TRIGEMINAL NEURALGIA (TN):
An Overview

Ramin AmirNovin, MD

Trigeminal neuralgia (TN) is characterized by a recurrent, unilateral sharp pain in the distribution of one or more branches of the trigeminal nerve. The pain is usually in the distribution of the mandibular or maxillary branches and has a prevalence of 4 per 100,000 people1. Given that the diagnosis is made on a clinical basis, controversy still exits in regard to the best method of diagnosing the disorder 2, 3. In general, facial pain may be due to vascular, neurologic, or dental origins. Many patients with TN originally mistake the pain as dental pain and are hence seen and treated by several dentists, who fail to improve their condition. This is understandable since dental pain is much more common than TN and most dentists will only encounter 3-4 cases of TN in a practicing lifetime15. There is increasing agreement that the pain in TN is caused by the demyelination of the trigeminal nerve, due to either vascular compression, multiple sclerosis, amyloid infiltration, or other sources of trauma4.

Once the diagnosis has been made, the first line therapy is carbamazepine. Seventy percent of patients have good pain control with carbamazepine 5. Of the remaining 30%, almost all have good pain control with the help of other medications, including lamotrigine, phenytoin, gabapentin, oxcarbazepine, topiramate, baclofen, and clonazepam 6, 7. Unfortunately, the mean time to recurrence while on pharmacotherapy is approximately one year 6. Patients with poor pain control by medications are then eligible for surgical interventions. These include Microvascular Decompression (MVD)8 of the trigeminal nerve, Percutaneous Rhizotomies (PR) 9 (with glycerol, alcohol, radiofrequency lesion, or balloon expansion), or Gamma Knife Radiosurgery. Unfortunately, since the pain from TN is very severe, very few patients are willing to be a part of studies on the natural history of this disease. Hence the possibility and rate of spontaneous remission are not well studied.

MVD is a surgical intervention (performed under general anaesthesia) where an incision behind the ear allows for a small 3-5 cm craniotomy to be performed directly at the junction of the transverse and sigmoid sinuses. The cerebellum is retracted exposing the trigeminal nerve. Under the microscope, the nerve is inspected and all the vessels that come in contact with the nerve are mobilized and kept off the nerve with the help of Teflon pledgets. With the advent of newer high resolution MRI protocols, the vascular compression of the trigeminal nerve can be documented well before surgery and hence aids in patient selection. PR is a procedure performed under deep conscious sedation. It involves placement of a needle through the patient's cheek and into the foramen ovale at the skull base. Stimulation of the trigeminal nerve at different depths beyond the foramen is used to find the proper area within the trigeminal ganglion that corresponds to the patient's pain territory. Once the correct area of the nerve is found, the patient is deeply sedated and the nerve is injured using either heat (radiofrequency induced), glycerol, alcohol, or balloon expansion. Gamma Knife Radiotherapy (GK) is performed after the placement of a head frame onto the patient's skull under mild sedation and local anaesthesia. The patient's head (while within the frame) is then scanned using a high resolution MRI protocol. The Brain MRI is then used to stereotaxically target the trigeminal nerve just before its entry into the Meckel's cave. Forty Grays of radiation is applied to a 4 mm target and the brainstem dose is kept less than 12 Grays 16.

MVD, PR, and GK all have a comparable short-term efficacy of approximately 80%. The effects of GK radiotherapy take 1-3 months to be complete while most PR and MVD patients have results within 2 weeks. It is the long-term effects of these therapies that are vastly different. Eighty percent of MVD patients continue to have good pain control at ten years of follow-up. Unfortunately, only 30% of PR patients and 55% of GK patients have good symptomatic control in ten years 9-11, 16. Hence, MVD is currently the mainstay of surgical therapy for refractory TN 1, 12. However, MVD is the most invasive of these procedures with many possible complications, even in experienced hands 13. These include hearing loss (0.5%), diplopia, facial weakness, facial numbness (1%), cerebellar or brain stem infarcts, CSF leaks, meningitis, hydrocephalus, and even death (0.2%) 11-13. The major complications of PR and GK are similar in incidence. They both yield approximately 10% facial numbness and 4-6% painful facial numbness (anaesthesia dolorosa)10,18.

The long-term benefits of MVD probably outweigh the risks in younger patients, but older patients have a higher risk of complication. The risk of CSF leaks, wound infection and dehiscence, and transient confusion are all much higher in the elderly 12. Furthermore, many older patients cannot handle the physiologic stress of general anaesthesia. Unfortunately, the incidence of TN in men increases from 4 to 45.2 in 100,000 people after the age of 80 2. Furthermore, previous studies suggest that the pain becomes more difficult to treat with time 2, 6. Hence, the ability to treat TN in the elderly is an important consideration.

Little literature exists with regards to the best overall approach to the TN patient. Most studies are focused on the effectiveness of individual methods of TN therapy 8, 9, 12, 14. Utilizing MVD for relatively younger patients (less than 70 years old) and PR or GK for older patients (older than 70 years old), might provide the best approach. Such an approach can decrease the overall complication rate of surgical therapies for older patients17. Given the relatively mild nature of GK radiosurgery for the patient, there is a large sub-population of younger patients opting for GK for their medically intractable TN. Fortunately, there is evidence to suggest that MVD is still a relatively safe option for the younger patients whose pain recurs after GK or other previous invasive therapies20,21. Early studies of GK in patients with previous invasive therapies of their TN suggest that it is not as efficacious as in it first application but still a good treatment option. Twenty percent of the patients who undergo salvage GK therapy are pain free at 5 years and another 40% have significant pain control18, 19. Hence,TN that is resistant to one modality of invasive therapy may be either addressed through another modality or a repeat posterior fossa exploration with either MVD or partial rhizotomy, depending on the patient's age and relative health 17-20.

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Do you know this man?

The answer will be on page 18.