

Conclusions: In the porcine model laparoscopic renal hypothermia achieved with microparticulate ice slurry was safe and efficient. It significantly decreased renal dysfunction secondary to an ischemic insult with no adverse effects or complications associated with microparticulate ice slurry use.

Editorial Comment

Prevention of renal ischemia-reperfusion injury remains a challenge, particularly in laparoscopic partial nephrectomy. Gill et al. first reported the use of ice slush laparoscopically to achieve cold ischemia in laparoscopic partial nephrectomy, but the delivery system was somewhat cumbersome. Conversely, this animal study used microparticulate ice slurry (MPS) for laparoscopic hypothermia during renal ischemia in a single kidney porcine model. MPS contains smooth globular ice particles (< 100 μ m in diameter) suspended in saline carrier medium. MPS may be pumped through a 4 mm catheter without plugging, in contrast to the standard ice slush which is composed of dendritic ice crystals that do not flow through narrow tubes, making it not applicable for laparoscopic surgery but it is used for regional hypothermia during open procedures. Survival studies comparing 3 different groups (Group 1 - 90 minutes warm ischemia, group 2 - 90 minutes cold ischemia using laparoscopically delivered MPS, and control group 3 - hilar dissection, no clamping and no microparticulate ice slurry), demonstrated significant difference in renal function in group 1 when compared to other groups. The authors concluded that MPS was safe and efficient to achieve renal hypothermia and to decrease renal dysfunction due to ischemia-reperfusion injury.

Dr. Fernando J. Kim

*Chief of Urology, Denver Health Med Ctr
Assistant Professor, Univ Colorado Health Sci Ctr
Denver, Colorado, USA*

IMAGING

MRI-Guided Biopsy of the Prostate Increases Diagnostic Performance in Men with Elevated or Increasing PSA Levels After Previous Negative TRUS Biopsies

Anastasiadis AG, Lichy MP, Nagele U, Kuczyk MA, Merseburger AS, Hennenlotter J, Corvin S, Sievert KD, Claussen CD, Stenzl A, Schlemmer HP

Department of Urology, Comprehensive Cancer Center (CCC) Tubingen, Eberhard-Karls-Universitat Tubingen, Germany

Eur Urol. 2006; 50: 738-48

Objectives: Repeatedly negative prostate biopsies in individuals with elevated prostate specific antigen (PSA) levels can be frustrating for both the patient and the urologist. This study was performed to investigate if magnetic resonance imaging (MRI)-guided transrectal biopsy increases diagnostic performance in individuals with elevated or increasing PSA levels after previous negative conventional transrectal ultrasound (TRUS)-guided biopsies.

Methods: 27 consecutive men with a PSA > 4 ng/ml and/or suspicious finding on digital rectal examination, suspicious MRI findings, and at least one prior negative prostate biopsy were included. Median age was 66 years (mean, 64.5 +/- 6.8); median PSA was 10.2 ng/ml (mean, 11.3 +/- 5.5). MRI-guided biopsy was performed

with a closed unit at 1.5 Tesla, an MRI-compatible biopsy device, a needle guide, and a titanium double-shoot biopsy gun.

Results: Median prostate volume was 37.4 cm³ (mean, 48.4±31.5); median volume of tumor suspicious areas on T2w MR images was 0.83 cm³ (mean, 0.99±0.78). The mean number of obtained cores per patient was 5.22±1.45 (median, 5; range, 2-8). Prostate cancer was detected in 55.5% (15 of 27) of the men. MRI-guided biopsy could be performed without complications in all cases.

Conclusion: According to our knowledge, this is the largest cohort of consecutive men to be examined by MRI-guided transrectal biopsy of the prostate in this setting. The method is safe, can be useful to select suspicious areas in the prostate, and has the potential to improve cancer detection rate in men with previous negative TRUS-biopsies.

Editorial Comment

New biopsy strategies with increased numbers of systematically placed biopsy cores have been developed to decrease the false-negative rate associated with conventional sextant prostate biopsy; however, many men still find themselves in this clinical dilemma, and the best way to care for these patients remains uncertain. Conventional and 3D-spectroscopic endorectal magnetic resonance imaging (3D-MRSI) techniques have shown promise in the improved detection of cancer within the prostate. One important drawback of using 3D-MRSI-guided biopsy is the process of overlaying the abnormal voxel seen of spectroscopic images on transrectal ultrasound scans. In other words to project a suspicious area for cancer seen on an endorectal magnetic resonance spectroscopic imaging into the scans obtained with transrectal ultrasound in order to adequately sample the suspicious areas. The authors present in this manuscript an interesting technique of MRI-guided biopsies. They used a non-metallic, fully automatic core-needle, double shot biopsy gun and a portable biopsy device previously described. The major limitations of this study are related to the criterion used to consider suspicious lesion on conventional endorectal MR imaging of the prostate and the need for 2 consecutive MRI examinations. As we know prostate cancer of the peripheral zone appear as hypointense areas but this finding is not specific since other benign abnormalities such as inflammation, fibrosis and focal prostatic atrophy may have similar appearance. 3D-MRSI is superior to conventional MR imaging as a guide for repeat biopsy due its capacity of detect abnormal metabolic activities, thus allowing the differentiation between benign and malignant lesions. Detection of cancer in prostate with normal appearance on conventional MRI examination is also possible with 3D-MRSI. Perhaps in the near future, the ideal approach for these patients would be the use of this technique associated with 3D-MRSI of the prostate and during a single procedure.

Dr. Adilson Prando

*Chief, Department of Radiology
Vera Cruz Hospital
Campinas, São Paulo, Brazil*

Dynamic Contrast Enhanced, Pelvic Phased Array Magnetic Resonance Imaging of Localized Prostate Cancer for Predicting Tumor Volume: Correlation with Radical Prostatectomy Findings

Villers A, Puech P, Mouton D, Leroy X, Ballereau C, Lemaitre L

Department of Urology, Hospital Claude Huriez, Centre Hospitalier Regional Universitaire de Lille, Lille, France

J Urol. 2006; 176: 2432-7

Purpose: We assessed the value of pelvic phased array dynamic contrast enhanced magnetic resonance imaging for predicting the intraprostatic location and volume of clinically localized prostate cancers.

Materials and Methods: Suspicious areas on prospective pre-biopsy magnetic resonance imaging in 24 patients were assigned a magnetic resonance imaging malignancy score and located with respect to anatomical features, gland side, and transition and peripheral zone boundaries. The largest surface area and volume were measured. These magnetic resonance imaging findings were compared with radical prostatectomy specimen histopathology findings.

Results: Histopathology maps detected 56 separate cancer foci. The largest tumor focus was located in the peripheral zone in 14 patients and in the transition zone in 10. T1-weighted dynamic contrast enhanced magnetic resonance imaging identified 30 of the 39 tumor foci greater than 0.2 cc and 27 of the 30 greater than 0.5 cc. T2-weighted sequences were suspicious in 22 of 30 foci greater than 0.2 cc that were identified by T1-weighted dynamic contrast enhanced magnetic resonance imaging sequences. Sensitivity, specificity, and positive and negative predictive values for cancer detection by magnetic resonance imaging were 77%, 91%, 86% and 85% for foci greater than 0.2 cc, and 90%, 88%, 77% and 95% for foci greater than 0.5 cc, respectively. Median focus volume was 1.37 cc (range 0.338 to 6.32) for foci greater than 0.2 cc detected by magnetic resonance imaging in the peripheral zone and 0.503 cc (range 0.337 to 1.345) for those not detected by magnetic resonance imaging ($p < 0.05$). Corresponding median values for transition zone foci were 2.54 (range 0.75 to 16.87) and 0.435 (range 0.26 to 0.58).

Conclusions: Pre-biopsy pelvic phased array dynamic contrast enhanced magnetic resonance imaging is an accurate technique for detecting and quantifying intracapsular transition or peripheral zone tumor foci greater than 0.2 cc. It has promising implications for cancer detection, prognosis and treatment.

Editorial Comment

The authors present a very interesting study for the detection and prediction of prostate tumor volume using 1.5 Tesla MRI - dynamic contrast enhanced protocol with a single pelvic phased array coil. As we know, estimation of tumor volume is improved by endorectal 3D-magnetic resonance spectroscopic imaging (3D-MRSI) and endorectal dynamic contrast enhanced technique, but errors are not infrequent. Although the authors' project is based on a controversial issue (we do not agree that the pelvic phased array coil provides similar image quality in comparison with endorectal coil), their results are impressive. Endorectal MR imaging and 3D- MRSI are useful for detecting the majority of peripheral zone tumors larger than 0.5 cc (1.0 cm). So far dynamic contrast enhanced endorectal-MRI also has the capability of detecting tumor foci greater than 0.5 cc, with 85.3% sensitivity and 92.6% positive predictive value. The authors results was very impressive since they had 77% sensitivity, 91% specificity, and 86% positive and 85% negative predictive values for detecting tumor foci greater than 0.2 cc (7 mm). Another important contribution of this technique was also the possibility of detecting transition zone tumors. Further studies with larger population are necessary to confirm the value of this new imaging approach.

Dr. Adilson Prando
Chief, Department of Radiology
Vera Cruz Hospital
Campinas, São Paulo, Brazil