Diagnostic value of MR imaging for prostatic lesions

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Introduction

Recently, great interest has been shown in multi parametric MRI(mpMRI), which combines anatomic T2WI and T1WI with MRS, DWI and/or dynamic contrast-enhanced MRI (DCE-MRI).

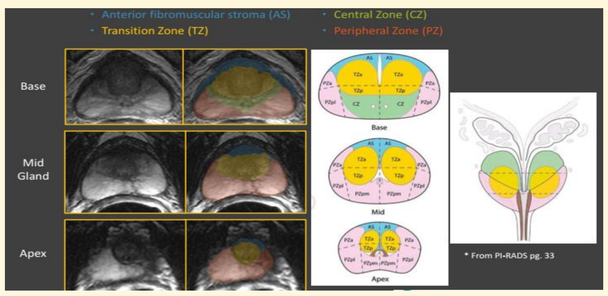
• The combination of anatomic, biologic and functional dynamic information offered by mpMRI improve early detection and characterization of prostatic lesions and improve many aspects of Prostatic Cancer management.

Objectives

To evaluate the diagnostic accuracy of MRI in detection and characterization of different prostatic lesions.

Methods

This prospective study include MRI prostate of 30 adult male patients presented by different prostatic lesions obtained by using 1.5Tmachine. Pulse sequences include conventional (T1W& T2W) , (MRSI), (DWI) and/or (DCE-MRI). The mp MRI results are correlated with histopathological reports obtained after TRUS biopsies



Results

Table(1) conventional MRI findings compared with histopathology.

Histopathology	Conv. MRI findings	No	%
Cyst	high T2 , low T1	4	100
BPH	Enlarged TZ with normal PZ	4	100
Malignant	Enlarged TZ with abnormal SI at PZ(BPH + cancer)	13	86.7
	Abnormal SI at PZ and TZ (sarcoma)	2	13.3
	Total	15	100
Infarction	Enlarged TZ with abnormal SI at PZ & TZ	2	100
Atrophy	Normal TZ with abnormal SI at PZ	3	100
Granulomatous prostatitis	Enlarged TZ with abnormal SI at PZ & TZ	2	100

Table (2): DWI and ADC findings compared with histopathology.

Pathology	DWI and ADC	No	%
Benign	no restriction	8	59.7
	Restriction	7	40.3
	Total	15	100.0
Malignant	no restriction	1	6.7
	restriction	14	93.3
	Total	15	100

Table (3): MRS on PZ compared with histopathology

Pathology	values of { (Cho + CR) \ CIT}	No	%
Benign	normal (≤0.34)	10	66.6
	borderline (0.34 -0.50)	3	20.0
	cancer (>0.50)	2	13.3
	Total	15	100
Malignant	cancer (>0.50)	15	100

Table (4) MRS on TZ compared with histopathology

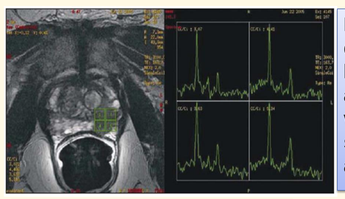
Pathology	(Cho + CR)\CIT ratio	No	%
Benign	normal (≤0.63)	11	73.3
	borderline (0.63-0.93)	4	26.7
	Total	15	100
Malignant	normal (≤0.63)	13	86.7
	cancer (≥0.93)	2	13.3
	Total	15	100

Table (5) MRI Diagnostic accuracy for malignant prostatic lesions

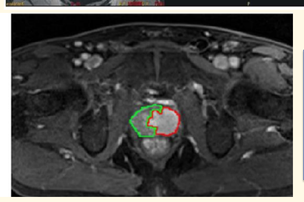
Sensitivity	100%
Specificity	53.3%
Positive predictive value	68.2%
Negative predictive value	100%
Accuracy	76.7%

Illustrated cases

Case (1): 53-year-old man with Prostate cancer (Gleason score of 4 + 3 and a PSA level of 90.5 ng/mL)

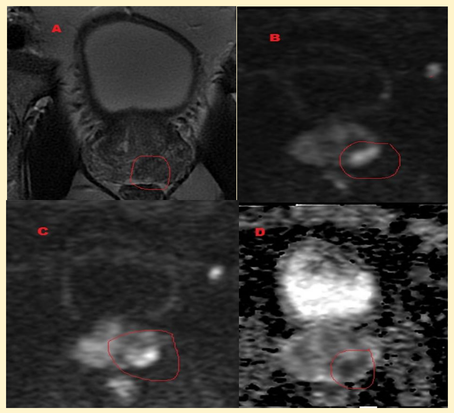


MR axial T2W demonstrating low signal lesion on the LT apical PZ, and four contiguous voxels with a neoplastic spectral pattern (↑choline and ↓citrate).



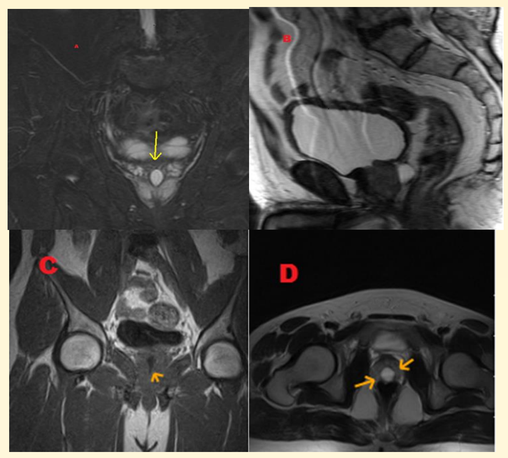
Post contrast T1-W-MRI at higher level shows typical enhancement of LT apical PZ lesion outlines by red line,

Case (2): 62-year-old man with granulomatous prostatitis mimic prostate cancer (PCA level of 6.8 ng/Dl)



Focal highly suspicious lesion in the left posterior and postero-lateral PZ base. Homogenous hypo on T2WI (a). Restricted diffusion at DWI (b, c) and ADC map (d). TRUS biopsy showed granulomatous prostatitis.

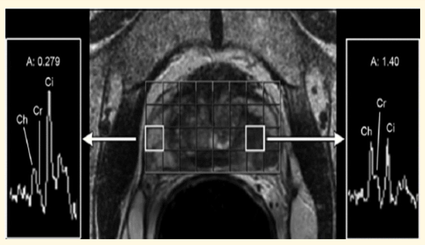
Case (3) Male 45 years patient with midline prostatic cyst



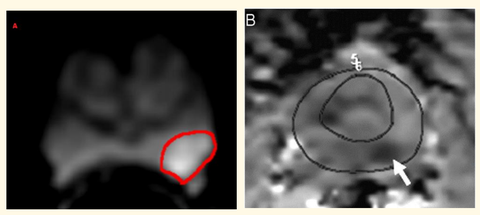
Conventional MRI of the prostate shows mid line fluid signal cyst of high SI at coronal STIR image (a) , Sagittal T2WI (b) and low SI at coronal T1WI (c) and axial T2WI (d)

Differential includes Mullerian duct cyst and Utricle cyst.

Case (4): 57-year-old man with Prostate cancer (Gleason score = 3+4, PSA level = 21 ng/mL [mg/L]).

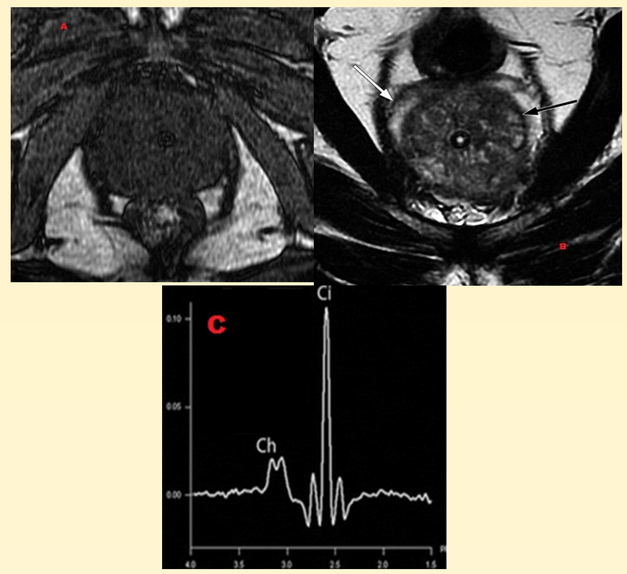


Right : MRS shows a benign spectral pattern in an area of high T2 signal intensity. Left : MRS shows a malignant spectral pattern, in an area of low T2 signal intensity.



A)DW-MRI shows restriction at cancer which is highlighted in red. B)ADC maps shows outlines for whole prostate and central gland with the lesion is a focally restricted area (arrow)

Case (5) 71-year-old man with BPH and PSA level = 21 ng/mL [mg/L])



Axial. T1WI (A) shows homogeneous intermediate SI of both central gland and PZ. T2WI (B) Central gland (black arrow) has predominant high SI, with nodules of varied SI. PZ (white arrow) has predominant high SI, tenuous hypo intense areas, and no nodules.(C) MRS shows a benign spectral pattern, with ↑citrate and ↓choline

Conclusion

Multi-parmetric MRI ,T2W and T1W with MRS, DWI and/or dynamic contrast-enhanced MRI (DCE-MRI) provides non invasive diagnostic tool for detection and characterization of prostatic lesions.

References

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