Original Article

The role of peripheral glycerol injection in the management of trigeminal neuralgia

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Abstract

Study Objectives: To evaluate the efficacy of glycerol injection in controlling neuralgic pain distributed in peripheral branches of trigeminal nerve, the reversibility of the lost sensory function of the nerve and also to evaluate the morbidity associated with this procedure.
Method: Ten randomly selected diagnosed patients of trigeminal neuralgia of either sex were given glycerol injection in the peripheral branches of trigeminal nerve. Patients were followed up for next 1 year at monthly intervals and intensity of their pain was assessed.
Result: The time period of pain relief after glycerol injection in the trigeminal nerve was 20–56 weeks (mean duration of pain relief was 41 weeks). The mean period for return of sensory functions after glycerol injection was 3.7 weeks. There was no morbidity in any patient.
Conclusion: Peripheral glycerol injection can be used as one of the treatment modalities for trigeminal neuralgia. Although recurrence rate after peripheral glycerol injection may be like any other peripheral surgical procedures, but the ease in performing this procedure, early return of lost sensations and faster onset of pain relief with minimal complications makes it a worthwhile choice.

Keywords: Peripheral glycerol injection, trigeminal neuralgia

INTRODUCTION

Pain is an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage and is always subjective.[1,2] Trigeminal neuralgia (TN) is among the most painful afflictions man has experienced. It is characterized by intense, sudden, electric shock like paroxysmal attacks of pain along the branches of trigeminal nerve that are typically unilateral, brief and lasting only for seconds to minutes, either spontaneously or on gentle tactile stimulation of a trigger point on the face or in the oral cavity. The area from which the pain is activated has been described as the trigger zone. Treatment options for TN are both medical and surgical. The initial treatment should be medical. Various drugs (carbamazepine, gabapentin, and phenytoin) have been used. The dosage of drug is initially small but if the patient does not get relief and pain becomes worse, the dose has to be increased. These drugs have their own dose dependent side effects like ataxia, light headedness, drowsiness, rash, leucopenia, thrombocytopenia, and abnormal liver function test. For those patients, in whom symptoms cannot be controlled medically without side effects, it is wise to consider surgical options. Several surgical options available include:

1. *Peripheral surgical procedures:* alcohol and glycerol block, cryotherapy, and neurectomy.
2. *Minor surgical procedures:* radio frequency thermo coagulation of the gasserian ganglion.
3. *Major surgical procedures:* microvascular decompression and partial rhizotomies.

Selection of any surgical option is based on a risk to benefit ratio. The peripheral procedures are given first consideration as these are minimally invasive and there is comparatively less degree of morbidity as compared to intra-cranial procedures. In 1981 Håkanson was the first person who injected glycerol into trigeminal cistern in order to alleviate neuralgic pain and reduces the amount of sensory loss.[3] In 1989

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Stajcić injected glycerol around the peripheral nerve and he claimed it to be a simple technique with an excellent safety record as compared to other surgical options.[4] Glycerol being a normal constituent of human plasma, is highly viscous and poorly miscible in water. Due to this property, glycerol remains at the injection site and compresses the nerve causing temporary anesthesia providing instant relief.[5] Another property of glycerol is that it is a highly hypertonic or hygroscopic substance, which causes partial dehydration of surrounding axons. As a result of this dehydration, the activity of nerve fibers is decreased.[5]

We undertook this study to evaluate the efficacy of peripheral glycerol injection in providing pain relief to patients suffering from TN and to evaluate the morbidity associated with this procedure.

AIMS AND OBJECTIVES

This prospective clinical study aimed:

1. To evaluate the efficacy of glycerol injection in controlling neuralgic pain distributed in peripheral branches of trigeminal nerve.
2. To evaluate the reversibility of the lost sensory function of the nerve.
3. To analyze the postoperative morbidity associated with the procedure.
4. To judge the overall acceptance of the procedure by the patient.

SURGICAL PROCEDURE

All patients were given prophylactic antimicrobials (amoxicillin 500 mg) 45 minutes prior to surgery. Under proper asepsis, procedure was carried out in all patients under local anesthesia by giving the nerve block of the affected nerve with 2% xylocaine + 1:200,000 adrenaline. After identifying by the signs and symptoms and the diagnostic nerve block, affected branch of the trigeminal nerve was exposed surgically by giving intra-oral incision followed by careful dissection. Subsequently, pure glycerol which had been sterilized in hot air oven for 1 hour at 150°C was injected through a 22 gauze needle directly into the foramen around the periphery of nerve under direct vision. Volume of glycerol injected was dependent on the nerve specific, i.e. 0.5, 1, and 1.5 mL for infra-orbital nerve (Figure 1), mental nerve (Figure 2) and inferior alveolar nerve (Figure 3), respectively. After completion of the injection, flap closure was done with 3–0 interrupted sutures. Post-surgically, all the patients were given amoxicillin 500 mg TDS, metronidazole 400 mg TDS and ibuprofen and paracetamol combination for the next 5 days), patients were called for suture removal after 1 week and thereafter for evaluation at definite time intervals of 1 month for at least 1 year.

MATERIALS AND METHOD

Ten patients suffering from TN were selected randomly irrespective of age, sex, caste, religion, socioeconomic status, etc. from the Outpatient Department of Oral and Maxillofacial Surgery, DAV (C) Dental College and Hospital, Yamunanagar.

Patients were included according to the following criteria:

1. Pain in the distribution of trigeminal nerve.
2. Complete abolition of pain by a diagnostic anesthetic injection.
3. Symptomatic relief with a therapeutic trial of carbamazepine or phenytoin.

Patients with pain due to diseases related to other specialties of otolaryngology, neurology, psychiatry, neurosurgery, ophthalmology, maxillofacial surgery, and dentistry were not included in the study.

The patients were subjectively and objectively evaluated for the return of sensory sensation at regular interval of 1 month for 1 year. Subjective evaluation was done by asking the patient about the return of other sensations (touch, temperature, pressure) in the area supplied by the nerve treated with peripheral glycerol injection. Objective evaluation for the return of lost sensory sensation was done by (1) light touch sensation test and (2) deep pain (pin prick) sensation test.

Postoperative morbidity was assessed in terms of postoperative swelling (immediately postoperatively and on third day) and occurrence of infection. Infection was assessed postoperatively in terms of pus discharge, sinus, dehiscence at the operated site and any systemic manifestation (fever, lymphadenopathy, etc.).

Patient acceptance to the procedure was judged according to response of patient's to definite questions like 'Did the procedure provide them relief from pain?' and 'Would they prefer to undergo the same procedure if pain came back?'

OBSERVATIONS AND RESULTS

Out of the total 10 patients that were treated by peripheral glycerol injection, infra-orbital nerve was afflicted in 5 cases, mental nerve in 4 cases and inferior alveolar nerve in 1 case. The time period of pain relief was 20–56 weeks (mean duration of pain relief was 41 weeks) (Graph 1 and Table 1).

The mean period of sensory return was found to be 3.7 weeks (Graph 1 and Table 1). Due to surgical procedure, only mild swelling was present immediately postoperatively. Swelling was absent on third postoperative day. Infection was not observed in any patient (Figure 4).

The response to the questions showed that, all patients got relief from pain and showed preference to undergo the same procedure if the pain came back.