

Risk

- Has an incidence of 12–27:100,000/y.
- More common in women and pts >50 y.
- 1–5% of pts with MS have TN, and 2–4% of pts with TN have tumors or vascular malformations in the posterior fossa. There is an association with Charcot-Marie-Tooth disease.

Perioperative Risks

- Evaluate comorbidities with pts with MS, tumors.
- Liver enzyme induction with use of antiepileptic drugs.
- Difficulties with mastication might lead to nutritional deficits.
- Bradycardias with percutaneous balloon compression.

Worry About

- Severe bradycardia/asystole with manipulation of the fifth nerve in the posterior fossa or with balloon compression
- Oversedation and management of the airway in RFA procedures
- Postop exacerbation of MS

Overview

- TN is a facial pain syndrome characterized by recurrent episodes of intense pain over the distribution of the fifth cranial nerve, more commonly the V2 and V3 divisions. Diagnosis is made by pain distribution and quality. Characteristic pain is severe in intensity, shooting or stabbing, lasts seconds to minutes, and is often precipitated by light touch or cold air. Pt may have bouts over weeks or

months, with some spontaneous remissions up to 6 mo. Usually the bouts become more frequent and the pain more sustained. Pts with MS rarely have remissions.

- Imaging techniques such as MRI and MRA are used to evaluate nerve decompression, and to rule out MS and tumors.
- Neurologic exam is normal in most pts, with the exception of a minimal amount of sensory loss over the affected area.

Etiology

- Idiopathic: >90% of cases are idiopathic with evidence of focal demyelination of trigeminal sensory fibers within the nerve root or within the brainstem. Compression by an aberrant artery or vein results in close apposition of axons and absence of intervening glial processes. This favors ectopic impulses and ephaptic conduction to adjacent fibers. In the area of the trigeminal nerve entry zone, demyelination would lead to ephaptic conduction between fibers for light touch and those for pain explaining the sensitivity of trigger zones.
- Symptomatic: These pts have less classical features of TN. Primary demyelinating disorders such as MS will lead to demyelination and plaque formation in the root entry zone, but they may also have nerve compression by a vascular structure. Rarer presentations would include compression by tumor, infiltration by tumor or amyloid, small infarcts, or angioma in the brainstem.

Usual Treatment

- Pharmacologic: The mainstay of treatment is anticonvulsant/antiepilepsy drugs. Initial response in

over 70% of pt occurs with carbamazepine (Tegretol) or oxcarbazepine (Trileptal). Polypharmacy with other medications is common: baclofen, gabapentin, lamotrigine, and pimozide. Pain or inability to tolerate these medications limits their use.

- Procedural:
 - RFA: Under sedation and fluoroscopic control, a radiofrequency electrode is advanced into the foramen ovale, and the pt is awakened to describe the location of the paresthesia. The lesion is made in cycles of 45–90 sec at temps 60–90° C. Glycerol, ethanol, and cryotherapy have been used to create a nerve lesion by this approach. Injections of local anesthesia and also botulinum toxin have been reported efficacious. Percutaneous balloon compression of the nerve in the foramen ovale for 1–6 min has been employed under general anesthesia.
 - MVD: The posterior fossa is approached through a suboccipital craniotomy. The fifth nerve is identified and a surgical felt is interposed to protect the nerve from the artery or vein. This procedure is performed under general anesthesia. Endoscopic MVD has been reported. Outcome: 70–80% pain free for >10 y.
 - Stereotactic radiosurgery: The trigeminal nerve root at the pons is targeted with a “Gamma knife” radiosurgery. There is delayed onset of pain control. Few centers offer this treatment and long-term outcomes are yet unknown. May be performed with sedation.
 - Neuromodulation: Deep brain stimulation and motor cortex stimulation; these new procedures might have value for pts refractory to current therapies.

Assessment Points

System	Effect	Assessment by Hx	PE	Test
CNS	Cranial nerve involvement, sensory loss	Pain Hx and distribution	Full neurologic exam	MRI, MRA

Key References: Montano N, Conforti G, Di Bonaventura R, et al.: Advances in diagnosis and treatment of trigeminal neuralgia, *Ther Clin Risk Manag* 11:289–299, 2015; Rath GP, Dash HH, Prabhakar H, et al: Cardiorespiratory arrest during trigeminal rhizolysis, *Anaesthesia* 62(9):971–972, 2007.

Perioperative Implications

Preinduction/Induction/Maintenance

- If the procedure calls for pt assistance in identifying the area for ablation, then minimal sedation is used, especially longer-acting benzodiazepines.
- NPO status must be observed.
- Pts with MS require a detailed neurologic examination.
- Pts on anticonvulsant/antiepilepsy medications will be less responsive to induction agents and metabolize liver metabolized agents more quickly.
- Must take special care to avoid trigger zones when placing mask and nasal prongs.

Monitoring

- For MAC or GA for ablation procedures, usual ASA monitors.
- For posterior fossa craniotomy, ASA monitors, invasive arterial and venous lines, and precordial Doppler for venous air embolism detection, depending on the position of the pt.
- Consider the means to pace the heart: transesophageal pacemaker and transthoracic noninvasive pacer (Zoll pads).

General Anesthesia

- All usual considerations for posterior fossa craniotomy, including pt positioning, detection of air embolism, brainstem, and cranial nerve manipulation resulting in bradycardia, asystole, tachyarrhythmias, and Htn or hypotension.
- Avoid succinylcholine in MS pts with extensive motor involvement.
- Expect rapid metabolism of opioids, nondepolarizing muscle relaxants in pts managed with anticonvulsants medications (cytochrome P-450).
- Surgeons may monitor BAERS for eighth nerve function.
- Arousal and extubation will require careful management of BP, HR.
- If manipulation of lower cranial nerves has occurred, the pt may not be able to protect the airway and delayed extubation may be planned.
- Surgeons will expect the pt to respond to commands before leaving the OR.

Regional Anesthesia/Monitored Anesthesia Care

- Judicious use of sedation required such that level can be increased during painful lesioning, but the pt can be aroused for consultation. Agents used include

remifentanyl, fentanyl, methohexital, propofol, and dexmedetomidine.

- Use nasal prongs, careful assessment of patent airway, oxygenation, and ventilation, especially in the elderly and obese.
- Head and airway may be at a distance from the anesthesiologist.
- Placing the radiofrequency electrode may be very painful; may need to convert to GA.

Postoperative Period

- Outpatient surgery is possible with RFA.
- Posterior fossa craniotomy postop care will require a monitored unit for overnight neuro vital signs.

Anticipated Problems/Concerns

- Surgical problems: Infarct, hemorrhage, cranial nerve paralysis, masseter muscle weakness, eighth nerve injury, CSF leak, and dysaesthesia
- Anesthesia problems
- For GA: Positioning problems, including skin, joints, nerve compression, and eye injuries in prone/lateral position
- For MAC care: Oversedation and loss of airway