Imaging Characteristics of the Affected Trigeminal Nerve in Cases of Trigeminal Neuralgia Caused by Pure Venous Conflict.

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Abstract

Introduction: The efficacy of neuroimaging for identification of the pure venous neurovascular conflict (NVC) in cases of trigeminal neuralgia (TN) is low. Possible identification of additional radiological characteristics that may support clinical diagnosis and help to determine indications for microvascular decompression (MVD) in such cases seems important.
Method: The objective of our retrospective study[1] was assessment of the imaging characteristics that may support the clinical diagnosis of TN caused by pure venous conflict. Preoperative axial constructive interference in steady state (CISS) images were analyzed in 30 patients with TN, and length, width, T2 hyperintensity, and shape of the cisternal segment of trigeminal nerve (CN V), as well as sizes of the trigeminal-pontine angle, trigeminal-petrous angle, and cerebellopontine cistern were evaluated on both sides. In all patients pure venous NVC as a cause of TN was confirmed during subsequent MVD performed between April 2007 and December 2019. Two-tailed paired t test and chi-square test were used for comparison of evaluated variables as appropriate.
Result: On the affected side, the length of CN V was significantly shorter (mean 7.9 mm vs. 9.0 mm, P = 0.0249), whereas its width in midportion (mean 4.0 mm vs. 3.5 mm, P = 0.0022) and the size of the trigeminal-pontine angle (mean 55.30 vs. 48.80, P = 0.0052) were significantly larger. Other evaluated characteristics did not differ significantly between affected and nonaffected sides. Statistically significant odds ratio (OR) for the association with affected side was revealed for shorter length (OR 10.5, P = 0.0319) and larger width (OR 8.8, P = 0.0487) of CN V; the presence of either of these parameters (i.e., shorter and/or thicker CN V) provided the highest discriminative value (OR 19.3, P = 0.0063).
Discussion: In patients with TN the length of CN V on the affected side is usually shorter compared with the nonaffected side,[2,3] which well corresponds to results of this study. However, our data showed significantly greater trigeminal-pontine angle and larger width of CN V on the side of facial pain, which contravene previous reports.[2,3] Of note, all former relevant investigations were mostly done in cases of NVC caused by compressing artery, which is clearly different from our series. It can be speculated that different types of NVC result in divergent changes of CN V and that in contrast to arterial compression, which may be due to the sharper trigeminal-pontine angle and frequently lead to the nerve root atrophy, venous conflict often causes stretching and/or local edema of CN V, which may appear on MRI as an increase of its width.
Conclusions: Identification of shorter and/or thicker CN V on the affected side in patients with TN without an obvious offending vessel on MRI may suggest the presence of pure venous conflict and help with decision making about MVD.

References

1. Kumar A, Kubota Y, Yokosako S, Chernov M. Radiological characteristics of the affected trigeminal nerve in cases of trigeminal neuralgia caused by pure venous conflict. World Neurosurg. 2025;194:123500.
2. Park SH, Hwang SK, Lee SH, Park J, Hwang JH, Hamm IS. Nerve atrophy and a small cerebellopontine angle cistern in patients with trigeminal neuralgia. J Neurosurg. 2009;110(4):633-7.
3. Ha SM, Kim SH, Yoo EH, Han IB, Shin DA, Cho KG, Chung SS, Park YS. Patients with idiopathic trigeminal neuralgia have a sharper-than-normal trigeminal-pontine angle and trigeminal nerve atrophy. Acta Neurochir (Wien). 2012;154(9):1627-33.