IMAGING

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Clinical stage T1c prostate cancer: evaluation with endorectal MR imaging and MR spectroscopic imaging

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Purpose: To assess the diagnostic accuracy of endorectal magnetic resonance (MR) imaging and MR spectroscopic imaging for prediction of the pathologic stage of prostate cancer and the presence of clinically nonimportant disease in patients with clinical stage T1c prostate cancer.
Materials and Methods: The institutional review board approved-and waived the informed patient consent requirement for-this HIPAA-compliant study involving 158 patients (median age, 58 years; age range, 40-76 years) who had clinical stage T1c prostate cancer, had not been treated preoperatively, and underwent combined 1.5-T endorectal MR imaging-MR spectroscopic imaging between January 2003 and March 2004 before undergoing radical prostatectomy. On the MR images and combined endorectal MR-MR spectroscopic images, two radiologists retrospectively and independently rated the likelihood of cancer in 12 prostate regions and the likelihoods of extracapsular extension (ECE), seminal vesicle invasion (SVI), and adjacent organ invasion by using a five-point scale, and they determined the probability of clinically nonimportant prostate cancer by using a four-point scale. Whole-mount step-section pathology maps were used for imaging-pathologic analysis correlation. Receiver operating characteristic curves were constructed and areas under the curves (AUCs) were estimated nonparametrically for assessment of reader accuracy.
Results: At surgical-pathologic analysis, one (0.6%) patient had no cancer; 124 (78%) patients, organ-confined (stage pT2) disease; 29 (18%) patients, ECE (stage pT3a); two (1%) patients, SVI (stage pT3b); and two (1%) patients, bladder neck invasion (stage pT4). Forty-six (29%) patients had a total tumor volume of less than 0.5 cm(3). With combined MR imaging-MR spectroscopic imaging, the two readers achieved 80% accuracy in disease staging and AUCs of 0.62 and 0.71 for the prediction of clinically nonimportant cancer.
Conclusion: Clinical stage T1c prostate cancers are heterogeneous in pathologic stage and volume. MR imaging may help to stratify patients with clinical stage T1c disease for appropriate clinical management.

Editorial Comment

Similar to other studies the authors showed that MR imaging findings might represent additional useful variables for predicting disease extent in patients with clinically localized prostate cancer. Combined endorectal MRI-MR spectroscopic imaging had 80% accuracy in the staging of disease in patients with clinical stage T1c prostate cancer. These combined techniques had a moderate accuracy, 62-72%, in the prediction of clinically non-important cancer in this group of patients. As the authors pointed out it would be of clinical interest in the future to investigate whether multiparametric examination which combination of conventional T2-w images, spectroscopy, diffusion-weighted image (DWI) and perfusion studies can yield superior diagnostic information for stratifying patients with T1 c prostate cancer. Since 2004, we have been using in our department this multiparametric evaluation in patients with organ-confined tumor, based on finding of conventional T2-weighted images.

We have found that DWI and perfusion techniques, similarly to spectroscopy are very useful to detect tumor > 0.5 cm3 and with higher Gleason grades. All techniques have difficult to detect smaller and low grades tumor. In other words, when we find a lesion with imaging characteristics of a possible aggressive tumor on T2-w images and spectroscopy, but without concordant findings on DWI and perfusion studies, our tendency is to downgrade the lesion to a possible less important one. We have found that usually a large and aggressive tumor will present as an area with restricted diffusion (lower ADC values) and with abnormally elevated values of the pharmacokinetics parameters obtained with perfusion studies. On the other hand, patients with normal multiparametric prostate examination has a very high probability of have a clinically non-important cancer.

Another important finding of this study is that from 158, 124 (78%) patients had organ-confined disease (stage pT2), 29 (18%) had extracapsular extension (stage pT3a), two (1%) had seminal vesicle invasion (stage pT3b), and two (1%) had bladder neck invasion (stage pT4). We have to remember that clinically T1 c patients typically are considered to have localized early-stage disease of relatively low risk. Additionally 30 (19%) of the patients met the criteria to be considered for active surveillance as a management strategy, 4(13%) had extraprostatic extension of disease at surgical-pathologic analysis. These findings further enhance the value of endorectal MRI examination in the pre-operative evaluation of patients with T1c prostate carcinoma.

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Bladder tumor staging: comparison of contrast-enhanced and gray-scale ultrasound

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Objective: The purpose of this study was to evaluate the effectiveness of contrast-enhanced sonography in comparison with conventional sonography in differentiating muscle-infiltrating and superficial neoplasms of the urinary bladder.