Original Article

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Effectiveness of Percutaneous Radiofrequency Rhizotomy for Typical Trigeminal Neuralgia (TGN) (Single institutional study of 120 cases)

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ABSTRACT

Objective: The objective of the study was to determine the effectiveness of radiofrequency rhizotomy (RFR) after failure of medical treatment. **Study Design:** Prospective, non-randomized experimental study. **Settings:** Department of neurosurgery unit 3 PINS Lahore General Hospital Lahore-Pakistan. **Duration:** 2 Years with 6 months follow up. **Methodology:** It involved 120 cases of both genders between 41 to 65 year of age with diagnosis of TGN according to operational definition. All the patients were assessed clinically and radiologically pre operatively and followed post operatively. **Results:** Out of 120 patients included in this study,34 (28.3%) were males and 86 (71.6%) were females. Most of the patients were aged between 55 to 60 years (43.3%) with mean age 55.86 years. The duration of pain ranged from 6 months to 9 years with a mean of 2.4 years. The pain relief was observed in 97% of cases in 6 months follow up. **Conclusion:** Radio Frequency Rhizotomy is an extremely effective, safe and minimal invasive treatment modality for TGN.

Keywords: RFR, TGN, MVD, Atypical Pain

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INTRODUCTION

Typical TGN is a debilitating condition characterized by paroxysmal attacks of severe electric shock like pain in the distribution of trigeminal nerve that is triggered by non- noxious stimuli.[1] This pain has a considerable impact on quality of life, and is the most frequent type of facial pain.[2] The incidence of TGN is estimated at 10 per 100,000 person- years, with the mean of age at diagnosis 51.5 years. TGN is uncommon in population younger than 40 years (incidence is 0.2/100,000/per year). and increases in incidence with advancing age, older than 80 years (incidence is 25.9/100,000/per year). Womens are affected more than men in a ratio approximate 2.5:1.[3] Bilateral may be seen in 5% of classical cases with positive family history.[4] Drugs remain the first line of treatment in the management of TGN and provides significant relief of symptoms.[5] Medical treatment remains effective at least in the initial stage but for unknown reasons however it becomes ineffective after a few years. Surgery then becomes only available therapeutic option to treat TGN. About half of the patients eventually require alternative procedure for pain relief.[6] Surgical options available for the treatment of TGN are RFR, MVD, glycerol rhizotomy and balloon compression. This procedure is done under local anesthesia with i/v sedation. Straight needle is used to make lesion for V2 branch and curved Tew needle is supposed to better confirms anatomically to v1 when curved is directed forward and for v3 when curved is directed backward.

RFR is currently used in Pakistan. Various international studies have shown that it is more effective, less costly with minimal complication rate as compared with other surgical interventions. So current study will help to assess the outcome of RFR in Pakistan against the standard outcome achieved elsewhere.

Objective: The objective of the study was to assess the efficacy of RFR for typical TGN in term complete pain relief after failure of medical treatment.

Operational Definition:

The international headache society defined the clinical criteria for TGN.[7]

Diagnosis. This includes

(i) At least three attacks of unilateral facial pain.
(ii) Pain with at least three of the following characteristics.
  (a) Recurring paroxysmal attacks lasting for fraction of seconds to minutes.
  (b) Severe in intensity
  (c) Electric shock like
  (d) Precipitated by innocuous stimuli to the affected side of face.
(iii) Occurring in one or more divisions of TGN with no radiation beyond the trigeminal distribution.
(iv) Lack of evident neurological deficit.

Effectiveness:

It was defined in terms of complete pain relief. Pain relief was labeled if there is not even a single episode of TGN in six months follow up period.

METHODOLOGY

Study Design: Non-randomized, prospective experimental study.

Settings: The research was conducted at Department of Neurosurgery of Lahore General Hospital, Lahore-Pakistan.

Duration: Duration of study was 2 years.

Sampling Technique: It is a descriptive case series.

Inclusion Criteria: Either sex, Age 35-75, Patients with history of typical TGN according to operational definition, Patients with TGN refractory to medical treatment and patients with recurrent TGN after MVD.

Exclusion Criteria: Patients having well response to medical treatment and patients having atypical facial pain and secondary TGN.

Data Analysis: Total 120 patients of typical TGN those fulfill the inclusion criteria were enrolled. Written informed consent was taken. Pros and cons of the procedure were explained to the patient.

Methods: Demographic information i.e. name, age, sex and outcome measures like complete pain relief and efficacy were used. All the patients underwent minimal invasive RFR under light i/v anesthesia. Curved electrode for V1 and V3 and straight electrode is used for V2 territory. RFR needle is passed 2.5cm lateral to the angle of month directed towards mid- pupillary point and introduced through foramen oval under image intensifier and lesion is made after confirmation via stimulation. Patients were followed for six months to assess the effectiveness in term of complete pain relief. Age group, sex was treated as effect modifier and data was satisfied subsequently. All the collected data was entered to SPSS version 17. Numerical variable, age, duration of pain and distribution of pain has been presented by mean +-SD. Categorical variable i.e. gender and complete pain relief at 6 months have been presented by frequency and percentage. Data has been satisfied for age, gender, duration of pain and distribution of pain to address effect modifiers.

RESULTS

Out of 120 patients included in this study 34 (28.4 %) were male and 86(71.6%) were females.

Table 1: Gender distribution

Male	Female
34 (28.4 %)	86 (71%)

Table 2: Percentage of pain in age distribution

Age	No. of Patient (%)
41-45	4 (3%)
46-50	14 (12%)
51-55	28 (23%)
56-60	52 (44%)
61-65	22 (18%)

The most of the patients were aged between 56-60 years (44 %) with mean age 57.56 years, 51 to 55 years (23%) with mean 53.14 years, 61 to 65 years (18%) with mean 62.54 years. While the minimum number of patients aged between 41-45 years (3%) with mean 43 years. The duration of pain ranged from 6 months to 9 years with mean of 2.4 years. The distribution of pain observed maximum in V2.V3 division (55%), V3 division (17%), V2 division (13%) and minimal in V1 division (5%).

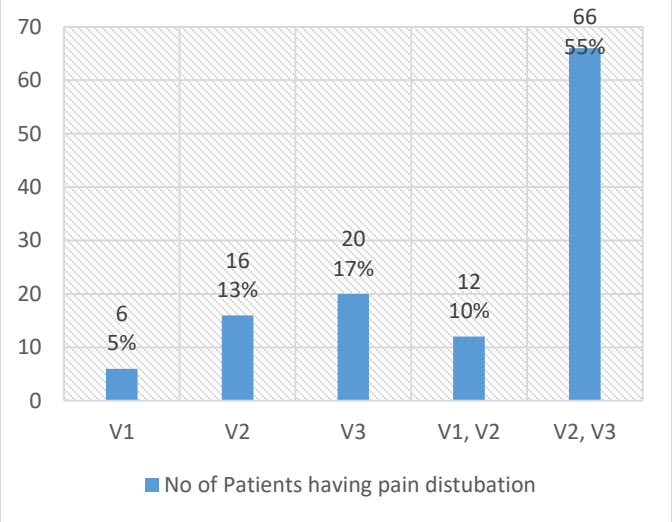

Figure 1: Pain relief was observed in 95% of cases in 6 months follow up period

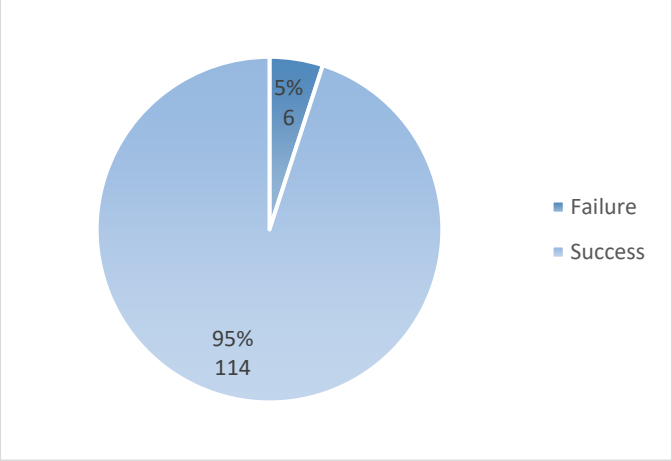

Figure 2: Success rate

DISCUSSION

TGN is a disease clinically characterized by paroxysmal attacks of lancinating pain in the distribution of TGN that is triggered by non- noxious stimuli. The prevalence of TGN in general population is 0.015%.[8] It has been recently shown that TGN is the most frequent type of facial pain[2] and that among of facial pain of syndromes, the incidence of TGN is 12 per 100000-person year. TGN is uncommon in population younger than 40 years with incidence of 0.2/100,000 per year and incidence is increases with advancing age older than 80 years occurred in 25.9/100,000. Females are affected more than males in ratio of

approximately 2.5:1.[3] Patients with bilateral TGN often have a positive family history.[4]

In patients affected by Multiple Sclerosis, prevalence is high. The exact etiology of TGN is unknown, however in a relatively small portion of patients with clinically established TGN, even the most advanced diagnostic investigation fails to shows cause called idiopathic TGN,[9-10] and can be differentiated from secondary TGN due to lesion in CP angle in which patients have pain with neurological deficit.

According to the recent EFNS guideline, drugs remain the first line of treatment for TGN and provides significant relief of symptoms. If the disease becomes medically refractory, there are several surgical options like MVD. Minimal invasive percutaneous lesioning of TGN, such as RFR glycerol Rhizotomy and balloon compression.[11-13]

The surgical outcome of CT-guided trigeminal rhizotomy using Tew needle came out good in 67 of the 79 (80%) pts with more than 90 to 95% pain relief .[14]

While another review study, it has been concluded that RFR allows for somatotropic nerve mapping, selective division lesioning and provide pain relief in up to 97% of patients.[14]

RFR is currently used in Pakistan international studies have shown that it is less costly with minimal complication rate as compared with other surgical interventions but no study has ever been undertaken in Pakistan to shows its efficacy.

While in our study the distribution of pain observed maximum in V2-V3 division (55%), V3 division (17%), V2 division (13%) and minimal in V1 division (5%). Pain relief was observed in 95% of cases in 6 months follow up period.

CONFLICT OF INTREST

There is no conflict of interest in this study.

CONCLUSION

RFR is an extremely effective, safe and minimal invasive treatment modality for TGN.

REFERENCES

1. Li Y, Mao F, Cheng F, Peng C, Guo D, Wang B. A Meta-Analysis of Endoscopic Microvascular Decompression versus Microscopic Microvascular Decompression for the Treatment for Cranial Nerve Syndrome Caused by Vascular Compression. World Neurosurg. 2019;126:647-55.
2. Gornitsky M, Elsaraj SM, Canie O, Mohit S, Velly AM, Schipper HM. (2019) Greater palatine block for V2 trigeminal neuralgia: Case report. Spec Care Dentist. 2019;39(2):208-13.
3. Jafree DJ, Zakrzewska JM. Long-term pain relief at five years after medical, repeat surgical procedures or no management for recurrence of trigeminal neuralgia after microvascular decompression: analysis of a historical cohort. Br J Neurosurg. 2019;33(1):31-6.
4. Ravina K, Strickland BA, Rennert RC, Bakhsheshian J, Russin JJ, Giannotta SL. Revision Microvascular Decompression for Trigeminal Neuralgia and Hemifacial Spasm: Factors Associated with Surgical Failure. J Neurol Surg B Skull Base. 2019;80(1):31-9.
5. Yuvaraj V, Krishnan B, Therese BA, Balaji TS. (2018) Efficacy of Neurectomy of Peripheral Branches of the Trigeminal Nerve in Trigeminal Neuralgia: A Critical Review of the Literature. J Maxillofac Oral Surg. 2019;18(1):15-22.
6. Shah RJ, Padalia D. Sphenopalatine Ganglion Radiofrequency Thermocoagulation. Stat Pearls. Treasure Island (FL); 2019. https://www.ncbi.nlm.nih.gov/pubmed/30725629
7. Eller JL, Raslan AM, Burchiel KJ. Trigeminal neuralgia: definition and classification. Neurosurg Focus. 2005;18(5):E3.
8. Yadav YR, Nishtha Y, Sonjjay P, Vijay P, Shailendra R, Yatin K. Trigeminal Neuralgia. Asian J Neurosurg. 2017;12(4):585-97.
9. Antonini G, Di Pasquale A, Cruccu G, Truini A, Morino S, Saltelli G, et al. Magnetic resonance imaging contribution for diagnosing symptomatic neurovascular contact in classical trigeminal neuralgia: a blinded case-control study and meta-analysis. Pain. 2014;155(8):1464-71.
10. Bayat A, Burbelo PD, Browne SK, Quinlivan M, Martinez B, Holland SM, et al. Anti-cytokine autoantibodies in postherpetic neuralgia. J Transl Med. 2015;13:333.
11. Johnson RW, Rice AS. Clinical practice. Postherpetic neuralgia. N Engl J Med. 2014;371(16):1526-33.
12. Mallick-Searle T, Snodgrass B, Brant JM. Postherpetic neuralgia: epidemiology, pathophysiology, and pain management pharmacology. J Multidiscip Healthc. 2016;9:447-454.
13. Z. H. Bajwa, C. C. Ho, and S. A. Khan, Trigeminal neuralgia - UpToDate. UpToDate, 2016.
14. Cheng JS, Lim DA, Chang EF, Barbaro NM. A Review of Percutaneous Treatments for Trigeminal Neuralgia. Neurosurgery. 2013;23:209-15.

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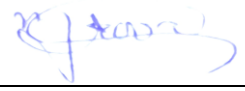
Dr. Muhammad Farooq Senior Registrar, Neurosurgery Lahore General Hospital, Lahore	Manuscript Writing	
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