EFFICACY OF PERIPHERAL GLYCEROL INJECTION IN THE MANAGEMENT OF TRIGEMINAL NEURALGIA

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ABSTRACT

To evaluate the degree and duration of pain relief obtained with peripheral glycerol injection in patients with idiopathic trigeminal neuralgia.

Interventional, Clinical trial.

Fifty (50) medically resistant and non-surgically treated patients were selected. In the study group twenty five (25) patients received 1 ml glycerol injections in the involved peripheral nerve, after administration of local anaesthesia. The control group of twenty five (25) patients received 1 ml normal saline injections.

All the patients (25) in the control group (normal saline) had no pain relief Out of the 25 patients who received glycerol injections 24 (96%) patients had pain relief for 3 months. At six months nineteen (76%) patients had pain relief At one-year follow up eleven patients (44%) continued to have pain relief Another eleven (44%) patients were pain free with minimal dose of medication. There were no significant complications reported after the glycerol injections.

The combination of efficacy and decreased morbidity makes peripheral glycerol injections a useful treatment modality for medically intractable Trigeminal Neuralgia patients.

Key words: Glycerol injection, treatment, trigeminal neuralgia

INTRODUCTION

Trigeminal neuralgia is characterized by a sharp, current like, shooting, paroxysmal pain in the distribution of Trigeminal nerve.1 Incidence of Trigeminal Neuralgia is 4 in 100,0002 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.2

The pain is unilateral in majority of cases (97%) and one division of the trigeminal nerve is usually involved. The pain may be provoked by various non-noxious stimuli such as light touch, movement and cold. There is usually a trigger point, which if touched may set off a pain attack. In severe cases, Trigeminal neuralgia may significantly decrease the quality of life with marked depression and anxiety. 1 There is rarely any objective sensory loss of the involved area.

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.'

Medical therapy is the first line of management. Carbamazepine is the drug of choice. Dilantin sodium

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and baclofen alone or in combination with carbamazepine are also used. 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.

Peripheral injection of different chemical agents into the effected nerve is a minimally invasive treatment option. Central and peripheral glycerol injections into the trigeminal cistern or terminal branches of the nerve have been used since 1981.

The purpose of this study was to evaluate the efficacy of peripheral glycerol injection for the management of Trigeminal neuralgia.

MATERIALS & METHODS

This study was carried out on fifty patients of Trigeminal neuralgia in the Department of Oral & Maxillofacial surgery, de, Montmorency College of Dentistry / Punjab Dental Hospital, Lahore — Pakistan. All the patients were either resistant to medication or had significant side effects due to prolonged medicinal therapy. Patients with history of surgical treatment were excluded from the study.

The diagnosis was based on a detailed history, clinical examination and control of pain by carbamazepine. Orthopantomograph (OPG) was performed for every patient to exclude local pathology. The branch of Trigeminal nerve involved was identified according to the site of pain and confirmed with diagnostic local anesthetic injection at the identified site. This was repeated on three consecutive days.

Patients were randomly distributed into 2 equal groups. Injections containing glycerol 1 ml were administered to 25 patients in the study group. Patients in the control group (25) received normal saline injections.

Standard intra-oral injection technique was used to administer local anesthesia (2% lidocaine with 1:100,000 adrenaline), followed by lml anhydrous glycerol or normal saline injection into the confirmed branch of trigeminal nerve.

Patients were reviewed after one day, one week, two weeks, one month, three months, six months and one-year post operatively. At every follow up visit, grades of pain relief and side effects were noted including any alteration of nerve sensation.

The relief of pain was graded on a 4-point scale:

- 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)

Statistical analysis of the results was performed on SPSS programme. Chi square test was used to determine the significance of the results.

RESULTS

A total of 50 patients with trigeminal neuralgia were included in this study. There were 32 females and 18 male patients (Fig. 1). Twenty five patients received peripheral glycerol injection (study group) and normal saline was administered to the rest of the 25 patients (control group).

The right side of the face was involved in 31 cases (62%) and the left side in rest of the 19 patients (38%). No case presented with bilateral involvement. Mandibular division was involved in 35 cases (70%) and maxillary division in 15 (30%).

The sites of involvement were:

- Mental Nerve 44%
- Infra orbital Nerve 30%
TABLE I: PAIN RELIEF IN PATIENTS FOLLOWING GLYCEROL INJECTION (STUDY GROUP).

<table>
<thead>
<tr>
<th>Duration</th>
<th>No pain</th>
<th>Occasional pain</th>
<th>Mild pain</th>
<th>Moderate to severe</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 months</td>
<td>19 (76%)</td>
<td>5 (20%)</td>
<td>0</td>
<td>1 (4%)</td>
</tr>
<tr>
<td>6 months</td>
<td>11 (44%)</td>
<td>8 (32%)</td>
<td>3 (12%)</td>
<td>3 (12%)</td>
</tr>
<tr>
<td>12 months</td>
<td>7 (28%)</td>
<td>4 (16%)</td>
<td>11 (44%)</td>
<td>3 (12%)</td>
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</table>

Inferior dental nerve 18%
Long buccal nerve 6%
Lingual nerve 2%.

All patients reported with post-injection swelling and pain, which subsided after three days. Non-narcotic analgesic were prescribed. Four patients reported postoperative numbness at the site of injection. In two patients it resolved within 3 months and in rest of the patients it persisted up to one year. No other significant side effects were noted.

The control group obtained no pain relief at the one day review. These patients continued to experience no pain relief at subsequent follow up visits.

In the study group 19 (76%) patients had complete pain relief for 3 month duration (Table I). Another 5 (20%) had occasional pain during this period, with no need for medication. One patient experienced no pain relief after the glycerol injection. This patient had involvement of the long buccal nerve.

After six months 11 (44%) patients had complete pain relief and this figure dropped to 7 (28%) at the one year review. Overall 11 (44%) patients had no pain or occasional pain after one year, and did not require any medical therapy (p=<0.001).

DISCUSSION

Trigeminal neuralgia is unique among chronic pain syndromes for its dramatic and intense symptoms. The definite cause of trigeminal neuralgia is still not determined therefore there is no treatment which will absolutely cure the patient. Trigeminal neuralgia responds well to anticonvulsant medication, particularly carbamazepine. Medical treatment becomes intolerable or refractory over a period of time in 50% of the patients. These patients may be managed with a variety of invasive procedures.

Hakanson first injected anhydrous glycerol into trigeminal cistern in 1981. Since then glycerol has been reported to be effective in the treatment of trigeminal neuralgia. To avoid possible complications of central injection, Stajcic (1989) introduced peripheral injection into the different affected nerves. He established that peripheral glycerol injections could give comparable results to percutaneous retrogasserian glycerol injections injection with faster onset of pain relief and with minimal complications.

Stajcic (1989) and Lunsford et al (1985) have reported structural changes in the nerve fibers after glycerol injection. Rengachary et al (1983) have also reported myelin disintegration and axonolysis after Glycerol injection in peripheral nerves. Al-kateeb (1998) re destruction relief of pain obtained with extraneural glycerol injection is related to partial dehydration and compression of the affected nerve with little evidence of actual destruction.

Stajcic (1989) reported that 71% patients had pain relief from 6 to 26 months with repeated glycerol injections. 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.

In this study, longer duration of pain relief was obtained in mental and infra orbital nerves respectively. Both these nerves can be targeted precisely during injections, possibly leading to better results. One patient in this study who did not respond to peripheral glycerol injection had long buccal nerve involvement. The long buccal nerve lies in soft tissue and has a wavy and variable course, making it difficult to locate the correct site for the injection.

Peripheral injections of absolute alcohol have also been used for treatment of trigeminal neuralgia, with
success rates similar to glycerol. In comparison 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.\textsuperscript{4,14}

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.\textsuperscript{15,16,17} All these procedures have potential adverse effects, and may not be suitable for all patients.

Many elderly patients are infirm and unable to travel long distances for specialized treatment, or unable to cope with the side effects of invasive procedures. There remains a need for a relatively simple, minimally invasive method for pain control, which may be carried out on an outpatient basis and may be repeated without additional risk.\textsuperscript{18,19} Glycerol injections fulfill these criteria.

Glycerol injections have limitations due to anatomical variations in the course of the nerves. At higher temperatures glycerol becomes less viscous and may disperse from the site at the time of injection. Larger studies are required to better determine the efficacy of glycerol. 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**

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. In this study patients exhibited significant reduction of symptoms after glycerol injection in the vicinity of the involved peripheral nerve. The combination of efficacy, decreased morbidity and repeatability makes this procedure a useful treatment option for patients with trigeminal neuralgia.

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