



All men should have an MRI prior to first prostate biopsy

PMH Dialogues – Sep 2019

Nathan Perlis, MD MSc FRCSC
Urologic Oncology, UHN, UofT



Disclosures

- None relating to this presentation



All men should have an MRI prior to first prostate biopsy

- What are the goals of a prostate biopsy?
 1. Identify clinically significant disease
 2. Avoid clinically insignificant disease
 3. Provide meaningful information to tailor treatment



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 2. Affordable
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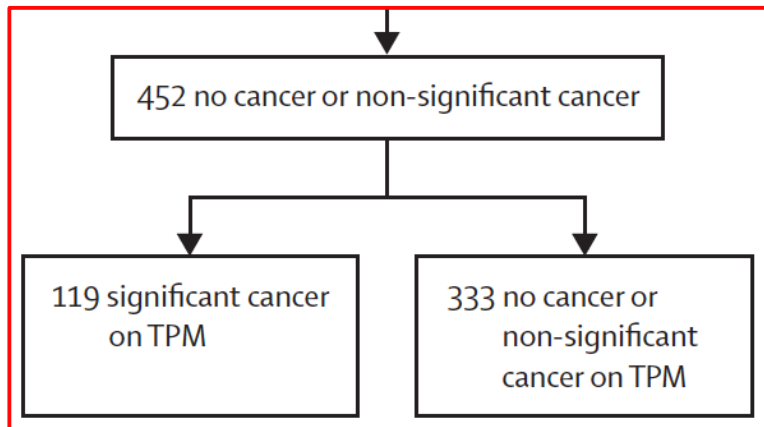
MRI identifies clinically significant cancer

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

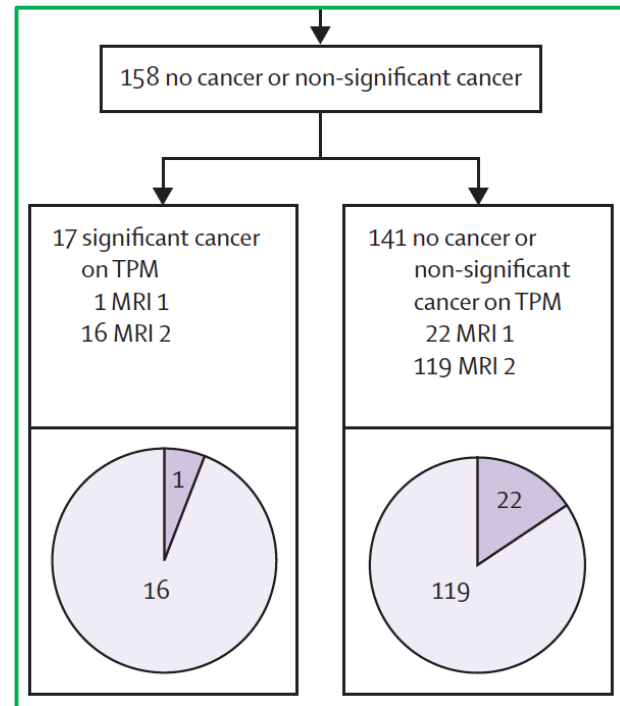
Hashim U Ahmed*, Ahmed El-Shater Bosaily*, Louise C Brown*, Rhian Gabe, Richard Kaplan, Mahesh K Parmar, Yolanda Collaco-Moraes, Katie Ward, Richard G Hindley, Alex Freeman, Alex P Kirkham, Robert Oldroyd, Chris Parker, Mark Emberton, and the PROMIS study group†

www.thelancet.com Published online January 19, 2017 [http://dx.doi.org/10.1016/S0140-6736\(16\)32401-1](http://dx.doi.org/10.1016/S0140-6736(16)32401-1)

On TRUS Bx:



On MRI:





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	MP-MRI, % (95% CI)	TRUS-biopsy, % [95% CI]	Test ratio* [95% CI]	p value
Any Gleason score 7 ($\geq 3+4$), prevalence of clinically significant cancer 308 (53%, 49–58%)				
Sensitivity test	88 (84–91)	48 (43–54)	0.55 (0.49–0.62)	p<0.0001
Specificity test	45 (39–51)	99 (97–100)	2.22 (1.94–2.53)	p<0.0001
PPV	65 (60–69)	99 (95–100)	40.8 (10.2–162.8)	p<0.0001
NPV	76 (69–82)	63 (58–67)	0.53 (0.38–0.73)	p<0.0001



MRI identifies clinically significant cancer

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MAY 10, 2018

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MRI-Targeted or Standard Biopsy for Prostate-Cancer Diagnosis

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Level 1 evidence

Table 2. Comparison of Cancer Detection between Groups.*

Outcome	MRI-Targeted Biopsy Group (N = 252)	Standard-Biopsy Group (N = 248)
Biopsy outcome — no. (%)		
No biopsy because of negative result on MRI	71 (28)	0
Benign tissue	52 (21)	98 (40)
Atypical small acinar proliferation	0	5 (2)
High-grade prostatic intraepithelial neoplasia	4 (2)	10 (4)
Gleason score		
3+3	23 (9)	55 (22)
3+4	52 (21)	35 (14)
3+5	2 (1)	1 (<1)
4+3	18 (7)	19 (8)
4+4	13 (5)	6 (2)
4+5	7 (3)	2 (1)
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GI7 or worse

95 vs 64



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42 pts \geq GI7 on TRUS Bx that were missed on MRI

74 pts GI6 on TRUS Bx that would have been avoided on MRI Bx

91 \geq GI7 that were Dx on MRI Bx and missed on TRUS Bx

Only 38 GI6 Dx w MRI Bx that were avoided w TRUS Bx

Original Investigation

Comparison of MR/Ultrasound Fusion-Guided Biopsy With Ultrasound-Guided Biopsy for the Diagnosis of Prostate Cancer

M. Minhaj Siddiqui, MD; Soroush Rais-Bahrami, MD; Baris Turkbey, MD; Arvin K. George, MD; Jason Rothwax, BS; Nabeel Shakir, BS; Chinonyerem Okoro, BS; Dima Raskolnikov, BS; Howard L. Parnes, MD; W. Marston Linehan, MD; Maria J. Merino, MD; Richard M. Simon, DSc; Peter L. Choyke, MD; Bradford J. Wood, MD; Peter A. Pinto, MD

Figure 3. Comparison of Pathology From Standard Extended-Sextant Biopsy and Targeted MR/Ultrasound Fusion Biopsy for Prostate Cancer

Targeted MR/Ultrasound Fusion Biopsy Results		Standard Extended-Sextant Biopsy Results				Totals	
		No Cancer	Low-Risk Cancer		Intermediate-Risk Cancer		High-Risk Cancer
			Gleason 6	Gleason 3+4 Low Volume ^a	Gleason 3+4 High Volume ^b		Gleason \geq 4+3
No cancer	439	74	12	12	5	542	
Low-Risk Cancer	Gleason 6	38	84	12	10	3	147
	Gleason 3+4 Low volume ^c	17	14	9	19	7	66
Intermediate-Risk Cancer	Gleason 3+4 High volume ^d	14	21	7	29	4	75
High-Risk Cancer	Gleason \geq 4+3	26	13	12	19	103	173
Totals	534	206	52	89	122	1003	



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Use of prostate systematic and targeted biopsy on the basis of multiparametric MRI in biopsy-naive patients (MRI-FIRST): a prospective, multicentre, paired diagnostic study

Olivier Rouvière, Philippe Puech, Raphaële Renard-Penna, Michel Claudon, Catherine Roy, Florence Mège-Lechevallier, Myriam Decaussin-Petrucci, Marine Dubreuil-Chambardel, Laurent Magaud, Laurent Remontet, Alain Ruffion, Marc Colombel, Sébastien Crouzet, Anne-Marie Schott, Laurent Lemaitre, Muriel Rabilloud, Nicolas Grenier, for the MRI-FIRST Investigators*

Lancet Oncol 2019; 20: 100–09

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Results are % (95% CI) of 251 patients, or p value. ISUP=International Society of Urological Pathology. csPCa=clinically significant prostate cancer. MCCL=maximal cancer core length. *Difference between the detection rate obtained by combined systematic biopsy and targeted biopsy, and by targeted biopsy alone. †Difference between the detection rate obtained by combined systematic biopsy and targeted biopsy, and by systematic biopsy alone. ‡From the comparison of detection rates obtained by systematic biopsy and targeted biopsy.

Table 3: Detection of clinically significant prostate cancer, according to biopsy strategy

250 men all had MRI, TRUS Bx and Fusion Bx.

Similar detection of \geq GI7

But still 7.6% clinically significant PC would be missed without MRI, impressive since:

All hypoechoic lesions were targeted during TRUS



ProTest

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MRI provides meaningful information to tailor treatment

Length of Capsular Contact for Diagnosing Extraprostatic Extension on Prostate MRI: Assessment at an Optimal Threshold

Andrew B. Rosenkrantz, MD,^{1*} Alampady K. Shanbhogue, MD,¹ Annie Wang, MD,¹
Max Xiangtian Kong, MD,² James S. Babb, PhD,¹ and Samir S. Taneja, MD³

J Magn Reson Imaging, 2016 Apr;43(4):990-7. doi: 10.1002/jmri.25040. Epub 2015 Sep 23.

EPE is strongly predicted by lesion capsular contact

Any EPE – 6mm contact on T2 image

Non-focal EPE – 10mm contact T2 image

AUC 0.81

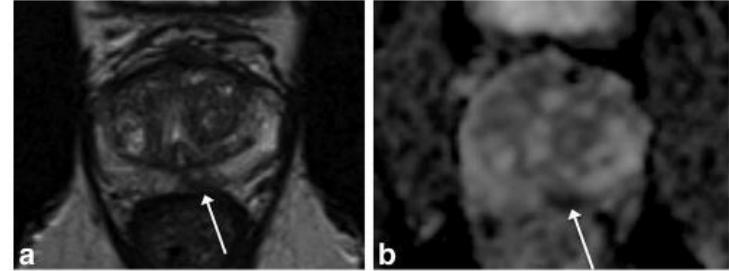


FIGURE 2: A 67-year-old man with Gleason score 3+4 tumor in left posteromedial peripheral zone on radical prostatectomy. (a) Axial T₂WI and (b) axial ADC map show dominant lesion (arrow) matching prostatectomy findings. Lesion was not considered to exhibit EPE based on subjective interpretation by either reader. Length of capsular contact measures over 6 mm on both image sets. Focal EPE was present pathologically.

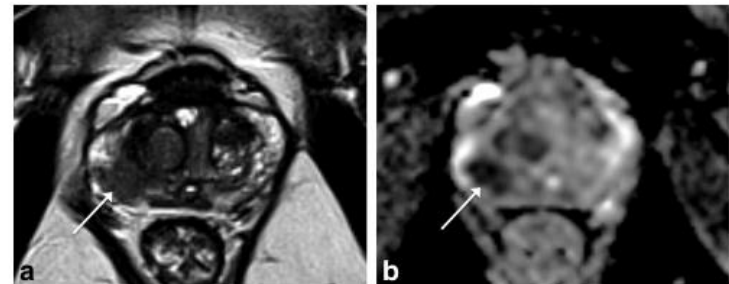
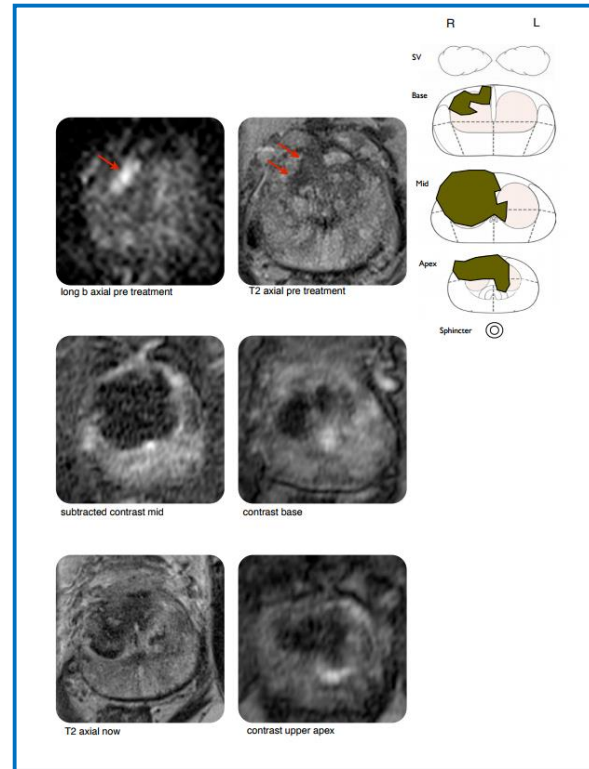
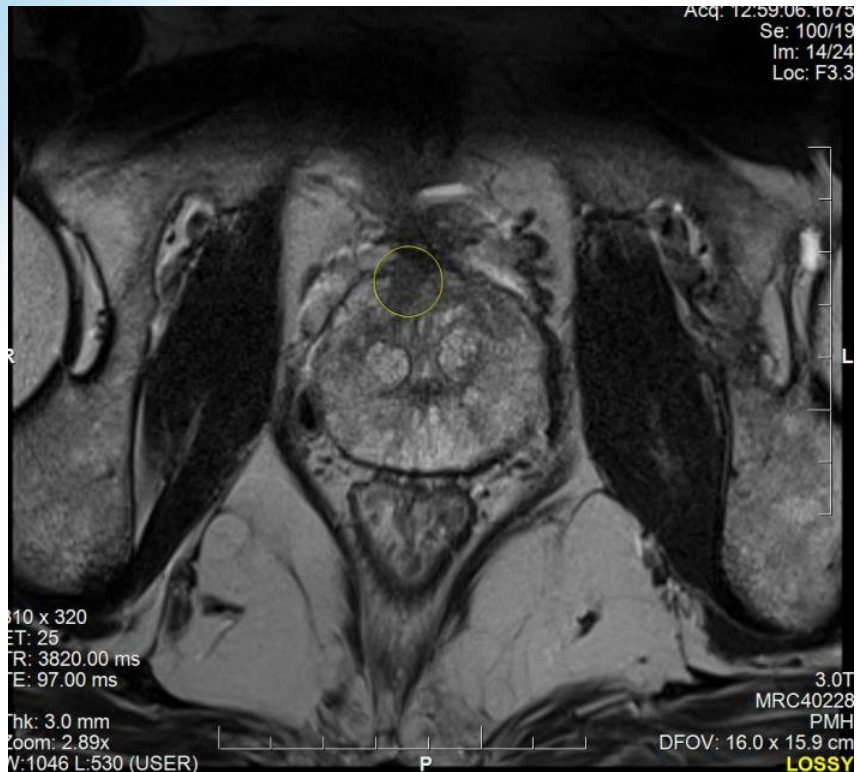


FIGURE 3: A 60-year-old man with Gleason score 4+3 tumor in the right posterolateral peripheral zone on radical prostatectomy. (a) Axial T₂WI and (b) axial ADC map show dominant lesion (arrow) matching prostatectomy findings. Lesion was not considered to exhibit overt EPE based on subjective interpretation by either reader. Length of capsular contact measures over 10 mm on both image sets. Nonfocal EPE was present pathologically.



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MRI: *safe*, affordable, reproducible?

- Precision NEJM 2018
 - MRI w fusion Bx only vs TRUS Bx
 - ✓ Immediate HRQOL and pain similar
 - ✓ 2% in each arm serious adverse events
 - ✓ Fewer 30d complications in MRI Bx: hematuria, hematospermia, pain, ED, rectal bleeding



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- Barnett et al, BJUI 2018
 - Decision tree analysis, multiple sensitivity analyses, Markov modelling
 - ✓ Best strategy: MRI if PSA ≥ 4 , combined biopsy PIRADS ≥ 3 , no Bx if MRI negative
 - ✓ Cost-effective strategy assuming a willingness-to-pay threshold of \$100,000/QALY



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- Rosenkrantz et al, RSNA 2016
 - Experienced radiologists achieved moderate reproducibility for PI-RADS v2
 - ✓ Agreement better in PZ than TZ



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TRUS Biopsy

vs

MRI and fusion biopsy





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Ideas for debate

PROMIS study

- MRI has greater sensitivity and specificity for clinically significant cancer than TRUS Biopsy

- PRECISION trial

- RCT comparing two clinical approaches in men with AbN PSA and clinical history concerning for clinically significant prostate cancer:

- MRI approach:** MRI for everyone → then only perform fusion biopsy to visible lesions (and avoid biopsy for men with normal MRIs)
- No MRI approach:** Systematic TRUS biopsy for everyone

MRI Approach

- More clinically significant cancer found
- More men avoid biopsy altogether
- MRI useful for future interventions
 - Surgical/Radiation/Ablation planning
 - Tumour evolution on Surveillance

No MRI approach

- Cheaper
- Easier
- Requires less expertise and re-training



All men should have an MRI prior to first prostate biopsy rebuttal...

Nathan Perlis, MD MSc FRCSC
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Level 1 evidence for pre-biopsy MRI

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Strategies vary

Each approach has a unique balance between morbidity of multiple tests and biopsies

Talk to your patients and learn about their own preferences and risk tolerance



Level 1 evidence for pre-biopsy MRI

EAU 2019 recommendations in biopsy naïve pt

- Perform mpMRI before prostate biopsy (1a, strong)
- When mpMRI is positive (PI-RADS ≥ 3) perform combination of targeted and systematic (2a, weak)
- When mpMRI is negative and patient has low risk of clinically significant disease (risk calculator or biomarker) consider avoiding biopsy (2a, weak)





PRostate Evaluation for Clinically Important Disease: MRI vs Standard Evaluation Procedures (PRECISE)



The safety and scientific validity of this study is the responsibility of the study sponsor and investigators. Listing a study does not mean it has been evaluated by the U.S. Federal Government. [Know the risks and potential benefits](#) of clinical studies and talk to your health care provider before participating. Read our [disclaimer](#) for details.

ClinicalTrials.gov Identifier: NCT02936258

Recruitment Status : RecruitingFirst Posted : October 18, 2016Last Update Posted : February 22, 2018See [Contacts and Locations](#)

Arms and Interventions

Arm

MRI

Men in Arm A will undergo a MRI followed by either a targeted biopsy of suspicious areas or will be followed for two years if there is no suspicious areas identified by MRI. The unbiopsied men will have a repeat MRI at 2 years.

Active Comparator: Standard of Care

Men in Arm B will undergo a 12-core systematic TRUS guided biopsy. All men in the study will be followed for two years or until they have had radical treatment (whichever comes first).

Sunnybrook Health Sciences Centre

Toronto, Ontario, Canada, M4N 3M5

Contact: Marlene Kebadjian 416-480-6100 ext 2890 marlene.kebadjian@sunnybrook.ca

Principal Investigator: Laurence Klotz, MD

Recruiting

Princess Margaret Cancer Centre

Toronto, Ontario, Canada, M5G1X6

Contact: Michael Nesbitt 416-946-4501 ext 6097 michael.nesbitt@uhn.ca

Principal Investigator: Antonio Finelli, MD

Recruiting

Canada, Quebec

CIUSSS du Centre-Ouest-de-l'île-de-Montreal-Jewish General Hospital

Montreal, Quebec, Canada, H3T1E2

Contact: Oleg Loutochin 514-340-8222 ext 21627 oloutochin@jgh.mcgill.ca

Principal Investigator: Franck Bladou, MD

Recruiting



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