



Trigeminal Neuralgia: A Case Report

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Abstract

Trigeminal neuralgia is defined as a sudden, usually unilateral, severe brief, stabbing and recurrent pain in the distribution of one or more branches of the trigeminal nerve. Also known as Tic douloureux, it usually occurs in old age, usually around 60-70 years.

Our patient was a 76-year-old female who reported pain in her lower left front tooth region for 1 week.

Pain experienced as sharp, shooting, lancinating and intermittent which radiated from the lower left anterior tooth region towards the head ipsilaterally. Approximately 6-7 episodes of pain in a day and relieves itself after 1-2 minutes. History reveals a similar kind of pain 4 years back.

The patient was relieved by taking anti-convulsants and nerve conditioners. The treatment also included patient counseling and diet counseling. The patient was disease-free after 3 months of the prescribed treatment.

Introduction

Tic douloureux, Trifacial neuralgia, Fothergill's disease occur between 5 – 7th decades of life with a slight female predilection. Most commonly affect the Maxillary division followed by Mandibular and Ophthalmic. Trigeminal Neuralgia is classified as Classic/Primary/Idiopathic or Symptomatic/Secondary. Aetiology is when Atherosclerotic blood vessels (superior cerebellar artery) press on and groove the root of the trigeminal nerve, Tumour of the cerebellopontine angle, A demyelinating plaque of multiple sclerosis, A vascular malformation, Progressive degeneration and demyelination of the trigeminal ganglion and dorsal root. If this condition manifests in Adolescents or young adults – is bilateral, demyelinating lesion in the pons (multiple sclerosis) should be ruled out as that is one of the most common occurrences.

Case Presentation

Summary of case: A 76-year-old female patient reported to the Department of Oral Medicine & Radiology with a chief complaint of pain in her left side back tooth region for 1 week. The patient was apparently asymptomatic 1 week back until she developed pain in her lower left back tooth region. The pain was sharp, shooting, lancinating and intermittent. Which radiated from the lower left anterior tooth

region towards the head ipsilaterally. After this incident episodes of pain start occurring. Pain aggravates on eating food while talking, drinking water, washing face, exposure to cold winds & alveolar mucosa. Approximately 6-7 episodes of pain in a day and relieves itself after 1 - 2 minutes. The patient experienced the same type of pain 4 years back for which she had consulted a dental surgeon and was diagnosed with Trigeminal Neuralgia and got relieved on taking medication. On clinical examination, a generalized recession was found. On radiographic examination: An OPG was taken to rule out any odontogenic cause. On the basis of clinical and past history given by the patient provisional diagnosis of Trigeminal Neuralgia was made. The possible differential diagnosis that could be made are listed in table 1 [given below]

Differential Diagnosis:

Differential Diagnosis	Trigeminal Neuralgia	SUNCT [Short lasting, Unilateral, Neuralgiform Headache Attacks]	Sphenopalatine Neuralgia [Cluster Headache]	Glossopharyngeal Neuralgia
Differentiating Features includes				
Unilateral/ Bilateral	Unilateral	Unilateral	Unilateral	Unilateral
Male/Female	Female > Male		Male > Female	Females
Attack lasts for	Second to 2 minutes	More than 4 minutes	15 minutes to 2 hours	Seconds to 2 minutes
Trigger Zones	Nasolabial fold, Corner of lip		Trigger Factor: CH Alcohol	Pharynx, Tongue, Ear & Infra-auricular retro mandibular area
Area involved	Maxillary division followed by Mandibular & Ophthalmic.	Mid face & Orbital region	Head	Tonsil region and ear
Treatment of choice	Carbamazepine 200 mg Microvascular Decompression, Gamma Knife Surgery		Ergotamine tartrate 2mg [1-2 hours before bed]	Same as Trigeminal Neuralgia

Table 1

On the basis of past history and clinical examination it was finally diagnosed as **TRIGEMINAL NEURALGIA**.

Case Discussion

Definition

The International Association for the study of pain [IASP] defines TN as sudden, usually unilateral, severe brief, stabbing, and recurrent pain in the distribution of one or more branches of the trigeminal nerve. [1]

The International Headache Society [IHS] classifies TN into Idiopathic TN and Symptomatic TN [2]. The IHS describes TN as a unilateral disorder characterized by brief electric shock-like pains, abrupt in onset and termination, limited to the distribution of one or more divisions of the trigeminal nerve in the second edition [3].

Diagnostic criteria for classical TN are as follows:

- A. Paroxysmal attacks of pain lasting from a fraction of a second to 2 minutes, affecting one or more divisions of the trigeminal nerve and fulfilling criteria B and C.
- B. Pain has at least one of the following characteristics:
 1. Intense, sharp, superficial or stabbing.
 2. Precipitated from trigger areas or by trigger zone/factors.
- C. Attacks are stereotyped in the individual patient.
- D. There is no clinically evident neurological deficit.
- E. Not attributed to another disorder.[3]

Incidence

- It is estimated that 1 in 15,000 or 20,000 people suffer from TN.
- It is common *after 50 years of age*.
- It is *more common in females* than males.
- Face affected Right side then left.

- 4% Bilateral
- 95% Mandibular nerve involved
- 5% Ophthalmic nerve involved

Clinical Features

“SWEETS CRITERIA”

Pain, Trigger Zones, Pre Trigeminal Neuralgia, Hyperesthesia/ Hyperalgesia, Always Unilateral

Pain

- Paroxysmal [usually lasts a *few seconds to several minutes.*]
- Extremely intense[stabbing, electric shocks, burning, pressing, crushing, exploding, shooting, boring, shock-like sensations, migraine-like, piercing, prickling, or a combination.]
- *Some patients reported that the pain can last for hours.*

Trigger zones

Identified precipitating factors include-

- Mastication & talking [76%]
- Touching [65%]
- Cold [48%]
- Movement of the head and best rest [2%]
- Psychological factors [2%]
- Heat [1%]
- Pressures by denture [0.4%]

Pre Trigeminal Neuralgia

- Mild, lancinating/pricking type.
- Months to years before chronic type of trigeminal neuralgia.

Hyperesthesia/Hyperalgesia

- On routine clinical examination
- HYPERESTHESIA: Increased sensitivity to stimulation.
- HYPERALGESIA: Extreme response to pain.

Always Unilateral

- If bilateral, then only one side affected at a time
- Unshaven and unclean face (*frozen face*)
- Spontaneous remission is unusual
- Attacks do not occur during sleep (characteristic)
- Secondary radiation of pain to adjacent division

Others

- It can be associated with Dandy walker syndrome, small posterior fossa, brain stem infarct, hydrocephalus etc.
- Afferent or efferent paroxysmal sharp pain radiating into the territory of one or more of the trigeminal sensory divisions is often so severe that patients must stop all activity during the episode.
- An increased incidence of additional cranial nerve dysfunction and hypertension.
- TN pain occurs spontaneously or is triggered by routine, non-noxious stimuli applied to a specific trigger point.
- Sound or light rarely triggers the attack.
- A trigger point is present in 50 – 60 % of patients with TN.
- Although the trigger points can be located almost anywhere within the trigeminal nerve area, it is most common in the *nasolabial fold, on the upper lip and the alveolar gingiva*.
- Lacrimation occurs in 31% of patients with Trigeminal Neuralgia, 9% of patients with rhinorrhea, 7% of patients with swelling and 5% of patients with flushing.
- The frequency of occurrence of facial pain attacks is

- Highest in Daytime for 71% of patients
- Highest in Night for 11% of patients
- The same Day & Night is 18%
- Some patients were found to have experienced a *second episode within 5 – 10 years*.
- It is not unusual for a patient to have one or more teeth extracted on the side affected by TN.
- Unusual forms of TN – some patients have gustatory neuralgia following surgery in the region of the auriculotemporal nerve, a branch of the mandibular nerve.

The smell of food triggered the pain in a preauricular location. The mandibular movement did not evoke pain.

Etiology

- C-P Angle Tumors
- Acoustic Neuroma
- Cholesteatoma
- Anatomical variation of Petrous bone ridge
- Aneurysms and Adhesions
- Multiple sclerosis

Pathophysiology

- Chronic irritation of the Trigeminal nerve.
- Failure of segmental inhibition in the trigeminal nucleus and ectopic action potentials in the trigeminal nerve.
- Increased firing and impaired efficiency of the inhibitory mechanism.
- Paroxysmal discharges in the trigeminal nucleus.
- Attacks of Trigeminal Neuralgia.

Investigations

- **Nerve Functions:** Sensory and Motor [Trigger Zones]
- Diagnostic Nerve Blocks
- **Special tests for tumors and systemic diseases:** CT Scans, MRI, Scintigraphy

Pain Assessment

BNI Score

1. No pain, No medications
2. Occasional pain, No medications
3. Some pain, adequately controlled with medications
4. Some pain, is not adequately controlled with medications
5. Severe pain/no relief

Classification

Diagnostic criteria for classical TN and symptomatic TN described by the IHS second edition are based on the combined etiology & symptomatology.[2]

Based on *Etiology*

1.Primary or Idiopathic TN

- Does not have a clear cause

2.Secondary or Symptomatic TN

- Due to a manifest cause such as a tumor, multiple sclerosis or vascular compression.

Based on *Symptomatology*

- a. Typical Trigeminal Neuralgia
- b. Atypical Trigeminal Neuralgia

Related Disorders

1. Atypical Trigeminal Neuralgia

It is defined as TN with continuous or repeated pain between transient paroxysms [7-9] in the territory of one or more branches of the trigeminal nerve.

- Symptoms:

Persistent pain is usually burning or aching pain.[5, 7, 10], Patients have bilateral facial pain more frequently than patients with TN.[6], Duration of paroxysms in patients with atypical TN is often longer than that in patients with TN.

- Pathogenesis:

Atypical TN may be due to neural cross compression peripheral to the area where the root enters the brainstem, but central to the trigeminal ganglion.[11], A combination of root entry zone and more distal trigeminal injury produced atypical TN.[9]

- Diagnosis:

Diagnosed based on history and physical examination. Based on transient paroxysms and constant pain in the territory of one or more branches of the trigeminal nerve.

2. Trigeminal Neuropathic pain

Trigeminal Neuropathic pain is a constant unilateral facial pain in the territory of one or more branches of the trigeminal nerve without paroxysmal pain [4, 9] with or without sensory disturbance [12], The pain is usually burning or aching, Trigeminal neuropathy as defined by Jannetta means facial numbness with or without facial pain.[13]

3. Pre Trigeminal Neuralgia [Pre-TN]

- Pre Trigeminal Neuralgia is classified into trigeminal neuropathic pain before the occurrence of Trigeminal Neuralgia.
- *A tumor may cause Pre TN as well as TN.*
- Symptoms: Intermittent or continuous aching or dull pain in the upper and lower jaws which eventually converts into lancinating and paroxysmal pain, TN.[14, 15]

- Treatment: Pain is relieved by Carbamazepine or Baclofen and had no other discernible cause. [14]

4. Short Lasting Unilateral Neuralgiform Headache with Conjunctival Injection and Tearing [SUNCT]

5. Atypical facial pain

Treatment

Non-Surgical

DRUG	INITIAL DOSE (mg)	TARGET DOSE (mg)	SCHEDULE
1)Carbamazepine (DOC)	100-200	1200	*3-4/d
2)Oxcarbazepine	200-400	1200-1400	*3/d
3)Baclofen	5-15	30-60	*3/d
4)Clonazepam	0.25-0.5	1-4	Bedtime
5)Gabapentin	300	900-2400	*3/d
6)Lamotrigine	25	400-600	*1-2/d
7)Topiramate	25	100	*2/d

Drug therapy slowly withdrawn if patient pain free for 3months.

Table 2

Percutaneous Injections

- 2 days – 1-week Interval
- **Chemical Used:** Local Anesthesia/ Absolute Alcohol/ Phenol glycerin mixture.
- **Injection Site:** Peripheral Nerve/ Trigger Zones/ Gasserian Ganglion
- Intravenous infusion of a **combination of magnesium and lidocaine** can be very effective in some patients.
- **5% lidocaine plaster and 8% capsaicin patch** can be useful in some TN.
- The 5-HT R3 antagonists, neurokinin-1 antagonists, or mast cell stabilizers may have a role in the treatment of TN.

- **Botulinum toxin Type A injections** may be offered before surgery or unwilling to undergo surgery and in failed drug treatment.
- **Tetracaine nerve block** as an additional treatment after carbamazepine, acupuncture and peripheral nerve stimulation can be used.

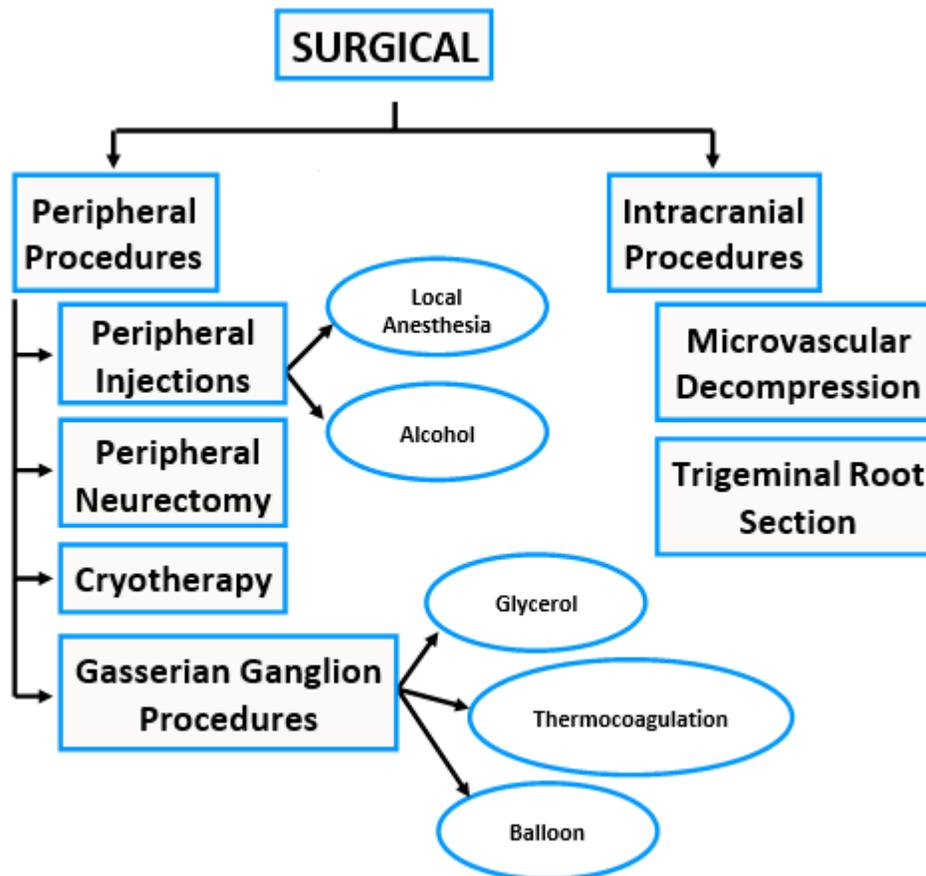


Figure 1

A. PERIPHERAL INJECTION

It has been known that injection of a destructive substance into peripheral branches of the trigeminal nerve produces anesthesia in the trigger zones or in areas of distribution of spontaneous pain.

1.LONG ACTING ANAESTHETIC AGENTS: Without adrenaline such as bupivacaine with or without corticosteroids may be injected at the most proximal possible nerve site.

2.ALCOHOL INJECTION: 0.5 - 2 ml of 95% absolute alcohol can be used to block the peripheral branches of the trigeminal nerve. The aim is to destroy the nerve fibers & produces total numbness in the region of distribution of the nerve that was anesthetized.

Complication:

- Necrosis of the adjacent tissue
- Fibrosis
- Alcohol-induced neuritis

B. GAMMA KNIFE RADIOSURGERY

- It is a Non-Invasive, Scalpel Less Radiosurgery.
- It is based on the principle that, radiation delivered precisely to a target will destroy the cells in a particular area while minimizing injury to surrounding nerves and brain tissue.
- The Gamma Knife is not a knife. It is a complex machine that uses Cobalt – 60 as the energy source in radiosurgery.

C.PERCUTANEOUS BALLOON COMPRESSION [PBC]

- This is a mechanical means of destruction of the trigeminal nerve introduced by Mullan & Lichtor in 1980.
- Technique
 - Ano. 4 Fogarty's catheter is introduced with fluoroscopic guidance.
 - A0.7 mm balloon is inflated for 1 – 2 minutes.
- PBC is a safe, simple, and effective method of about 90% temporary pain relief.

D. GLYCEROL RHIZOTOMY

- Glycerol is neurolytic alcohol that can be used to chemically destroy the nerve root.
- Advantages: Simple technique, Lower incidence of anesthesia Dolorosa

- Complication: Postoperative headache, nausea, vomiting, meningitis, post-operative herpes simplex perioral.

E. RADIOFREQUENCY THERMO COAGULATION [RFTC]

It was first introduced by Kirschner in 1931 & later modified by Sweet 1970.

Technique:

1. The patient is sedated with a short-acting sedative and vital signs are monitored.
2. The electrode is inserted through the cheek under fluoroscopy into the foramen ovale.
3. The patient is awakened briefly to accurately locate the position of the electrode.

Indications:

- Toxicity of drugs
- Failure of response to the other modalities
- Dependence on the drugs for a lifetime
- Elderly patients
- Medically compromised patients

Advantages:

- Comparative low rate of recurrence
- Zero mortality
- Thermo coagulation preserves the motor function of the trigeminal nerve
- Can avoid major surgical procedure

Disadvantages:

May cause anesthesia Dolorosa loss of corneal reflex Meningitis (rarely)

[a] INFRA ORBITAL NEURECTOMY

1. Conventional Intraoral Approach
2. Braun's Trans antral Approach

[b] INFERIOR ALVEOLAR NEURECTOMY:

1.Extraoral approach

2.Intraoral approach

F. LINGUAL NEURECTOMY:

- An incision is made in the anterior border of the ramus slightly towards the lingual side.
- The lingual aspect is exposed & the lingual nerve is identified in the third molar region just below the periosteum.
- The nerve can be either avulsed or ligated, cut and the ends may be cauterized.

G. MICROVASCULAR DECOMPRESSION

a. Open Procedures [Intracranial Procedures]

1. Procedure popularized in 1967 – 1976 by Jannetta.
2. Most commonly performed is the intracranial open procedure.
3. The root is examined under the microscope.

H. Endoscopic Vascular Decompression

- a. Endoscopic techniques are increasingly being used in spine, skull base and intracranial pathologies.
- b. Endoscopic technique can be used alone in TN or as an adjuvant to the microscope.
- c. It is a minimally invasive technique, allows better visualization of the entire root from the pons to ganglion including the ventral aspect.
- d. The endoscope is a valuable tool during MVD, especially when a bony ridge hides the direct microscopic view of the vascular conflict.
- e. Effectiveness and completeness of decompression can be better assessed.
- f. New nerve-vessel conflicts can be identified which may be missed by microscope in 7.5%–33% of patients.

g. It is safe, requires less brain retraction and is associated with improved pain relief with lower complications as compared to MVD.

h. The vascular conflict is mostly distributed in the medial side on the second division while it is in the lateral area for the third division in TN.

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