

Tumor to Cerebellar Peduncle T2-Weighted Imaging Intensity Ratio Fails to Predict Pituitary Adenoma Consistency

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Introduction

The consistency of pituitary macroadenomas affects the complexity of surgical resection. On T2-weighted (T2W) imaging, the intensity ratio of the tumor to the cerebellar peduncle (tumor to cerebellar peduncle T2-weighted imaging intensity; TCTI ratio) correlates with meningioma consistency. We aimed to determine the correlation of this radiographic finding with pituitary macroadenoma consistency and determine whether it can be used for preoperative planning.

Methods

We performed a retrospective evaluation of 196 patients with macroadenomas who underwent endoscopic transsphenoidal resection from January 2012 to June 2017. Macroadenoma consistency was determined by one senior neurosurgeon at the time of surgery. Axial and coronal T2W MRI images were evaluated retrospectively and adenoma size, Knosp grade, suprasellar extension and TCTI were calculated.

Learning Objectives

MRI use for prediction of pituitary adenoma consistency

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Results

The mean TCTI ratio was 1.70 (95% CI: 1.65-1.75). Intraoperatively, 140 (71.4%) adenomas were classified as soft and 48 (24.5%) as fibrous. Gross total resection was achieved in 66.7% of fibrous adenomas and in 86.4% of soft adenomas (p = 0.007). The mean score was 1.68 (95% CI: 1.62-1.74) for soft tumors and 1.76 (95%CI: 1.67-1.84) for fibrous tumors. There was no difference in the mean TCTI score between groups. Lactotroph and somatotroph adenomas had a lower mean TCTI ratio compared to other functioning and non-functioning adenomas with a mean TCTI of 1.52 compared to 1.77.

Conclusions

In this retrospective cohort study we found that the TCTI score does not correlate with tumor consistency. We also noted that the TCTI score is increased in prolactin and growth hormone secreting adenomas.



(A) Representative MRI analysis and ROI measurement for macroadenoma and cerebellar peduncle; (B) Dot plot of TCTI ratio for soft and fibrous adenoma, no statistically significant difference was identified (p = 0.19); (C) ROC curve dermonstrating lack of predictive value of the TCTI ratio for tumor consistency (AUC = 0.419 ± 0.047, p = 0.9)