Trigeminal neuralgia pathogenesis

- The Impact of Negative Emotions on the Treatment Outcome of Percutaneous Balloon Compression for Idiopathic Trigeminal Neuralgia Patients: A Longitudinal Study
- Cognitive and Personality Profiles of Patients With Chronic Trigeminal Neuralgia
- Concomitant trigeminal and glossopharyngeal neuralgia: Illustrative case and scoping review
- Long-Term Effectiveness of Early Versus Late Microvascular Decompression for Trigeminal Neuralgia Secondary to Arterial Compression
- Glial inwardly rectifying potassium channel 4.1 regulates secretion of BDNF and GDNF via ERK1/2 MAP kinases in trigeminal neuropathic pain
- Identifying associated comorbidities in the development of trigeminal neuralgia: A propensity-matched analysis of the National Inpatient Sample
- Lactate alleviates trigeminal neuralgia symptoms in mice by suppressing neuroinflammation
- Knockdown of the CALHM1 Gene Alleviates Allodynia in Rats With Trigeminal Neuralgia

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Many anatomical variants can potentially contribute to trigeminal neuralgia. These include compression by the superior cerebellar artery and less commonly, bony compression near the Meckel's cave.

Banerjee et al. reported the gross and histological findings of a cadaveric specimen found to have a bony roof of the trigeminal cave. During the routine dissection of a male cadaver, an unusual finding of the skull base was observed. Palpation over the porus trigeminus identified a completely ossified roof. The bony spicule was 1.22 cm long and 0.76 mm wide. The trigeminal nerve was noted to have an indented region just below its contact with the ossified roof of the porus trigeminus. No frank nerve degeneration was noted with histological analysis. Normal mature bone tissue was noted surrounded by a sheath of dura mater. Future radiographic research is needed to better elucidate if ossification of the roof of the trigeminal cave is related to clinical symptoms of trigeminal neuralgia (TN). However, physicians should be cognizant of radiographic ossification of the trigeminal cave as a potential cause of TN [1)]

The main cause of lightning-like pain in patients with TN may be chronic inflammation that causes nerve demyelination. Nano-silicon (Si) can safely and continuously produce hydrogen in the alkaline environment of the intestine to exert systemic anti-inflammatory effects. Hydrogen has a promising anti-neuroinflammatory impact. The study aimed to determine how intra-intestinal application of a hydrogen-producing Si-based agent affected the demyelination of the trigeminal ganglion in TN rats. We discovered that increased expression of the NLRP3 inflammasome and inflammatory cell infiltration occurred concurrently with demyelination of the trigeminal ganglion in TN rats. We could determine that the neural effect of the hydrogen-producing Si-based agent was connected to the inhibition of microglial pyroptosis by using transmission electron microscopy. The results demonstrated that the Si-based agent reduced the infiltration of inflammatory cells and the degree of neural demyelination. In a subsequent study, it was discovered that hydrogen produced by a Si-based agent regulates the pyroptosis of microglia may through the NLRP3-caspase-1-GSDMD pathway, preventing the development of chronic neuroinflammation and consequently lowering the incidence of nerve demyelination. This study offers a novel strategy for elucidating the pathogenesis of TN and developing potential therapeutic drugs [2)]

B cell receptor signaling pathway, cell adhesion, complement and coagulation cascade pathways, neuroimmune pathways are closely related to the occurrence of trigeminal neuralgia. The interaction of multiple genes among Cacna1s, Cox8b, My11, Ckm, Mylpf, Myoz1, Tnnc2 leads to the occurrence of trigeminal neuralgia [3)].

Neurovascular contact in trigeminal neuralgia

see Neurovascular contact in trigeminal neuralgia.

see Superior cerebellar artery aneurysm.

see Tumor associated trigeminal neuralgia.

Other anatomical abnormalities have been considered, including differences of trigeminal nerve (TN) volume.

No correlation between volumetry and clinical data was detected [4)].

see Multiple sclerosis related trigeminal neuralgia.

The incidence rates of posterior fossa tumor-induced TN range from 2.1–11.6% percent; in the literature; these cases mainly comprise meningiomas (14–54% percnt;), epidermoid tumors (8–64% percent;), and vestibular schwannomas (7–31% percnt;) [5) 6) 7) 8)].

It appears that aggressive bony edges may contribute-at least indirectly-to the neuralgia. This should be considered for surgical indication and conduct of surgery when patients undergo MVD [9)].

Posterior fossa volume

Abarca et al. data support the theory that a small volume of the posterior fossa cisterns containing the trigeminal nerve may increase the incidence of ITN [10].

Horínek et al. did not find any association between the clinical neurovascular conflict (NVC) and the size of the posterior fossa and its substructures. MRI volumetry may show the atrophy of the affected trigeminal nerve in clinical neuromuscular conflict [11].

Park et al. did not find any volumetric differences (including the cisternal and parenchymal volumes) [12].

Chiari's malformation and hydrocephalus are rare associates of TN. The pathophysiology of TN in these cases may be due to neurovascular conflict, related to raised intracranial pressure from the hydrocephalus and/or the small posterior fossa volume in these patients. Drainage of associated hydrocephalus may be an effective surgical treatment [13].

Pontomesencephalic cistern

High-resolution magnetic resonance imaging scans are able to demonstrate significant volumetric differences of the pontomesencephalic cistern in patients with unilateral TN. A smaller cistern may be correlated with the occurrence of a neurovascular compression, and these findings support the neurovascular compression theory in idiopathic TN [14].

Park et al. confirmed that small pontomesencephalic cistern volumes were more frequent in patients with TN [15].

Uric acid in trigeminal neuralgia

see Uric acid in trigeminal neuralgia.

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