MRI of the Prostate

Wm. Faulkner, B.S., R.T.(R)(MR)(CT), FSMRT

Prostate Cancer

- Most common cancer, other than skin cancers, in American men
- Second leading cause of cancer death behind lung cancer
- Approximately 1 man in 6 will be diagnosed with prostate cancer during his lifetime and...
- 1 in 35 will die

American Cancer Society

What currently happens?

- Elevated PSA
  - recheck in 6 months
  - If still high or higher - biopsy

1 million TRUS biopsies annually in U.S. market

TRUS biopsy randomly acquires 6-12 samples from different areas of the gland
Saturation bx = 36-60+ cores!

What currently happens?
- Elevated PSA
- recheck in 6 months
- If still high or higher - biopsy
- Biopsy negative:
  - repeat PSA and biopsy if still elevated

MRI

Choi Y J et al. Radiographics 2007;27:63-75
Claus, Hedvig, Hattery; RadioGraphics 2004;24:S167–S180

Tumor in Peripheral Zone

Extracapsular Extension
1.5 T

3 T

Courtesy Dr. Larry Tanenbaum
TIW not adequate contrast for zonal anatomy

non-invasive, partly cystic mass with a well-defined capsule adherent to the posterior wall of the bladder

Pretreatment Evaluation of Prostate Cancer: Role of MR Imaging and ¹H MR Spectroscopy¹

R. Chakravarthy, K. Sikand, V. A. C. Ramani & N. W. Clarke: Giant Multilocular Cystadenoma of the Prostate – A Potential Pitfall On Needle Core Biopsy.
The Internet Journal of Pathology. 2009 Volume 8 Number 1

Radiographics RSNA 2004: Filip G. Claus, MD, PhD; Hedvig Hricak, MD, PhD; Robert R. Hattery, MD
**Protocol**

- Field strength of at least 1.5 T
- Coils: Combination of eCoil and Pelvic Array
- T1 Pelvis for:
  - Nodes
  - Post-biopsy intraglandular hemorrhage
  - Thin slice T2 FSE (FOV ~ 140 mm) 3 planes
  - If post-biopsy, 4 - 6 weeks wait for imaging

**Prostate Cancer**

- 70% of adenocarcinomas in peripheral zone
- 20% in transitional zone
- 10% in central zone
- BPH usually involves transitional zone

**T1W contrast insufficient for zonal anatomy and pathology visualization**

**T1W contrast post-biopsy hemorrhage**

**T1W contrast post-biopsy hemorrhage**

**Other techniques and procedures**

- DCE
- Diffusion
- Spectroscopy
- MR-guided biopsy

Biopsy proven adenocarcinoma in a 71-year-old man with a PSA level of 5.65
Time-Course Curves

Radiology: Vol 250: Number 1 January 2009

T2W Images Only

ADC Map Only

T2W Images and ADC Map
Diffusion

Spectroscopy

"The application of the future, and always will be."

- Unknown

Spectroscopy

Spectroscopy
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Biopsy using Invivo DynaLOC™ and DynaTRIM™
Summary

High Resolution MRI
DCE
Diffusion
Spectroscopy
MR-guided biopsy

“Urology department. Can you hold?”