Tumor volume assessment in consecutive newly-diagnosed patients with acromegaly- evaluation of two methods

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Introduction and aim

Volumetric assessment is not a standard procedure in the analysis of pituitary Magnetic Resonance Imaging (MRI), even though it is reported to be reliable and might predict the surgical outcomes.

Our aim was to **evaluate the outcomes of two quantitative methods of tumor volume measurements** in patients with acromegaly.

Material and methods

72 consecutive patients diagnosed with acromegaly between 01.01.2012 and 31.12.2021 at the Department of Endocrinology, Jagiellonian University Medical College were evaluated (Figure 1). Pituitary MR images were analysed by a specialist of radiology with experience in the interpretation of pituitary MRI (diverse radiological manifestations are depicted in Figure 2). Tumor volume was measured by manual segmentation (Method 1) and by manual delineation of volume of interest (VOI)(Method 2). Other radiological parameters noted are included in Table 1.

Figure 1.

72 consecutive newly-diagnosed patients with acromegaly

Inclusion criteria:

Biochemically confirmed acromegaly before treatment

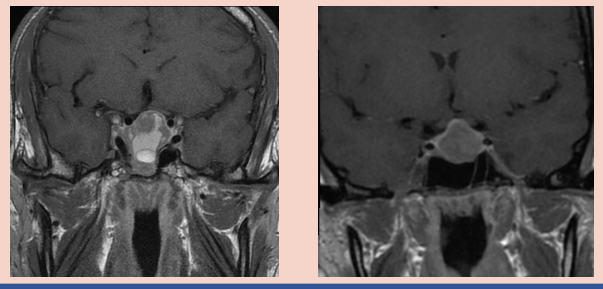
Sellar tumor confirmed in the pituitary MRI

58 patients were included in the study

Table 1.

Components of radiological assessment:
• The largest tumor diameter Parasellar expansion assessed using modified Knosp classification
• Evaluation for the compression of the optic chiasm
• Signs of the intratumoral bleeding.

Figure 2. Analysed pituitary MR T1, contrast-enhanced images. On the left: pituitary tumor with features of intratumoral bleeding, bilateral invasion to cavernous sinuses and compression of the optic chiasm. On the right: macroadenoma with compression of the optic chiasm.



Results

The median TV was 1.02 cm^3 (IQR 2.08) for Method 1 and 1.23 cm^3 (IQR 2.21) for Method 2. There was a strong correlation between measurements in two Methods ($R=0.949$; $p<0.01$) as well as between each method and the maximal tumor diameter ($R=0.884$, $p<0.001$ for Method 1 and $R=0.893$; $p<0.01$ for Method 2). Univariate logistic regression showed, that in both Methods larger tumor size was associated with higher risk of optic chiasm compression and invasion of the cavernous sinuses. Neither method was associated with tumor infarction. Surprisingly, tumor volume estimation using both methods did not predict the outcomes of the surgery in the univariate logistic regression ($p=0.117$)

Conclusions

Both methods show a strong correlation between each other and with median tumor diameter- **therefore their use may be reliable**. Surprisingly, tumor volume did not predict the neurosurgery outcomes in our cohort of patients.