DOI: https://doi.org/10.53350/pjmhs211593083

ORIGINAL ARTICLE

Outcomes of Microvascular Decompression in Patients with Trigeminal Neuralagia

NAEEM UL HAQ[1], ANWAR SHAH[2], SHAFAAT HUSSAIN[3], MOHAMMAD MUSHTAQ[4], FAIZA SHAFQAT[5], ROOMISA ANIS[6]
[1]*Assistant Professor Neurosurgery, Bacha khan Medical College Mardan Medical Complex, Mardan*
[2]*Associate Professor Neurosurgery, Khalifa Gul Nawaz Hospital, Bannu*
[3]*District Neurosurgeon, DHQ Teaching Hospital KDA, Kohat*
[4]*Assistant Professor Neurosurgery, Frontier Medical and Dental College, Abbottabad*
[5]*Senior Demonstrator Anatomy Department, Shifa College of Medicine, Islamabad*
[6]*Assistant Professor Biochemistry, Al Nafees Medical College, Islamabad*
Corresponding author: Shafaat Hussain, Email: shafaathussain213@gmail.com, Cell: 0335 5081768

ABSTRACT

Objective: To determine the treatment outcomes of microvascular decompression in patients with trigeminal neuralagia.

Study Design: Prospective/Observational

Place and Duration: The study was conducted at Neurosurgery department Bacha Khan Medical College/ Mardan Medical Complex, Mardan and Al Nafees Medical College, Islamabad for duration of six months i.e from July 2020 December 2020.

Methods: Thirty four patients of both genders presented with trigeminal neuralagia were enrolled in this study. Patient's detailed demographics were recorded after taking written consent. All patients underwent microvascular decompression. Outcomes were assessed by using Borrow Neurological Institute Pain score (BNIP). Follow-up was taken at 5th post-operative day. Data was analyzed by SPSS 24.0.

Results: Mean age of patients was 54.26±9.78 years. There were 20 (58.82%) were females while 14 (41.17%) were males. Postoperatively 17 (50%) patients had BNIP score 1-2 with no medication required, 12 (35.29%) patients had partial recovery with BNIP score 3 and 5 (14.71%) patients showed no recovery with BNIP score 4.

Conclusion: Microvascular decompression is safe and effective treatment procedure for trigeminal neuralagia with fewer rate of complications.

Keywords: Trigeminal Neuralagia, Microvascular Decompression (MVD), Effectiveness

INTRODUCTION

Shock-like, knife-cutting, and tear-like pain in the distribution area of the cranial nerve V on the face and head is known as Trigeminal Neuralagia, and it is one of the most severe clinical conditions. Involuntary movements of facial muscles, such as those triggered by talking, smiling, or chewing can cause the pain, as can a random tap on the face. It is common for bursts to last from a few seconds to a few minutes. During remission, patients are able to carry out their daily routines. Attacks are becoming more frequent with shorter intervals as the disease progresses [1].

The agony is becoming more intense, which can lead to a mental problem or a suicide. Fortunately, TN is extremely rare, occurring in about 8 people out of every 10,000 people throughout the course of their lifetime. Fewer than 0.7 percent of the population has ever been diagnosed with cancer in their lifetime. There is a chance this number is overestimated, as many patients have been misdiagnosed with dental problems at the outset and have had unneeded procedures. [3] Giorgio Cruccu's classification of TN can be broken down into three categories: primary (idiopathic), typical (typical), and secondary (secondary). Patients with TN were initially treated with medicines like carbamazepine or oxcarbazepine and other psychotropic drugs to control or alleviate pain, but approximately 30%–75% had unsatisfactory therapeutic pain-relief effects or side effects after a long-term medication, and thus had to undergo surgery, which carries an increased risk of complications. Until date, there hasn't been a single mechanism that explains the TN pathogenesis. "compression-short circuit theory," on the other hand, was widely accepted by academics. When the naked axons of the trigeminal nerve enter the pons, short-circuits occur between the pain fibres and non-pain fibres, as well as between afferent fibres. This causes demyelination of the trigeminal nerve, which can lead to pain and non-pain fibres being short-circuited together, as well as demyelination of the peripheral nerve. First-choice functional neurosurgery for primary TN treatment is MVD, which involves separating the compressed nerve and the offending vessel and pouring Teflon between them [10,11]. Patients with trigeminal neuralgia who underwent microvascular decompression were the focus of this investigation.

MATERIALS AND METHODS

This prospective/observational study was conducted at Neurosurgery department Bacha Khan Medical College/ Mardan Medical Complex, Mardan and Al Nafees Medical College, Islamabad for duration of six months i.e from July 2020 December 2020. In this study, a total of 34 individuals, both males and females, who had been diagnosed with idiopathic trigeminal neuralagia were included. Patients' full demographic information, including age, gender, body mass index (BMI), and symptoms duration, was collected after they gave written consent to participate in the study. In this study, patients with brain tumours, patients with traumatic brain damage, and those who did not provide informed consent were eliminated.

Borrow Neurological Institute for pre- and post-operative care. The severity of the pain was measured.

Prior to surgery, all patients got a brain CT scan and an MRI scan to assess their neurological condition. Microvascular decompression was administered to all of the patients. The asterion is identified after a small straight (3-5 cm) entry point is provided 1 cm beyond the mastoid depression and the asterion is analysed until it is identified. In this case, a little (2x3cm) retromastoid craniectomy is completed, revealing the intersection of the sigmoid and transverse sinuses. The dura is opened in the shape of a "Y" and anchored to the borders of the injury. The cerebellum is allowed to slip back due to the release of cerebrospinal fluid. The boundary between the tentorium and the petrous bone is followed until the trigeminal nerve can be identified from the other nerves. The arachnoid analyzation is performed firmly around the trigeminal nerve from the pons to the Meckel's cavern in order to diagnose the condition. In more than 90 percent of cases, the responsible vessel is discovered. It is necessary to firmly dismember every single guilty vessel in order to completely free the nerves from the conflict.

The treatment outcomes were evaluated based on the BNIP score obtained on the fifth post-operative day. Complications such as CSF leak, wound infection, hearing loss, and death, among others, were investigated. Postoperatively, the satisfaction of the patients was also assessed. SPSS 24.0 was used to analyse all of the data. The mean and standard deviation were calculated. A table was created to record the frequency and percentages of each event.

RESULTS

Mean age of patients was 54.26±9.78 years. There were 20 (58.82%) were females while 14 (41.17%) were males. Mean body mass index (BMI) was 25.34±3.18 kg/m^2. 19 (55.88%) patients had right side involved and 15 (44.12%) had left side. Mean duration of symptoms was 2.98±1.16 years. (Table 1)

Table No 1: Baseline Details of all the patients

variables	Frequency No.	Percentage
Mean age (yrs)	54.26±9.78	-
Mean BMI (kg/m^2)	25.34±3.18	-
Disease Duration (Years)	2.98±1.16	-
Gender		
Female	20	58.82
Male	14	41.17
Involved Side		
Left	15	44.12
Right	19	55.88

Preoperatively, 21 (61.76%) had BNIP score 4 and 13 (38.24%) had BNIP score 5. (Figure 1)

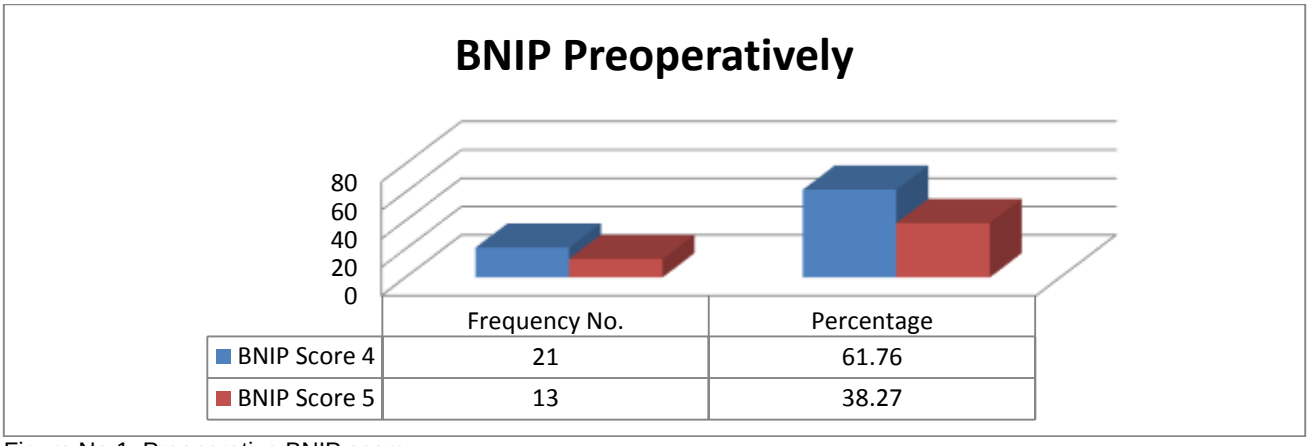

Figure No 1: Preoperative BNIP score

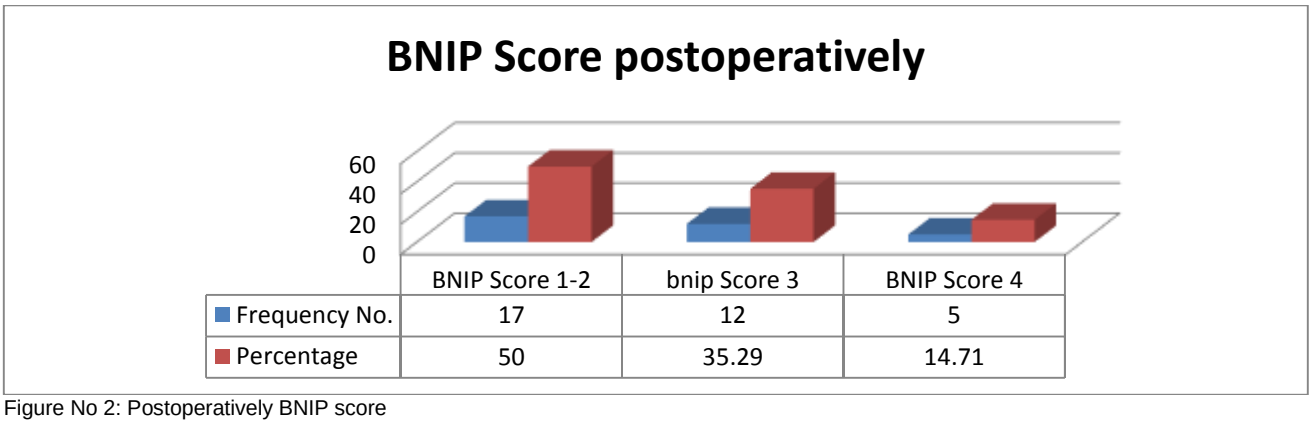

Figure No 2: Postoperatively BNIP score

Postoperatively 17 (50%) patients had BNIP score 1-2 (complete recovery) with no medication required, 12 (35.29%) patients had partial recovery with BNIP score 3 and 5 (14.71%) patients showed BNIP score 4 (no recovery). (Figure 2)

According to postoperative complications, 3 (8.82%) patients had CSF leak, 2 (5.88%) patients had wound infection, 1 (2.94%) had hearing loss and 28 (82.35%) patients had no complications. (Table No 2)

Table No 2: Postoperative complications among all the patients

Variables	Frequency No.	Percentage
No Complication	28	82.35
CSF Leak	3	8.82
Wound infection	2	5.88
Hearing Loss	1	2.94

DISCUSSION

Trigeminal neuralagia is one of the most painful neurological illnesses, and it is one of the most common. The current study was undertaken with the goal of examining the treatment outcomes of microvascular decompression in individuals who had been diagnosed with trigeminal neuralagia (trigeminal nerve pain). Approximately 40 individuals underwent microvascular decompression in this setting. The majority of patients (59 percent) were girls, while the remaining 41 percent were males, with a mean age of 54.269.78 years (ranges 32 to 65 years). These findings were consistent with many prior studies in which the proportion of female patients was higher (60 to 75 percent) than the proportion of male patients, and the majority of patients were over the age of 50 [12-13].

The current study found that the average duration of symptoms was 2.981.16 years. BNIP score 4 was achieved by 21 patients (61.76 percent) and BNIP score 5 was achieved by 13 patients (38.24 percent) prior to surgery. At the time of the study, 56 percent of patients had BNIP score 4, and 744 percent had BNIP score 5 according to Ihsanullah et al. [14].

Following surgery, we discovered that 17 patients (50 percent) had BNIP scores 1-2 (complete recovery) with no medication required, 12 patients (35.29 percent) had partial recovery with BNIP scores 3 and 5, or 14.71 percent, of the patients had BNIP scores 4 (partial recovery with medication required) (no recovery). According to a study conducted by Wang X et al [15], 19 patients (83 percent) indicated that they were pain-free after surgery. The use of BNI II–III provided transitory partial pain alleviation in four patients, and three of them (13 percent) were fully pain-free within three months of starting treatment.

According to the findings of another study conducted by Adela Wu et al [16] on the outcomes of MVD for trigeminal neuralagia, 91.8 percent of patients reported pain alleviation after MVD, while 8.2 percent of patients experienced no pain relief. A large number of prior studies proved that the MVD technique resulted in considerable pain reduction [17-18]. Rao GB and colleagues [19] found that 65 percent of patients experienced rapid postoperative pain relief, 15 percent experienced delayed pain relief, and 20 percent experienced no pain relief following MVD.

In the current study, we discovered that three patients (8.82 percent) had CSF leak, two patients (5.88 percent) had wound infection, one patient (2.94 percent) had hearing loss, and 28 patients (82.35 percent) had no problems. It was shown that the most common problems linked with microvascular decompression were CSF leak, hearing loss, and wound infection, which were all reported in earlier research [20-21].

According to the findings of this study, 80 percent of patients were satisfied with the surgery. An investigation by Sarsam Z et al [22] found that 84 percent of patients were satisfied with the MVD method for the treatment of trigeminal neuralagia after undergoing the surgery.

CONCLUSION

In neurological settings, Trigeminal Neuralagia is one of the most deteriorated conditions. Our findings indicate that microvascular decompression is a safe and effective therapy option for trigeminal neuralagia, with a lower rate of complications and patient dissatisfaction than other available treatments. We discovered that, on average, 90 percent of patients experienced pain reduction with MVD.

REFERENCES

1. Zakrzewska JM, Linskey ME. Trigeminal neuralgia. BMJ 2015; 350: 1238.
2. Zakrzewska JM, Linskey ME. Trigeminal neuralgia. BMJ Clin Evid 2014; 2014.
3. Cruccu G, Finnerup NB, Jensen TS. Trigeminal neuralgia: New classification and diagnostic grading for practice and research. Neurology 2016; 87: 220-228.
4. Jensen TS. Selective sodium channel blockers in trigeminal neuralgia. Lancet Neurol 2017; 16: 255-256.
5. Zakrzewska JM, Palmer J, Morisset V. Safety and efficacy of a Nav1.7 selective sodium channel blocker in patients with trigeminal neuralgia: a double-blind, placebo-controlled, randomised withdrawal phase 2a trial. Lancet Neurol 2017; 16: 291-300.
6. Love S, Gradidge T, Coakham HB. Trigeminal neuralgia due to multiple sclerosis: ultrastructural findings in trigeminal rhizotomy specimens. Neuropathol Appl Neurobiol 2001; 27: 238-244.
7. Li ST, Pan Q, Liu N, Shen F, Liu Z, Guan Y. Trigeminal neuralgia: what are the important factors for good operative outcomes with microvascular decompression. Surg Neurol 2004; 62: 400–4.
8. Li ST, Wang X, Pan Q, Hai J, Liu N, Shen F, et al. Studies on the operative outcomes and mechanisms of microvascular decompression in treating typical and atypical trigeminal neuralgia. Clin J Pain 2005; 21: 311–6.
9. R Jannetta PJ, Abbasy M, Maroon JC, Ramos FM, Albin MS. Etiology and definitive microsurgical treatment of hemifacial spasm: Operative techniques and results in 47 patients. J Neurosurg. 1977;47:321-8.
10. Merrison AF, Fuller G. Treatment options for trigeminal neuralgia. BMJ 2003; 327: 1360-1361.
11. Gerganov VM, Giordano M, Elolf E. Operative management of patients with radiosurgery-related trigeminal neuralgia: analysis of the surgical morbidity and pain outcome. Clin Neurol Neurosurg 2014; 122: 23-28.
12. Xia L, Zhong J, Zhu J. Effectiveness and safety of microvascular decompression surgery for treatment of trigeminal neuralgia: a systematic review. J Craniofac Surg 2014; 25: 1413-1417.
13. Barker FG, Jannetta PJ, Bissonette DJ, Larkins MV, Jho HD. The longterm outcome of microvascular decompression for trigeminal neuralgia. N Engl J Med. 1996; 334 (17): 1077-83.
14. Ihsanullah, Khalid Khanzada, Musafir Alam, Hameedullah. Functional outcome of Microvascular Decompression for Trigeminal Neuralgia (TN). Pak. J. of Neurol. Surg. – Vol. 23, No. 2, Apr. – Jun., 2019.

15. Wang, X., Wang, H., Chen, S. et al. The long-term clinical outcomes of microvascular decompression for treatment of trigeminal neuralgia compressed by the vertebra-basilar artery: a case series review. BMC Neurol 19, 217 (2019). https://doi.org/10.1186/s12883-019-1450-z.
16. Wu, Adela; Doshi, Tina; Hung, Alice; Garzon-Muvdi, Tomas; Bender, Matthew T; Bettegowda, Chetan; Lim, Michael. Immediate and Long-Term Outcomes of Microvascular Decompression for Mixed Trigeminal Neuralgia. World Neurosurg (2018). 300-e307.
17. Sharma R, Phalak M, Katiyar V, Borkar S, Kale SS, Mahapatra AK. Microvascular decompression versus stereotactic radiosurgery as primary treatment modality for trigeminal neuralgia: A systematic review and meta-analysis of prospective comparative trials. Neurol India 2018;66:688-94.
18. Li Y, Yang L, Ni J, Dou Z. Microvascular decompression and radiofrequency for the treatment of trigeminal neuralgia: a meta-analysis. J Pain Res. 2019;12:1937-1945 https://doi.org/10.2147/JPR.S203141
19. RAO, Godugu Bhaskar et al. Clinical outcome following micro-vascular decompression for trigeminal neuralgia. International Journal of Research in Medical Sciences, [S.l.], v. 3, n. 7, p. 1741-1744, jan. 2017. ISSN 2320-6012. Available at: <https://www.msjonline.org/index.php/ijrms/article/view/1588>. Date accessed: 21 apr. 2020. doi:http://dx.doi.org/10.18203/2320-6012.ijrms20150262.
20. Bohman LE, Pierce J, Stephen JH, Sandhu S, Lee JY. Fully endoscopic microvascular decompression for trigeminal neuralgia: technique review and early outcomes. Neurosurg Focus, 2014; 37 (4): E18.
21. Régis J, Tuleasca C, Resseguier N, Carron R, Donnet A, Yomo S, et al. The very long-term outcome of radiosurgery for classical trigeminal neuralgia. Stereotact Funct Neurosurg. 2016; 94 (1): 24-32.
22. Sarsam Z, Garcia-Fiñana M, Nurmikko TJ, Varma TR, Eldridge P. The long-term outcome of microvascular decompression for trigeminal neuralgia. Br J Neurosurg. 2010; 24 (1): 18-25.