramen, over the mental foramen, inner canthus of eye and lateral to the ala nasi.[4] Triggers of pain are certain head movements, include touch, chewing, talking, swallowing, brushing teeth, shaving or even a cold or warm draft. The most commonly affected dermatomal zones are innervated by the second and third branches of the trigeminal nerve.[5] Most of the time immediately after an injection, refractory period starts during which no more pain attacks be evoked.

Trigeminal neuralgia is rarely seen in patients younger than 30 years; however, if it does occur in younger patients, it is usually associated with multiple sclerosis (MS).[6] In number of cases Trigeminal neuralgia have unknown origin. Occasionally, Trigeminal neuralgia is due to involvement of lesions of central nervous system labeled as symptomatic trigeminal neuralgia, such as cysts, tumors, arteriovenous malformations, multiplesclerosis.[7] Trigeminal neuralgia is also associated with peripheral demyelinating disease but this condition is very rare and atypical.[8]

Association of TN with demyelinating is only found

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in conditions when it was idiopathic or vascular compression of the trigeminal root-entry zone occurred because at this time demylanating of nerve fiber is most common.[9] Problem is that there is uncertainty regarding the pathophysiology and etiology of trigeminal neuralgia and there are wide ranges of treatment modalities available.[10]

METHODOLOGY

This study was conducted in the Department of Maxillofacial Surgery, Nishtar Institute of Dentistry, Multan from March 2017 to March 2018. Patients diagnosed with Trigeminal Neuralgia on the basis of history and clinical examination (duration of pain, side of face involved, trigger zones, branches of the trigeminal nerve involved, complete record of previous medical treatment regarding any systemic disease) were included. Patients with history of any surgical procedure for management of Trigeminal Neuralgia was done previously, immunocompromised patients which do not fulfill the criteria for surgical procedure, patients already taking any kind of medication for the management of Trigeminal neuralgia were excluded from the study. Ethical issues were considered and managed during the study after approval from the hospital ethical committee. A consent form signed by the witness and the consenting person was delivered to the patient before the commencement of the procedure carrying all information regarding surgical procedure and its complications. Patients were randomly allocated into two equal groups (group A, group B) by using the lottery method (80 slips were made with name, Group A and Group B, each patient was asked to pick one slip, whatever the name of group written on the slip ,patient was managed accordingly).Group A was treated with cryosurgery. Group B was treated with neurectomy. Bias was controlled by randomly allocating the patients by researcher. Procedure was performed by researcher (having 18 month experience in oral surgery training) and was assisted by Consultant (5 years experience after post graduation). Final outcome of restoration of sensory sensations were checked at 2 months interval. All information was collected on a specially designed proforma by researcher. Effectiveness was assessed in terms of restoration of sensations. Sensory sensations was checked by using sterile needle tip over the area supplied by that branch of trigeminal nerve for sharp stimuli and hub for dull stimuli (to test patient's ability to discriminate sharp from dull stimuli). Cryosurgery is the rapid freezing and thawing of the nerve with a cryoprobe with nitrous oxide as refrigerant gas.

Neurectomy is excision of a portion of nerve. Trigeminal Neuralgia is a painful, unilateral affliction of the face characterized by brief shock like lancinating pain limited to one or more divisions of trigeminal nerve. It will be diagnosed by injecting 2% lignocaine with adrenaline in 1:80,000 for temporary nerve block in the affected branch of the trigeminal nerve.

All data were compiled and analyzed by using SPSS -10.Descriptive statistics was calculated for all variables. Mean and standard deviation were calculated for quantitative variable like age of patients. Frequency and percentages were calculated for all qualitative variables like gender and restoration of sensory sensations. Chi-square test was applied to all qualitative variables. Confounding variables like age, gender were controlled by making stratified cross matching tables.

RESULTS

Among the 40 patients treated with cryosurgery, 26 were female presented in the study and 14 were male. Among the 40 patients treated with neurectomy, 24 were females and 16 were male. Patients treated with cryosurgery, mean age of patients was 56.4 ± 7.8 years with an age range of 36-67 years. Among the 4o patients treated with neurectomy, mean age of patients was 56.7± 8.2 years with an age range of 38-71 years.

TABLE 1: DEMOGRAPHICS AND TRIGEMINAL NERVE INVOLVEMENT

Age	56.59 ± 8.006
Male	30(37.5%)
Female	50(62.5%)
Involvement of Trigeminal Nerve	
Right Side	50(62.5%)
Left Side	30(37.5%)

TABLE 2: DIVISION AND BRANCH INVOLVEMENT OF TRIGEMINAL NERVE

Division of trigeminal nerve involvement	**Cryosurgery**	**Neurectomy**
Mandibular division	29(72.5%)	27(67.5%)
Maxillary division	11(27.5%)	13(32.5%)
Branches Involvement		
Mental nerve	21(52.5%)	17(42.5%)
Lingual nerve	3(7.5%)	2(5%)
Long buccal nerve	2(5%)	1(2.5%)
Inferior alveolar nerve	3(7.5%)	7(17.5%)
Infra orbital nerve	11(27.5%)	11(27.5%)
Nasopalatine nerve	0	2(5%)

TABLE 3: RESTORATION OF SENSORY SENSATION

Restoration of sensory sensations	Cryosurgery	Neurectomy
Present	14 (35%)	5 (12.5%)
Absent	26 (65%)	35 (87.5%)
P Value	0.018	

These details are given in table I.

Patients treated with cryosurgery, right side of face was involved in 28(70%) cases while left side in 12(30%) cases and patients treated with neurectomy, right side of face was involved in 22(55%) cases while left side was involved in 18(45%) cases. The total 80 cases were treated in which right side of the face was involved in 50(62.5%) cases, while left side was involved in 30(37.5%) cases.

Patients treated with cryosurgery, the most common division of trigeminal nerve was the mandibular division in 29(72.5%) case followed by maxillary division involved in 11(27.5%) cases of all the patients. Among the branches of mandibular division, mental nerve was involved in 21(52.5%) cases while among the branches of maxillary division, infra orbital nerve was involved in 11(27.5%) cases.

Patients treated with neurectomy, the most common division of trigeminal nerve was the mandibular division in 27(67.5%) cases followed by maxillary division involved in 13(32.5%) cases. Among the branches of mandibular division, mental nerve was involved in 17(42.5%) cases while among the branches of maxillary division, infra orbital nerve was involved in 11(27.5%) cases. These details are given in table 2.

When patients were evaluated for outcome variable treated with neurectomy only in 5(12.5%) patients sensory sensations were recovered in 2 months follow up period while in the rest of the 35(87.5%) patients there was no recovery of sensory sensations in 2 months follow up. Similarly patients treated with cryosurgery, sensory sensations were recovered in 14(35%) patients in 2 months follow up period while in rest of 26(65%) patients there was no recovery of sensory sensations in 2 months follow up period. These stats are given in table 3.

DISCUSSION

Trigeminal neuralgia is unique chronic pain syndromes for its symptomatology and high frequency with which it responds to anticonvulsant medication, particularly carbamazepine.[11] The exact cause and the pathology of the trigeminal neuralgia is still controversial. No point is saved in the trigeminal pathway in which a lesion has not been described. Mechanical factors like tentorial ossification [12], vascular compression by the superior cerebellar [13], anterior inferior cerebellar and basilar artery and arteriovenous malformation of the cerebellopontine angle are considered as possible causes.

In this study mean age of patients was 56.5 ± 8 years with age range of 36-71 years similar study by Zakrzewska et al[14] mean age of the patients was 54 years with range of 18-76 years.

Compared to this study Shah et al[15], found right side of face was involved in 32 patients (64%) and left side in 18 patients (36%). Warraich[16] study also showed that right side was involved in 60 cases (66.67%) and left side was involved in 30 cases (33.33%). Present study also confirmed the findings of Zakrzewska[14] that right side is more commonly involved.

In a study conducted by Shah[15], described involvement of mandibular division in 30 cases (60%) followed by the maxillary division in 17 cases (34%) and also involvement of ophthalmic division in 3 cases (6%). However in present study there was no involvement of ophthalmic division.

The present study, mental nerve was involved in 21 cases (52.5%) among the mandibular division branches while infra orbital nerve was involved in 11 cases (27.5%) among the maxillary division branches in patients treated with cryosurgery and mental nerve was involved in 17 cases (42.5%) among the mandibular division branches and infra orbital nerve was involved in 11 cases (27.5%) among the maxillary division branchesin patients treated with neurectomy.

Compared with current study, Zakrzewska[14] study on 29 patients showed that after cryosurgery all the patients regained the sensory sensations within 2-3 months.

Compared with this study, Warraich[16] study showed complete recovery of sensory sensations treated with cryosurgery in 25 cases (54.34%) while in 8 cases(18.2%) treated with neurectomy , there was complete recovery of sensory sensations . The cases treated with cryosurgery with complete recovery of sensory sensations were 14 patients (35%) while those treated with neurectomy with complete recovery of sensory sensations were 5 cases (12.5%).

In another study conducted by Quinn[17] reported 70% cases about pain relief after neurectomies. In another study by Khanna and Galinde[18] reported 75% success rate after Neurectomy but outcome was assessed after 12 months follow up.

In a study conducted by Goss[19] reported that cryo-

surgery is a minimal invasive procedure which give high efficacy of trigeminal nerve recovery.

CONCLUSION

This study revealed that cryosurgery was significantly more effective as compared to neurectomy in the management of trigeminal neuralgia in term of restoration of sensory sensations.

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4 Sohail Fareed:	Final approval of version.