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THE IMPORTANCE OF RADIO FREQUENCY ABLATION FOR TRIGEMINAL NEURALGIAS.

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Abstract
Views on the etiology and pathogenesis of trigeminal neuralgia (TN) have changed as diagnostic and treatment methods have improved. The use of microvascular root decompression has shown high effectiveness, but relapses of the disease are observed.

Keywords: **Analysis of literature data on epileptic seizures in various locations of brain tumors**

Introduction
Views on the etiology and pathogenesis of trigeminal neuralgia (TN) have changed as diagnostic and treatment methods have improved. The use of microvascular root decompression has shown high effectiveness, but relapses of the disease are observed. In addition, there is increasing evidence that disputes vascular compression as a cause of TN neuralgia. The issue of improving diagnostic methods and establishing the cause of the disease is still relevant. To assess microstructural changes in the white matter of the brain, a special MRI sequence is used in diffusion tensor mode with tractography. It allows you to quantitatively assess various indicators of diffusivity, for example, fractional anisotropy (FA), radial and axial diffusion, etc. In the presented work, we analyzed the information content of FA in trigeminal neuralgia (TGN). This parameter was chosen as an integral one, and the features of the tomograph software did not allow reproducible assessment of diffusion vectors.

Materials and Methods
All patients undergo brain MRI using a GE Signa HDxt 3.0 T device (GE Healthcare) using the protocol recommended by the European Academy of Neurology [1]. The scanning protocol included the following modes: high-resolution images, T1 and T2 time-weighted (TI), in 3D CUBE mode, slice thickness 1 mm, matrix 288 × 288 points, square field of view measuring 26 cm; • FIESTA-C mode, slice thickness 0.4 mm (interpolated), matrix 384 × 384 pixels, square field of view measuring 26 cm; non-contrast time-of-flight arteriography in 3D TOF (time-of-flight) mode, slice thickness 1 mm (interpolated), matrix 288 × 384 points, square field of view measuring 26 cm. Conditions for NVC identified on MRI in FIESTA-C mode were classified according to M Sindou [2]: • degree of compression I – the vessel is in contact with the nerve; • degree of compression II - the vessel dislocates the nerve; • degree of compression III - the vessel causes visible atrophy of the nerve at the point of contact. Based on the results of the FIESTA-C sequence, the thickness of the

TN roots was measured on both sides of each patient. The measurement was carried out in the middle third of the TN root in the axial projection (in the ROI area); the straightness of the cisternal portion and the severity of the impact of adjacent vascular structures were assessed in 3 projections. The difference in root thickness (ΔTN) was obtained by subtracting the value of the root thickness of the symptomatic side from the value on the healthy side. With severe vascular compression, thinning of the root is expected, which will be manifested by a positive value when calculating the difference between the thickness of the healthy and symptomatic roots. To assess microstructural changes, the protocol was supplemented with the DTI mode with the following parameters: a block of slices in the DTI mode in the axial plane, positioned parallel to the TN, slice thickness 2.6 mm, matrix 384 × 384 points, square field of view measuring 26 cm, number of phase directions encoding gradient 35. Maps of FA were obtained - an indicator reflecting the degree of directionality of diffusion and representing the ratio of the components of transverse diffusion to longitudinal diffusion: with absolutely directional (anisotropic) diffusion it is equal to 1, with absolutely non-directional (isotropic) diffusion it is equal to 0. By selecting the region of interest (region of interest, ROI), placed on the cisternal portion of the TN, a quantitative calculation of the FA indicator was made. To standardize the study, regardless of the location of the neurovascular conflict (NVC), the widest part of the middle third of the TN root was chosen as the target for the ROI. The choice of target is also related to the radiosurgery that patients are undergoing, during which the same area serves as the irradiation site. In Sindou grade III, the ROI was placed before or after the nerve penetration site, depending on which was closer to the middle third of the root. To increase the accuracy of measurements, preliminary coregistration of DTI data with high-resolution anatomical images was carried out.In the structures of the central nervous system, the direction of diffusion (anisotropy) depends on the fibrillar structure and the presence of the myelin sheath. In unchanged tissues, the diffusion of liquid molecules is directed along the fibers and is practically absent in the radial direction. The FA indicator in this case will tend to one. An increase in radial diffusion (in the transverse direction) occurs during pathological processes, as a result of which the integrity of the myelin sheath of axons is disrupted (for example, during demyelination) and their fibrillar structure changes (for example, during gliotic changes). In such cases, directionality (diffusion in the longitudinal direction) decreases, and the FA indicator tends to zero [3, 4]. The FA indicator quantitatively reflects the processes of demyelination, and therefore can serve as a biomarker of the clinical severity of TGN [5]. However, data on PA in TGN remain controversial. Most authors, when assessing DTI at the preoperative stage, revealed a decrease in PA on the side of clinical manifestations [6, 7]. Percutaneous selective radiofrequency ablation of the trigeminal nerve branch (at the level of the Gasserian ganglion) is performed in one stage. Many options are used to treat TN, namely drug therapy, microvascular decompression, percutaneous radiofrequency ablation, radiosurgery, retrogasserian rhizotomy, peripheral neurectomy, trigeminal tactotomy, glycerol injection and alcohol in the Gasserian node, balloon compression of the Gasserian node. The lack of a unified algorithm and approach in the treatment of TN is due to the use of different surgical methods, scales and criteria for selection and outcome assessment, the lack of studies in large series and the use of different surgical methods [10].retrogasserian rhizotomy, peripheral neurectomy, trigeminal tactotomy, injection of glycerol and alcohol into the gasserian node, balloon compression of the gasserian node. The lack of a unified algorithm and approach in the treatment of TN is due to the use of different surgical methods, scales and criteria for selection and outcome assessment, the lack of studies in large series and the use of different surgical methods [10].retrogasserian rhizotomy, peripheral neurectomy, trigeminal tactotomy, injection of glycerol and alcohol into the gasserian node, balloon compression of the gasserian node. The lack of a unified algorithm and approach in the treatment of TN is due to the use of different surgical methods, scales and criteria for selection and outcome assessment, the lack of studies in large series and the use of different surgical methods [10].

Conclusion

Selective radiofrequency ablation, as with unilateral TN, is an effective and relatively safe method of treating BTN. Further studies in larger patient groups are needed to evaluate the effectiveness of radiofrequency ablation for BTN.

References

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