Trigeminal Neuralgia

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INTRODUCTION

"Trigeminal Neuralgia (TN) is the worst pain in the world,".This is stated in "Striking Back" by the Trigeminal Neuralgia Association [1]. Trigeminal neuralgia is a painful condition of the face. TN is the most common form of facial pain in people older than 50 years. The highest incidence occurs in the ages between 50 and 70 years. TN is more prevalent in women than men with a ratio of 1.5:1 [2].

A survey conducted in 6 European countries indicated that trigeminal neuralgia significantly impacted the quality of life and the socioeconomic functioning of affected patients. [3]. According to International Association for the Study of Pain (IASP), year 2014 is the Global Year Against Orofacial Pain. This signifies the increased awareness of TN internationally.

PATHOPHYSIOLOGY

It is unclear. But compression of trigeminal ganglion near the origin of the brain steam near the origin of the brain stem by vessels or tumor, may be the possible cause. Such compression causes demyelination that leads to abnormal depolarization resulting in ectopic impulses and pain.

SYMPTOMS

TN is recognized by

- Unilateral,
- short-lived,
- strong, lancinating, " electric shock" like shooting pains in 1 or more branches of the fifth cranial nerve.

The pain is triggered by ordinary stimuli, such as eating, washing, shaving, cold, warmth, and even talking.

The distribution of the pain in the various branches of the trigeminal nerve is stated below [2].

V1 only	4%
V2 only	17%
V3 only	15%

V2+V3	32%
V1+V2	14%
V1+V2+V3	17%

DIFFERENTIAL DIAGNOSES

There are essential and secondary TN.

For the differential diagnoses of essential TN, the most important differential diagnostic considerations are specific facial pain, nonspecific facial pain, temporomandibular arthrosis, dental disorders, and vascular migraine etc. [4].

Six questions for history taking [4] for essential TN
1. Does the pain occur in attacks?
2. Are most of the attacks of short duration (seconds to minutes)?
3. Do you sometimes have extremely short attacks?
4. Are the attacks unilateral?
5. Do the attacks occur in the region of the trigeminal nerve?
6. Are there unilateral autonomic symptoms?

Indicate answer with a ✓ for the following afflictions	Does the Pain Occur in Attacks?	Are Most of the Attacks of a Short Duration (Seconds to Minutes)?	Do You Sometimes Have Ultra Short attacks?	Are the Attacks Unilateral?	Do the Attacks Occur in the Region of the Trigeminal Nerve?	Are There Unilateral Autonomous Symptoms?
	No	No	No	No	No	Yes
• Musculoskeletal	✓	✓	✓	✓	✓	✓
• Dentoalveolar	✓	✓	✓	✓	✓	✓
• Ear, Nose and Throat	✓	✓	✓	✓	✓	✓
• Giant cell arthritis	✓	✓	✓	✓	✓	✓
• Glaucoma		✓	✓	✓	✓	✓
• Cluster headaches		✓	✓	✓	✓	✓
• Atypical migraine		✓	✓	✓	✓	✓
• Chronic paroxysmal hemicrania		✓	✓	✓	✓	✓
• Temporomandibular joint syndrome			✓	✓	✓	✓
• Cracked tooth syndrome			✓	✓	✓	✓
• Idiopathic stabbing headache				✓	✓	✓
• Glossopharyngeal neuralgia					✓	✓
• Nervus Intermedius neuralgia					✓	✓
• SUNCT						✓
• Trigeminal neuropathy Atypical trigeminal neuralgia • Typical trigeminal neuralgia						

For secondary TN, it is usually due to other problems e.g.tumor of the cerebellopontine angle or multiple sclerosis.

PHYSICAL EXAMINATION
Cranial nerve examination and other neurological exam needed to be done.

For idiopathic TN, neurological examination is usually unremarkable.

For secondary TN, there may be positive neurological signs, indicating underlying pathology.

INVESTIGATIONS

It is important that MRI of the brain should be carried out in each patient so as to exclude secondary TN such as a tumor or multiple sclerosis, or vascular compression of the trigeminal nerve in the posterior cranial fossa, especially before interventional pain procedures.

TREATMENT

(A) For conservative treatment (according to IASP fact sheet)

Medical treatment of TN is based on the use of antiepileptic drugs.

First-line therapy should be carbamazepine (200–1200 mg/day) and oxcarbazepine (600–1800 mg/day), according to current evidence-based treatment guidelines. Second-line treatment is based on little evidence and includes add-on therapy with lamotrigine (400 mg/day) or a switch to lamotrigine or baclofen (40–80 mg/day). Other antiepileptic drugs have been studied in small open-label.

(B) Interventional treatment

1. Surgical microvascular decompression (MVD)
2. Stereotactic radiation therapy, Gamma knife
3. Percutaneous balloon microcompression
4. Percutaneous glycerol rhizolysis
5. Percutaneous radiofrequency (RF) treatment of the Gasserian ganglion
6. Gasserian ganglion stimulation/neuromodulation (experimental)

<u>Surgical MVD</u>

During MVD, the vessels that are in contact with the root entry zone are coagulated and arteries are separated from the nerve using an inert sponge. It is, however, a major surgical procedure that entails a craniotomy to reach the trigeminal nerve in the posterior fossa.

Efficacy:

- 90% of patients reporting initial pain relief and more than 80% remaining pain free after 1 year, 75% after 3 years, and 73% after 5 years, with sustained improvements in activities of daily living. (IASP fact sheet)

Risks:

- The average mortality rate ranges from 0.2% to 0.5%, and up to 4% of patients suffer from major problems such as cerebrospinal fluid leakage, infarcts, hematomas, or aseptic meningitis.
- The most common long-term complications include mild sensory loss (7%) and hearing loss (10%) (IASP fact sheet).

<u>For Stereotactic radiation therapy, Gamma knife, The Gamma knife</u>

It involves high dose irradiation of a small section of the trigeminal nerve. It is a noninvasive treatment that can be applied under local anesthetic and light sedation.

Efficacy:
- initial efficacy appears to be limited; between 60% and 70% indicate a reduction in pain.
- The long-term effects are not yet known. [5]

Disadvantages:
- Cost
- delayed onset of both pain relief (for an average of 1 month) and sensory loss.

Percutaneous balloon microcompression

The trigeminal nerve is compressed by a small balloon, which is percutaneously introduced into Meckel's cavity using a needle, causing ischaemia to the ganglion cells.

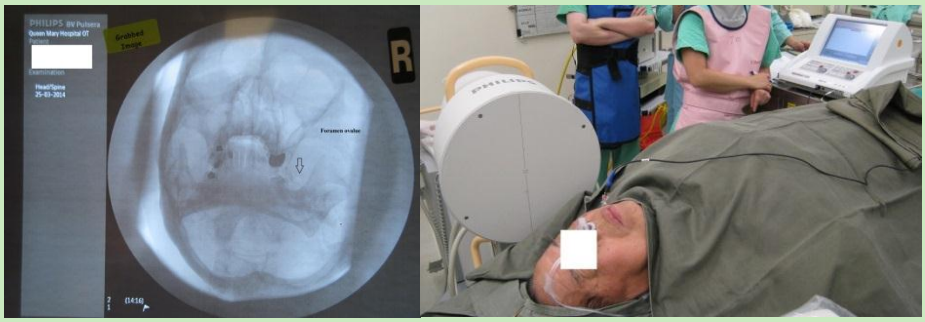
Percutaneous glycerol rhizolysis

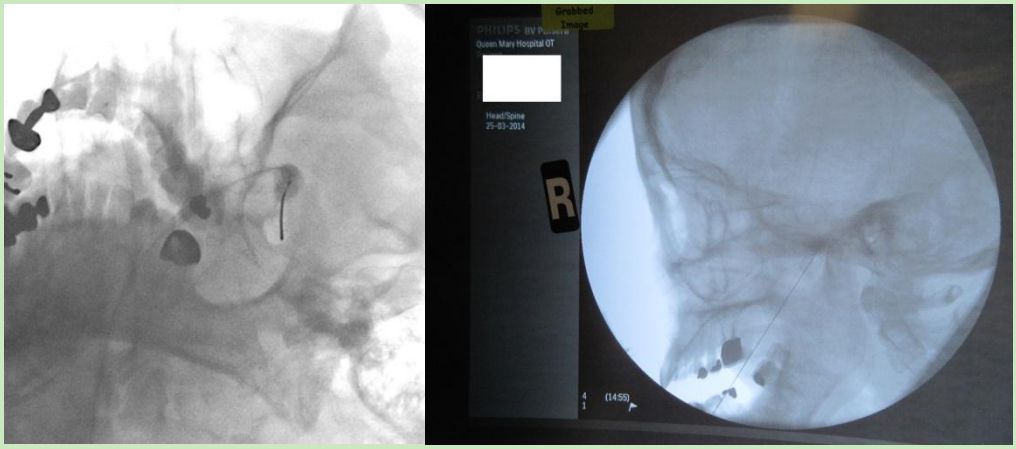
During percutaneous glycerol rhizolysis, a needle is introduced into the trigeminal cistern, visualized using fluoroscopy. In a seated patient, with the head flexed, a contrast dye can be injected to determine the size of the cistern. Then, after the contrast dye is aspirated, an equal volume of glycerol is injected.

Percutaneous RF Treatment of the Gasserian Ganglion

Efficacy:
- One year following radiofrequency thermocoagulation, 68–85% of patients are still pain free, but after 3 years the percentage goes down to 54–64%, and after 5 years only 50% of patients are still pain free (IASP fact sheet).
- The outcome of treatment of Gasserian ganglion is reportedly less favorable than with open operation (MVD) but it is less invasive and has lower morbidity and mortality rates.

Risks:
- most common side effects are sensory loss (50%),
- paralysis of the Masseter muscle (4.1%)
- dysesthesias (6%),
- anesthesia dolorosa (4%),
- corneal numbness with a risk of keratitis (4%)





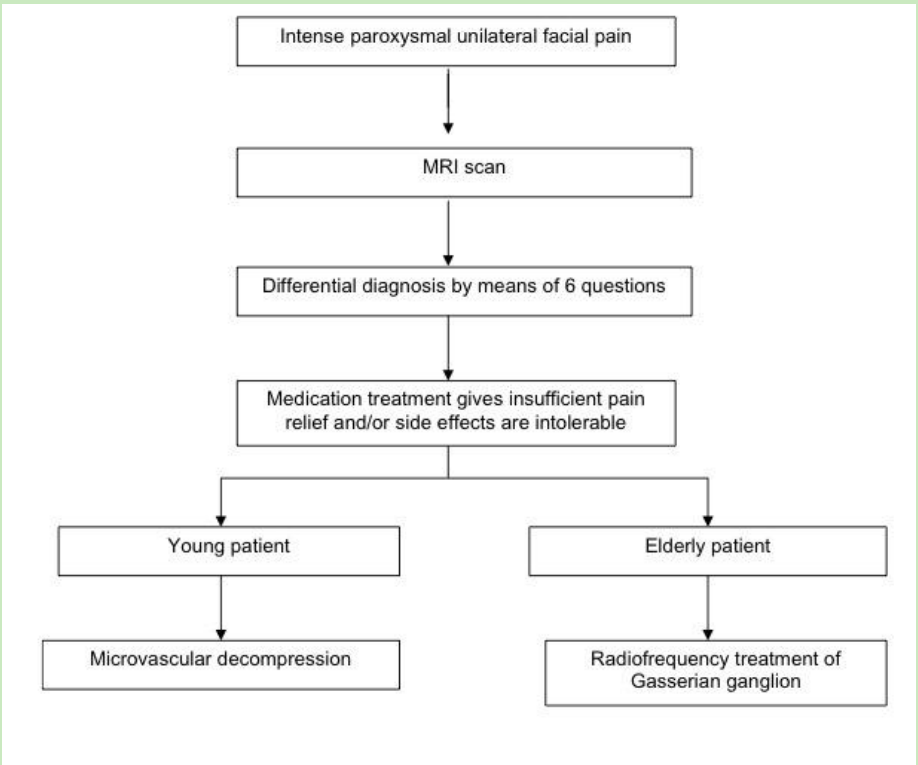
Gasserian Ganglion Stimulation/Neuromodulation (Experimental)

Gasserian ganglion electric stimulation was first described by Shelden et al. in 1967 for 3 patients with trigeminal neuralgia [6]. More recently in 2007, Machado et al. reported percutaneous Gasserian ganglion stimulation in 8 patients with trigeminal neuropathic pain. Only 3 patients continued to have >50% pain improvement after 1 year of treatment [7]. In fact, people have tried to have Gasserian ganglion electric stimulation, however the results were still suboptimal. This is mainly due to difficulty in anchoring the leads. These techniques should only be reserved for selected patients with intractable trigeminal neuropathic pain who failed to improve with other conservative treatment.

SUMMARY

The first treatment of choice is carbamazepine or oxcarbazepine. In younger patients with TN, the first choice is probably MVD. For elderly, RF treatment of Gasserian ganglion is recommended.

Clinical practice algorithm for the treatment of trigeminal neuralgia [8].



Evidence for interventional management of trigeminal neuralgia [9].

Technique	Evidence	Recommendation
Radiofrequency treatment of Gasserian ganglion	2B + value of "2" when the benefit was closed balanced with the risk and burden of possible side effects. "B" represents evidenced derived from RCTs with methodological limitation or large observational studies. "+" +ve outcome "-" –ve outcome	Recommended
Pulsed Radiofrequency treatment of Gasserian ganglion	2B -	Negative recommendation

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