



LASER TRAINING DAYS

19 - 20 GIUGNO 2019

MILANO

ISTITUTO EUROPEO DI ONCOLOGIA (IEO)
Via G. Ripamonti 435, Milano

 IEO education
Istituto Europeo di Oncologia

REVISIONE MRI PROSTATICA

Sarah Alessi



IEO

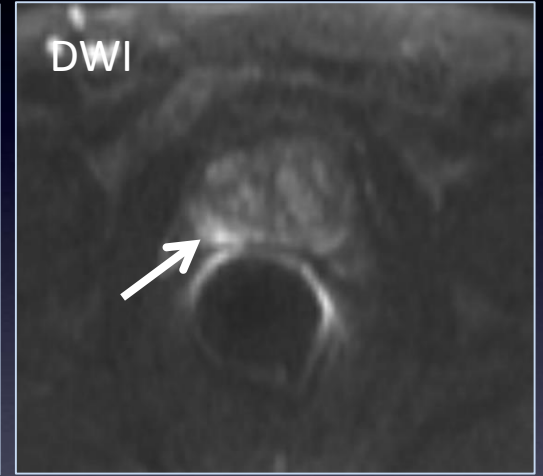
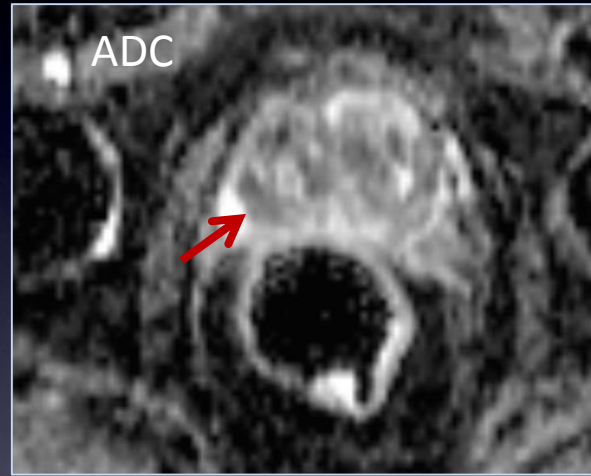
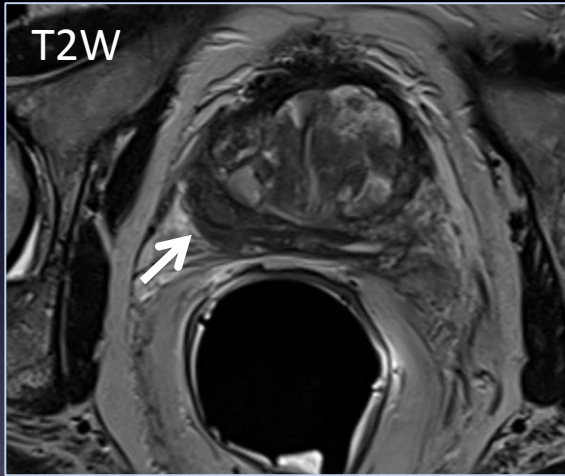
European Institute of Oncology

Research
for care

S.S. comes to IEO

- 70 years
 - Lawyer
 - PSA increasing ; PSA= 14ng/ml ratio 31% PHI 84
 - September 2016 Bx (12 regions) negative
 - mp-MRI (peripheral center): PI-RADS 5 right base postero-lateral.

Peripheral mp-MRI

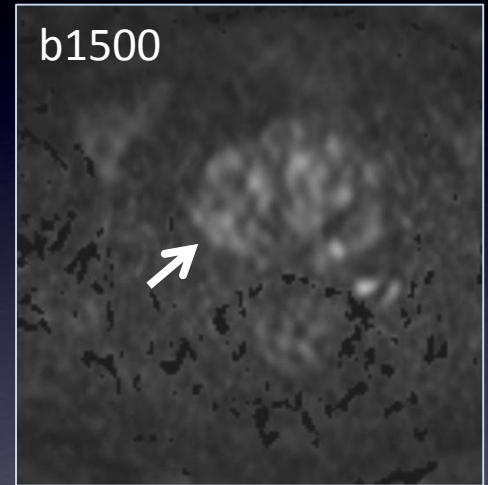
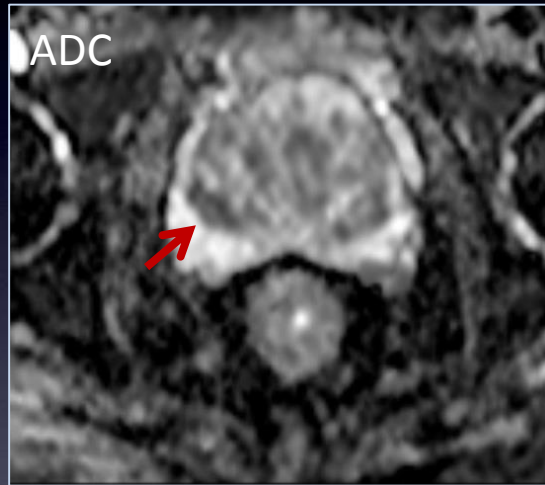
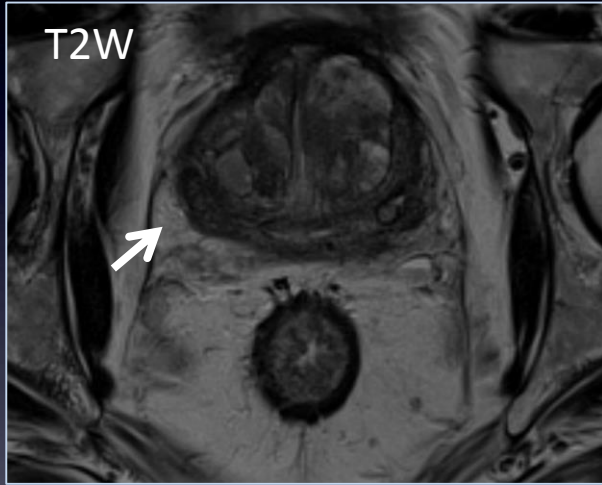


Peripheral: PI-RADS 5 right base

MDT

- Revision mp-MRI: negative
 - Follow-up
 - PSA
 - mp-MRI in our Institute after 6 months.

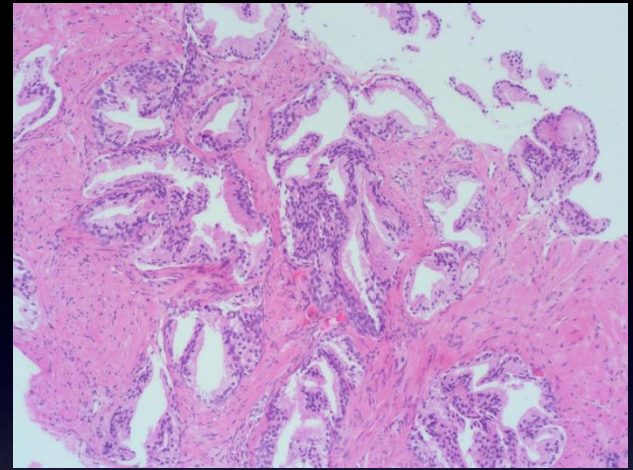
IEO mp-MRI



PI-RADS 2; central zone TZ right base

MDT

- Elevated PSA
- IEO saturation biopsy
 - negative; basal cells hyperplasia and fibrosis.



Experience is maximized in MDT

- 266 outside mpMRIs reviewed by two 'specialist radiologists' (8 & 5 yrs experience)¹

¹Luzzago et al. Clinical Genitourinary Cancer 2018

Aims of the study

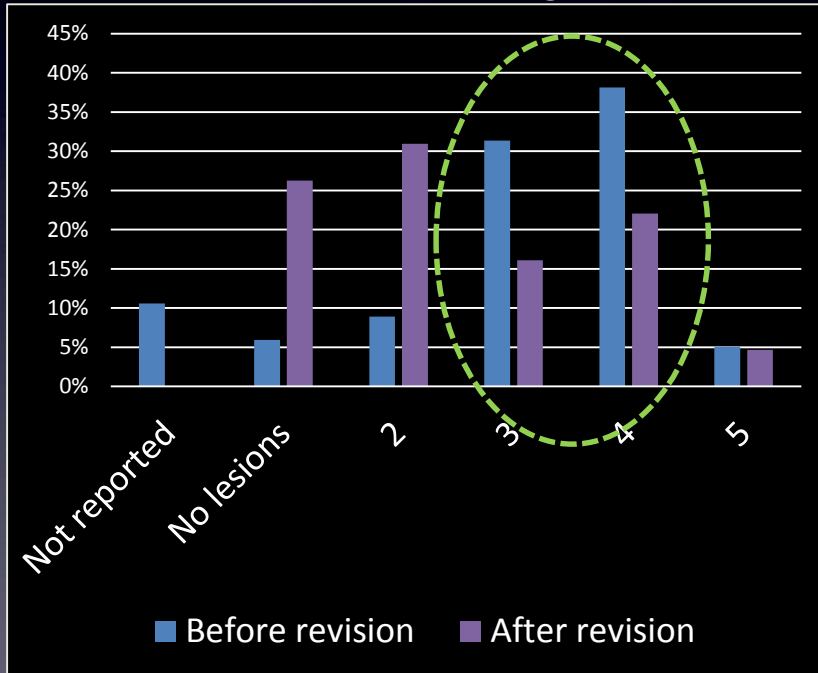
- Inter-reader agreement between radiologists
 - Inexperienced (peripheral centers) vs. Experienced (Academic centers)
- Rate of management strategy changes
 - Targeted biopsies skipped
 - Overall biopsies avoided



Results: primary endpoint

Index lesion PI-RADS score

Fair ($k=0.23$; 95% CI: 0.17-0.3) agreement



Central review:

Reduces PI-RADS 3-4 lesions

Increases PI-RADS 1-2

T.R. comes to our IEO

- 54 years
 - PSA = 5.2 ng/ml
 - mp-MRI (peripheral center) : PI-RADS 4; 8mm
right postero-lateral apex
 - Random biopsy: negative

Peripheral mp-MRI

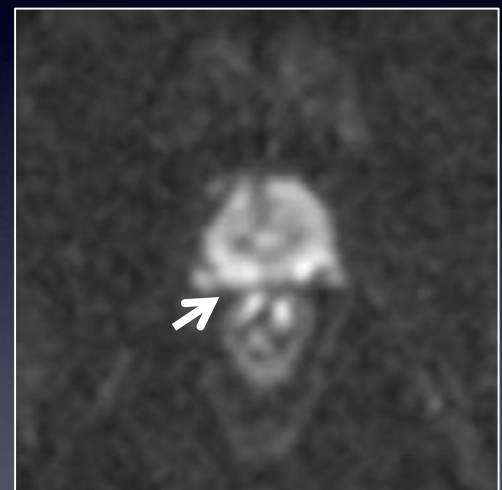
T2W



ADC



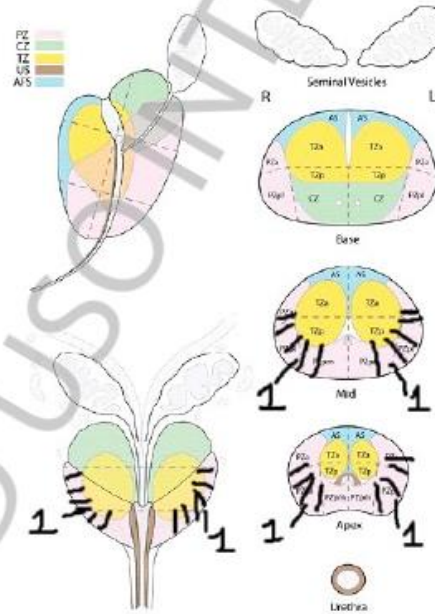
DWI



Central review : PI-RADS 2 PZ right and left No target biopsy

IEO mp-MRI after 6 months

INDICAZIONE: Detection
PSA (ng/ml): 7,25



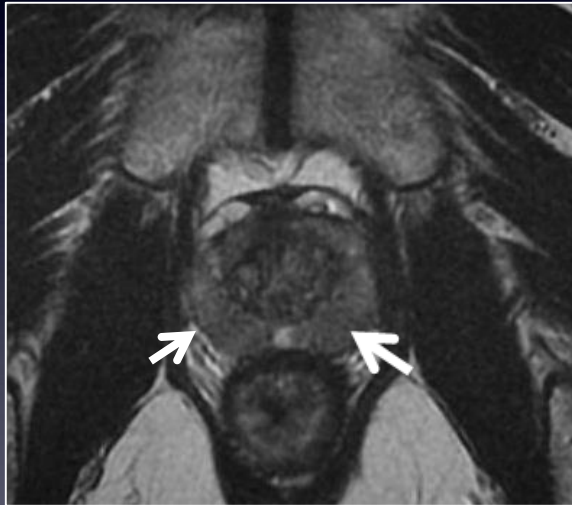
Pictures from: <http://www.acr.org/Quality-Safety/Resources/PIRADS/>

PROSTATA: 37 x 28 x 40 mm Volume: 21,55 mm³

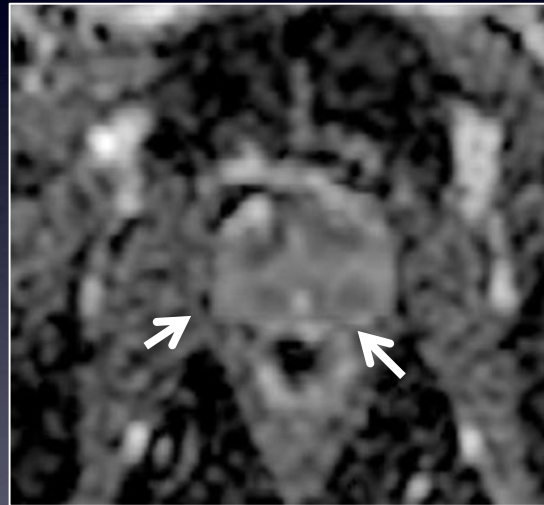
Lesion	Size	Site	Level	Dist. Apex	T2W	DWI	DCE	ADC	SD	Contact with Capsule	Position	ECE	PI-RADS
1	diffuse alteration	PZ - dx;sn	Intermediate;Apex	mm	2	2	0	1055	19	YES	laterale dx;laterale sn;postero-laterale dx;postero-laterale sn	1	2

IEO mp-MRI after 6 months

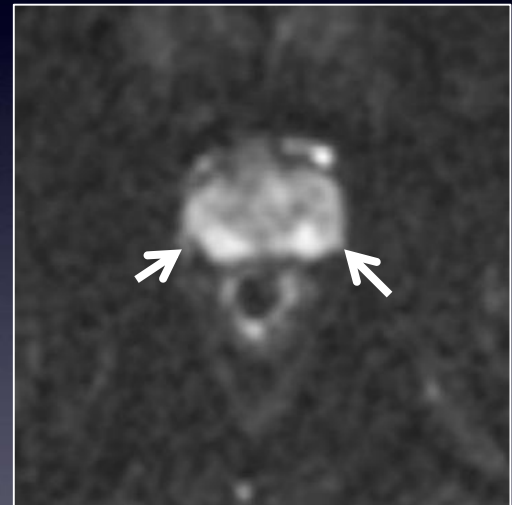
T2W



ADC



DWI

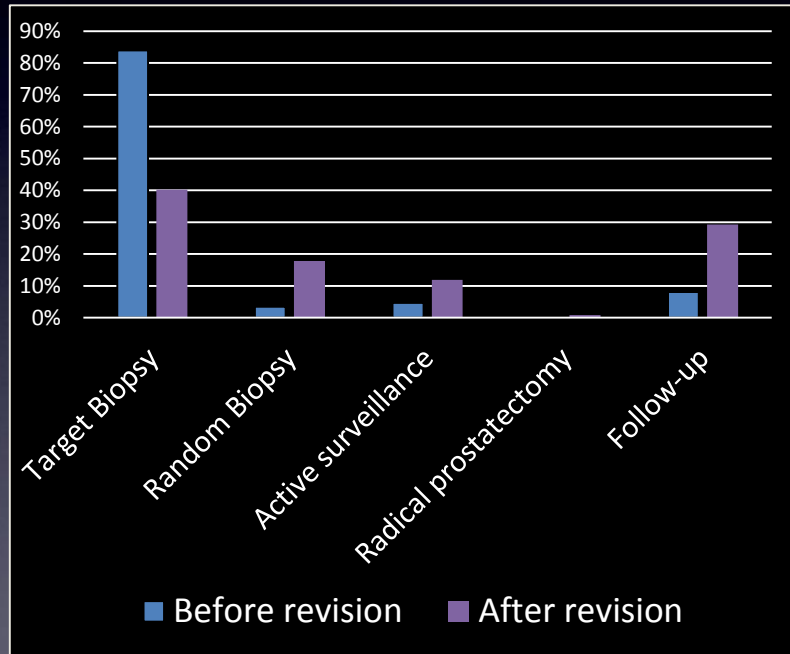


PI-RADS 2 PZ right and left mid and apex

Results: primary endpoint

Clinical Management

Fair ($k=0.21$; 95% CI: 0.1-0.28) agreement



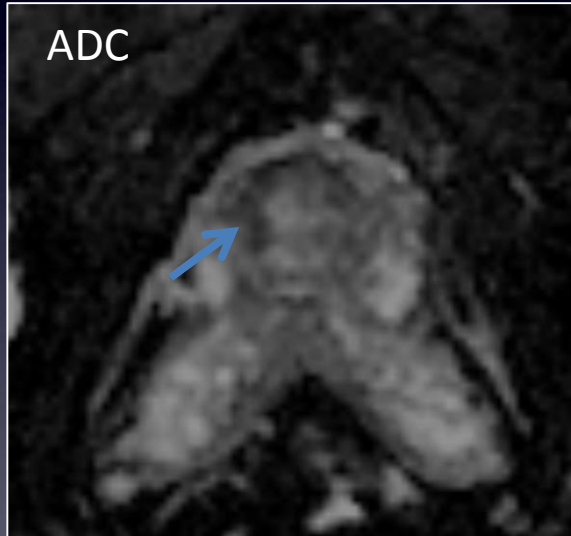
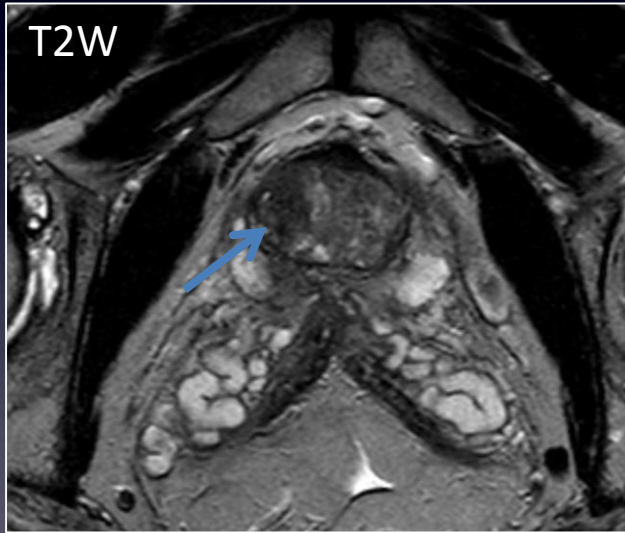
- Management changes in 48%
- 52% fewer targeted biopsies
- 33.5% overall biopsies skipped

B.A. comes to IEO

- 63 years
 - PSA = 9,01 ng/ml
 - PCa GS 3+3 2/12 right 20%-10%; left neg.
 - mp-MRI (peripheral center): PI-RADS 3/4 12mm rt PZ intermediate postero-lateral
 - cT1c
 - Low risk NCCN 2016 → active surveillance?
 - Clinical question: target biopsy?

MDT

- mp-MRI revision



PI-RADS 5 15mm TZ right base and intermediate

RARP → GS 4+3
pT3a

«... the inappropriate use of PI-RADS v2 by new users, who do not have sufficient training or experience may be damaging to clinical care»¹

- Interreader reproducibility tended to be higher for relatively experienced readers than for less experienced readers and to be higher in the PZ than in the TZ
- Priority should be given to development of programs to provide dedicated training and specialty-level expertise in prostate MRI interpretation.

1. Rosenkrantz et al, AJR 2016.

Learning curve

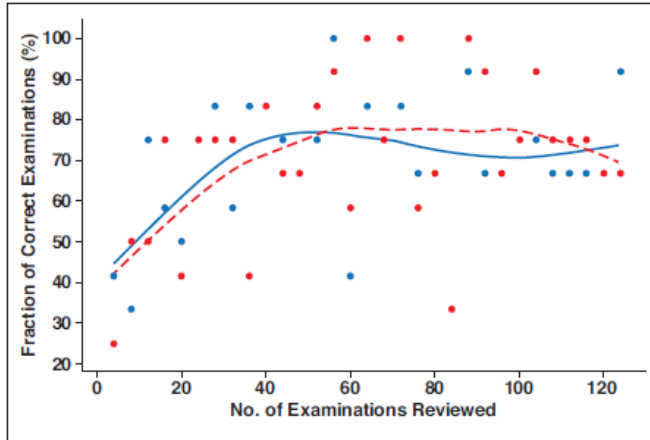


Fig. 3—Learning curves in prostate MRI interpretation for readers without (solid blue line) and with (dashed red line) continual case-based feedback. Proportion of examinations correctly interpreted by readers without (blue data points) and with (red data points) feedback was plotted for consecutive sets of four examinations, and learning curves were fit using locally weighted scatterplot smoothing.

A

61-year-old man with PSA of 21.8 ng/mL. Prior negative biopsy.

Select Scroll, Zoom/Pan, and Window/Level to perform each of these functions. Scroll and zoom using the middle mouse button or mouse wheel. Pan and window/level using the left mouse button.

[SEE THE SOLUTION](#)

[PREVIOUS](#) [NEXT](#)

B

Finding: Within the right anterior PZ and TZ is a large region of markedly decreased ADC and increased high b-value signal, with associated focal early enhancement and locally invasive behavior.

T2WI: 5. **DWI:** 5. **DCE:** (+). **PI-RADS:** 5.

MRI/TRUS fusion biopsy: Gleason score 4+3 tumor.

1. Rosenkrantz et al, AJR 2017.
2. Rosenkrantz et al, Current Problems in Diagnostic Radiology 2019.

Who is the 'specialist radiologist'?

- Specialist radiologist > 2000 mpMRIs
- General radiologist → 300-500 mpMRIs

ORIGINAL RESEARCH

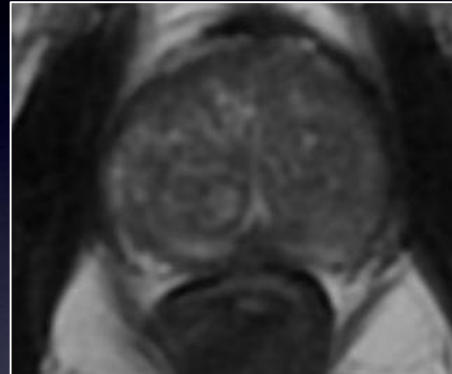
Accuracy and Agreement of PIRADSv2 for Prostate Cancer mpMRI: A Multireader Study

Matthew D. Greer BS,^{1,2} Anna M. Brown BSE, MPhil,^{1,3} Joanna H. Shih PhD,⁴
Ronald M. Summers MD, PhD,⁵ Jamie Marko MD,⁶ Yan Mee Law MD,⁷
Sandeep Sankineni MD,¹ Arvin K. George MD,⁸ Maria J. Merino MD,⁹
Peter A. Pinto MD,⁸ Peter L. Choyke MD,¹ and Baris Turkbey MD^{1*}

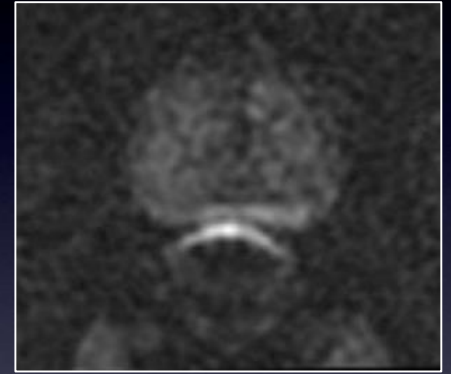
Clinical case: Quality check

- 66yo
 - PSA = 4,39ng/mL
 - GS 3+3 left 1/12
 - cT1c
- MRI outside Institution
 - PI-RADS 3 (PZ left , mid)
 - Not multiparametric!
 - No ADC
 - No DCE

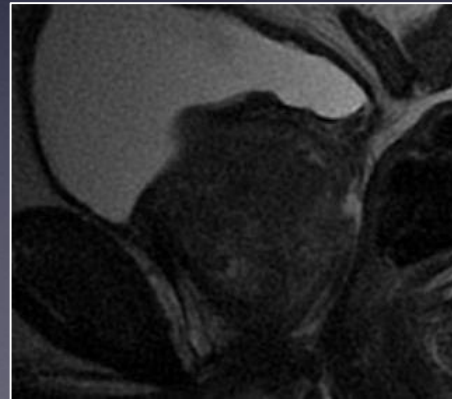
T2W



DWI

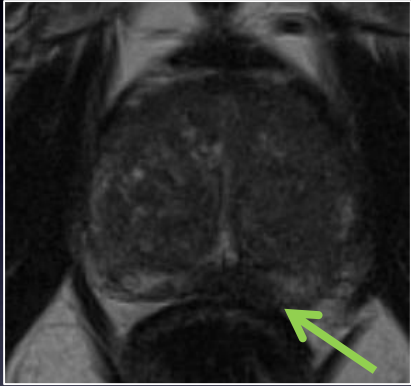


T2W

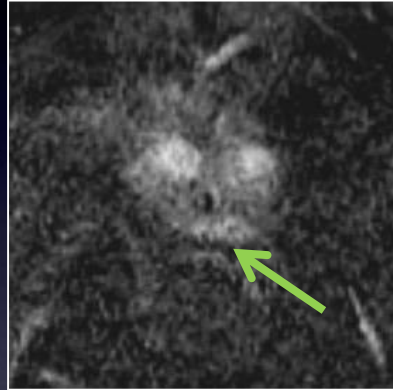


Clinical case

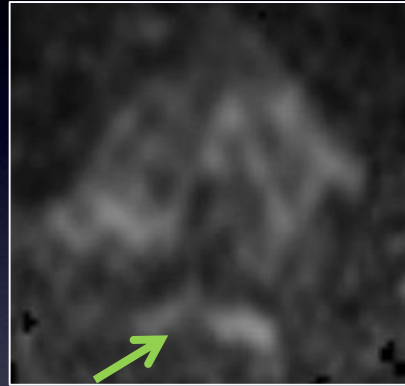
T2W



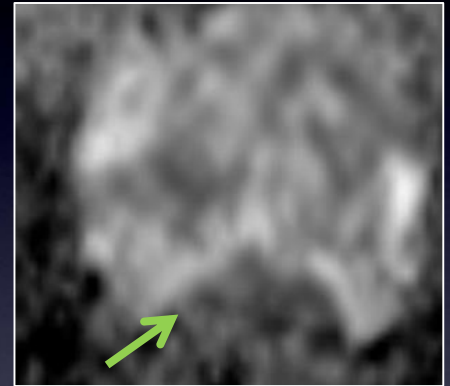
DCE



DWI

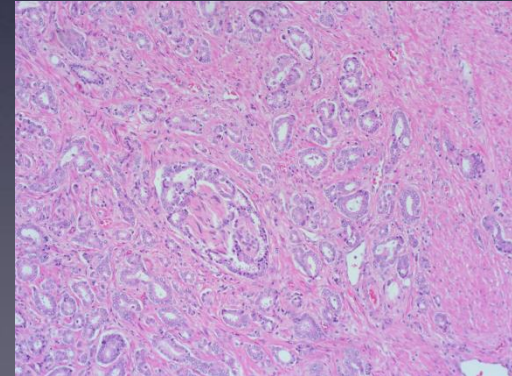


ADC



PI-RADS 4

RARP → GS 4+3
pattern 4 = 55%
pT3a pNx R0



Optimising mp-MRI: prepare for success

- PI-RADS v2.1 recommendations (2019)
- Hardware, software, scanning parameters
- Patient-related factors: bowel peristalsis, rectal distension, total hip replacement, post-biopsy haemorrhage

Experienced MDT → adapts to clinical context

Patient group clinical priorities

First biopsy

- Detect all csPCa
- Do not over-diagnose insignPCa

Repeat biopsy

- Do not miss csPCa

mp-MRI Reading strategy

- Maximise SPecificity
- SEnsitivity adjustments to clinical data (PSAD, F/H, risk calculator)

- Maximise SEnsitivity
- Review blind spots (TZ, AFMS, CZ, subcapsular regions)

Key messages

- MDT increase value with few biopsies and improved decisions on biopsy methods
- Reviews should take into account the risk of csPCa depending on clinical factors
- Reading of images should also be weighted according to clinical priorities (SEnsitivity or SPecificity)



THANK YOU

Prostate MRI Team (IEO)

G. Petralia, MD, S. Alessi, MD, P. Pricolo, MD, P. Summers, PhD