Headache Medicine

The Role of Brain Mri as an essential method in the Diagnosis of Trigeminal Neuralgia

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Introduction
The trigeminal nerve is the main sensory nerve of the face and head and is subdivided into three branches: ophthalmic nerve (V1), maxillary nerve (V2) and mandibular nerve (V3). Trigeminal neuralgia (TN) is a complex, debilitating condition, of sudden onset, caused by intense, unilateral and paroxysmal pain in one or more branches of the trigeminal nerve.
According to the document "Trigeminal neuralgia - New classification and diagnostic classification for practice and research", published in 2016, classic TN requires demonstration of morphological changes in the root of the trigeminal nerve due to vascular compression, and the superior cerebellar artery and anteroinferior cerebellar artery are the most involved. Secondary TN occurs due to an identifiable underlying neurological pathology, such as neoplastic processes, traumatic conditions, vascular malformations, and demyelinating diseases. Finally, TN of unknown etiology is called idiopathic and is a diagnosis of exclusion.
Objective
This study aims to reinforce the importance of Magnetic Resonance Imaging (MRI) of the brain in patients with trigeminal neuralgia, in order to detect a possible causal factor. The study is corroborated by MRI images from our personal collection, illustrating the diffferent subtypes of TN.
Methods
This article was based on a bibliographic review using the following databases as a research source: the Scientific Electronic Library Online (SCIELO), Google Scholar and NCBI Pubmed.The terms: neuralgia, trigeminal and Magnetic Resonance were used as descriptors. The inclusion criteria were language (English, Spanish and Portuguese) and period (2018-2023). At the end of the bibliographic survey, 14 articles were selected, according to their relevance to the proposed topic.
Results
The most common cause of trigeminal neuralgia is neurovascular conflict, which occurs primarily with an arterial branch. MRI protocols with thin slices and 3D sequences with constructive interference in steady state (CISS) or similar are essential for evaluating the cerebropontine angle and inner ear in patients with TN. The presence of a contact margin between a vascular branch and the trigeminal nerve is not sufficient to be characterized as neurovascular conflict, as this finding is commonly visualized incidentally in asymptomatic patients. For this reason, criteria such as thinning or deformation of the nerve or distortion of its course must be taken into consideration. It should be emphasized, however, that the transition zone (TZ) of the trigeminal nerve consists of a segment with approximately 2.0 mm that is about 4.2 mm from the brain stem, and it is an area extremely sensitive to mechanical traction. For this reason, when contact occurs in the TZ of the trigeminal nerve, it must be considered responsible for the TN. Differentelly from primary TN, secondary TN occurs in the presence of neoplasms, benign or malignant, that occur in the pathway of trigeminal nerve. In this context, meningiomas and schwannomas are the most commonly detected tumors.
In 1995, Hasegawa et al. classified the mechanisms of TN secondary to neoplasms as follows: type A, the nerve is completely involved by the tumor; type B, the nerve axis is distorted by the tumor; type C, the nerve is displaced by the tumor and compressed contralaterally by the artery, and type D, the tumor displaces the artery, which ends up compressing the nerve. To illustrate what we mentioned, in this study we show examples from our personal collection of images of patients with primary TN (conflicts between the trigeminal nerve and the CSA, the AICA and the vertebral artery) and with secondary TN (meningioma, schwannoma, herpetic rhomboencephalitis).
Conclusion
Trigeminal neuralgia is a painful complex condition that can be associated to neurovascular conflict and structural injuries. For this reason, evaluation with brain MRI is essential for diagnosis, therapeutic planning and postoperative follow-up.

Keywords: neuralgia;trigêmeo;ressonância magnética.