Trigeminal Neuralgia

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Key points

- A rare, episodic facial pain that is unilateral, electric shock-like, and provoked by light touch
- It is caused by compression of the trigeminal nerve root, usually within a few millimetres of entry into the pons
- First line treatment is sodium channel blockers, either carbamazepine or oxcarbazepine
- Rhizotomy is a minimally invasive surgical procedure to remove sensation from a painful nerve by killing nerve fibres responsible for sending pain signals to the brain.

Abstract

Trigeminal neuralgia (TN) is a rare, episodic facial pain that is unilateral, electric shock-like, and provoked by light touch. Most patients say they feel sudden burning or shock like facial pain they also feel numbness or tingling sensation. At first, it is often mistaken as a tooth problem owing to its presentation in the two lower branches of the trigeminal nerve. Patients may undergo unnecessary and also sometimes irreversible—dental treatment before the condition is recognised. Initially, a small dose of an antiepileptic drug (such as carbamazepine) rather than any analgesic drug can provide excellent pain relief. However, up to 10% of patients will not respond to antiepileptic drugs. It can be secondary to a brain tumour, multiple sclerosis, or vascular anomalies, which will be identified only on neuroimaging. If quality of life becomes impaired and symptoms are uncontrolled with drug treatment, patients should be referred to a neurosurgeon for consideration of surgical management.

Aetiology

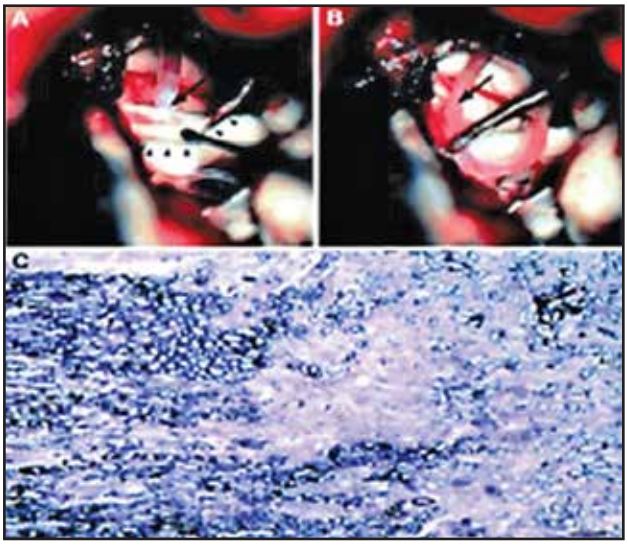
Most cases are caused by compression of the trigeminal nerve root, usually within a few millimetres of entry into the pons, i.e. the root entry zone. In a few cases, trigeminal neuralgia is due to a primary demyelinating disorder. Other, rare causes include infiltration of the nerve root, gasserian ganglion or nerve by a tumour or amyloid, and small infarcts or angiomas in the pons or medulla. Trauma is also a cause of TN. Once all of these possibilities have been excluded, there remains a small proportion of patients in whom the aetiology is undetermined.

Epidemiology

TN is frequently both misdiagnosed and underdiagnosed. The incidence of TN is variably reported between studies, with a range from 4.3 to 27 new cases per 100,000 people per year. The incidence is among women, and increases with age. The lifetime prevalence was estimated to be 0.16–0.3% in population-based studies. The average age of onset is 53 years in classical TN and 43 years in secondary TN, but the age of onset can range from early to old age. In tertiary care-based studies, STN accounted for 14–20% of TN patients.

Pathogenesis of trigeminal neuralgia

The pathophysiology of trigeminal neuralgia has been much debated, the pain being ascribed variously to hyperactivity or abnormal discharges arising from the gasserian ganglion, the `injured' nerve root and the trigeminal nucleus within the brainstem. Any credible explanation of the pathophysiology has to account for both the abnormal generation of sensory impulses and their spread from fibres subserving light touch to pathways involved in the perception of pain in non-congruous regions of the face. The explanation has also to be reconciled with the observation that the pathological substrate of this condition in the great majority of cases appears to be demyelination, especially in the trigeminal root entry zone.



A) The surgical approach to the trigeminal root is posterolateral. Retraction of a vein (arrowheads) discloses a region of indentation (arrow) by an anteriorly placed artery. (B) The offending loop of artery (arrow) has now been mobilized and repositioned behind the nerve root. (C) Examination of toluidine blue-stained semi thin sections through a region of trigeminal nerve root compression reveals a zone of demyelination within the proximal, CNS part of the nerve root, close to the junction with the PNS. Several thinly myelinated fibres are present within the zone of demyelination. Scale bar = 25 µm.

Autonomic symptoms in facial pain

Traditionally, autonomic symptoms such as tearing and rhinorrhoea have not been associated with TN. However, it is now known that a large proportion of TN patients have autonomic symptoms from time to time. Keeping in mind that the trigeminovascular reflex can be elicited by intense facial pain in general, it is not surprising that there can be sporadic autonomic symptoms in TN. The challenge is related to differential diagnosis; short-lasting triggered stabbing pain with pronounced and consistent autonomic symptoms is characteristic of short-lasting unilateral neuralgiform headache attacks with conjunctival injection and tearing (SUNCT), and short-lasting uni-lateral neuralgiform headache attacks with autonomic symptoms (SUNA)

Diagnosis and Treatment

Medical experts suggest a MRI of the brain and brainstem, ECG and laboratory testing. As symptomatic and classical TN cannot be confidently separated based on history and examination, an MRI is important early on to exclude a symptomatic cause of pain that could warrant specific treatments, such as tumours or multiple sclerosis. Laboratory testing is performed to ensure normal renal and liver function and normal sodium level prior to prescription of medication. ECG is warranted because carbamazepine and oxcarbazepine are contraindicated in patients with atrioventricular block. First line treatment is sodium channel blockers, either carbamazepine or oxcarbazepine. Initial dose of carbamazepine is 200mg orally twice a day which increases weekly in increments up to 200mg per day. Maximum dosage of carbamazepine is 1600mg per day. They have the same mechanism of action, namely the blockade of voltage-gated sodium channels in a frequency-dependent manner. Treatment recommendations are generally the same in classical and secondary TN. Generally, sodium channel blockers are effective in most TN patients. However, side effects including somnolence, drowsiness, dizziness, rash, and tremors are frequent. Oxcarbazepine may be preferred because of a minor risk of drug interaction.

Rhizotomy

Rhizotomy is a minimally invasive surgical procedure to remove sensation from a painful nerve by killing nerve fibres responsible for sending pain signals to the brain. This is also another treatment which is being used these days for the treatment of trigeminal neuralgia. There are different types of Rhizotomy i.e.

1. Radiofrequency Rhizotomy
2. Endoscopic Rhizotomy

References

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