



REVIEW ARTICLE

A BIRD'S EYE OVERVIEW ON VARIOUS TREATMENT MODALITIES OF TRIGEMINAL NEURALGIA

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ABSTRACT

Trigeminal neuralgia is the painful entity affecting oral and facial structures. In this disease, patient experiences severe burning, throbbing, intermittent pain. "Fothergill's disease" and "Suicide disease" are other rarely used nomenclature options for "Trigeminal neuralgia". "Tic douloureux" is the medical term for "trigeminal neuralgia". Trigeminal neuralgia often compromises the life quality of the patient. Severe, intermittent, electric shock like pain on the face is caused due to "Trigeminal Neuralgia". In 1773, John Fothergill described the typical features of the trigeminal neuralgia, like paroxysms of unilateral facial pain, evoked by eating or speaking or touch, starting & ending abruptly and associated with anxiety. A wide range of treatments are available, such as neurosurgical treatments, neuroablative procedures, radiosurgery, pharmacotherapy, LASER. The present paper sheds light on various medical and surgical treatment modalities for the treatment of this therapeutically challenged disease.

INTRODUCTION

Trigeminal neuralgia [TN] is a relatively rare condition, unilateral disorder characterized by severe, intermittent, electric-shock like pain which is abrupt in onset & termination and it is restricted to the distribution of one or more divisions of the trigeminal nerve (Prathima Sreenivasan, 2014). The International Association for the Study of Pain (IASP) defined "Trigeminal neuralgia" as "sudden usually unilateral severe brief stabbing recurrent pains in the distribution of one & more branches of the fifth cranial nerve." (Zokrzewska, 2011) The pain experienced by the patient in this disorder is severe, lancinating and is triggered by cutaneous stimuli, episodic with spontaneous remissions (Prathima Sreenivasan, 2014). The aim of this article is to provide a bird's eye view over various and recent treatment modalities for trigeminal neuralgia. Following are some important neurosurgical procedures to treat trigeminal neuralgia which are divided into intra-cranial and extra-cranial procedures (Kumar, 2015).

Intracranial Procedures

Medullary and Mid-brain tractotomy –Sjoquist proposed the method of the cutting the spinal tract of the trigeminal

nerve in the medulla. After 4 years, i.e., in 1942, Walker proposed a method of severing the spinothalamic tract in midbrain (mesencephalic tractotomy)

Percutaneous retrogasserianrhizotomy with a) Glycerol injection – Glycerol mixed with tantalum powder is used to inject and found to abolish pain in patients with trigeminal neuralgia, b) Alcohol injection—Absolute alcohol is also used to perform percutaneous retrogasserianrhizotomy in trigeminal neuralgia patients.

Radiofrequency Thermocoagulation- In this technique, radio frequency current applied to nerve tissue creates molecular friction, creating heat and finally causes a heat lesion.

Nerve Decompression- a) Microvascular decompression [MVD]: This is the gold standard treatment for primary trigeminal neuralgia. "Neurovascular separation" is the principle behind the microvascular decompression. The important step for this surgery is the identification and separation of the offending vessels which can be vein, artery or both, without traumatizing other structures.

Ballon Microcompression (BMC): This technique applies pressure to the trigeminal nerve and changes the way it transmits the pain.

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Extracranial Procedures

Peripheral nerve injections- In this method, injections with local anaesthesia and with alcohol are used. The use of chloroform and Neuber of osmic acid was introduced by Bartholow.

Peripheral Neurectomy- This is the oldest of all procedures. This surgery is performed on various peripheral branches of the trigeminal nerve and it plays beneficial role in the management of trigeminal neuralgia.

Cryosurgery- Cryotherapy is used to eliminate pain in peripheral nerves and it acts by a process of selective nerve fibre destruction. Trigeminal neuralgia can be treated by "Stereotactic radiosurgery", it works by a precise delivery of a single, high dose of radiation in a one day session.

Gamma Knife Radio Surgery- Gamma Knife is a neurosurgical tool which is designed for treating brain disorders such as trigeminal neuralgia. The lesion which is being treated receives a high dose of radiation with minimum risk to nearby tissue and structures.

Pharmacotherapy- For most of the patients with trigeminal neuralgia, medicinal therapy is effective only initially. Following drugs are usually prescribed in these patients⁹:

Carbamazepine (Tegretol): Carbamazepine is an "immunostilbine" whose action is that of an anticonvulsant without analgesic effects. It depresses synaptic transmission. This drug has some side effects like drowsiness, vertigo, diastolichypertension, bradycardia. Dose : 600 mg daily

Baclophen (Lioresal) : It is an aminobutyric acid receptor agonist. This may be used in combination with carbamazepine or phenytoin. Drowsiness, dizziness and nausea are the side effects of this drug. Dose : 5-50 mg/day.

Dose: 300-500 mg/day, divided in three doses.

Gabapentin (Neurontin): This is anti-epileptic drug. This is structurally related to the neurotransmitter GABA. The most common adverse reactions of this drug include ataxia, somnolence, fatigue and nystagmus.

Dose: 300 mg TDS.

Lamotrigine (LTG): This drug acts by stabilizing the slow inactivated conformation of type 2 neuronal sodium channels which results in inhibition of repetitive firing of action potentials under conditions of sustained neuronal depolarization.

Dose: 400 mg.

Trileptal (Oxycarbazepine): This is a keto derivative of carbamazepine. It is an anti-seizure drug. Nausea, dizziness, tremors, fatigue are the side-effects of this drug.

Dose : 300 mg BD to 3000 mg per day.

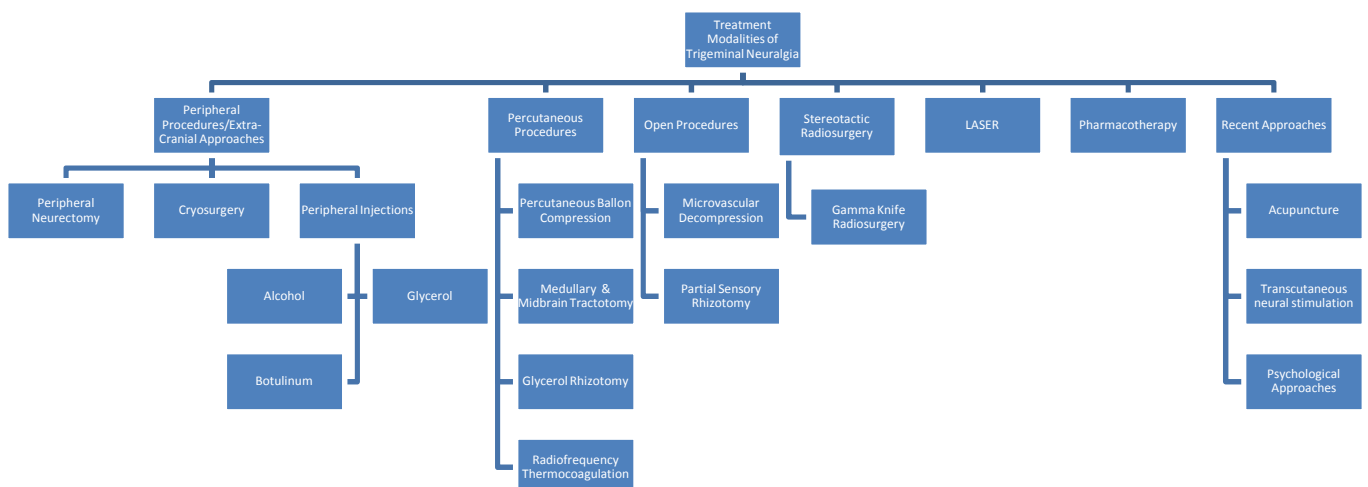
Tizanidinehydrochloride: This drug has neurochemical activity.

Dose : 2-4 mg/day

Pimozide: This is the neuroleptic drug.

Dose : 2-12 mg/day.

In treating trigeminal neuralgia, low-level laser therapy can also be considered as an option. For effectiveness of laser therapy, neuralgia must be distinguished from other chronic pain like atypical facial pains. (FarnazFalaki *et al.*, 2014)



Various Treatment Modalities of Trigeminal Neuralgia

Phenytoin (Dilantin): Phenytoin can be administered orally as well as in severe cases, intravenously. The dose-dependent side-effects of the phenytoin are nystagmus, ataxia, dysarthrias, ophthalmoplegia, gingivalhyperplasia.

Recent Approaches to treat Trigeminal Neuralgia (Kumar *et al.*, 2015)

Acupuncture- Acupuncture is the physiological approach to pain control and neurological treatment. The theory behind “Acupuncture” is based on an invisible system of communication between various organs of the body.

Transcutaneous neural stimulation - This has proved the most effective against nerve injury pain. In this, cutaneous bipolar surface electrodes are placed in the target site and the patient administers low-voltage electrical currents. It is effective in few patients but it is an excellent non-invasive procedure.

Psychological Approaches - Psychophysiological techniques such as relaxation therapy, bio-feedback hypnosis and psychotherapy are used as a significant control over pain as well as other sensory complaints (Roy, 1988).

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