

## ORIGINAL ARTICLE

# MANAGEMENT OF TRIGEMINAL NEURALGIA WITH PERIPHERAL GLYCEROL INJECTION: A CLINICAL STUDY

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### ABSTRACT:

Trigeminal Neuralgia is a painful condition of the oro-facial structures. Patients experience dull, aching, throbbing or burning, constant pain in the same distribution as the paroxysms. In this study we evaluated the effectiveness of peripheral glycerol injections for the management of trigeminal neuralgia. The study included sixty patients clinically diagnosed with trigeminal neuralgia. Out of sixty patients, 30 patients were treated with 1ml of peripheral glycerol injections in involved nerve and thirty patients (control) were given normal saline. All the patients (30) in the control group (normal saline) had no pain relief. 30 patients who were treated with 1ml of peripheral glycerol injections showed significant results. There were no significant complications reported after the glycerol injections.

Key words: Peripheral glycerol injections, trigeminal neuralgia, control.

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## INTRODUCTION

Trigeminal neuralgia (TN) is characterized by a sharp, current like, shooting, paroxysmal pain in the distribution of Trigeminal nerve.

Most commonly V2 (maxillary) and V3 (mandibular) branch of trigeminal nerve is involved. Right side is more often involved than the left.<sup>1</sup>

The incidence is highest in middle to old age. It is slightly more common in women. Cases have been reported in which the disease affects children and even infants.<sup>2</sup> Incidence of Trigeminal Neuralgia is 4 in 100,000. The exact etiology of Trigeminal Neuralgia is still unknown but most of the evidence centers around demyelination of the Trigeminal nerve due to compression of the nerve by blood vessels or tumors.<sup>1</sup> The diagnosis of TN is based primarily on history, characteristic of pain and trigger zone that are

consistent with specific, widely accepted research and clinical criteria for the diagnosis.<sup>3</sup>

Most clinicians still prefer drug therapy as the first line of management. Analgesics such as aspirin and ibuprofen are generally not effective against trigeminal neuralgia.<sup>4</sup> Carbamazepine being the drug of choice. Dilantin sodium and Baclofen alone or in combination with carbamazepine are also used. These medications were found to be initially effective for pain control in 90% of patients.<sup>5</sup> One must keep in mind that these drugs can cause side effects. This necessitates a regular patient monitoring and blood tests to ensure that the drug levels remain safe to minimize side effects. Surgical treatment modalities are usually sought either because of failure of medicinal treatment or if the patient experiences intolerable side effects of long-term medication.<sup>6</sup>

Different operative procedures for treating TN used are percutaneous ablative procedures, intracranial rhizotomy, peripheral rhizotomy, cryotherapy, posterior fossa decompression, electrofrequency thermocoagulation and peripheral neurectomy of branch of trigeminal nerve. Peripheral alcohol injection is minimally invasive treatment option and can play significant role in the management of trigeminal neuralgia.<sup>7</sup> They are particularly useful in those refractory to medical management and in those who are unable or unwilling to undergo neurosurgical treatment. The purpose of this study was to evaluate the outcomes of peripheral glycerol injection block for the management of trigeminal neuralgia.

**MATERIALS AND METHODS:**

The study included sixty patients who were clinically diagnosed with TN of Mandibular nerve were included in the study irrespective of age and sex.

The inclusion criteria were:

1. Patients resistant to medication or had significant side effects due to prolonged medicinal therapy.

The Exclusion criteria were:

1. Patients with history of surgical treatment.
2. Medically compromised patients.

The diagnosis was based on a detailed case history, clinical examination, diagnostic block Orthopantomograph (OPG) was performed for every patient to exclude local pathology. Patients were randomly distributed into 2 equal groups of 30 each. Injections containing 1ml glycerol 1 were administered to 30 patients in the study group. 30 Patients in the control group received normal saline injections. Standard intra-oral injection technique was used to administer local anesthesia (2% lidocaine with 1:100,000 adrenaline), followed by 1ml anhydrous glycerol or normal saline injection into the confirmed branch of trigeminal nerve.'

The relief of pain was graded on a 4-point scale (4).

0 :- No pain

1 :- Occasional pain; no medication required

2 :- Mild pain; controlled with minimal dose of medication (<=300mg Carbamazepine/day)

3 :- Moderate to severe pain; increase dose of medication required (>300mg Carbamazepine/day)

Patients were reviewed periodically after three months, six months, nine months and twelve months. Pain relief was evaluated after 1 month post treatment to determine the efficacy of alcohol injection in TN

patients. Other parameters like postoperative trismus, inflammatory reaction and alteration in pain were also considered.

Results obtained were tabulated and statistically analyzed.

**RESULTS:**

A total of sixty patients with trigeminal neuralgia of (V3) third division of trigeminal nerve were taken for this study. Out of 60 patients, glycerol injections were given in 30 patients while control group (30) received normal saline.

**Table I:** Distribution of patients according to age and gender

Age group	Male	Female
31-40	5	15
41-50	6	11
51-60	4	9
61-70	3	7
Total	18	42

Table I shows distribution of patients according to age and gender. Out of sixty patients, 42 were females and 18 were male patients. Age group 31-40 years shows maximum patients of TN.

**Table II:** Distribution of patients according to side

Total	Right	Left	Bilateral
60	38	20	2

Table II shows distribution of patients according to side. Out of 60 patients, 38 patients showed right side involvement, 20 left side and 2 patients showed bilateral involvement.

**Table III:** Patients response to treatment

Duration	No Pain	Occasional Pain	Mild Pain	Moderate to Severe
3 Months	20	3	3	4
6 Months	14	10	5	1
9 Months	7	12	6	5
12 Months	8	7	13	2

Table III shows patients response to treatment. In the study group, 20 patients had complete pain relief for 3 month duration, 3 had occasional pain during this period, 4 patients experienced no pain relief after the glycerol injection.

After six months, 14 patients had complete pain relief for 6 month duration, 10 had occasional pain during this period, 5 patients had mild pain, 1 experienced no pain relief.

7 had no pain, 12 had occasional pain, 6 had mild pain while 5 had no pain relief in 9 months period. 8 patients had no pain, 7 had occasional pain, 13 had mild pain while 2 had no pain relief in 12 months period.

**Table IV:** Sites of involvement

Nerve	Mental nerve	Inferior dental nerve	Long buccal nerve	Lingual nerve
%	60%	18%	10%	2%.

Table IV shows sites of involvement of mandibular nerve. Mental nerve was involved in 60%, inferior dental nerve in 18%, long buccal nerve in 10% and lingual nerve in 2% cases.

**DISCUSSION**

A painful experience being one that is not only unforgettable, but also produces changes within that individual’s psyche as regards future painful experiences. The alleviation of pain, therefore comprises one of the most important and satisfying duties of one engaged in the health services and particularly is true when one talks about pain as excruciating as trigeminal neuralgia.<sup>8</sup>

John Fothergill gave the first full and accurate description of trigeminal neuralgia in 1773, but early descriptions of trigeminal neuralgia (Fothergill’s disease) can be inferred from the writings of Galen, Aretaeus of Cappadocia (born circa AD 81), and in the 11th century by Avicenna (“tortura oris”).<sup>8</sup> Trigeminal neuralgia is unique among chronic pain syndromes for its dramatic and intense symptoms. There are many different opinions concerning trigeminal neuralgia etiology, however some of them are controversial and lack objective evidences. Currently, there are three most popular theories<sup>9</sup>. These are as endogenous and exogenous intoxication, temporomandibular joint pathology and high position of the petrous pyramid apex of the temporal bone.<sup>9</sup> In reality, for most patients with TN, there is no identifiable cause.

The definite cause of trigeminal neuralgia is still not determined therefore there is no treatment which will absolutely cure the patient. Trigeminal neuralgia re-

sponds well to anticonvulsant medication, particularly carbamazepine. Medical treatment becomes intolerable or refractory over a period of time in 50% of the patients.<sup>10</sup> Other invasive procedures that are useful in management of trigeminal neuralgia include peripheral neurectomy, cryotherapy, radiofrequency thermo-coagulation and microvasacular decompression of the trigeminal nerve root. All these procedures have potential adverse effects, and may not be suitable for all patients.<sup>11</sup>

Glycerol injection technique was introduced by Hakanson after a fortuitous discovery, during the development of a stereotactic technique for gamma radiation, that glycerol mixed with tantalum powder not only visualized trigeminal cistern but also abolished pain in patients with trigeminal neuralgia.<sup>12</sup> Hartel<sup>13</sup> in 1912 pioneered the percutaneous transovale approach to the Gasserian Ganglion using absolute alcohol. Sweet<sup>14</sup> (1974) described glycerol injection (and radiofrequency) lesioning to the ganglion. Hakanson<sup>15</sup> (1981) accidentally discovered glycerol relieved tic pain when injecting the retrogasserian space. This method is generally well tolerated and mortality is negligible.

In this study, longer duration of pain relief was obtained in mental and inferior dental nerve as these nerves can be targeted precisely during injections, possibly leading to better results.

Other treatment modality is alcohol injection. Glycerol was found to be more difficult to administer because of its viscosity, but not as painful as absolute alcohol. Other complications associated with alcohol injection are necrosis of skin, mucosa and bone along with fibrosis, swelling, severe pain, loss of vision, and trismus<sup>15</sup>.

In Ankara University (2001) a study of peripheral glycerol injection was carried out which reported 98% initial success rate and recurrence rate was 38% between 25 and 36 months. These studies did not report on the degree of pain relief. There were no control groups in these studies and patients who did not respond were re-injected with glycerol. The pain relief achieved in our study is comparable to the cited literature. The absence of pain relief in our control group indicates that there may be little role of placebo in the management of trigeminal neuralgia.<sup>16</sup>

Techniques and aids for determining the exact location of peripheral nerves should be utilized. The ideal temperature and viscosity of glycerol also need to be determined.

## CONCLUSION

Trigeminal neuralgia is a severe neuralgic disease involving any of three branches of trigeminal nerve. Various treatment modalities have been tried like medicinal such as carbamezipine, Baclofen etc. Different operative procedures like percutaneous ablative procedures, intracranial rhizotomy, peripheral rhizotomy, cryotherapy, posterior fossa decompression, electrofrequency thermocoagulation and peripheral neurectomy of branch of trigeminal nerve is being used. Peripheral Glycerol injections may be used to treat trigeminal neuralgia in patients, refractory to medicinal therapy or unsuitable for invasive procedures. Glycerol is well tolerated and has minimal side effects. The combination of efficacy, decreased morbidity and repeatability makes this procedure a useful treatment option for patients with trigeminal neuralgia. However, larger studies are required to better determine the efficacy of glycerol.

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