What Nurse Practitioners Should Know About Recognizing and Treating Trigeminal Neuralgia



Robert E. Salsameda, MPA, MSN, RN, NP-C, CRNFA, CNRN Neurosurgical Nurse Practitioner MemorialCare Medical Group: Neurosurgery UCLA Extension, RN First Assistant Programs Course Chair

Objectives

- Recognize and describe the symptoms, anatomy & physiology of trigeminal neuralgia (CN V)
- Describe treatment and outcome of TN including medication and surgery
- Apply knowledge from a case study presentation and review NP assessment & intervention for the care of patient with TN

Trigeminal Neuralgia

- The goal of this presentation is to provide information to nurse practitioners regarding diagnosis and treatment modalities for a problem that is life altering.
- Patients will present to their advanced practice providers for help in pain management before the disease is diagnosed.
- Early diagnosis will have major implications on quality of life (QOL).

The Surgical Treatment of Trigeminal Neuralgia: Overview and Experience at the University of Florida Journal of Neuroscience Nursing, AANN. Volume 41. No 4: August 2009; pp 211-214

Incidence of Trigeminal Neuralgia aka *Tic douloureux*

- Estimated at 12.6 per 100,000 person years
- Mean years at diagnosis 51.5 years
- Women are more often affected than men, in a ratio ~2.5:1

Anatomy of Trigeminal Nerve (CN V) has three parts



A The brain viewed from the basal aspect to show the brainstern and associated structures including the blood vessels and cranial nerves. The meninges have been removed, x1.2 1 Abducens nerve (VI) 9 Mamillary body

- 2 Cerebellum
- 3 Cerebral pedancle
- 4 Factal nerve and nervus
- intermedius (VII)
- 5 Frontal lobe
- & Hypoelossal nerve (XII) roots 7 Hypothalamus
- 8 Interpredoncular fossi
- 11 Oculomotor nerve (III) 12 Olfactory tract 13 Olive 14 Optic nerve (II)
- 15 Pons

10 Midbrain

- 16 Pyramid
- 17 Pyramidal decussation
- 18 Room of glossopharyngeal (IX), vagus (X), and accessory (XI) nerves 19 Surface blood vessels 20 Temporal lobe
- 21 Trigeminal nerve (V)
- 22 Trochlear nerve (IV)
- 23 Vestibulocochlear nerve (VIII)

The trigeminal nerve emerges from the pons, Passing across the petrous ridge to become the gasserian ganglion which in turn separates into the ophthalmic, maxillary, and mandibular divisions. Hickey, 2009

CN V Anatomy



Lateral view: skin, subcutaneous tissue, and a branch to the dura mater



Trigeminal ganglion CN V1 for the ciliary ganglion CN V2 for the pterygopalatine ganglion CN V3 for the submandibular and otic ganglia

 CN V3 is also motor to four pairs of muscles: temporal, masseter, and the two pterygoid muscles

Symptoms of trigeminal involvement

- Pain: Marked if gasserian ganglion or peripheral branches are involved
- Loss of Sensation: Over sensory distribution; corneal anesthesia early.
- Dissociate Anesthesia: Loss of pain but not touch may be noted when the spinal tract of the fifth nerve is involved (eg, in syringobulbia).
- Paresthesia: Occasionally seen in anemia and in nervous and hysterical patients.
- Paralysis: Paralysis of muscles of mastication, with deviation of jaw to affected side.
- Reflexes: Loss of jaw jerk, sneeze, and lid, conjunctival, and corneal reflexes.
- Hearing: impaired hearing due to paralysis of tensor tympani.
- Trismus (Lockjaw): tonic spasm of muscles of mastication in rabies, tetany, tetanus, epilepsy, and hysteria.
- Trophic and Secretory Disturbances: Herpes simplex, neurokeratitis, dryness of nose (causes anosmia, as moisture is necessary to smell), ulcerations of face, and loss of teeth.

Chusid, J.G. Correlative Neuroanatomy & Functional Neurology, 18th ed

Symptoms: Hallmark features

- Sharp and lancinating pain
- Paroxysmal attacks
- Pain in the distribution of the trigeminal nerve
- Pain triggered by non-noxious stimuli
- Lack of sensory loss

Trigeminal neuralgia is a clinical diagnosis

- Based on the hallmark features it is imperative that the NP ask the following questions:
 - Does the pain have a lancinating quality?
 - Is the pain constant?
 - Is it in the distribution of the TN?
 - Are there triggers?
 - Is there any sensory loss?
 - Does the patient fit the proper demographic category?

Etiology

- Compression of trigeminal nerve (TN) by anomalous arteries or veins of posterior fossa, compressing trigeminal root
- Etiologic classification:
 - Idiopathic (classic)
 - Secondary: Cerebellopontine angle tumors (e.g., meningioma); tumors of CN V (e.g., neuroma, vascular malformations), trauma, demyelinating disease (e.g., multiple sclerosis [MS])



Pathophysiology

 Demyelination around the compression site seems to be the mechanism by which compression of nerves leads to symptoms.

 Demyelinated lesions may set up an ectopic impulse generation causing erratic responses: Hyperexcitability of damaged nerves and transmission of action potentials.

Clinical Tests

- Sensation: With wisps of cotton, pinpricks, and warm or cold objects.
- Reflexes: Corneal (wink), conjunctival, jaw jerk, sneeze.
- Motor Status: ability to chew; palpation of masseter and temporal muscles when the jaws are clamped tightly together. Wasting of the masseter muscles and deviation of the mandible to one side on attempting to lower the jaw against resistance are noted when present.

Attack triggers of TN

- Touching the skin lightly
- Washing
- Shaving
- Brushing teeth
- Blowing the nose
- Drinking hot or cold beverages
- Encountering a light breeze
- Applying makeup
- Smiling
- Talking

Imaging



Indicated in all 1st-time presenting patients to r/o secondary causes

Initial approach

- MRI vs. CT scan: MRI, with and without contrast, offers more detailed imaging and is preferred, if not contraindicated
- Routine head imaging identifies structural causes in up to 15% of patients
- No positive findings are significantly correlated with diagnosis

Pathological Findings

- Trigeminal nerve: inflammatory changes, demyelination, and degenerative changes
- Trigeminal ganglion: hypermyelination and microneuromata



Differential diagnosis (DDx)

- Other forms of neuralgia usually have sensory loss. Presence of sensory loss nearly excludes the diagnosis of TN (if younger patient, frequently multiple sclerosis MS)
- Neoplasia in cerebellopontine
 angle
- Vascular malformation of brainstem
- Demyelinating lesion (MS is diagnosed in 2-4% of patients with TN)
- Vascular insult
- Migraine, cluster headache

- Giant cell arteritis
- Postherpetic neuralgia
- Chronic meningitis
- Acute polyneuropathy
- Atypical odontalgia
- SUNCT syndrome (shortlasting, unilateral, neuralgiform pain with conjunctival injection, and hearing)

Pharmacologic Treatment Medication (Drugs)

First Line:

- Carbamazepine (Tegretol) start at 100-200 mg po bid; effective dose usually 200 mg qid; max dose 1,200 mg/day
- 70-90% of patients respond initially
- Most common SE: Sedation
- Oxcarbazepine (Trileptal) start at 150-300 mg bid; effective dose usually 375 mg bid; max dose 1,200 mg/day
- Efficacy similar to carbamazepine
- Decreases serum sodium
- Most common SE: Sedation

Second Line

- Nonantiepileptics (NAED): Insufficient evidence from randomized, controlled trials to show significant benefit from NAEDs in TN
- Phenytoin (Dilantin) 300-400 mg/d
- Baclofen (Lioresal) 10-80 mg/d; start at 5-10 mg tid with food
- Gabapentin (Neurontin) start at 100 mg tid or 300 mg at bedtime; can increase dose up to 300-600 mgtid-qid
- Lamotrigine (Lacmictal) titrate up to 200 mg bid: SE 10% experience rash
- Chlorphensin carbanate (Maolate) 800-2400 mg/d (as an adjunct to phenytoin and/or carbamazepine) SE : Drowsiness
- Antidepressants, including amitriptyline, fluoxetine, trazadone used especially with AEDs; particularly effective for atypical forms of TN
- Clonazepam (Klonopin)
- Sumatriptan (Imitrex) 3mg SC reduces acute symptoms
- Capsaicin cream topically
- Botulinum toxin injection into zygomatic arch
- Valproic acid (Depakene, Depakote)

Treatment tenets

- Earlier surgical intervention is better
- Microvascular decompressio (MVD) is the best surgical treatment
- Elderly patients can be good candidates for MVD
- Stereotactic radiosurgery (SRS) is a promising firstline surgical option

Complementary therapies (CAM)

- Some patients may try other complementary therapies in addition to drug therapy before or instead of surgery.
- Some therapies include:
 - Acupuncture
 - Biofeedback
 - Vitamin therapy
 - Nutritional therapy
 - Electrical stimulation of the nerves

Trigeminal neuralgia fact sheet: 2011

Relative risks of percutaneous procedures and MVD of CN V for TN

- Percutaneous procedures
 - Altered facial sensation
 - Corneal hypesthesia
 - Corneal ulceration
 - Dysesthesia
 - Anesthesia dolorosa
 - Cranial nerve palsies
 - Brain abscess

MVD

Death

- Cerebellar hematoma
- Stroke
- Cranial nerve palsies
 - Fourth
 - Seventh
 - Eighth

Percutaneous Techniques

Thermal Rhizotomy Glycerol Rhizotomy Balloon Compression





Stereotactic Radiosurgery



STEREOTACTIC RADIOSURGERY FOR THE TREATMENT OF TRIGEMINAL NEURALGIA

Transmit municipal (First is well difficul and one of the over scenario musics of table pairs reprint



Figure Dearth of exception proved war again resources

interest entropy the registrice form and all adaptive terms of the second state of the

"A har been originate as a result reacting of while on origin," Despite always, Prophol. When is the measure-optic teacourged

> (a) and a large of and along (a) and induces relating attentions, at a rate to its property (regeleration).

may prevent designs thereare it would be the a applicant the above

Marco completente, president constructive, edit descente del la completenza della del a deschara del descriptiva del realizzati adanza di constati agginata care conservativa anticio forcinano, editi i de constati adali del constructiva presidente della del constati adali del del constructiva agginaria.

Interpretation Acad Social Exposition 1 Interaction were indexed produce of the mainteel 1 Annual 1 Ann

For the 2000 feedback of 2010 (spaced datasets) for a 64 (spaced dataset) and the foreign datasets and the first of the 10 km for the first of the 10 km for the first of the 10 km foreign datasets are consistent within a first dataset. For example, the first of the first of

transit does it reliably a file dispersion





Sub-occipital craniectomy for microvascular decompression (MVD) of CN V





Surgical positioning for approach





- Mayfield tongs
- Abdominal binder
- Sequential stockings
- CVP line & Precordial doppler, TEE
- Pillows and flexing of LEs

Exposure of CN V



- Greenberg retractor
- Teflon pledgett
- Cottonoids
- Micro instruments
- Duragen
- Evicel



Microsurgical anatomy of the approach to the right ventrolateral brainstem and cranial nerves.

Microvascular decompression (MVD)







Teflon pledget maintains microvascular decompression.

Post op & Follow up Care

- Admit to Neuro ICU
- Routine neuro assessments esp; corneal reflex, EOMs, symmetric facial movement
- HOB 30 degrees
- Analgesics (IV): MSO4, Dilaudid, Ofirmev, PCA, & muscle relaxants; antiemetics
- Resume Carbamazepine
- Assess sense of taste and the motor component of CN V
- Diet liquid \rightarrow regular

- Return to office/clinic ~ 10 days post op
- Wound evaluation
- Staple removal
- Resume activities
- Wean off carbamazepine?

Case Study





Conclusions

- Trigeminal neuralgia (TN) is a disease classically characterized by paroxysmal attacks of lancinating pain in the distribution of the TN that are triggered by non-noxious stimuli and that are not associated with sensory loss.
- It is a clinical diagnosis with several surgical options if the disease becomes medically refractory
- Neurosurgical treatments include:
 - Percutaneous procedures
 - Stereotactic radiosurgery (SRS)
 - MVD

Summary

 Patients with trigeminal neuralgia commonly are seen in various practice settings; therefore, an understanding of the underlying disease process and early intervention is beneficial.

 The symptomatalogy patients experience with trigeminal neuralgia can significantly affect their lifestyle and QOL.

 NPs are pivotal to assess, intervene, educate, reassure, and advocate for patients with trigeminal neuralgia.

It ain't rocket science! NP power



"Damn it, I'm a brain surgeon, not a rocket scientist."

- Look at your patient
- Listen to what they are saying
- Ask an unscripted question Better: A surgeon's notes on performance : Atul Gawande, MD; 2007
- Make your referrals to a neurologist and/or neurosurgeon.



QUESTIONS?

Bob Salsameda, MPA, MSN, NP-C, CRNFA, CNRN MemorialCare Medical Group: Neurosurgery **Neurosurgical Nurse Practitioner** 2865 Atlantic Ave #202 Long Beach, CA 90806 562-427-5388 office 562-254-0883 mobile rsalsameda@memorialcare.org

Neuroscience Resources

- Chusid, J.G. Correlative Neuroanatomy & Functional Neurology, 18th ed, Los Altos, California. Lange Medical Publications, 1982
- Greenberg, M.S. *Handbook of Neurosurgery*, seventh ed. New York City: Thieme Medical Publishers, 2010.
- Hickey, J. The Clinical Practice of Neurological and Neurosurgical Nursing, sixth ed. New York. Lippincott, 2009.
- Moore, KL, Dailey, AF. Clinical Oriented Anatomy, Fourth edition, Baltimore, Lippincott Williams & Wilkins 1999
- Popp, A.J. & Deshaies, E.M. A Guide to the Primary Care of Neurological Disorders, second ed. New York: Thieme Medical Publishers, 2008
- Trigeminal neuralgia fact sheet. (2011). Retrieved September 12, 2012, from http://www.ninds.nih.gov/disorders/trigeminal_neuralgia /detail_trigeminal_neuralgia.htm

UCLA Extension RN First Assistant Program



(310) 825-7093 uclaextension.edu/healthsci