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PROSTATE mpMRI: WHAT THE UROLOGIST WANTS TO KNOW

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Disclosures

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Introduction

- Why the interest in multiparametric prostate MR?
- Where can radiologists add value?
  - Five Key Clinical Scenarios
- How can you make your findings impactful for the patient and the referring clinician?
  - Standardized reporting – PI-RADS v2
  - Quality improvement = key
Multiparametric Prostate MRI

“Hot topic” in Radiology

- >300 articles in Pubmed in 2016

Why the boom?

- Anatomic + Functional imaging → better detection and characterization of clinically significant PCa

- Leading to a groundswell of support for use of mpMRI worldwide
So, what’s the problem?

- Demand for high quality prostate mpMRI >>> Ability for most to provide
- Must train a generation of radiologists to perform and interpret prostate mpMRI without sacrificing quality and patient care
- Must provide GU Oncologists and Urologists with the information they need to impact patient care
- Quality and Quality Improvement are key to creating a successful practice
RADIOLOGISTS
ADDING VALUE
Key Clinical Scenarios

- Failure to Diagnose
  - Especially with multiple negative biopsies
  - NEW Joint recommendation from SAR/AUA

- Active Surveillance Candidacy

- Surgical Planning

- Focal Therapy Evaluation

- Biochemical Recurrence
PI-RADS v2 & QUALITY IMPROVEMENT
Prostate mpMRI Goals

- Improve detection of clinically significant PCa
  - Critical to reduce mortality
- Increase confidence in benign diseases and dormant malignancies
  - Critical to reduce unnecessary biopsies and treatment
PI-RADS v1

- Published in 2012 by ESUR
- Validated in clinical and research scenarios
- Due to continued rapid progress in the field, several limitations revealed
- PI-RADS v2 = joint effort of ESUR & ACR
PI-RADS v2: Specific Aims

- Establish **minimum acceptable technical parameters** for prostate mpMRI
- Simplify and standardize the terminology and content of radiology reports
- Facilitate use of MRI data for targeted biopsy
- Develop assessment categories that summarize levels of suspicion or risk and can be used to select patients for biopsies and management (e.g., observation strategy vs. immediate intervention)
PI-RADS v2: Specific Aims

- Enable **data collection and outcome monitoring**
- Educate radiologists on prostate MRI reporting and **reduce variability in imaging interpretations**
- Enhance interdisciplinary communications with referring clinicians
**Clinically significant cancer**

- Defined on pathology/histology as **Gleason score \( \geq 7 \)** (including 3+4 with prominent but not predominant Gleason 4 component)
- And/or **Volume > 0.5 mL**
- And/or **extraprostatic extension (EPE)**

5-point scale based on likelihood (probability) that mpMRI findings correlates with presence of clinically significant cancer for each lesion in the prostate gland
PI-RADS v2: Assessment Categories

- PIRADS 1 – Very low (clinically significant cancer is highly unlikely to be present)
- PIRADS 2 – Low (clinically significant cancer is unlikely to be present)
- PIRADS 3 – Intermediate (the presence of clinically significant cancer is equivocal)
- PIRADS 4 – High (clinically significant cancer is likely to be present)
- PIRADS 5 – Very high (clinically significant cancer is highly likely to be present)
PI-RADS v2: Key Concepts

- Dominant sequence for PZ: DWI
- Dominant sequence for TZ: T2
- Dominant sequence for Recurrence: DCE
mpMRI is useful for determination of the T stage, either confined to the gland (< T2 disease) or extending beyond the gland (≥ T3 disease)

Extraprostatic Extension (EPE)
- Asymmetry or invasion of the neurovascular bundles
- Bulging prostatic contour
- Irregular or spiculated margin
- Obliteration of rectoprostatic angle
- Tumor-capsule interface of greater than 1.0 cm
- Breach of the capsule with evidence of direct tumor extension or bladder wall invasion
PI-RADS v2: Staging

Seminal Vesicle Involvement
- Focal or diffuse low T2W signal intensity
- Abnormal contrast enhancement within and/or along the seminal vesicle
- Restricted diffusion
- Obliteration of the angle between the base of the prostate and the seminal vesicle
- Demonstration of direct tumor extension from the base of the prostate into and around the seminal vesicle

Lymph nodes > 8 mm are suspicious
QUALITY ASSURANCE vs. QUALITY IMPROVEMENT
QA vs. QI

Quality Assurance (QA)
- Older way of dealing with quality
- Reactive
- Punitive
- “Who is at fault?” was the key question

Quality Improvement (QI)
- Prospective and retrospective reviews
- Aimed at improvement
- Avoids attributing blame
- Creates systems that helps to avoid errors in the future
QA vs. QI

- QI can be prospective or retrospective
- QA is always retrospective
- Most importantly, QI should be always be introspective
- QI should be a vehicle to ensure delivery of quality care to patients while continuously iterating how that should best be done
STRATEGIES FOR QUALITY IMPROVEMENT
“Speak the Same Language”

- Patient in scanner ➔ Images to PACS ➔ Clinical Report
- Data compression ➔ Data loss
"Speak the Same Language"

- So, what can we do to bridge this gap and prevent data loss?
- **Standardize the nomenclature**
  - Within the Radiology group
  - With the referral base
  - Equally important to do both
- PI-RADS v2 is a good start
  - Lots of ongoing validation studies
Finally, should decide with the multidisciplinary team the course of action depending on suspicion level of lesion(s)

- @ Duke, volume > 0.5 mL and PI-RADS 4 or 5 lesions → Biopsy
- Small lesions or PI-RADS 3 → watch
- Continuously iterating this

Prostate should follow Breast for assessing (dis)concordance with bx
“Follow up your results”

- **Misses are key** because
  - They allow you to learn and adapt
  - They help identify “blind spots”
  - They influence future readings
  - They are key for peer review

- **BUT, make sure your misses are actually your misses**
  - Repeat biopsy needed? Concordant path?
Performing the mpMRI

Reading/segmenting the mpMRI

Joint review of images/segmentation

Performing the MRI-TRUS Fusion and Biopsy

Team histopathology review including both Urologist and Radiologist

Feedback Loop
SUMMARY
Detection/characterization of prostate CA continues to increase using MRI, especially with multiparametric approach

Five key clinical scenarios for radiologists to add value

**Quality Improvement** is at the heart of a successful multi-disciplinary clinical practice

- Must be able to bridge the gaps between providers and speak the same language
- Get in the (feedback) loop

Image quality and experience matter
THANK YOU

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