ROLE OF CONVENTIONAL T2 AND DIFFUSION WEIGHTED MAGNETIC RESONANCE IMAGING IN PREOPERATIVE EVALUATION OF PITUITARY MACROADENOMA CONSISTENCY

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Introduction

Pituitary macroadenomas are typically benign tumors, that are composed of glandular tissue growth larger than 10 mm in the pituitary gland. Most are noncancerous.

The pituitary macroadenomas were divided into three groups based on the surgical viewpoint and histology of the tumor consistency: soft, intermediate, and hard.

The preoperative assessment of pituitary macroadenoma tumor consistency is crucial for neurosurgery in order to determine which surgical approach-transsphenoidal or transcranial-is the best. Tumors with a soft consistency can be removed by suction using the transsphenoidal approach, whereas those with a harder consistency are more fibrous and more difficult to remove through suction and curettage, which suggests the use of the transcranial approach.

Tumor cellularity and consistency can be evaluated noninvasively using apparent diffusion coefficient (ADC) mapping and diffusion-weighted imaging (DWI).

Our hypothesis was that we could predict consistency and successfully standardize MR signals to a consistent anatomical landmark using ratios of adenoma to cerebellar peduncle signal intensity on MR T2-weighted imaging.

Aim of the Work

The aim of this study was to evaluate the role of diffusion weighted MR imaging (DWI) and T2 signal in the preoperative evaluation of pituitary macroadenoma consistency.

Patients and Methods

Patients

Our study was conducted on twenty two patients diagnosed with pituitary macroadenoma.

Methods:
I. Full history taking.
II. Clinical examination.

MRI of the pituitary gland including:
- o Axial and sagittal T1WI.
- o Axial and coronal T2WI.
  - • Axial, sagittal and coronal contrast-enhanced T1WI.
  - • Coronal dynamic post-contrast T1 WI for the pituitary gland.
  - • DWI/ADC maps.
  - • The ratio of tumor to brainstem ADC and the ratio of tumor to brainstem T2-weighted signal was calculated.

III. Correlation with histopathological and/or surgical data was done.

Results

Table: Prognostic performance for different parameters to consistency

	AUC	p	95% C.I	Cut off	Sensitivity	Specificity	PPV	NPV
T₂ ratio	0.835	0.008*	0.624–1.000	≤1.4	81.82	63.64	69.2	77.8
				<1.34	81.82	100.0	100.0	84.62
ADC ratio	0.781	0.026*	0.557–1.000	>1	81.82	72.73	75.0	80.0
				< 1.1	18.18	27.27	20.0	25.0
ADC mean	0.876	0.003*	0.698–1.000	>0.64#	100.0	81.82	84.6	100.0
				>0.61	100.0	54.55	68.75	100.0

Case:
A 54 years old male patient presented by seizures and decreased visual acuity.
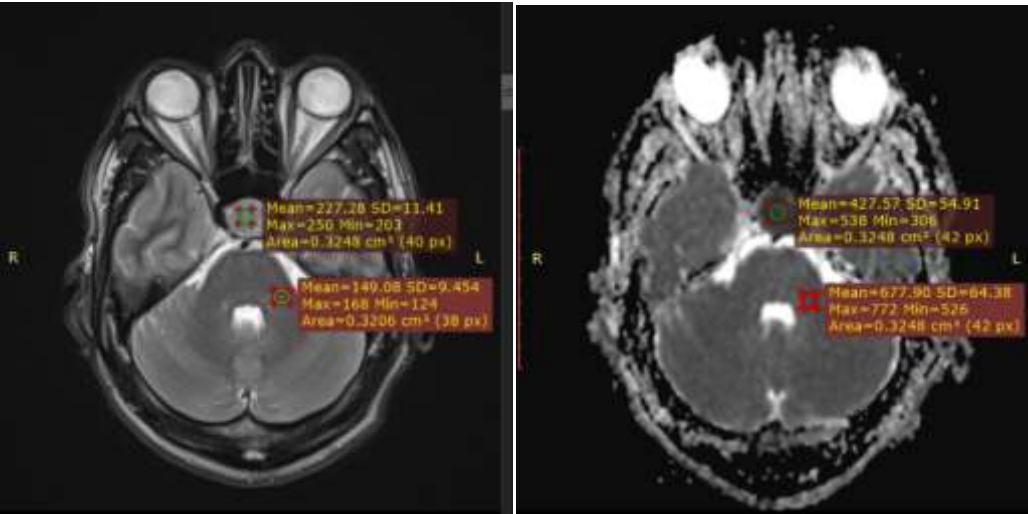

Figure: - Axial T2WI, DWI/ ADC maps (a,b)
Show a large macroadenoma showing restricted diffusion with T2ratio=1.5, ADC ratio=0.6 and ADC mean =0.4×10^{-3} mm^2 /s.
ROIs show regions of interest.
Surgical consistency was proved as soft and was removed through transsphenoidal approach.
Radiological consistency=soft

Conclusion

Diffusion weighted MR imaging (DWI) and T2 signal are successful in the preoperative evaluation of pituitary macroadenoma consistency.