

Magnetic Resonance Morphometry of Trigeminal Nerves in Order to Identify Factors Predisposing to the Development of Trigeminal Neuralgia

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Abstract

The aim of the study was to prospectively validate MR-criteria used for diagnosis of trigeminal neuralgia (TN).

Study population consisted of 133 patients: with trigeminal neuralgia (TN) (86, surgically ($n = 56$) and clinically ($n = 30$) verified; 55 ± 11 years) and reference group (47; 51 ± 16 years). The data were obtained using the FIESTA sequence (slice thickness 0,5 mm) on 3 T and 1,5 T (Discovery 750w and Optima 450w, General Electric).

Oblique coronal submillimetric reformatted images from MR-3D datasets were used to determine the length, cross-sectional area (CSA) and diameters ratio (DR, ratio of the biggest cross-sectional diameter to the smallest) of the trigeminal nerves at the point of 5 mm from the pons.

The CSA on the symptomatic side were significantly smaller than the CSA on the asymptomatic side in outpatients with neuralgia (medians 2,9 and 4 mm², $p < 0,05$) and operated patients (medians 2 and 3,38 mm², $p < 0,001$). Also the mean CSA on the symptomatic side was significantly smaller in comparison with the controls (medians 2,3 and 3,55 mm², $p < 0,001$).

The DR on the symptomatic side were significantly bigger than the DR on the asymptomatic side in outpatients (medians 1,78 and 1,32; $p < 0,001$) and in operated patients (medians 2,1 and 1,43; $p < 0,001$). The DR on the symptomatic nerves were significantly bigger in comparison with the controls (medians 2,08 and 1,4; $p < 0,001$).

The lengths in collateral nerves in patient with TN (medians 12,4 and 11,9 mm, $p > 0,05$ for outpatients; medians 12,9 and 12,6 mm, $p > 0,05$ for operated patients) and in comparison with the controls were not statistically different (medians 12,55 mm and 12 mm, $p > 0,05$).

The CSA in outpatients with TN were significantly bigger than the CSA in operated patients (medians 2,9 and 2 mm², $p < 0,05$). DR in outpatient and operated patients did not statistically differ (medians 2,1 и 1,78; $p > 0,05$).

Thus, noninvasive MR-measurements of the trigeminal nerves show the differences between the symptomatic and asymptomatic side in the patients with TN as well as healthy individuals. This result may be used in the diagnosis of TN.

Key words: Trigeminal Neuralgia, Magnetic Resonance Imaging, FIESTA, Neurovascular Relationships.

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