

## ASSESSMENT OF THE EFFECT OF DISTORTION OF MAGNETIC RESONANCE IMAGING IMAGES ON THE PLANNING OF RADIATION THERAPY

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MRI images have been increasingly used in radiotherapy planning in recent years. They have better soft tissues contamination in comparison with CT scans. This is used effectively in the irradiation of soft tissue tumors and especially brain tumors. However, geometric distortions have an impact on dose delivery accuracy when MRI is used in LT. MRI distortion is a particularly acute problem when planning stereotactic radiosurgery. In this case high dose (from 12 Gy) is delivered in 1-3 fractions with high accuracy of the beam hitting the target region. The aim of the present work is to measure distortions of MRI-images using a special phantom and subsequent quantitative assessment of their influence of distortion on stereotactic radiosurgery plan formation. CT scanning of the phantom was performed on a Phillips Brilliance iCT. The thickness of the slices was 1 mm and the resolution of the image was 0.5 mm.

The detected distortion is minimal in the central part of the magnetic field and increases significantly at the periphery of the examined phantom. The maximum displacement found is 3.1 mm and is located at 6.6 cm from the central axis of the phantom. At distances less than 5 cm from the center, the effect of distortion is not clinically significant and averages 0.01 cm.

The main conclusion of this work is that the measurement of distortion is essential to guarantee the accuracy of the planning process and further treatment of patients. It can be concluded from this study that for the practical application of MRI in radiotherapy planning, special protocols for outlining structures on MRI images should be applied considering the distortion. Otherwise, there is a possibility that covering the target with a dose will be unacceptable

### The speaker is a student or young scientist

Yes

### Section

1. Nuclear technology and methods in medicine, radioecology

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