Objective: The purpose of our study was to investigate the potential role of MRI in the preoperative characterization of the histologic type of testicular tumors and, more specifically, to differentiate seminomatous from nonseminomatous testicular neoplasms.

Materials and Methods: Twenty-one patients with histologically proven germ cell testicular tumors underwent MRI of the scrotum on a 1.5-T unit. T2- and T1-weighted sequences before and after i.v. administration of gadolinium chelate were performed. MRI studies were retrospectively reviewed by two radiologists and findings were correlated with the histopathologic diagnosis. An attempt was made to differentiate seminomatous from nonseminomatous testicular tumors on the basis of signal intensity and homogeneity of the lesions, presence of fibrovascular septa, tumor encapsulation, and patterns of contrast enhancement. Interobserver agreement was assessed using weighted kappa statistics.

Results: MRI findings correctly characterized 19 (91%) of 21 testicular neoplasms (nine seminomatous and 10 nonseminomatous testicular tumors), with excellent interobserver agreement. The presence of an intratesticular lesion of predominantly low signal intensity on T2-weighted images, with septa enhancing more than tumor tissue after contrast material administration, was more suggestive for the diagnosis of a seminoma. Tumors that were markedly heterogeneous both on unenhanced and contrast-enhanced images were indicative of a nonseminomatous neoplasm. Conclusion: Our study shows that MRI provides a credible preoperative differentiation of seminomatous from nonseminomatous testicular tumors, with excellent interobserver agreement.

Editorial Comment
Imaging plays an important role in the evaluation of testicular masses. Ultrasound is still the first imaging modality to be used since adds essential information in distinguish intratesticular from extratesticular...
lesions. US is also useful for adequate characterization of the vast majority of benign intra-scrotal lesions. The combination of clinical findings and sonography is usually sufficient for adequate management of the most scrotal masses since sonography is nearly 100% sensitive for detection of testicular tumors. On sonography, seminoma appears usually as a homogeneous hypoechoic lesion. The entire testis is replaced by tumor in more than half the cases and small cystic areas can be found in about 10% of tumors. Non-seminomatous tumors often have an inhomogeneous echotexture, irregular or ill-defined margins, echogenic foci (hemorrhage or calcification) and cystic necrosis. Both tumors present increased flow on color Doppler US. Sometimes some benign intratesticular lesions resemble malignant tumor on US. The authors of this manuscript confirm previous reports that MRI is an excellent technique for adequate differentiation of seminomatous from non-seminomatous testicular tumors (1). Although this information is essential for determining adequate treatment and prognosis an attempt to pre-operatively differentiate seminomatous from non-seminomatous testicular tumors perhaps is not essential since both are treated with orchiectomy. As already pointed out by the authors, it would be more interesting further investigation regarding the value of MRI in differentiating benign from malignant intratesticular lesions. The results of this study, however, further strength the utility of MRI, which should be used whenever sonographic findings are inconclusive or inconsistent with the clinical findings.

Reference

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Prostate cancer: identification with combined diffusion-weighted MR imaging and 3D 1H MR spectroscopic imaging—correlation with pathologic findings
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Purpose: To retrospectively measure the mean apparent diffusion coefficient (ADC) with diffusion-weighted magnetic resonance (MR) imaging and the mean metabolic ratio (MET) with three-dimensional (3D) hydrogen 1 ((1)H) MR spectroscopic imaging in regions of interest (ROIs) drawn over benign and malignant peripheral zone (PZ) prostatic tissue and to assess ADC, MET, and combined ADC and MET for identifying malignant ROIs, with whole-mount histopathologic examination as the reference standard.

Materials and Methods: The institutional review board approved this HIPAA-compliant retrospective study and issued a waiver of informed consent. From among 61 consecutive patients with prostate cancer, 38 men (median age, 61 years; range, 42-72 years) who underwent 1.5-T endorectal MR imaging before radical prostatectomy and who fulfilled all inclusion criteria of no prior hormonal or radiation treatment and at least one PZ lesion
(volume, > 0.1 cm(3)) at whole-mount pathologic examination were included. ADC maps were generated from diffusion-weighted MR imaging data, and MET maps of (choline plus polyamine plus creatine)/citrate were calculated from 3D (1)H MR spectroscopic imaging data. ROIs in the PZ identified by matching pathologic slides with T2-weighted images were overlaid on MET and ADC maps. Areas under the receiver operating characteristic curves (AUCs) were used to evaluate accuracy.

Results: The mean ADC +/- standard deviation, (1.39 +/- 0.23) x 10(-3) mm(2)/sec, and mean MET (0.92 +/- 0.32) for malignant ROIs differed significantly from the mean ADC, (1.69 +/- 0.24) x 10(-3) mm(2)/sec, and mean MET (0.73 +/- 0.18) for benign ROIs (P < .001 for both). In distinguishing malignant ROIs, combined ADC and MET (AUC = 0.85) performed significantly better than MET alone (AUC = 0.74; P = .005) and was also better than ADC alone (AUC = 0.81), although the difference was not statistically significant (P = .09).

Conclusion: The combination of ADC and MET performs significantly better than MET for differentiating between benign and malignant ROIs in the PZ. (c) RSNA, 2008.

Editorial Comment
Magnetic resonance imaging (MRI) combined to 3D-magnetic resonance spectroscopic imaging (MRSI) is the only non-invasive technique with the potential to provide useful information regarding the detection, localization, staging and prognosis of prostate cancer. The combination of these techniques (MRI+MRSI) has improved the diagnostic assessment of prostate cancer beyond the morphologic information provided by conventional MR imaging. To further improve the specificity and sensitivity of MRI+MRSI, other complimentary techniques such as dynamic contrast enhanced MR imaging and diffusion-weighted MR imaging (DWI) has been used in last years. DWI is used to detect the state of molecular translational motion of water in the tissue. In prostate cancer, densely packed malignant epithelial cells, causes restricted diffusion of water relative to that of normal tissue. Since apparent diffusion coefficient (ADC) reflects primarily diffusion coefficient of extracellular water, ADC values tend to be lower for tumors compared to normal tissue (benign tissue: ADC values > 1.3 cm2/s; cancer tissue: ADC values < 1.3 cm2/s). Contrary to cancer in BPH, extra-cellular space volume is higher, thus ADC values are higher as well. The authors of this retrospective study, nicely shows that the association of the measurements of the mean ADC values (DWI) with the mean metabolic ratio (MRSI) performs significantly better than the mean metabolic ratio alone for the discrimination of normal and malignant prostatic tissue of the peripheral zone. Since 2004, we have been using in our institution MRI+MRSI, DWI and dynamic contrast enhancement for all patients evaluated for detection or staging prostate cancer. We agree with the authors’ statement that MRSI+DWI are much better than the isolated use of any of these techniques. Unfortunately this combination does not prevent false positive results found particularly in patients with focal prostatic atrophy (1).

Reference

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