

# TRIGEMINAL NERVE COMPRESSION TECHNIQUE FOR THE TREATMENT OF TRIGEMINAL NEURALGIA: STUDY OF 80 CASES IN 10 YEARS

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## ABSTRACT

**Objective:** To determine the outcome of trigeminal nerve compression technique (TGNC) treatment for the idiopathic trigeminal neuralgia without decompressing the nerve compressed by the offending vessel.

**Methodology:** This case series study was conducted in Hayatabad medical complex, Lady ready hospital and Abaseen hospital, Peshawar from June 2004 to June 2014. Consent from the ethical committee and patients were taken. All patients of idiopathic trigeminal neuralgia (TGN) were included. Those TGN cases having mass lesion were excluded. All information were put in proforma. Results were analyzed by SPSS version 20 and presented in the form of tables.

**Results:** Total number of patients included in the study were 80 in which males were 45(56.25%) and females were 35 (43.75 %). Male to female ratio of 1.3:1 The ages ranged from 30 to 70 years and mean age was 50 ±20. Detail history and clinical examination were performed. Routine investigations of complete blood count, HBsAg, HCV and brain MRI were done in all cases. Follow up ranged from 1 to 10 years. Outcome was 77(96.2 %) patients were completely pain free while 3(3.8%) of patients developed recurrence. One patient (1.25%) developed CSF rhinorrhea, otorrhea, facial nerve paresis and deafness each.

**Conclusion:** The compression of TN by vascular loop was not found as a cause of TGN. TGNC Technique for TGN is less invasive, safe and effective.

**Key Words:** Trigeminal Neuralgia, Trigeminal Nerve Compression Technique

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## INTRODUCTION

Trigeminal neuralgia is a painful condition of the face in which the patient experience sudden, severe, shock-like paroxysmal, short duration pain distributed in one or more branches of TN<sup>1,2</sup>. Galen and Hippocrates called it cephalalgias. In 1756 Andre named it Tic Douloureux. Jhon Hunter described it the disease of nervous system in which pain is referred to the teeth, gums and tongue where there is actually no disease<sup>3,4</sup>. Trigeminal neuralgia is treated by both pharmacological and surgical methods. The drugs of choice are Carbamazepine and Gabapentine. Patients refractory to the medical treatment are subjected to various surgical procedures, which includes neurectomy of TN, glycerol block, radiofrequency rhizotomy, trigeminal ganglion compression and Gamma Knife surgery. The Microvascular Decompression (MVD) was first reported by Gardner in 1962 and Peter Jannetta in 1967<sup>5,6</sup>. In 2013 compression of intracisternal part of TN by bipolar forcep was carried out in those cases in which offending vessel was not found<sup>7,8</sup>.

In our study of TGNC technique intracisternal part of TN was compressed with bayonet forcep without manipulating the offending vessel which was there and compressing the TN.

## METHODOLOGY

This case series study was conducted in Hayatabad medical complex, Lady ready hospital and Abaseen hospital Peshawar from June 2004 to June 2014. Consent from the ethical committee and patients were taken. All patients of idiopathic trigeminal neuralgia (TGN) were included. Those TGN cases having mass lesion were excluded. Detail history and clinical examination were performed. Routine investigations and brain MRI were done in all cases. Follow up range from 1 to 10 years.

Standard approach for MVD was performed. Retromastoid vertical incision about 10cm long was given, 4x4 cm craniectomy was performed, dura opened, CSF drained and TN identified. Intracisternal part of TN was selected and gently compressed with bayonet forcep. The offending artery or vein were not repositioned and

in some cases arachnoid adhesions were present, which were not dissected. No Teflon or muscle piece used. Dura, muscles and skin were closed in layers.

All information were put in proforma. Results were analyzed by SPSS version 20 and presented in the form of tables.

## RESULTS

Total number of patients included in the study were 80 in which males were 45 (56.25%) and females were 35 (43.75%). Male to female ratio of 1.3:1. The ages ranges are shown in table 1. Outcome was 77(96.2 %) were completely pain free and 3(3.8%) patients developed recurrence. One patient (1.25%) developed CSF rhinorrhea, one otorrhea and facial nerve paresis and one patient deafness.

## DISCUSSION

Trigeminal neuralgia is extremely painful condition which involves the oral and facial region<sup>1,2</sup>. Different treatment modalities are available ranging from pharmacological therapies and ablative procedures. Microvascular decompression done either by open technique or endoscopically depending upon patient conditions and disease status<sup>3-5</sup>. Revuelta-Gutierrez et al in 2013 did compression of intracisternal part of TN by bipolar forcep in those cases in which offending vessel was not found for the treatment of TGN. They collected data of 44 patients in 10 years duration from the year 2000 to 2010 treated by this technique in which no offending vessel was found<sup>6,7,8</sup>. It is extremely impressive in terms of pain control, recurrence and post-operative morbidity and mortality. They showed that all patients were pain free after the procedure. There was 27% relapse in a mean time of 10 months, 83% of them were adequately controlled by the medical treatment and 17% needed a complementary procedure for pain relief. Partial loss

of facial sensitivity was 63% and significant complications were 6.7%. Furthermore, this technique was highly appreciated by other researchers in their commentary based articles<sup>9-11</sup>.

We performed the TGNC technique in all 80 cases irrespective of whether the nerve is compressed by an artery, vein or arachnoid adhesions. We did not decompress the nerve which was compressed by the offending vessel. So our study is different from Revuelta-Gutierrez et al<sup>8</sup> because they did compression of the TN nerve only in those cases where no offending vessel was found while in our study the offending vessel was present but was not repositioned by operative displacement. The male: female ratio is 1.3:1. Our study is different from international study where male: female ratio is 1:3. Our study shows that mainly young patients were affected. In 50% of cases the ages were from 30 -40 years and from 61-70y only 5 (6.3%) cases. The idiopathic TGN was present in 77 (96.2%) cases, post neurectomy were 2 patients and one case of multiple sclerosis had TGN. Temporary facial hypoesthesia occurred in 42(52.5%) cases. Post-operative follow up was 1- 10 years in which complete pain relief occurred in 77(96.25%) patients out of 80 patients and recurrence was noted in 3(3.75%) cases. Revuelta-Gutierrez et al<sup>8</sup> noted that initial pain relief was excellent in all 44(100%) patients but their recurrence rate was 12(27.2%) while the initial pain relief in case of MVD was noted in 211 (92.9%) out of 233 patients while the rate of recurrence was 14.8%( 32) which was much higher than the intracisternal compression of 5<sup>th</sup> nerve for trigeminal neuralgia<sup>12,13,14</sup>. This shows that this technique is more efficacious than MVD in terms of initial pain relief and recurrence of the pain. The efficacy of MVD in immediate pain relief ranges from 76.4% to 98.2% while its recurrence rate increases with increase in the post-operative duration. In international series the rate of recurrence has been mentioned in the range

**Table 1: Ages of the patients (n=80)**

Age of patients in years	Numbers	%
30-40	40	50.0
41-50	26	32.5
51-60	9	11.2
61-70	5	6.3
Total	80	100.0

**Table 2: Pain relief and its relapse rates (n=80)**

Pain	Number	%
Complete pain relief	77	96.2%
Relapse of pain	3	3.8%
Total	80	100.0

of 8.3 to 30 % based on different durations of post-operative follow-ups from 5 months to 120 months<sup>15,16</sup>.

The pulsatile compression of TN cause demyelination resulting in pain of TGN which is relived after surgery as myelination occurs<sup>12,15</sup>. In our view myelination is not possible within few hours as patient is pain free immediately after surgery in MVD, which proves that theory of demyelination and remyelination after MVD is not appealing.

Pain relief after MVD is not due to displacement of offending vessels, rather it is due to manipulation of TN during MVD procedure.

In our view vascular compression on fifth nerve is not the cause of TGN, either there is peripheral ectopic focus triggering pain or the TN is hypersensitive and slight stimulus of any kind is perceived as pain. In all the ablative procedures patients gets pain relief to various extent, which also proves that vascular compression is not the cause of TGN. There is no need of over investigating the patient looking for offending vascular loop. By compressing the TN pain impulse is interrupted and patient is pain free after surgery.

## CONCLUSION

The compression of TN by vascular loop is not the cause of TGN. TGNC Technique for TGN is less invasive, safe and effective. Further research is needed to know the exact pathophysiology and molecular base of the mechanism of TGN and relief of pain after TGNC procedure.

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## CONTRIBUTORS

AK conceived the idea, planned the study, and drafted the manuscript. AH helped acquisition of data and did statistical analysis. MI drafted the manuscript and critically revised the manuscript. All authors contributed significantly to the submitted manuscript.