Negative MRI able to rule out significant Prostate cancer

A. Villers, J. Olivier, P. Puech,
Department of urology
Lille University-France
MRI NPV

• The median mpMRI NPV was 88.1% (IQR, 85.7–92.3) for significant cancers (1)

• Interest in the role of MRI in the diagnosis of significant cancer was heightened following the publication of the PROMIS (2) and PRECISION (3) studies.

1-Moldovan Eur Urol 2017
2-Ahmed Lancet 2017
3-Kasivivanathan NEJM 2018
There are limitations with the standard of care, TRUS biopsy

Diagnostic accuracy of multi-parametric MRI and TRUS biopsy in prostate cancer (PROMIS): a paired validating confirmatory study

_HASHIM U AHMED*, AHMED EL-SHATER BOSAILY*, LOUISE C BROWN*, RHIAN GABE, RICHARD KAPLAN, MAHESH K PARMAR, YOLANDA COLLACO-MORAES, KATIE WARD, RICHARD G HINDLEY, ALEX FREEMAN, ALEX P KIRKHAM, ROBERT OLDROYD, CHRIS PARKER, MARK EMBERTON, AND THE PROMIS STUDY GROUP†_

<table>
<thead>
<tr>
<th></th>
<th>MP-MRI, % (95% CI)</th>
<th>TRUS-biopsy, % [95% CI]</th>
<th>Test ratio* [95% CI]</th>
<th>p value</th>
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<tr>
<td><strong>Primary definition (Gleason score ≥4+3 or cancer core length ≥6 mm), prevalence of clinically significant cancer 230 (40%, 36–44%)</strong></td>
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<tr>
<td>Sensitivity test</td>
<td>93 (88–96)</td>
<td>48 (42–55)</td>
<td>0.52 (0.45–0.60)</td>
<td>p&lt;0.0001</td>
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<td>Specificity test</td>
<td>41 (36–46)</td>
<td>96 (94–98)</td>
<td>2.34 (2.08–2.68)</td>
<td>p&lt;0.0001</td>
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<td>PPV</td>
<td>51 (46–56)</td>
<td>90 (83–94)</td>
<td>8.2 (4.7–14.3)</td>
<td>p&lt;0.0001</td>
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<td>NPV</td>
<td>89 (83–94)</td>
<td>74 (69–78)</td>
<td>0.34 (0.21–0.55)</td>
<td>p&lt;0.0001</td>
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Ahmed et al. Lancet 2017
Design a study evaluating MRI-TB vs standard biopsy
Pragmatic study:
Increases generalizability of study.

MRI-Targeted or Standard Biopsy for Prostate-Cancer Diagnosis

MRI-targeted or systematic biopsy for prostate cancer diagnosis

• **PRECISION**: Randomized multicenter Europe/USA comparing in 500 men with PSA < 20ng/ml

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<tr>
<th>12 Systematic Biopsies</th>
<th>MRI + Targeted biopsies</th>
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<tr>
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<td>If MRI suspicious MRI</td>
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<tr>
<td></td>
<td>No biopsies</td>
</tr>
<tr>
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<td>If MRI non suspicious</td>
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End point: % of cancers with G grade 4 ou 5

Kasivivanathan NEJM 2018
Results: In the MRI arm

IRM non-suspicious in 28% : no biopsies

IRM suspicious in 72% : targeted biopsies only:
- **12%** more cancers with grade 4/5 (38% vs 26%) (CI: 4-20) $p=0.005$ (beginning of window of curability ?)
- **13%** less micro-foci, grade 3 cancers
- Less biopsy cores (2 à 4 vs 12)
PRECISION
What next?

• Biopsy will be avoided for patients with suspicious PSA and non-suspicious MRI

• non-suspicious MRI will represent roughly 25% patients with suspicious PSA. But 5-10% of false negative MRI or missed TB

• Which tests to add? PSA-V ? PSA-D ?
• Which strategy during follow-up?
• Prospective evaluation ?
Can **PSA velocity** improve the diagnostic accuracy of PI-RADS score for eliminating significant prostate cancer?

- NPVs were estimated in two groups -
  - Group A with PSAV >1 ng/ml/yr : 148 patients
  - Group B with PSAV ≤1 ng/ml/yr : 123 patients
    - 271 men were included in the study.
    - 58 (21%) patients had significant Pca

- Examining the **NPV** of MRI with PI-RADS score < 3 to rule out significant PCa, NPV increased from 86.7% in group A to **97.3% in group B (PSAV was ≤1 ng/ml/year)** (p= 0.002)

Amr Mahran, et al, MP57-17, AUA2018
Risk-stratification based on MRI and PSA Density may reduce unnecessary follow-up biopsy procedures in men on AS

Methods:

- 210 men on AS with Gleason score 3 + 3 received a first MRI targeted biopsy
- The primary outcome was upgrading to Gleason score ≥3+4 based on MRI ± TBx

Results:

- 134/210 (64%) men had a positive MRI and 51/210 (24%) men had Gleason score upgrading based on MRI-TBx
- **No Gleason score upgrading** was detected by MRI-TBx in men with a PI-RADS score of 3 and aPSA-D of <0.15 ng/mL² (n = 15), nor by TRUS-Bx in men with a **PI-RADS score of 1-3 and a PSA-D of <0.15 ng/mL² (n = 15).**
Risk-stratification based on MRI and PSAD may reduce unnecessary follow-up biopsy procedures in men on AS

Conclusion:

– Men with a PI-RADS score of 1-3 and PSA-D of <0.15 ng/mL² did not show Gleason score upgrading at MRI ± TBx or TRUS-Bx at each time point of surveillance.

– Thus risk-stratification based on PI-RADS and PSA-D may reduce unnecessary follow-up biopsy procedures in men on AS.
Key role of MRI-1

- *Early triage test* for biopsy indication in case of suspicious PSA

- Add confidence in offering active surveillance treatment option for patients with non significant Pca: no lesion at MRI
Retrospective analysis. Lille Series 2002-2016: all had 12 S Bx + TB if positive MRI

1st Bx n=4563

With pre-PBx MRI n=3806
- Positive MRI n=2864 (75%)
  - Negative Bx n=674 (72%)
  - NCS n=188 (91.5%)
    182: GS 6, ≤3BP+ >5mm
    6: GS 7 and 1 PB+<3mm

Without pre-PB MRI n=757
- Negative MRI n=942 (25%)
  - Positive Bx n=268 (28%)
    - CSC n=80 (8.5%)
      7: GS>7
      40: GS 7 >1 Pos Bx >3mm
      33: GS6 >3 pos Bx+ or >5mm
Conclusion: EAU Guidelines

- MRI NPV and clinical date strong enough to rule out significant cancer
- If additional evidence will support the role of triage MRI, the number of low-risk men suitable for AS will inevitably decrease and new AS protocols for MRI-detected intermediate-risk PCa will be likely available in the future.