Referer confidence in a negative MR of the prostate for the detection of clinically significant prostate cancer

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Multi-parametric MR Prostate (mpMRI) with targeted TRUS biopsy

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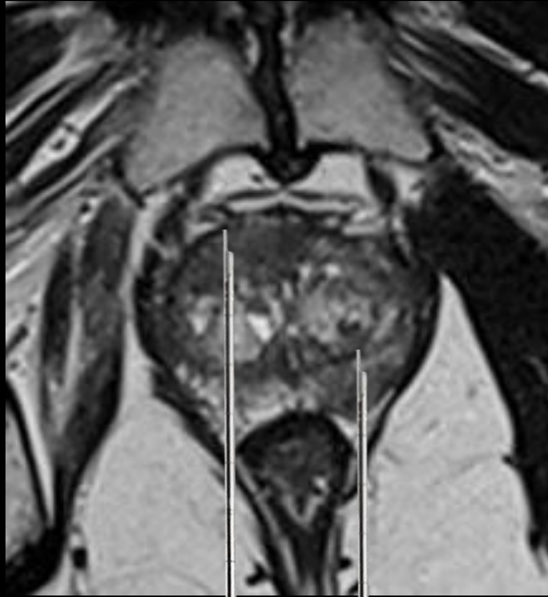

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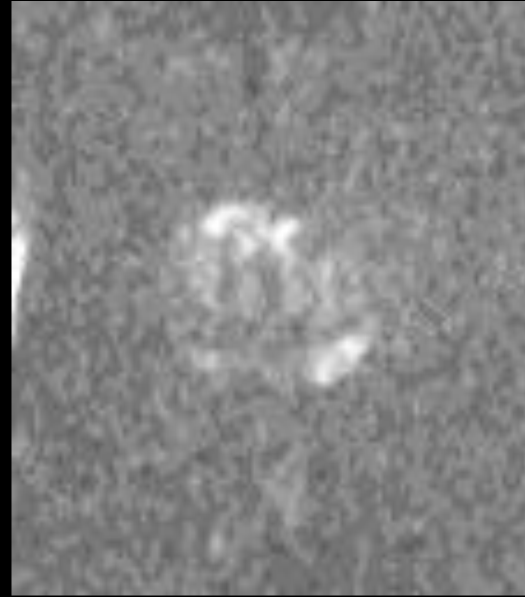

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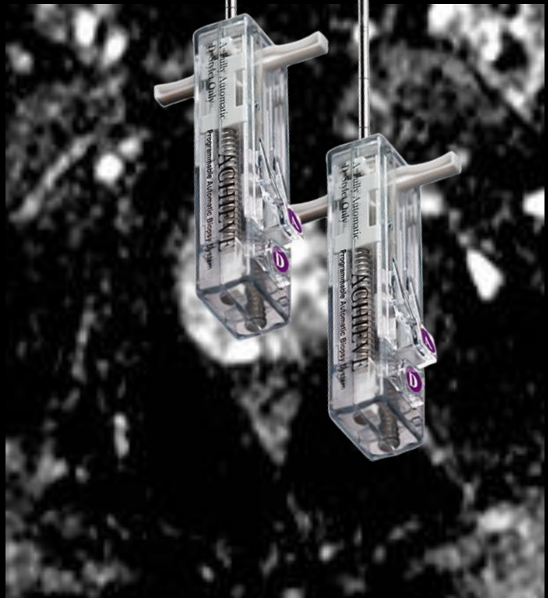

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Background

- The efficacy and superiority of targeted TRUS biopsy of prostate after multi-parametric MR over random/systematic biopsies is easy to prove;
  - Published evidence[1]
  - Referrers can read the pathology report
    - Higher Gleason Score in the target
    - More cores involved in the target
    - More % involved with cancer in the target

1. Magnetic resonance imaging-targeted biopsy may enhance the diagnostic accuracy of significant prostate cancer detection compared to standard transrectal ultrasound-guided biopsy: a systematic review and meta-analysis.
Schoots IG, Roobol MJ, Nieboer D, Bangma CH, Steyerberg EW, Hunink MG.
Eur Urol. 2015 Sep;68(3):438-50

Background

- To prove the negative predictive value of mpMRP is more challenging
  - The PROMIS and PRECISION studies have been a massive help[1,2]
  - However, these were strict multi-centre studies
  - Inclusion/exclusion criteria might not match local practice
  - Equipment, technique and reporting experience might not match local practice

1. Diagnostic accuracy of multi-parametric MRI and TRUS biopsy in prostate cancer (PROMIS): a paired validating confirmatory study.
Ahmed HU, El-Shater Bosaily A, Brown LC, Gabe R, Kaplan R, Parmar MK, Collaco-Moraes Y, Ward K, Hindley RG, Freeman A, Kirkham AP, Oldroyd R, Parker C, Emberton M; PROMIS study group.
Lancet. 2017 Feb 25;389(10071):815-822.
2. MRI-Targeted or Standard Biopsy for Prostate-Cancer Diagnosis.
PRECISION Study Group Collaborators.
N Engl J Med. 2018 May 10;378(19):1767-1777.

Background

- Random/Systematic TRUS biopsy is not without risk[1]
  - Standardized hospital admission ratios within 120 days after TRUS Bx = 4
  - Standardized mortality ratios within 120 days after TRUS Bx = 1.9

- Can we increase refer confidence in a negative mpMRP to avoid random TRUS Biopsy?

1. Brewster, D.H. et al. "Risk of Hospitalization and Death Following Prostate Biopsy in Scotland." Public Health 142 (2017): 102–110. PMC. Web. 9 Sept. 2018.

Aim

- We wanted to assess our local refer confidence in a negative mpMRI report

Materials and methods

- Single Teaching Hospital (serving 600,000 population)
- Single reporter with 10 years Uro-radiology experience
- Demographics, PSA, histology and clinical outcomes obtained from
  - results server
  - electronic cancer patient record

Materials and methods

- 38 month time period
- Up to Nov 2017 – when we moved to universal MR prior to biopsy
- All mpMRPs with “no MR evidence of significant prostate cancer” (e.g. no lesion, PI-RADS 1 or 2) were prospectively coded with **mpMRPn** text string in the report
- Text string search of Radiology data base

Results

- 106 MRs in 103 patients
- Mean age 68.5 years
- Mean PSA 6.15
- 9% were for patients undergoing active surveillance (AS) for known low risk CaP
- 91% were in patients with negative random/systematic TRUS Bx but persistent rasied PSA.

Results - histology

- 26% patients had further systematic or saturation (>20 cores) TRUS biopsies
  - 73% were benign
  - 15% PIN
  - 7% low volume Gleason 6
  - 1 patient Gleason 3+4, <5%
  - 1 patient had significant volume Gleason 3+4

Results - histology

- 3 benign patients went onto a 2nd MR
- New PIRADS 4 disease
- Subsequent targeted biopsies confirmed Gleason 7,7 and 9 disease

Results – clinical follow up

- Mean clinical follow 460 days.
- 7% patients remained on AS.
- 64% on continued PSA/clinical follow up
- 23% discharged to primary care
- 6% underwent radical treatment

Conclusion

- Our referrers had **medium** confidence in the NPV of mpMRP
  - 26% patients having further biopsies
  - only 23% discharged to primary care
- 96% of those biopsied were benign or non-significant cancer
- 1 patient had genuine missed significant cancer
- 3 patients went onto develop new PIRADS 4 changes with significant cancer on further targeted biopsy.

Conclusion

- On the 31st October 2018 we complete 12 months of universal mpMRP prior to biopsy
- All patients have had random/systematic biopsies +/- targeted biopsy in addition
- In November we can calculate our true NPV of our practice with our equipment and our experience within our patient population
- This will hopefully allow our referrers to not biopsy some patients
- **But a negative mpMRP still misses some significant cancer**

Thank you