ALBERT EINSTEIN
HOSPITAL ISRAELITA

Rastreamento, diagnóstico e estadiamento do câncer de próstata (REMA, PSMA)

Ronaldo Hueb Baroni

Coordenador Médico do Grupo de Radiologia Abdominal e
do Setor de Ressonância Magnética do Hospital Israelita Albert Einstein

Rastreamento de tumor de próstata hoje…

- TR alterado
- PSA: > 2,5 ng/ml

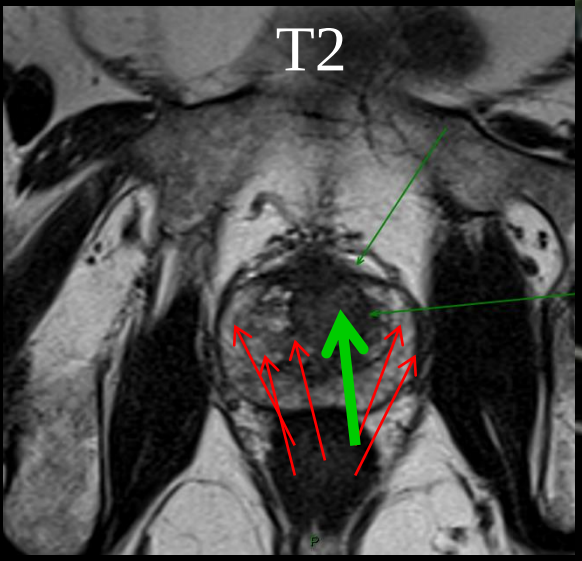
BIÓPSIA DE PRÓSTATA

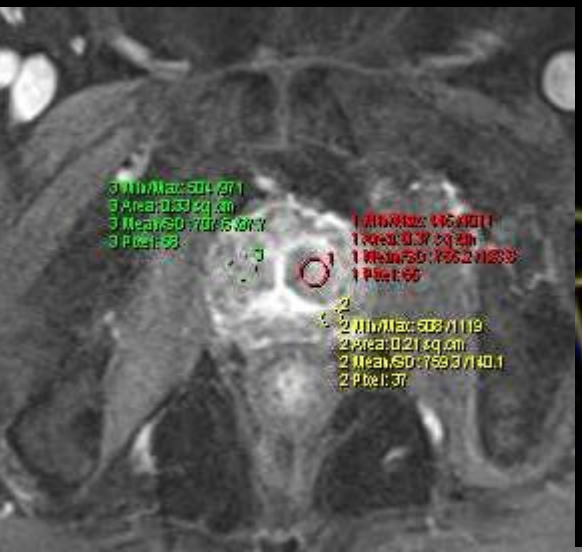
- 1 milhão de biópsias prostáticas anuais são realizadas nos EUA
- A técnica randomizada em sextantes ainda é a mais utilizada (até 16 fragmentos).
- Biópsia prostática randomizada pode não detectar tumor em até 30-60 % dos casos
- Até 50% dos CaP diagnosticados não são clinicamente significantes

Estadio clínico T1 c
Densidade PSA < 0.15 ng/mL
Sem Gleason 4 ou 5
Até 3 fragmentos < 50%

J Urol 2002;167:2435-2439
J Urol 2001;165:1554-1559
J Urol, 2003169(1) 12-19.

RM MULTIPARAMÉTRICA





AP: Adenoca Gleason 8 (5 + 3)

EUROPEAN UROLOGY 69 (2016) 16–40

available at www.sciencedirect.com
journal homepage: www.europeanurology.com

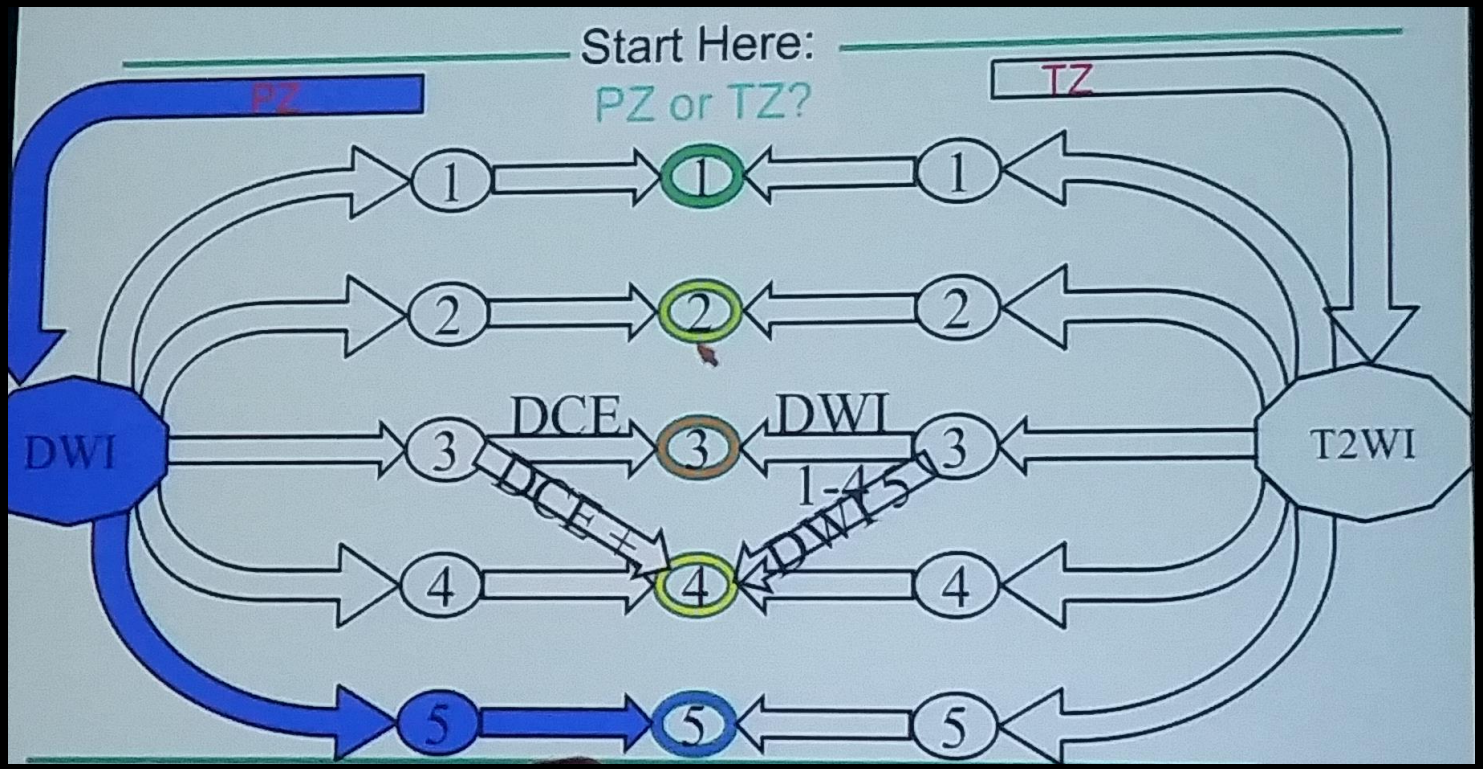
European Association of Urology

Platinum Priority – Prostate Cancer

Editorial by Jelle O. Barentsz, Jeffrey C. Weinreb, Sadhna Verma et al on pp. 41–49 of this issue

PI-RADS Prostate Imaging – Reporting and Data System: 2015, Version 2

Jeffrey C. Weinreb[a,†,], Jelle O. Barentsz[b,†], Peter L. Choyke[c], Francois Cornud[d], Masoom A. Haider[e], Katarzyna J. Macura[f], Daniel Margolis[g], Mitchell D. Schnall[h], Faina Shtern[i], Clare M. Tempany[j], Harriet C. Thoeny[k], Sadna Verma[l]*



Paciente 64 anos, elevação PSA, toque normal

	07/04/2011	21/08/2013
PSA total (ng/ml)	7,2	14,2
%PSA livre	8	8

Biopsia prévia negativa (08/06/2012)

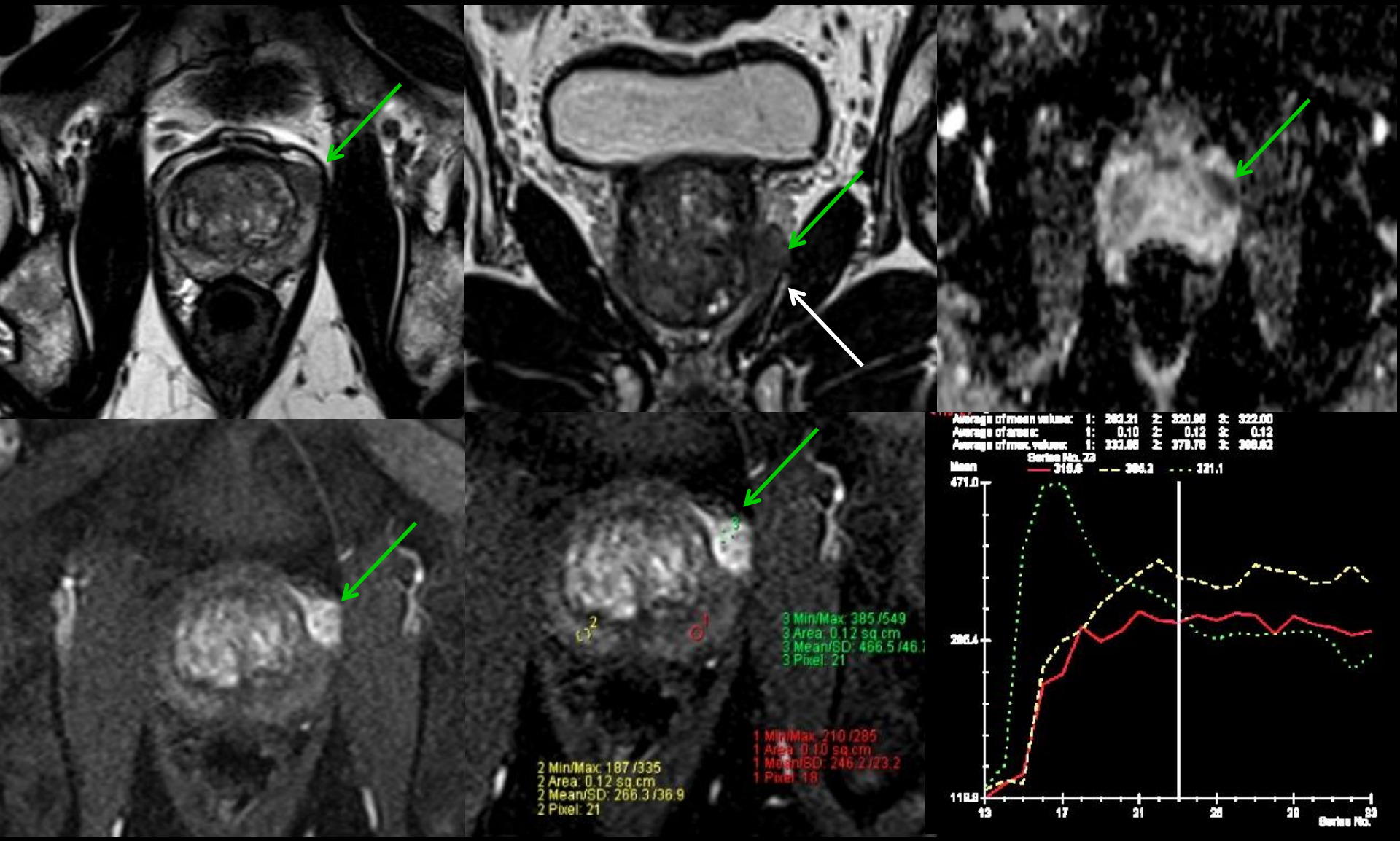
PEÇAS RADICAIS E PUNÇÕES
Exame Anatomopatológico

Espécimes e Procedimentos

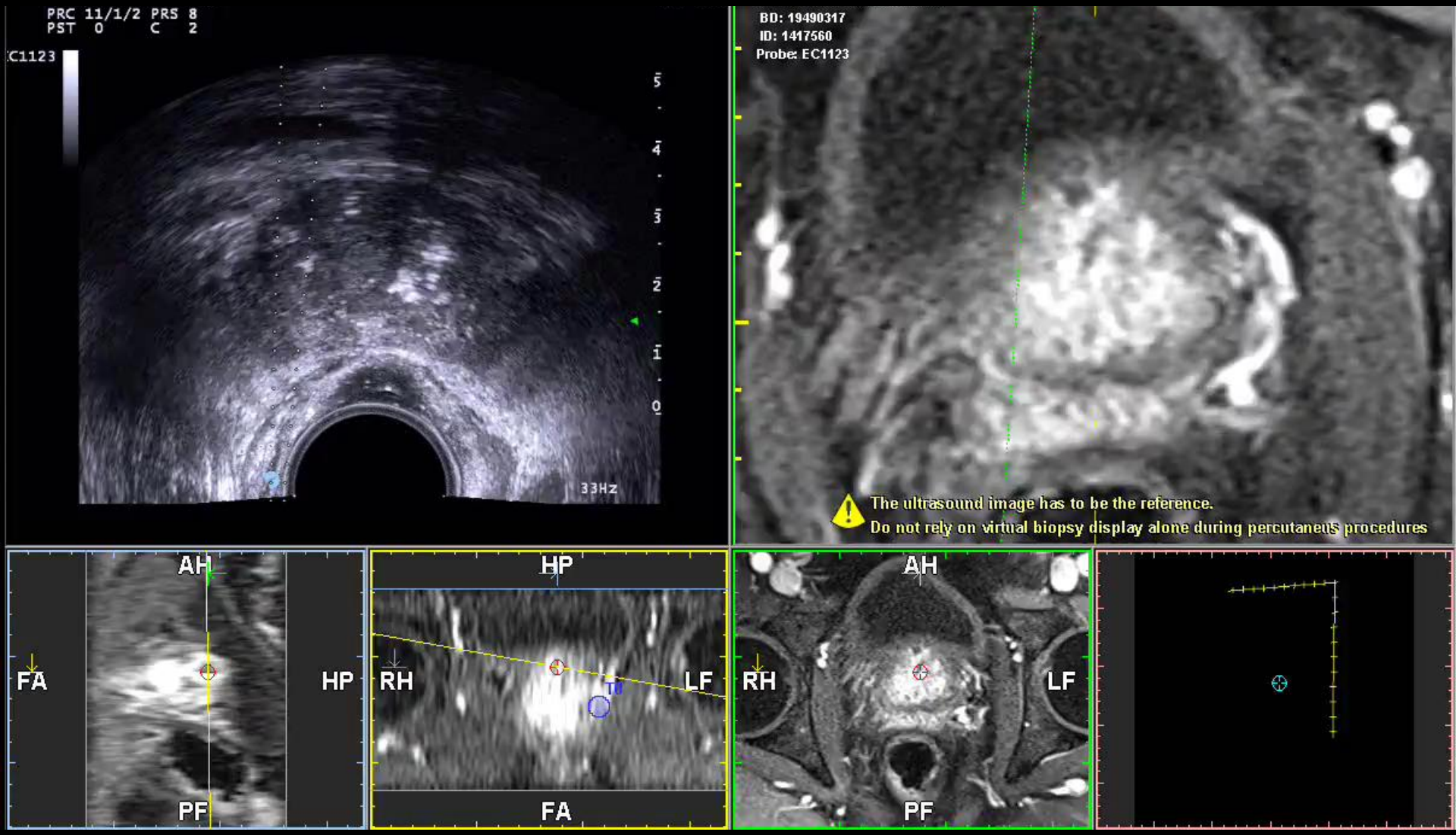
Próstata, biópsias seriadas por agulha

Microscopia e Conclusões
Diagnósticas

Negativo para neoplasia (todas as amostras)
Atrofia glandular multifocal
Prostatite crônica não específica com focos de atividade aguda


3 Min/Max: 385 /549
3 Area: 0.12 sq.cm
3 Mean/SD: 466.5 /46
3 Pixel: 21
2 Min/Max: 187 /335
2 Area: 0.12 sq.cm
2 Mean/SD: 266.3 /36.9
2 Pixel: 21
1 Min/Max: 210 /285
1 Area: 0.10 sq.cm
1 Mean/SD: 246.2 /23.2
1 Pixel: 18
Mean
471.0
285.4
13
17
21
25
29
33
Series No.

PIRADS 5


PRC 11/1/2 PRS 8
PST 0 C 2
C1123
5
4
3
2
1
0
33Hz
BD: 19490317
ID: 1417560
Probe: EC1123
The ultrasound image has to be the reference.
Do not rely on virtual biopsy display alone during percutaneus procedures
AH
FA
HP
PF
HP
RH
LF
TM
FA
AH
RH
LF
PF

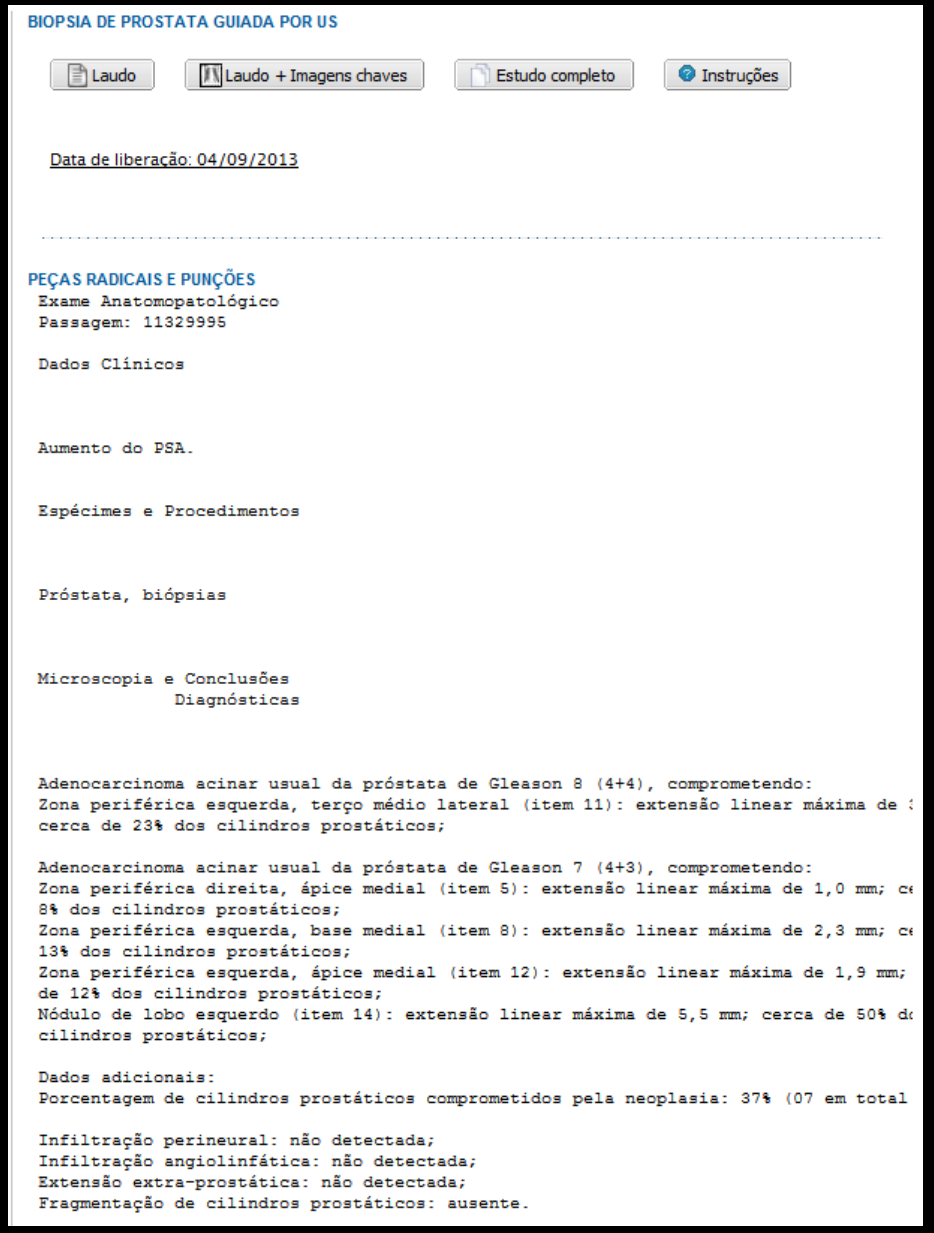
- BIÓPSIA (04/09/2013)

  Adenocarcinoma usual

- Gleason 8 (4+4)

  ZPE ML 23%,

  Nódulo lobo esquerdo 50%



BIOPSIA DE PROSTATA GUIADA POR US

Laudo | Laudo + Imagens chaves | Estudo completo | Instruções

Data de liberação: 04/09/2013

PEÇAS RADICAIS E PUNÇÕES

Exame Anatomopatológico
Passagem: 11329995

Dados Clínicos

Aumento do PSA.

Espécimes e Procedimentos

Próstata, biópsias

Microscopia e Conclusões
Diagnósticas

Adenocarcinoma acinar usual da próstata de Gleason 8 (4+4), comprometendo:
Zona periférica esquerda, terço médio lateral (item 11): extensão linear máxima de
cerca de 23% dos cilindros prostáticos;

Adenocarcinoma acinar usual da próstata de Gleason 7 (4+3), comprometendo:
Zona periférica direita, ápice medial (item 5): extensão linear máxima de 1,0 mm; ce
8% dos cilindros prostáticos;
Zona periférica esquerda, base medial (item 8): extensão linear máxima de 2,3 mm; ce
13% dos cilindros prostáticos;
Zona periférica esquerda, ápice medial (item 12): extensão linear máxima de 1,9 mm;
de 12% dos cilindros prostáticos;
Nódulo de lobo esquerdo (item 14): extensão linear máxima de 5,5 mm; cerca de 50% dc
cilindros prostáticos;

Dados adicionais:
Porcentagem de cilindros prostáticos comprometidos pela neoplasia: 37% (07 em total

Infiltração perineural: não detectada;
Infiltração angiolinfática: não detectada;
Extensão extra-prostática: não detectada;
Fragmentação de cilindros prostáticos: ausente.

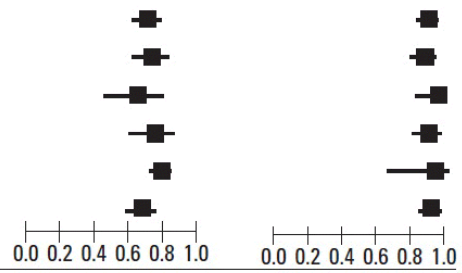
Accuracy of Multiparametric MRI for Prostate Cancer Detection: A Meta-Analysis

Maarten de Rooij[1,2]
Esther H. J. Hamoen[1,3]
Jurgen J. Fütterer[1]
Jelle O. Barentsz[1]
Maroeska M. Rovers[2,4]

AJR 2014; 202:343–351

TABLE 7: Forest Plots of Pooled Estimates of All Studies Overall and of Different Subgroups

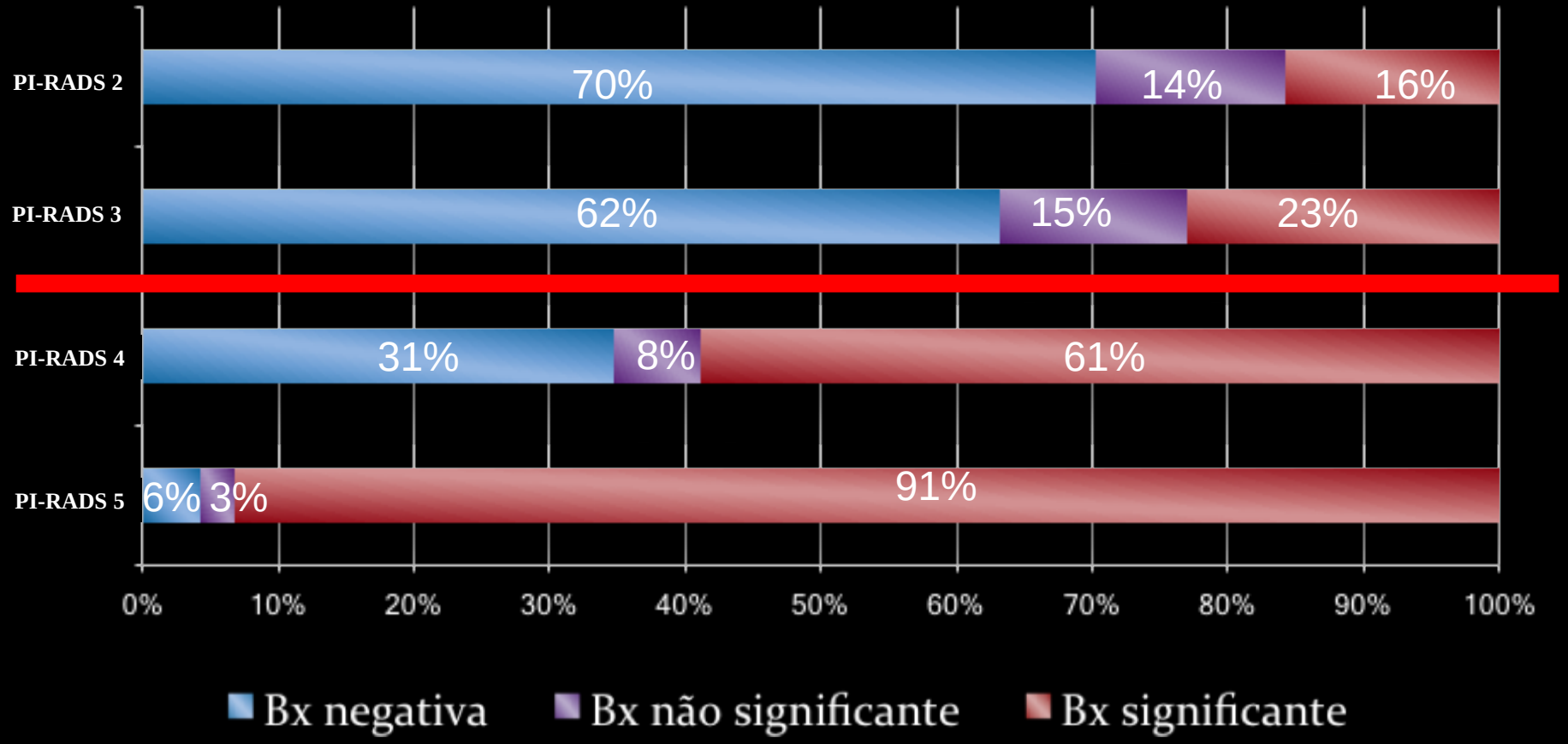
Studies[a]	Pooled Performance Value (95% CI)	
	Sensitivity	Specificity
All studies	0.74 (0.66–0.81)	0.88 (0.82–0.92)
Studies that used biopsy as reference standard	0.76 (0.66–0.84)	0.86 (0.79–0.91)
Studies that used prostatectomy as reference standard	0.69 (0.52–0.82)	0.93 (0.81–0.97)
Studies that reported data for the whole gland	[illegible]	0.88 (0.80–0.94)
Studies that reported data for the peripheral zone	0.81 (0.75–0.85)	0.91 (0.67–0.98)
Studies that reported data by region	0.71 (0.63–0.78)	0.89 (0.83–0.94)



Note—X = pooled performance value, horizontal lines = 95% CIs.
[a]We were not able to pool calculated estimates of the transition zone.

ALBERT EINSTEIN
MEDICINA DIAGNÓSTICA

Mmp + biópsia com fusão (1003 pacientes agosto 2013 – fevereiro 2018



Critério de Epstein

JAMA The Journal of the American Medical Association

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

JAMA January 27, 2015 Volume 313, Number 4

Table 2. Performance of Different Biopsy Approaches in the Detection of Intermediate- to High-Risk Prostate Cancer on Whole-Gland Prostatectomy Specimen

	Targeted MR/Ultrasound Fusion Biopsy	Standard Extended-Sextant Biopsy	Combined Biopsy
Sensitivity, % (95% CI)	77 (67-84)	53 (43-63)	85 (76-91)
Specificity, % (95% CI)	68 (57-78)	66 (54-76)	49 (37-60)
Negative predictive value, % (95% CI)	70 (58-80)	53 (43-63)	73 (58-84)
Positive predictive value, % (95% CI)	75 (65-83)	66 (54-76)	67 (58-75)
Accuracy, % (95% CI)	73 (70-76)	59 (55-63)	69 (65-72)
AUC (95% CI)	0.73 (0.66-0.79)	0.59 (0.52-0.67)	0.67 (0.60-0.74)
P value of comparison with targeted MR/ultrasound biopsy		.005	.04

Abbreviations: AUC, area under the curve; MR, magnetic resonance.

Eur Radiol
DOI 10.1007/s00330-017-4939-0

UROGENITAL

Incremental diagnostic value of targeted biopsy using mpMRI-TRUS fusion *versus* 14-fragments prostatic biopsy: a prospective controlled study

Guilherme C. Mariotti[1] · Priscila M. Falsarella[1,2] · Rodrigo G. Garcia[1] · Marcos R. G. Queiroz[1] · Gustavo C. Lemos[3] · Ronaldo H. Baroni[4]

Table 3 Comparison of biopsy results according to the RB vs. FB protocols

	Fusion biopsy (FB)		
Random biopsy (RB)	Negative	Clinically non-significant disease	Clinically significant disease	Total
Negative	38 (38.0%)	1 (1.0%)[a]	5 (5.0%)[a]	44 (44.0%)
Clinically non-significant disease	6 (6.0%)[b]	5 (5.0%)	5 (5.0%)[a]	16 (16.0%)
Clinically significant disease	3 (3.0%)[b]	3 (3.0%)[b]	34 (34.0%)	40 (40.0%)
Total	47 (47.0%)	9 (9.0%)	33 (35.1%)	100 (100.0%)

Approved by the AUA and SAR Board of Directors 2016

American Urological Association (AUA)
Society of Abdominal Radiology (SAR)
Joint Consensus Statement

PROSTATE MRI AND MRI-TARGETED BIOPSY IN PATIENTS WITH PRIOR NEGATIVE BIOPSY

Collaborative Initiative of the American Urological Association and the Society of Abdominal Radiology's Prostate Cancer Disease-Focused Panel

WORKGROUP MEMBERS

SAR: Andrew B. Rosenkrantz, MD; Sadhna Verma, MD; Peter Choyke, MD; Steven C. Eberhardt, MD; Masoom A. Haider, MD; Daniel J. Margolis, MD

AUA: Samir S. Taneja, MD; Krishnanath Gaitonde, MD; Scott E. Eggener, MD; Leonard S. Marks, MD; Peter Pinto, MD; Geoffrey A. Sonn, MD

CONSENSUS STATEMENTS

- Following an initial negative biopsy, there is an ongoing need for strategies to improve patient selection for repeat biopsy as well as the diagnostic yield from repeat biopsies.
- Many options exist for men with a previously negative biopsy.
- If a biopsy is recommended, prostate MRI and subsequent MRI-targeted cores appear to facilitate the detection of CS disease over standardized repeat biopsy.
- Thus, when high-quality prostate MRI is available, it should be strongly considered in any patient with a prior negative biopsy who has persistent clinical suspicion for prostate cancer and who is undergoing a repeat 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†*

Summary

Background Men with high serum prostate specific antigen usually undergo transrectal ultrasound-guided prostate biopsy (TRUS-biopsy). TRUS-biopsy can cause side-effects including bleeding, pain, and infection. Multi-parametric magnetic resonance imaging (MP-MRI) used as a triage test might allow men to avoid unnecessary TRUS-biopsy and improve diagnostic accuracy.

Methods We did this multicentre, paired-cohort, confirmatory study to test diagnostic accuracy of MP-MRI and TRUS-biopsy against a reference test (template prostate mapping biopsy [TPM-biopsy]). Men with prostate-specific antigen concentrations up to 15 ng/mL, with no previous biopsy, underwent 1·5 Tesla MP-MRI followed by both TRUS-biopsy and TPM-biopsy. The conduct and reporting of each test was done blind to other test results. Clinically significant cancer was defined as Gleason score ≥4+3 or a maximum cancer core length 6 mm or longer. This study is registered on ClinicalTrials.gov, NCT01292291.

Findings Between May 17, 2012, and November 9, 2015, we enrolled 740 men, 576 of whom underwent 1·5 Tesla MP-MRI followed by both TRUS-biopsy and TPM-biopsy. On TPM-biopsy, 408 (71%) of 576 men had cancer with 230 (40%) of 576 patients clinically significant. For clinically significant cancer, MP-MRI was more sensitive (93%, 95% CI 88–96%) than TRUS-biopsy (48%, 42–55%; p<0·0001) and less specific (41%, 36–46% for MP-MRI *vs* 96%, 94–98% for TRUS-biopsy; p<0·0001). 44 (5·9%) of 740 patients reported serious adverse events, including 8 cases of sepsis.

Interpretation Using MP-MRI to triage men might allow 27% of patients avoid a primary biopsy and diagnosis of 5% fewer clinically insignificant cancers. If subsequent TRUS-biopsies were directed by MP-MRI findings, up to 18% more cases of clinically significant cancer might be detected compared with the standard pathway of TRUS-biopsy for all. MP-MRI, used as a triage test before first prostate biopsy, could reduce unnecessary biopsies by a quarter. MP-MRI can also reduce over-diagnosis of clinically insignificant prostate cancer and improve detection of clinically significant cancer.

Lancet 2017; 389: 815–22

Published Online
January 19, 2017
http://dx.doi.org/10.1016/S0140-6736(16)32401-1

See Comment page 767

*These authors contributed equally

†For a complete list of members of the PROMIS study group see appendix

Division of Surgery and Interventional Science, Faculty of Medical Sciences, University College London, London, UK (H Ahmed FRCS, A El-Shater Bosaily MBBCh, Prof M Emberton FRCS); **Department of Urology, UCLH NHS Foundation Trust, London, UK** (H U Ahmed, A El-Shater Bosaily, Prof M Emberton); **Department of Academic Urology, Royal Marsden Hospital, Sutton, UK** (C Parker FRCR); **MRC Clinical Trials Unit at UCL, London, UK** (L C Brown PhD,

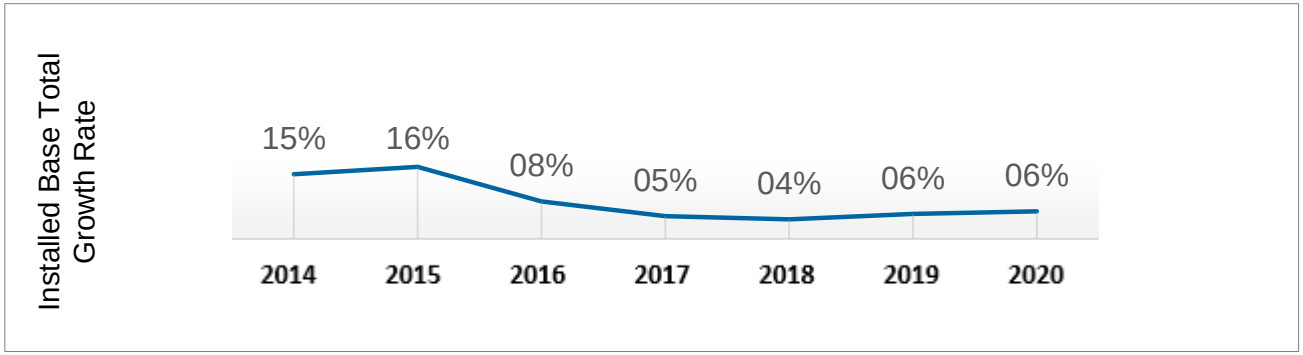
Are Dynamic Contrast-Enhanced Images Necessary for Prostate Cancer Detection on Multiparametric Magnetic Resonance Imaging?

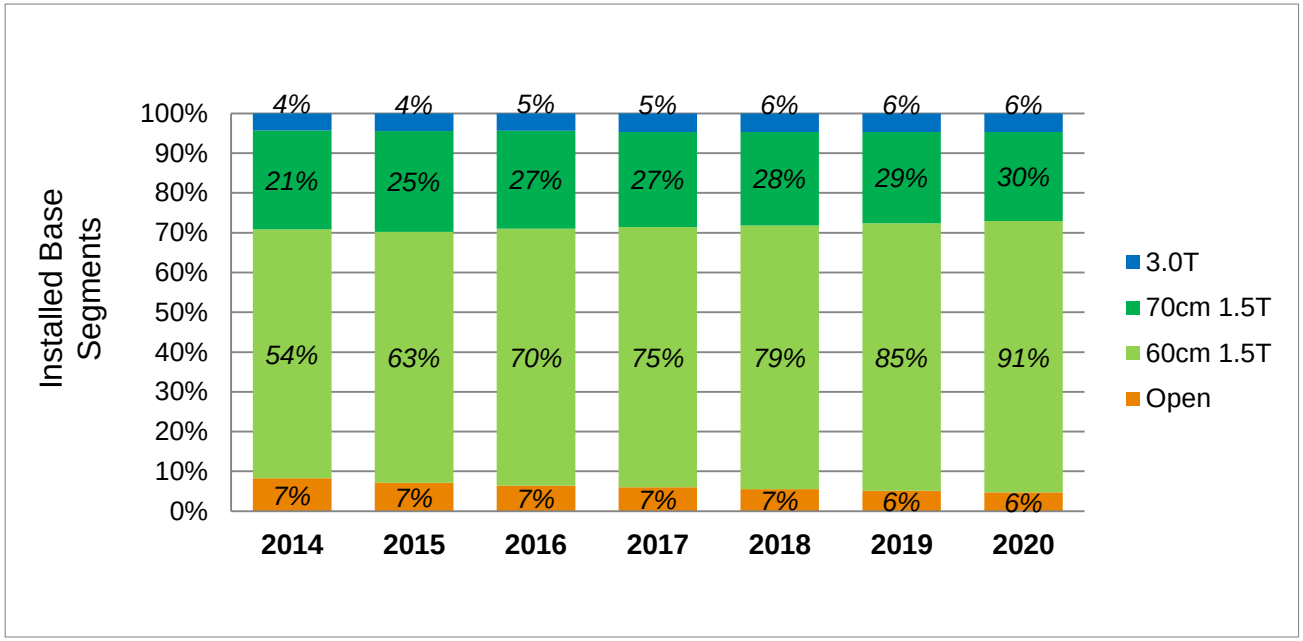
Thaís Caldara Mussi,[1] Tatiana Martins,[1,2] Rodrigo Gobbo Garcia,[3] Renee Zon Filippi,[4] Gustavo Caserta Lemos,[5] Ronaldo Hueb Baroni[1]

AV	Contrast	Sensitivity	Specificity	PPV	NPV	Accuracy
Reader 1	With	63.0 (54.8-71.3)	77.1 (72.3-81.9)	38.8 (30.0-47.5)	88.0 (83.9-92.1)	73.0 (68.8-77.3)
	Without	63.7 (54.5-72.9)	75.9 (71.2-80.6)	36.5 (28.0-45.0)	88.1 (84.0-92.2)	72.2 (68.0-76.4)
	p-value	0.837	0.551	0.084	0.752	0.599
	N	274	1142	448	968	1416
Reader 2	With	80.7 (73.9-87.6)	57.1 (51.8-62.4)	30.7 (23.4-38.0)	91.3 (87.7-94.9)	60.6 (55.8-65.4)
	Without	74.0 (65.3-82.7)	65.5 (60.1-71.0)	29.9 (22.7-37.2)	89.8 (86.0-93.6)	66.1 (61.4-70.9)
	p-value	0.052	**0.004**	0.494	0.109	**0.024**
	n	271	1139	660	750	1410

Clinical Genitourinary Cancer, *PII: S1558-7673*
Keywords: Dynamic-contrast enhanced, Magnetic resonance imaging, Prostate cancer, Prostatic neoplasms

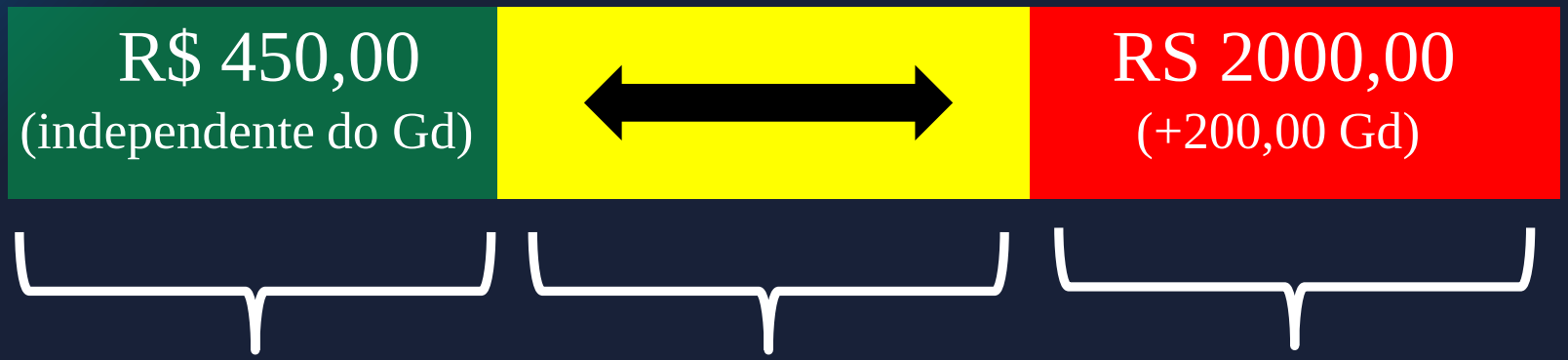
Brazil MR Installed Base Forecast





Source: COCIR

Custo / reembolso da RMmp no Brasil



RM biparamétrica: o futuro do rastreamento por imagem??

BJU Int 2015; **115**: 381–388

BJUI
BJU International

Diagnostic value of biparametric magnetic resonance imaging (MRI) as an adjunct to prostate-specific antigen (PSA)-based detection of prostate cancer in men without prior biopsies

Soroush Rais-Bahrami*, M. Minhaj Siddiqui*, Srinivas Vourganti*, Baris Turkbey†, Ardeshir R. Rastinehad*, Lambros Stamatakis*, Hong Truong*, Annerleim Walton-Diaz*, Anthony N. Hoang*, Jeffrey W. Nix*, Maria J. Merino‡, Bradford J. Wood§, Richard M. Simon¶, Peter L. Choyke† and Peter A. Pinto*‡

*Urologic Oncology Branch, †Molecular Imaging Program, ‡Laboratory of Pathology, §Center for Interventional Oncology, and ¶Biometric Research Branch, National Cancer Institute, National Institutes of Health, Bethesda, MD, USA

lesions (SPL) on B-MRI. B-MRI performed well for the detection of prostate cancer with an area under the curve (AUC) of 0.80 (compared with 0.66 and 0.74 for PSA level and PSAD, respectively). We derived combined PSA and

Combined Biparametric Prostate Magnetic Resonance Imaging and Prostate-specific Antigen in the Detection of Prostate Cancer: A Validation Study in a Biopsy-naive Patient Population

Michele Fascelli, Soroush Rais-Bahrami, Sandeep Sankineni, Anna M. Brown, Arvin K. George, Richard Ho, Thomas Frye, Amichai Kilchevsky, Raju Chelluri, Steven Abboud, M. Minhaj Siddiqui, Maria J. Merino, Bradford J. Wood, Peter L. Choyke, Peter A. Pinto, and Baris Turkbey

UROLOGY 88: 125–134, 2016.

Screen positive lesions on B-MRI had the highest sensitivity (95.5%) and negative predictive value of 71.4% compared with PSA and PSAD. B-MRI significantly improved sensitivity (43.2-72.7%, $P = .0002$) when combined with PSAD. The negative predictive value of PSA increased with B-MRI, achieving 91.7% for B-MRI and PSA for Gleason ≥3 + 4. Overall accuracies of the composite equations were 81.4% (B-MRI and PSA) and 78.0% (B-MRI and PSAD).

Research

Biparametric versus multiparametric MRI in the diagnosis of prostate cancer

Karen Cecilie Duus Thestrup[1], Vibeke Logager[1], Ingerd Baslev[2], Jakob M Møller[1], Rasmus Hvass Hansen[1] and Henrik S Thomsen[1]

Acta Radiologica Open
5(8) 1–8

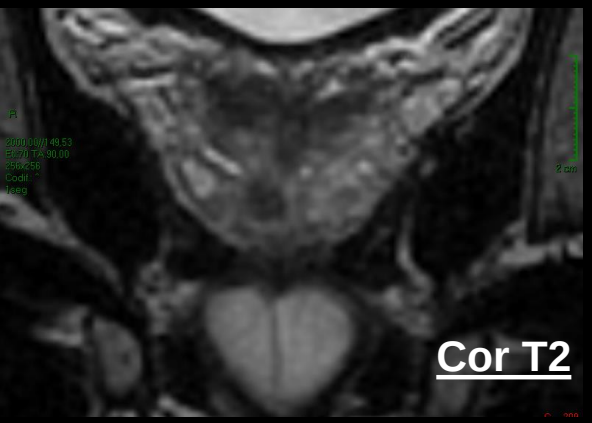
DOI: 10.1177/2058460116663046
arr.sagepub.com
SAGE

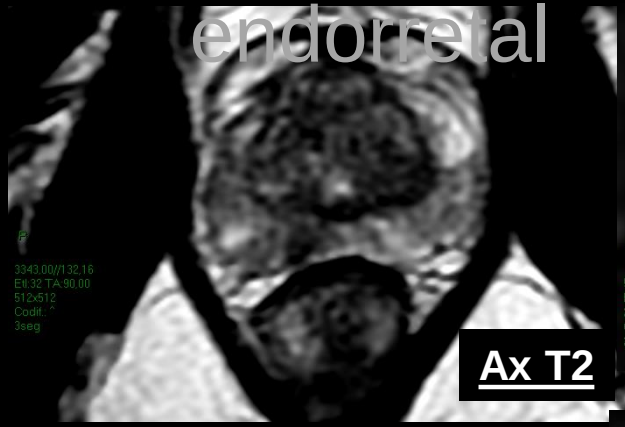
Table 4. The detection rates of Readers 1 and 2.

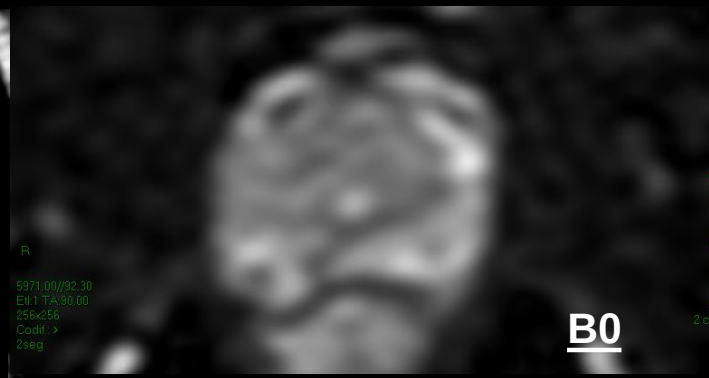
	Reader 1		Reader 2	
	bp-MRI	mp-MRI	bp-MRI	mp-MRI
Sensitivity	0.94	1.0	0.96	0.93
Specificity	0.15	0.04	0.15	0.16
PPV	0.36	0.34	0.36	0.36
NPV	0.83	1.00	0.87	0.81

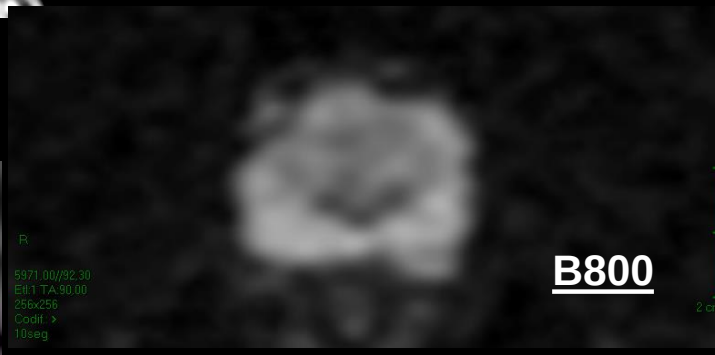
61 anos, vigilância ativa (GLEASON 6)

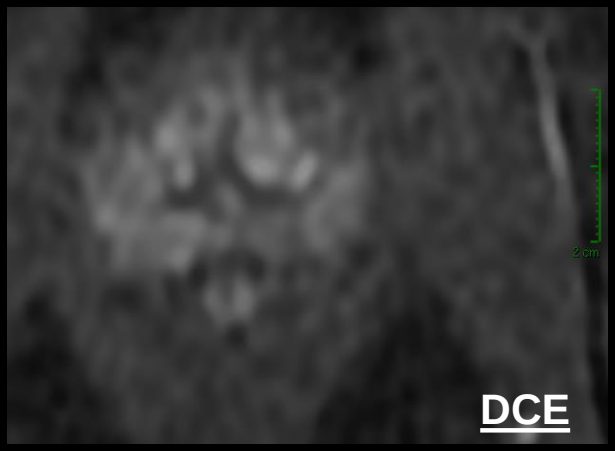
RMmp em aparelho de 1.5T sem bobina endorretal

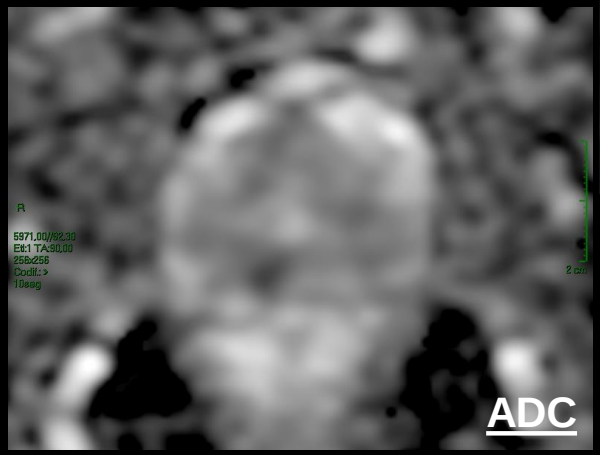


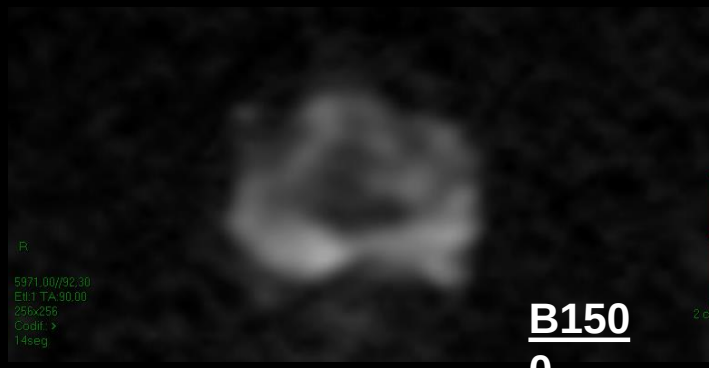








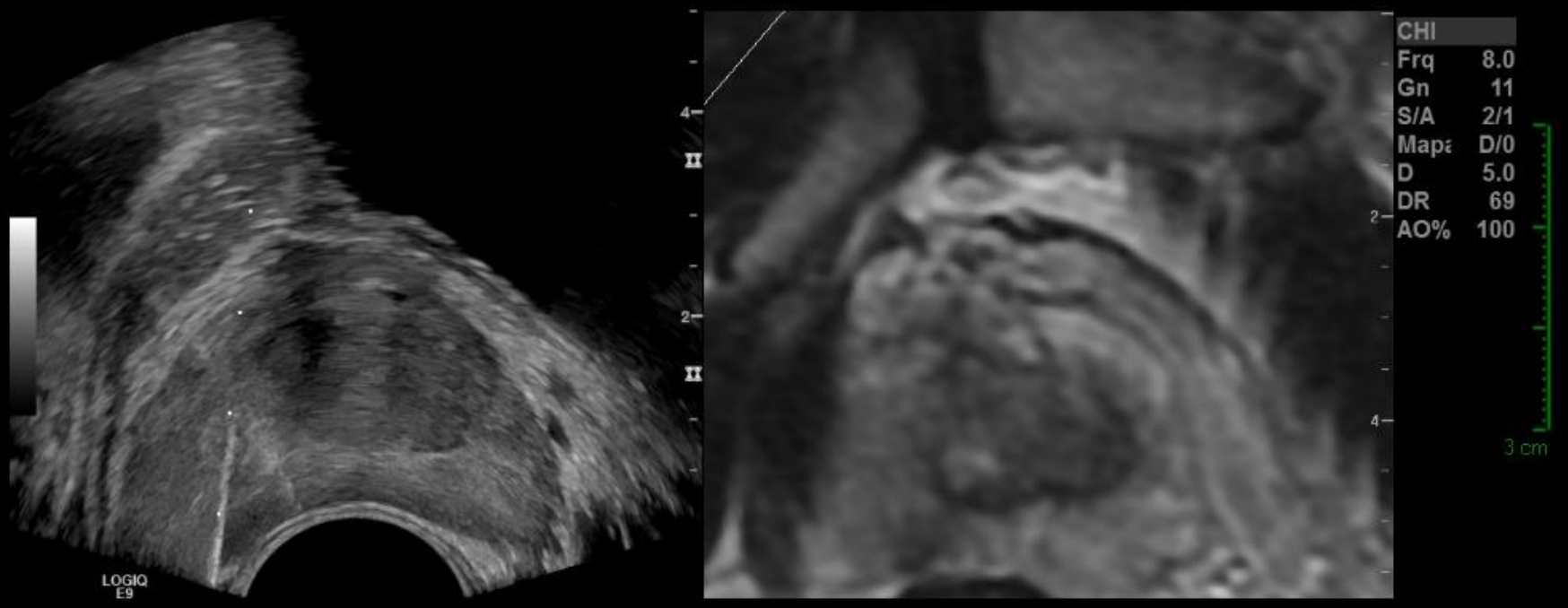




12 minutos de exame – custo de R$350,00

25 minutos – custo de

Biópsia com fusão de Imagens



GLEASON ~~6~~ → GLEASON 7 (4+3)

Radiology

Cost-effectiveness of MR Imaging–guided Strategies for Detection of Prostate Cancer in Biopsy-Naive Men[1]

Shivani Pahwa, MD
Nicholas K. Schiltz, PhD
Lee E. Ponsky, MD
Ziang Lu, BA
Mark A. Griswold, PhD
Vikas Gulani, MD, PhD

Purpose: To evaluate the cost-effectiveness of multiparametric diagnostic magnetic resonance (MR) imaging examination followed by MR imaging–guided biopsy strategies in the detection of prostate cancer in biopsy-naive men presenting with clinical suspicion of cancer for the first time.

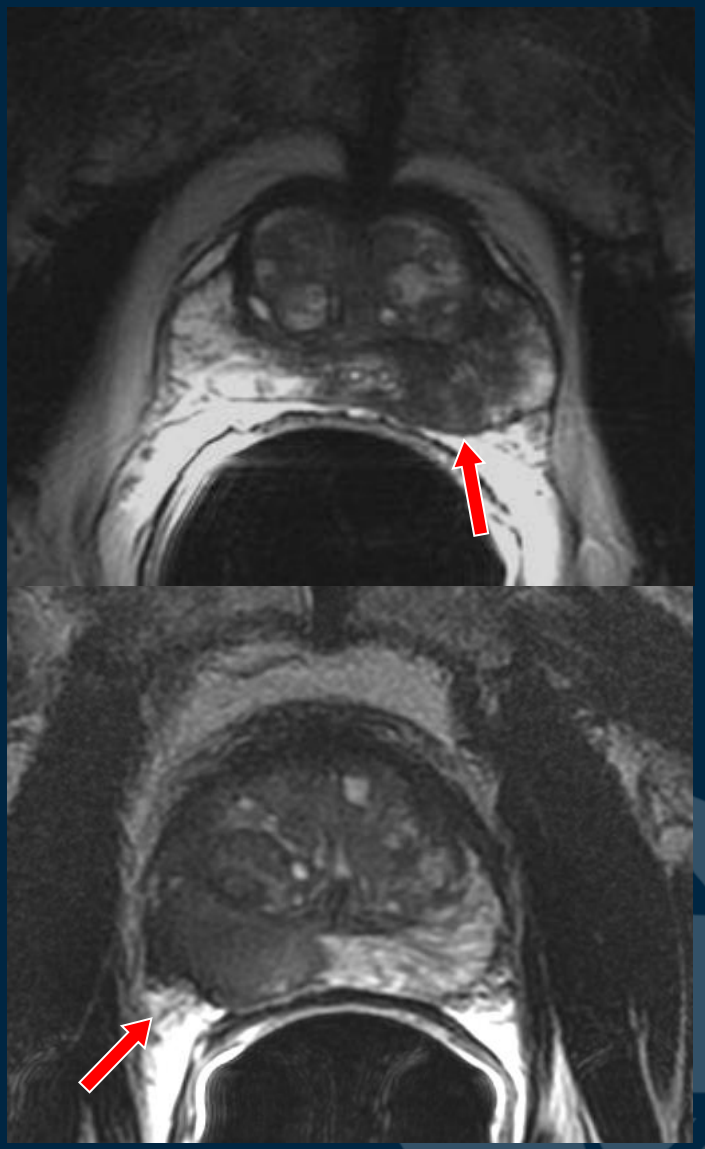
Results: Noncontrast MR imaging followed by cognitively guided MR biopsy (no standard biopsy if MR imaging findings were negative) was the most cost-effective approach, yielding an additional NHB of 0.198 QALY compared with the standard biopsy approach. Noncontrast MR imaging followed by in-gantry MR imaging–guided biopsy (no standard biopsy if MR imaging findings were negative) led to the highest NHB gain of 0.251 additional QALY compared with the standard biopsy strategy. All MR imaging strategies were cost-effective in 94.05% of Monte Carlo simulations. Analysis by age groups yielded similar results.

[1] From the Departments of Radiology (S.P., M.A.G., V.G.) and Urology (L.E.P.), University Hospitals Case Medical Center, 11100 Euclid Ave, Bolwell B120, Cleveland, OH 44106-0500; Department of Epidemiology and Biostatistics (N.K.S.) and Department of Biomedical Engineering (M.A.G., V.G.), Case Western Reserve University, Cleveland, Ohio; and Case Western Reserve University School of Medicine, Cleveland, Ohio (Z.L.). Received September 18, 2016; revision requested November 15; revision received January 22, 2017; accepted February 7; final version accepted February 24. **Address correspondence to** V.G. (e-mail:

ALBERT EINSTEIN
HOSPITAL ISRAELITA

RM no estadiamento local

- **Sinais de extensão extraprostática**



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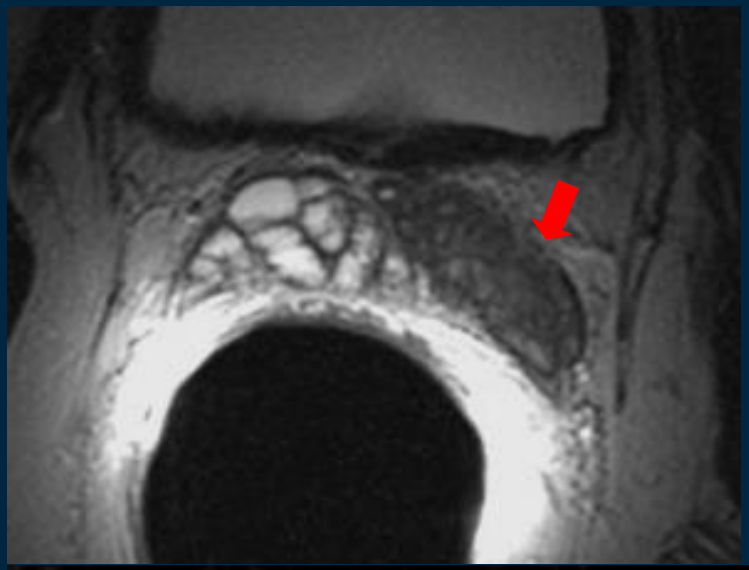
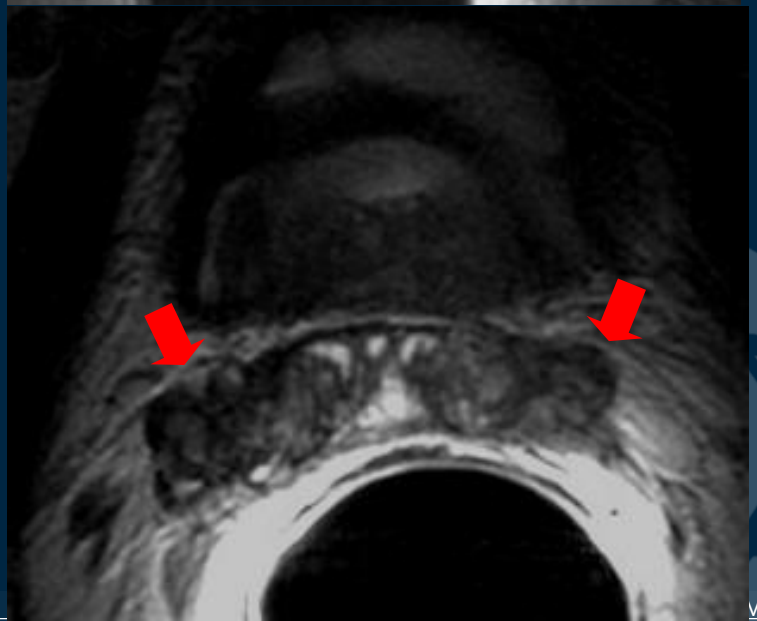
RM no estadiamento local

- **Invasão de vesículas seminais**





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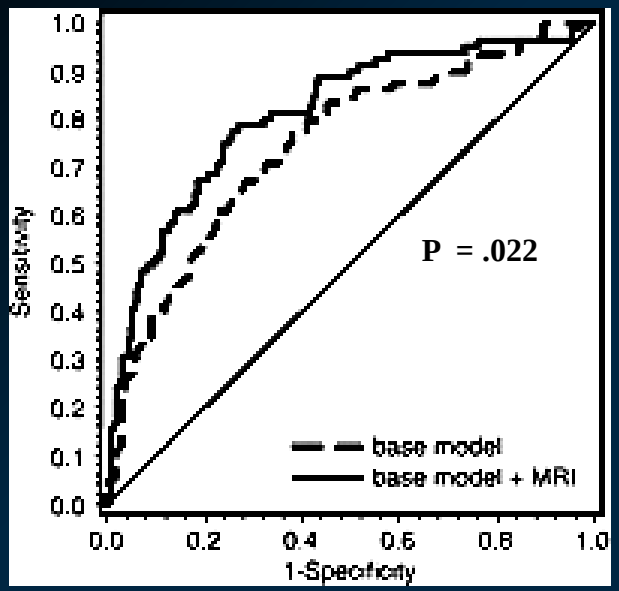
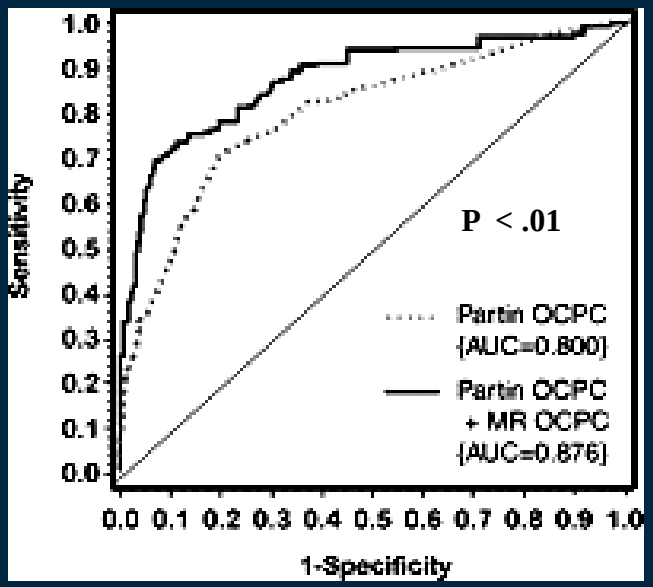
Nomogramas: valor incremental da RM

Liang Wang, MD, Michael W. Kattan, PhD, Peter T. Scardino, MD and Hedvig Hricak, MD, PhD



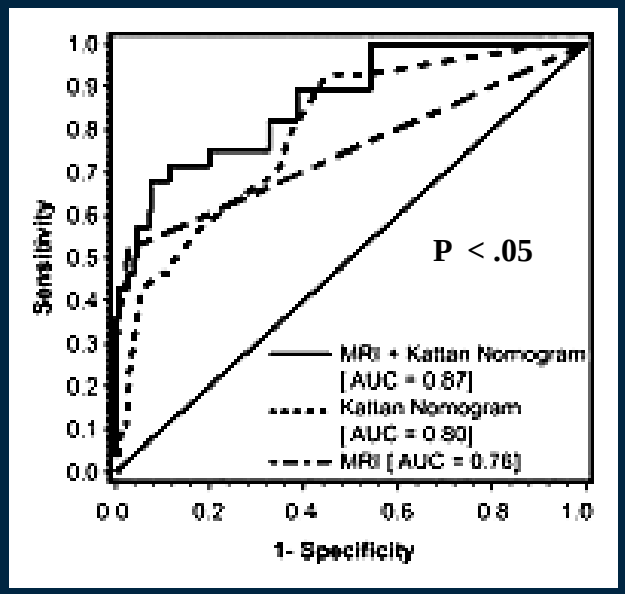
- Predição de extensão extracapsular
- 344 pacientes
- RM: melhor variável na análise univariada e multivariada

Radiology 2004;232:133-139



- Predição de doença órgão confinada
- 229 pacientes
- RM ainda melhor para pacientes de risco intermediário e alto

Radiology 2006;238:597-603



- Predição de invasão de VVSS
- 573 pacientes
- RM: maior curva ROC dentre todas as variáveis isoladas

Radiology 2006;242:182-188

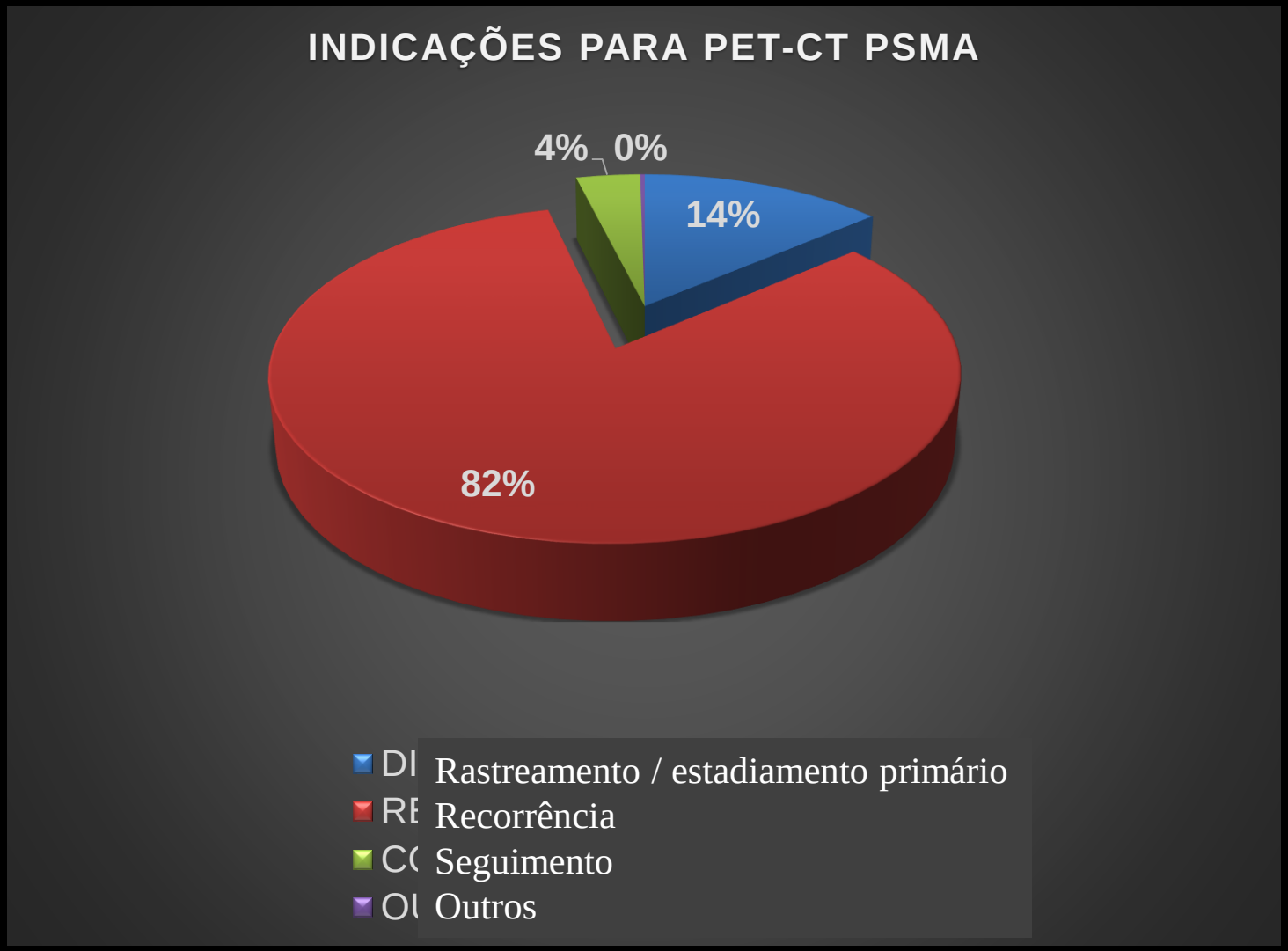
PSMA – Prostate Specific Membrane Antigen

- PSMA é uma glicoproteína transmembrana com expressão elevada em adenocarcinomas de próstata, notadamente nos pouco diferenciados, metastáticos e hormônio resistentes.

- É expressada também em tecidos normais como glândulas salivares, lacrimais, delgado proximal, túbulos renais, na subpopulação de células neuroendócinas de criptas cólicas e no endotélio de neovasos de várias neoplasias.

Foss CA et al. Curr Med Chem. 2012;19(9):1346–1359
Osborne JR et al. Urol Oncol. 2013;31(2):144–154
Silver DA et al.Clin Cancer Res. 1997;3:81-85

Experiência HIAE com PET-CT PSMA: 1800 casc



Eur J Nucl Med Mol Imaging (2017) 44:941–949
DOI 10.1007/s00259-017-3631-6

ORIGINAL ARTICLE

^{68}Ga-PSMA-11 PET/CT in primary staging of prostate cancer: PSA and Gleason score predict the intensity of tracer accumulation in the primary tumour

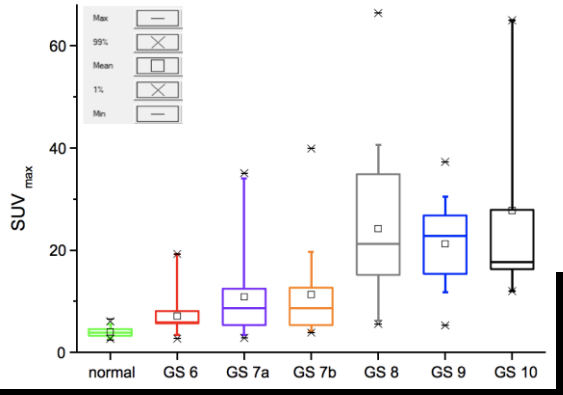


Table 3 Comparison of PSA level and SUV_{max} of primary tumours between patients with PSA < 10 ng/ml and those with PSA ≥ 10 ng/ml

PSA (ng/ml)	N	Median SUV_{max}	Mean SUV_{max}	SD SUV_{max}	Range SUV_{max}
<10	46	7.7	10.2	7.6	2.7–34.0
≥10	44	17.6	21.0	14.4	3.5–66.4

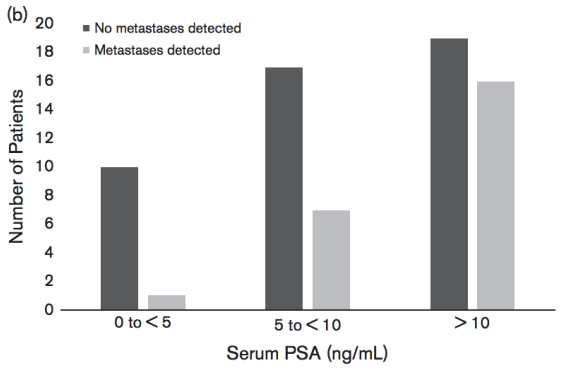
N number, *SD* standard deviation

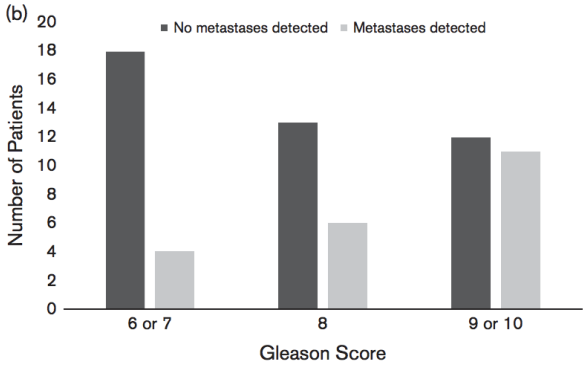
Original article

Nuclear Medicine Communications

The role of ^{68}Ga-PSMA-I&T PET/CT in the pretreatment staging of primary prostate cancer

Danielle P. Meyrick[a], Marcus Asokendaran[b], Laura A. Skelly[c], Nat P. Lenzo[a,b,d] and Andrew Henderson[e]





Eur J Nucl Med Mol Imaging (2013) 40:486–495
DOI 10.1007/s00259-012-2298-2

ORIGINAL ARTICLE

PET imaging with a [^{68}Ga]gallium-labelled PSMA ligand for the diagnosis of prostate cancer: biodistribution in humans and first evaluation of tumour lesions

A. Afshar-Oromieh · A. Malcher · M. Eder · M. Eisenhut · H. G. Linhart · B. A. Hadaschik · T. Holland-Letz · F. L. Giesel · C. Kratochwil · S. Haufe · U. Haberkorn · C. M. Zechmann

Results The PET/CT images showed intense tracer uptake in both kidneys and salivary glands. Moderate uptake was seen in lacrimal glands, liver, spleen and in small and large bowel. Quantitative assessment revealed excellent contrast between tumour lesions and most normal tissues. Of 37 patients, 31 (83.8 %) showed at least one lesion suspicious for cancer at a detection rate of 60 % at PSA <2.2 ng/ml and 100 % at PSA >2.2 ng/ml. Median tumour to background ratios were 18.8

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PET/CT com PSMA-^{68}Ga

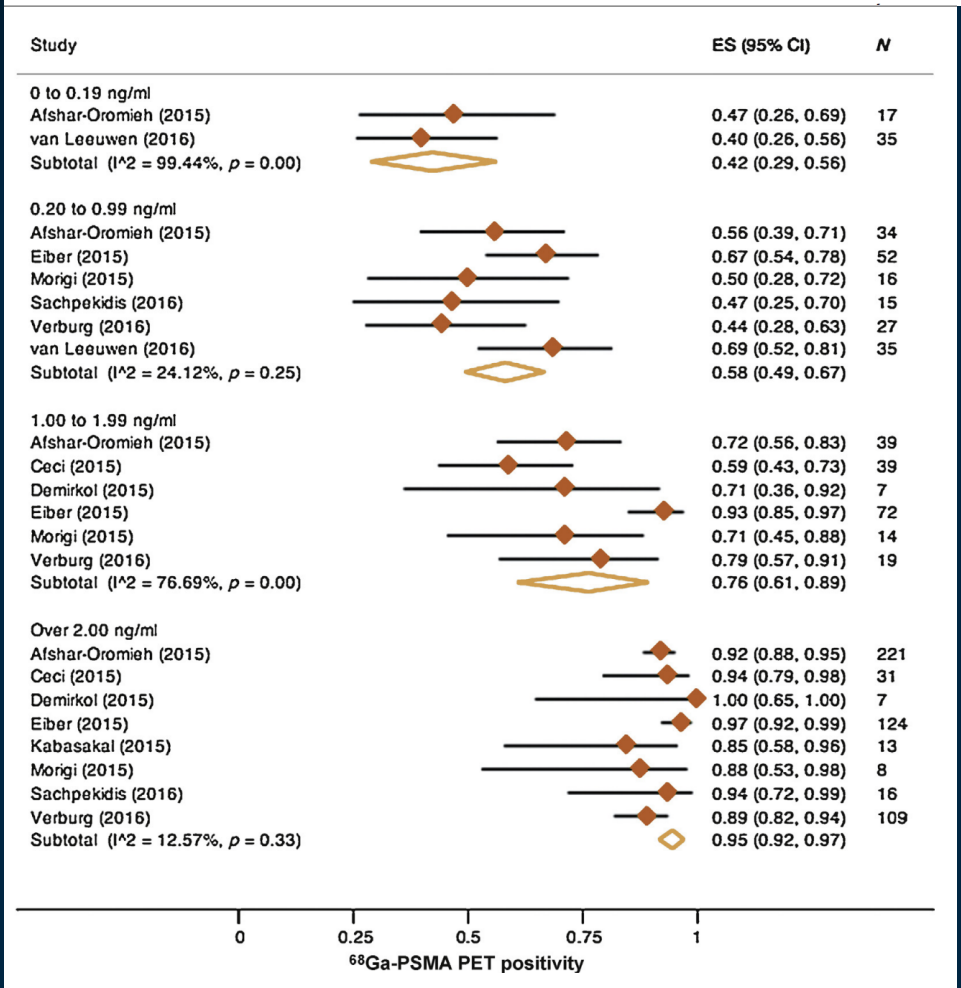
RESULTADOS (recidiva bioquímica)

- Maior série, 319 indivíduos incluídos:
- Análise baseada em todas as lesões identificadas na investigação:
- S=76,6%, E=100% VPP=91,4% e VPN=100%

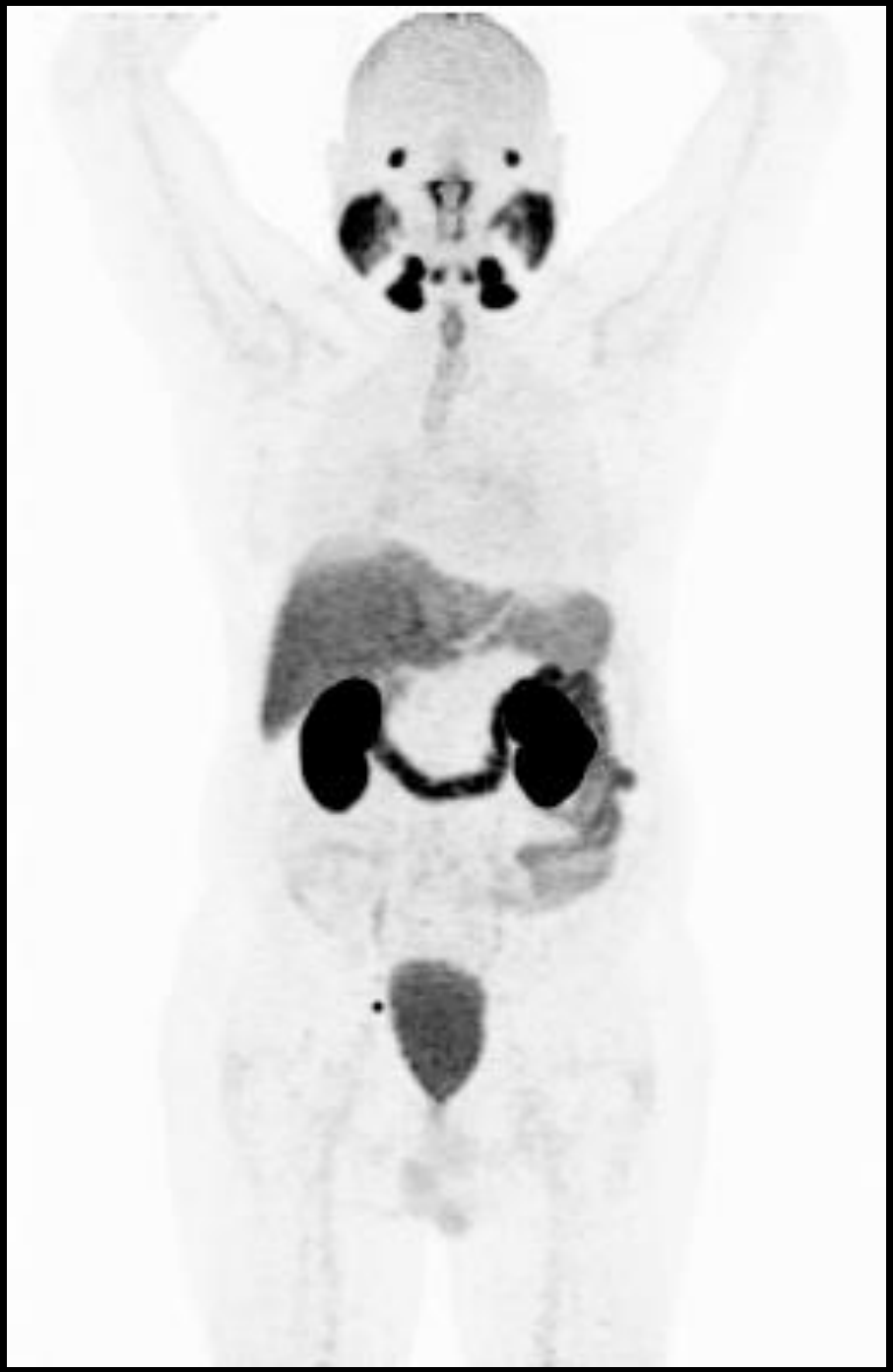
Ashar-Oromieh A et al. Eur J Nucl Med Imaging (2015)42:197-209

Sensitivity, Specificity, and Predictors of Positive ^{68}Ga–Prostate-specific Membrane Antigen Positron Emission Tomography in Advanced Prostate Cancer: A Systematic Review and Meta-analysis

Marlon Perera [a], Nathan Papa [a], Daniel Christidis [a], David Wetherell [a], Michael S Hofman [b], Declan G Murphy [c,e], Damien Bolton [a,d], Nathan Lawrentschuk [a,c,d,]*



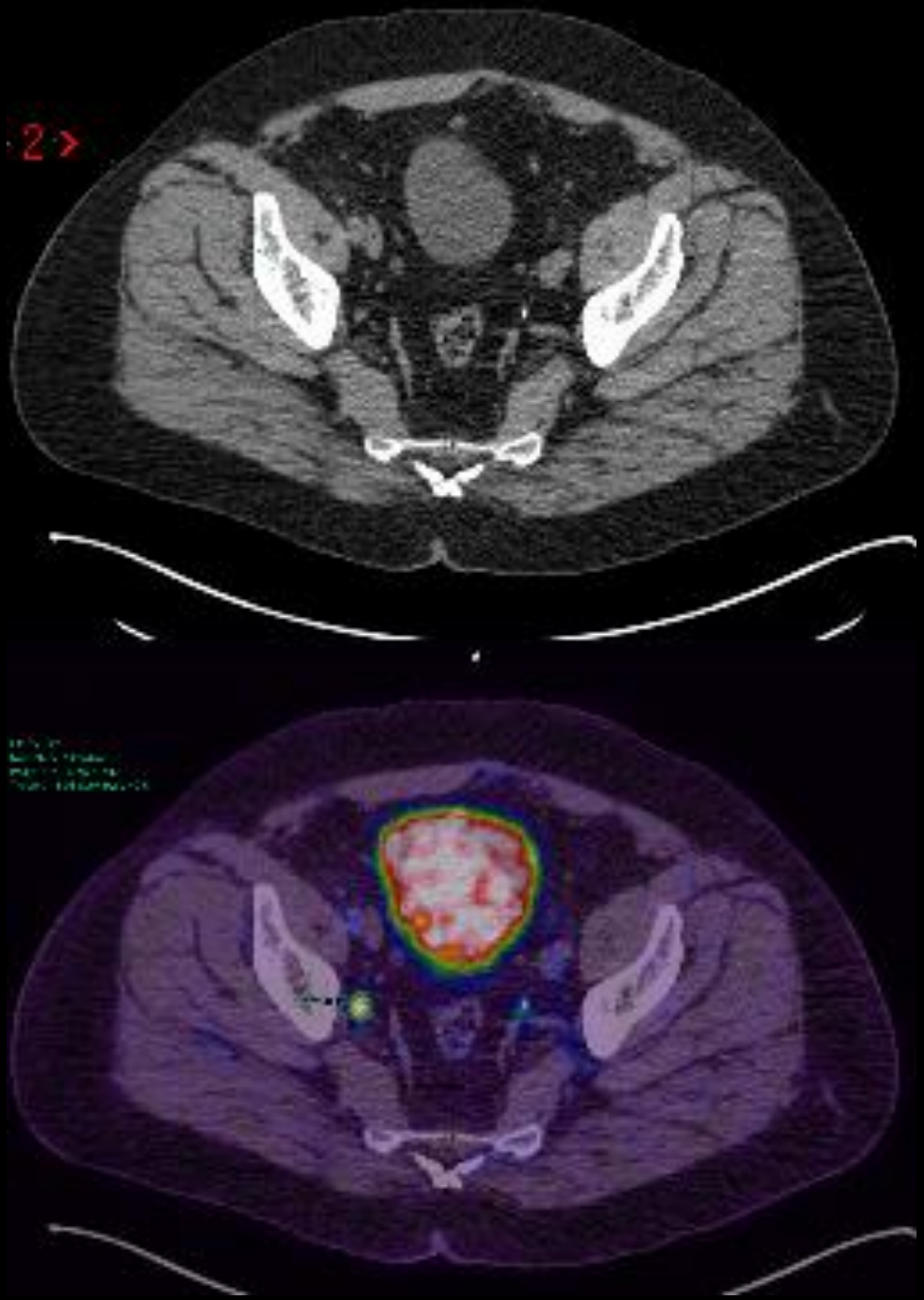
Eur Urol. 2016 Dec;70(6):926-937



PET/CT

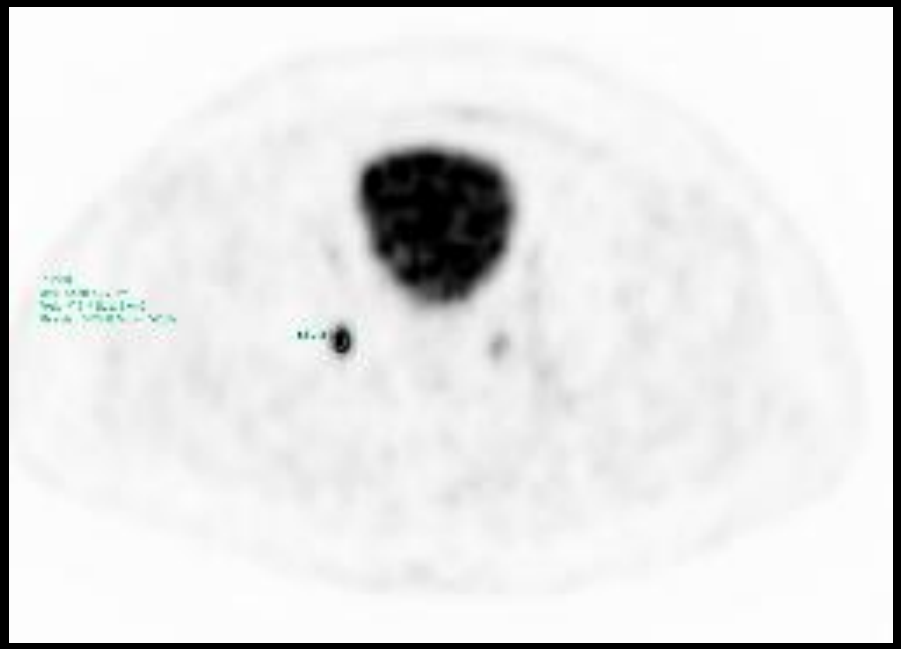
03/02/201
6

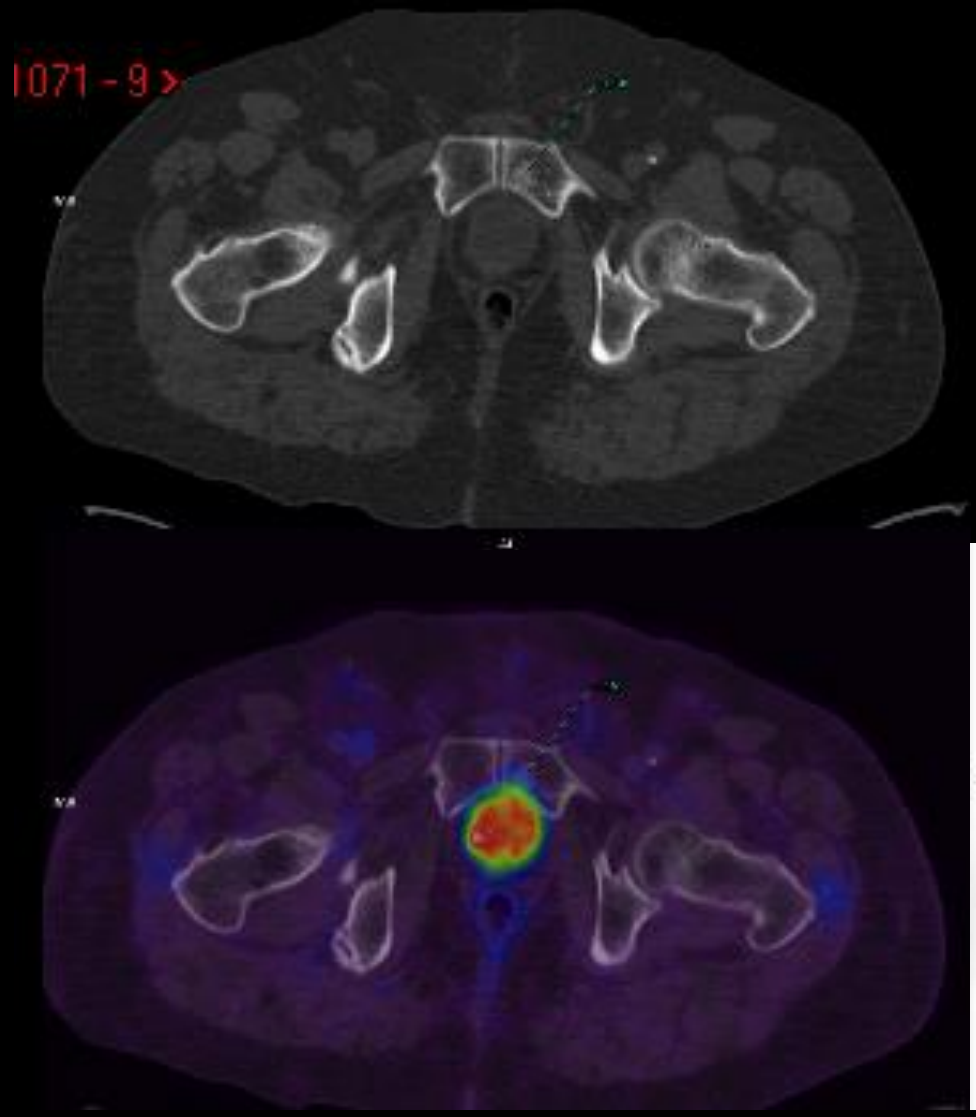
71 a, Ca de próstata 2006, prostatectomia com Gleason 8, nunca fez bloqueio androgênico, radioterapia 2011, aumento de PSA (0,5 atual).



PET/CT

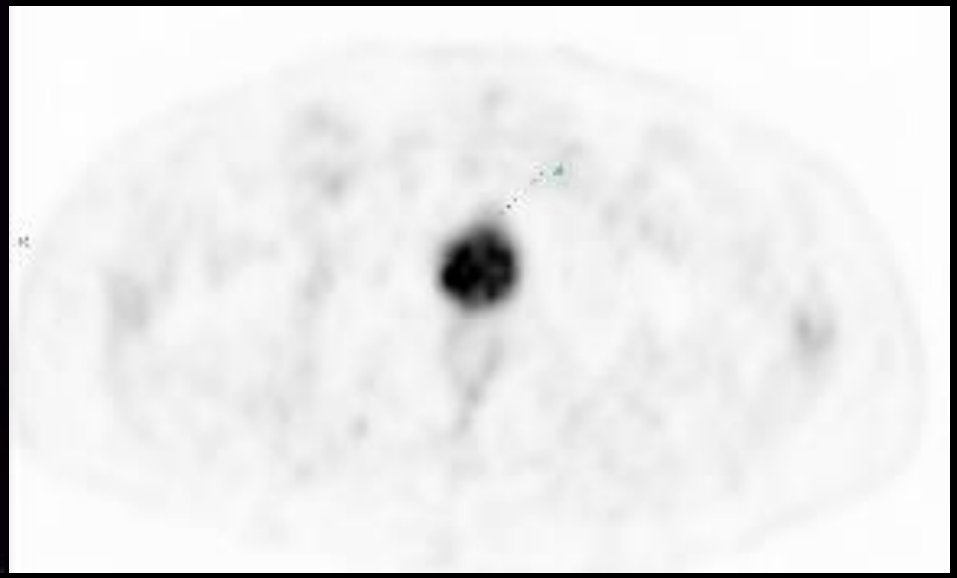
03/02/2016

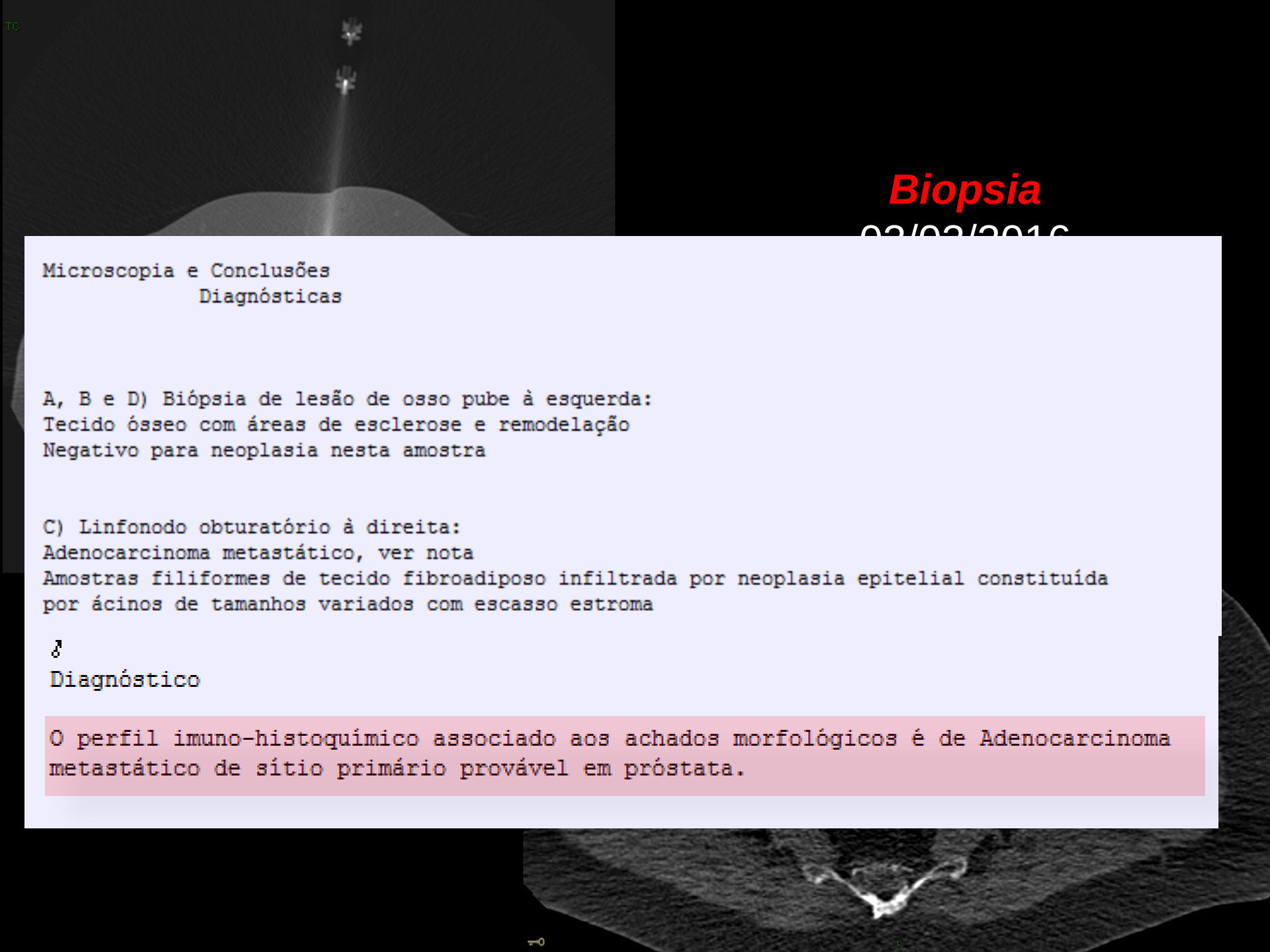




PET/CT

03/02/2016





Biopsia

02/02/2016

Microscopia e Conclusões
Diagnósticas

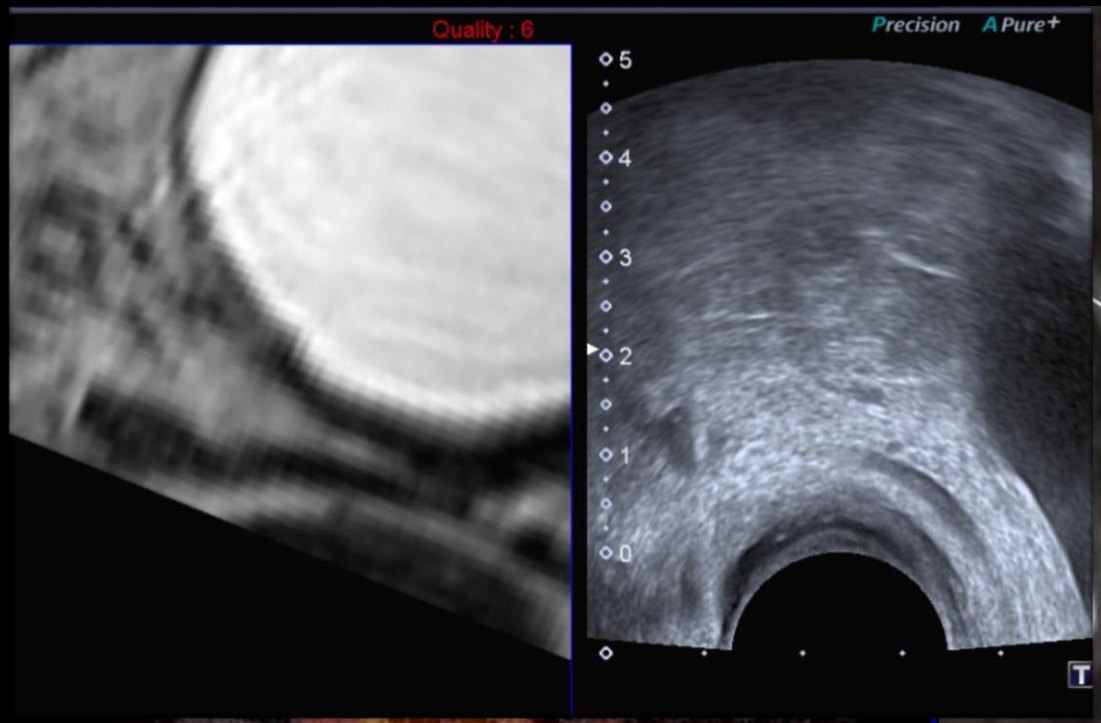
A, B e D) Biópsia de lesão de osso pube à esquerda:
Tecido ósseo com áreas de esclerose e remodelação
Negativo para neoplasia nesta amostra

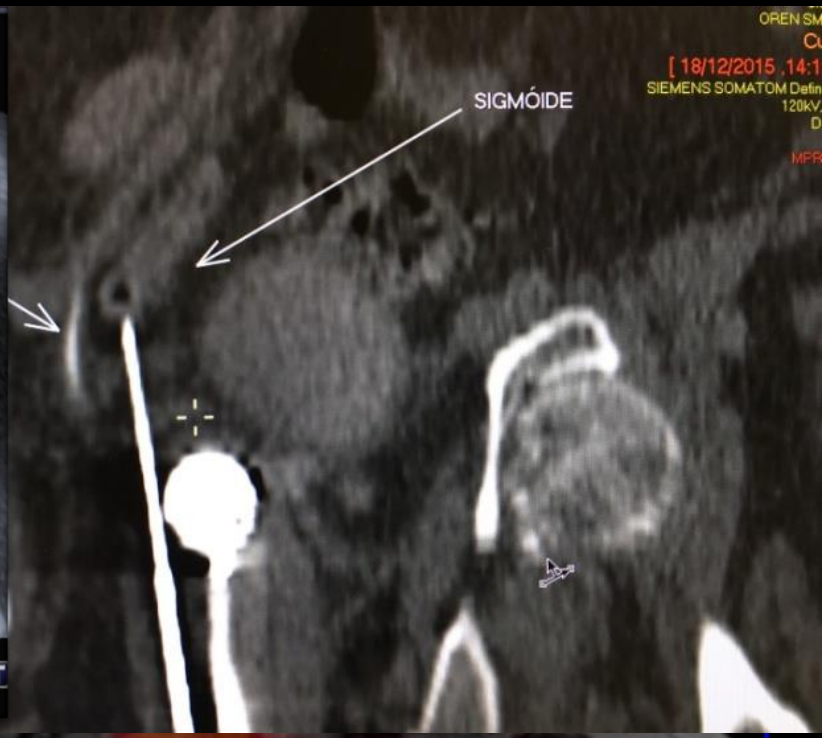
C) Linfonodo obturatório à direita:
Adenocarcinoma metastático, ver nota
Amostras filiformes de tecido fibroadiposo infiltrada por neoplasia epitelial constituída por ácinos de tamanhos variados com escasso estroma

Diagnóstico

O perfil imuno-histoquímico associado aos achados morfológicos é de Adenocarcinoma metastático de sítio primário provável em próstata.

PET/CT e PET/RM com PSMA-^{68}Ga





Microscopia e Conclusões
Diagnósticas

Biópsia de região pélvica (ducto deferente à direita):
Adenocarcinoma infiltrando parede de ducto deferente e tecido adiposo adjacente
Neoplasia epitelial infiltrativa em arranjo sólido esboçando ácinos focalmente
Infiltração perineural presente

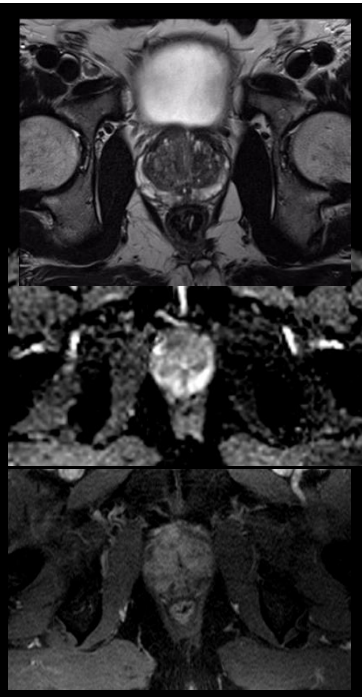
Nota: Aspectos histológicos consistentes com sítio primário em próstata. Em andamento exame imuno-histoquímico para confirmação de sítio primário que será emitido em relatório complementar.

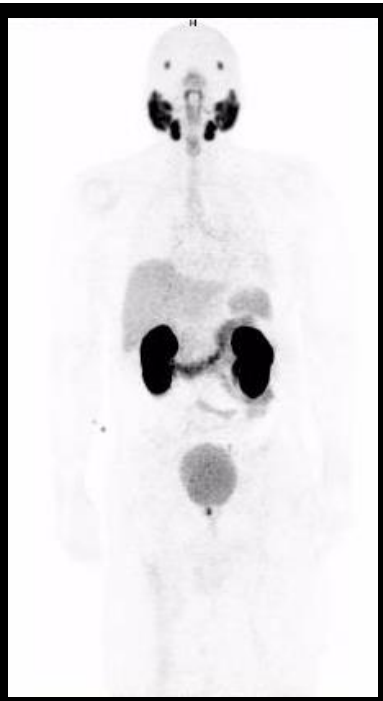
einstein. 2017;15(1):115-8

PET/MRI: a novel hybrid imaging technique. Major clinical indications and preliminary experience in Brazil

PET/RM: um novo método de imagem híbrida. Principais indicações clínicas e experiência preliminar no Brasil

Taise Vitor[1], Karine Minaif Martins[1], Tudor Mihai Ionescu[1], Marcelo Livorsi da Cunha[1], Ronaldo Hueb Baroni[1], Marcio Ricardo Taveira Garcia[1], Jairo Wagner[1], Guilherme de Carvalho Campos Neto[1], Solange Amorim Nogueira[1], Elaine Gonçalves Guerra[1], Edson Amaro Junior[1]





European Association of Urology

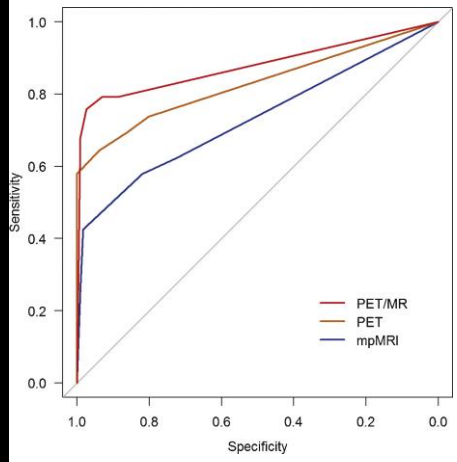
Prostate Cancer

Simultaneous ^{68}Ga-PSMA HBED-CC PET/MRI Improves the Localization of Primary Prostate Cancer

Matthias Eiber[a,*,‡], *Gregor Weirich*[b,‡], *Konstantin Holzapfel*[c], *Michael Souvatzoglou*[a,d], *Bernhard Haller*[e], *Isabel Rauscher*[a], *Ambros J. Beer*[a,d], *Hans-Jürgen Wester*[f], *Juergen Gschwend*[g], *Markus Schwaiger*[a,‡], *Tobias Maurer*[g,‡]

[a] *Department of Nuclear Medicine, Technische Universität München, Klinikum rechts der Isar, Munich, Germany;* [b] *Department of Pathology, Technische Universität München, Klinikum rechts der Isar, Munich, Germany;* [c] *Institute of Radiology, Technische Universität München, Klinikum rechts der Isar, Munich, Germany;* [d] *Department of Nuclear Medicine, University Hospital Ulm, Ulm, Germany;* [e] *Institute of Medical Statistics and Epidemiology, Technische Universität München, Klinikum rechts der Isar, Munich, Germany;* [f] *Pharmaceutical Radiochemistry, Technische Universität München, Garching, Germany;* [g] *Department of Urology, Technische Universität München, Klinikum rechts der Isar, Munich, Germany*

Article info

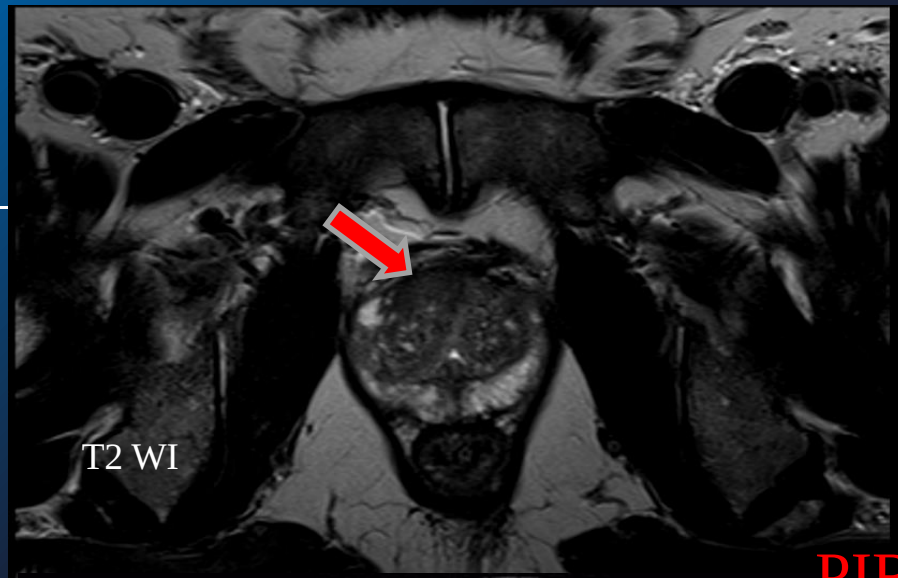


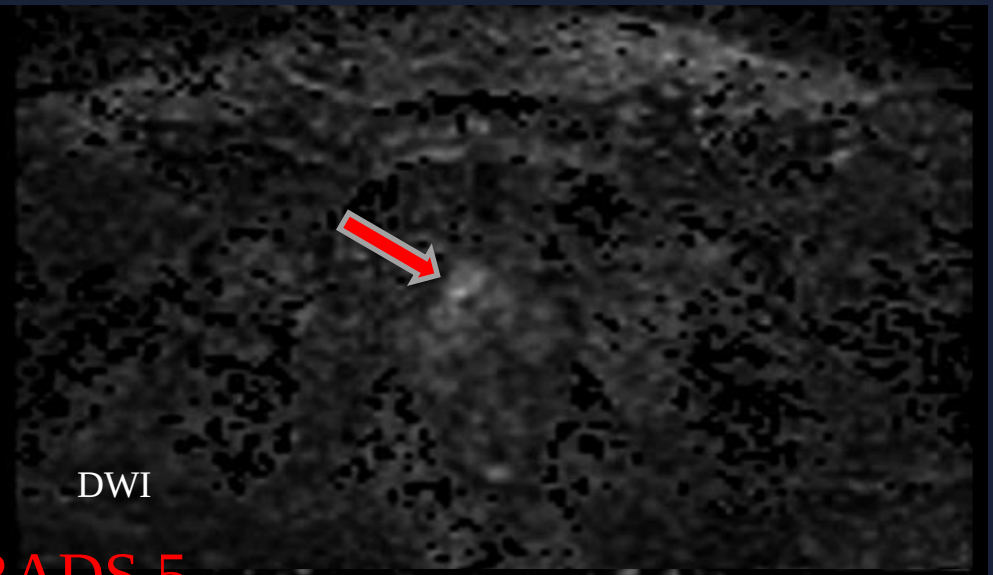
Abstract

Background: Ligands of the prostate-specific membrane antigen (PSMA) show promising results in positron emission tomography (PET) imaging of prostate cancer (PCa).
Objective: To compare the diagnostic performance of simultaneous gallium 68 (^{68}Ga)-PSMA HBED-CC PET/magnetic resonance imaging (MRI) for localization of primary PCa with multiparametric magnetic resonance imaging (mpMRI) and PET alone.
Design, setting, and participants: We performed ^{68}Ga-PSMA HBED-CC PET/MRI in 66 men with biopsy-proven PCa.
Intervention: PET, mpMRI, and combined ^{68}Ga-PSMA HBED-CC PET/MRI were independently evaluated using Prostate Imaging Reporting and Data System criteria or a 5-point Likert scale.
Outcome measurements and statistical analysis: The prostate was divided into sextants for histopathology and coregistered with imaging. Diagnostic performance for localization of malignancy was calculated based on receiver operating characteristics analysis for each modality. Regional quantitative PET tracer uptake was recorded; uptake ratio was defined as the ratio of malignant to nonmalignant prostate tissue.
Results and limitations: A total of 53 of 66 patients were eligible for analysis. mpMRI, PET, and PET/MRI detected cancer in 66% (35 of 53), 92% (49 of 53), and 98% (52 of 53) of the patients, respectively. Overall, 202 of 318 sextants (63.5%) contained cancer at pathologic examination. Simultaneous PET/MRI statistically outperformed mpMRI (area under the curve [AUC]: 0.88 vs 0.73; $p < 0.001$) and PET imaging (AUC: 0.88 vs 0.83;

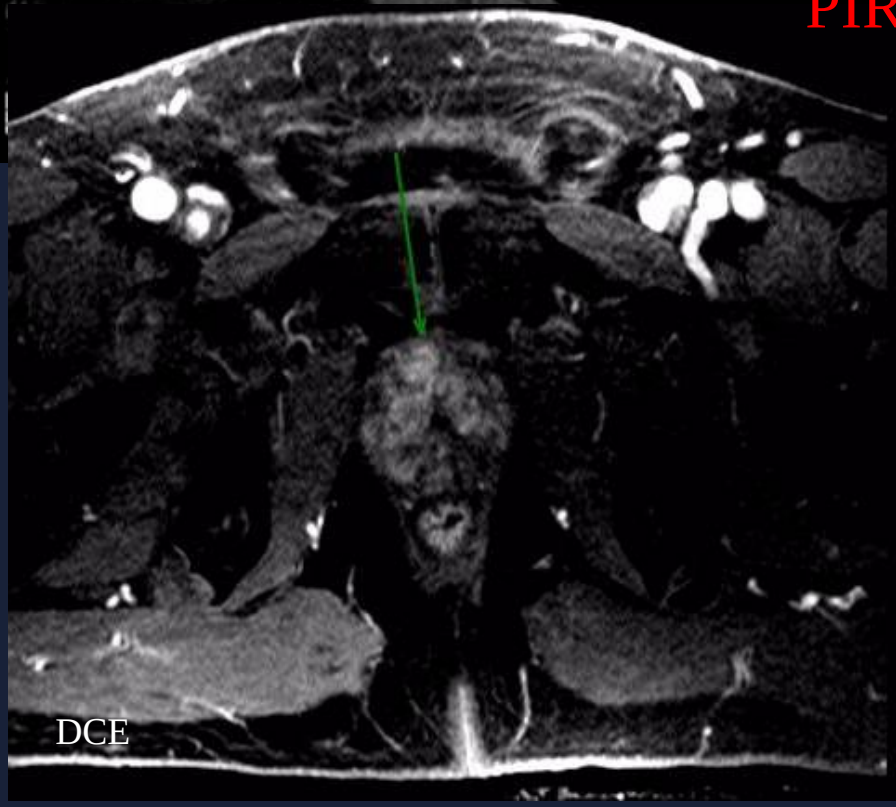
- 63 anos
  - PSA - 12 ng/ml
  - RMmp nos EUA suspeita para Ca (SIC)
  - Biópsia há 2 meses nos EUA (URONAV) pelo urologista - negativa

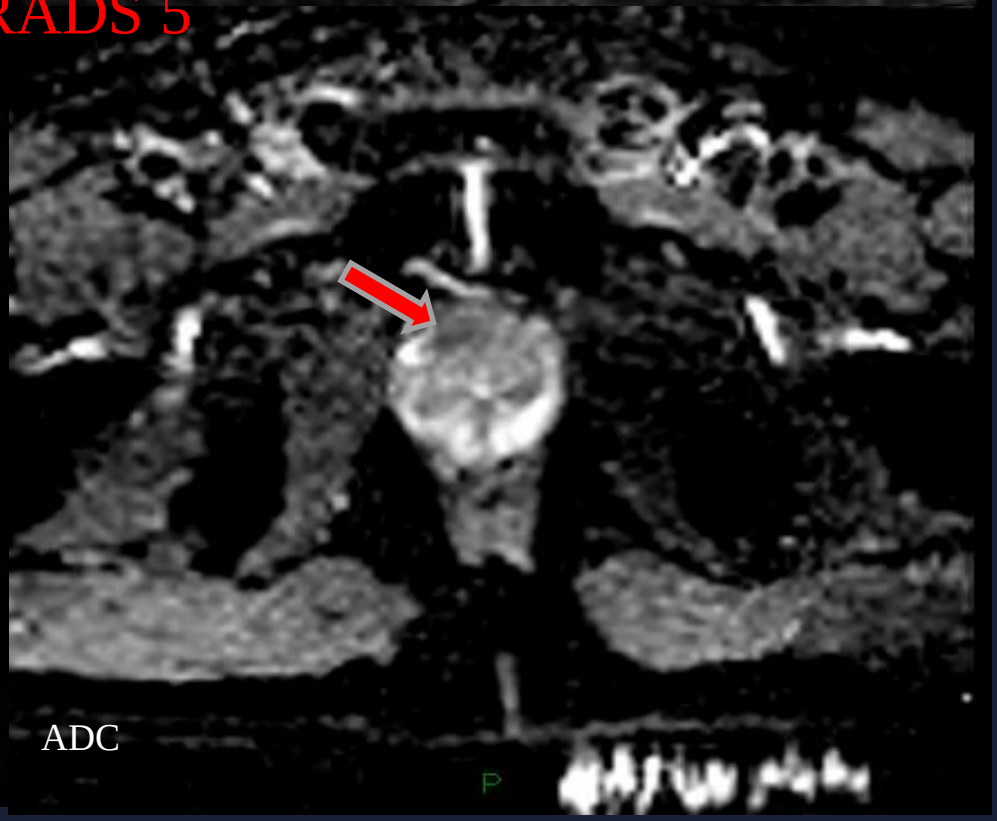
- Discussão do caso radiologista + oncologista: PET-RMmp com PSMA.

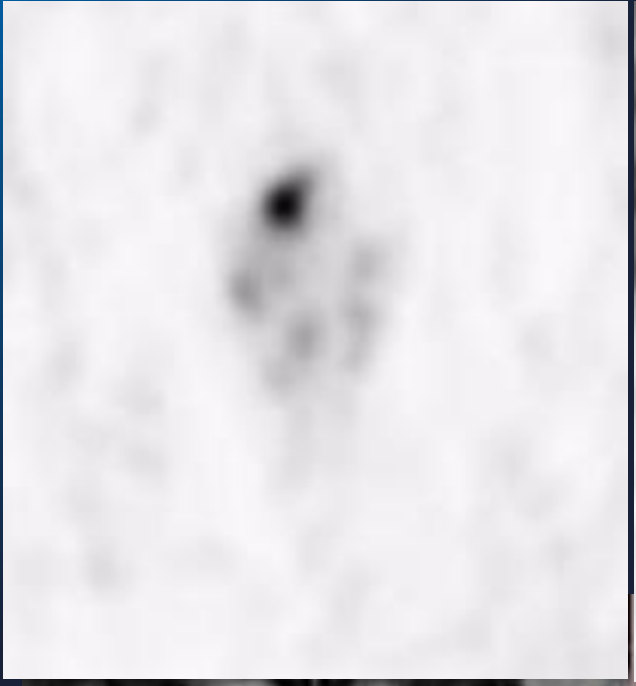
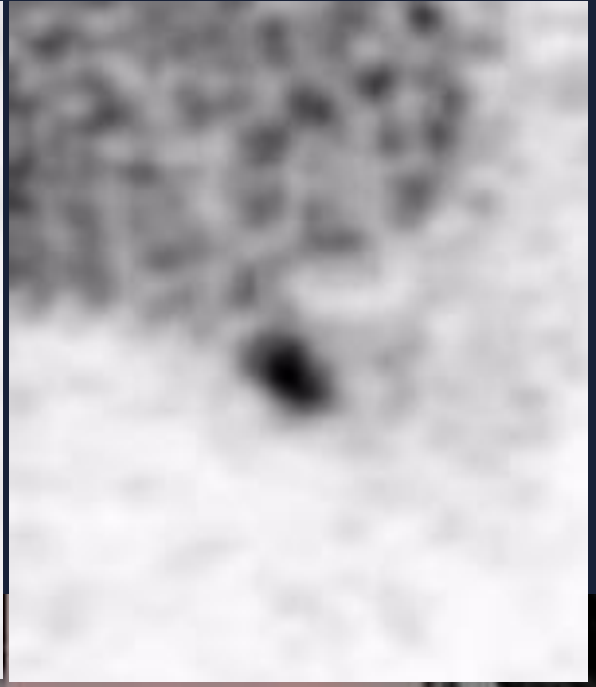
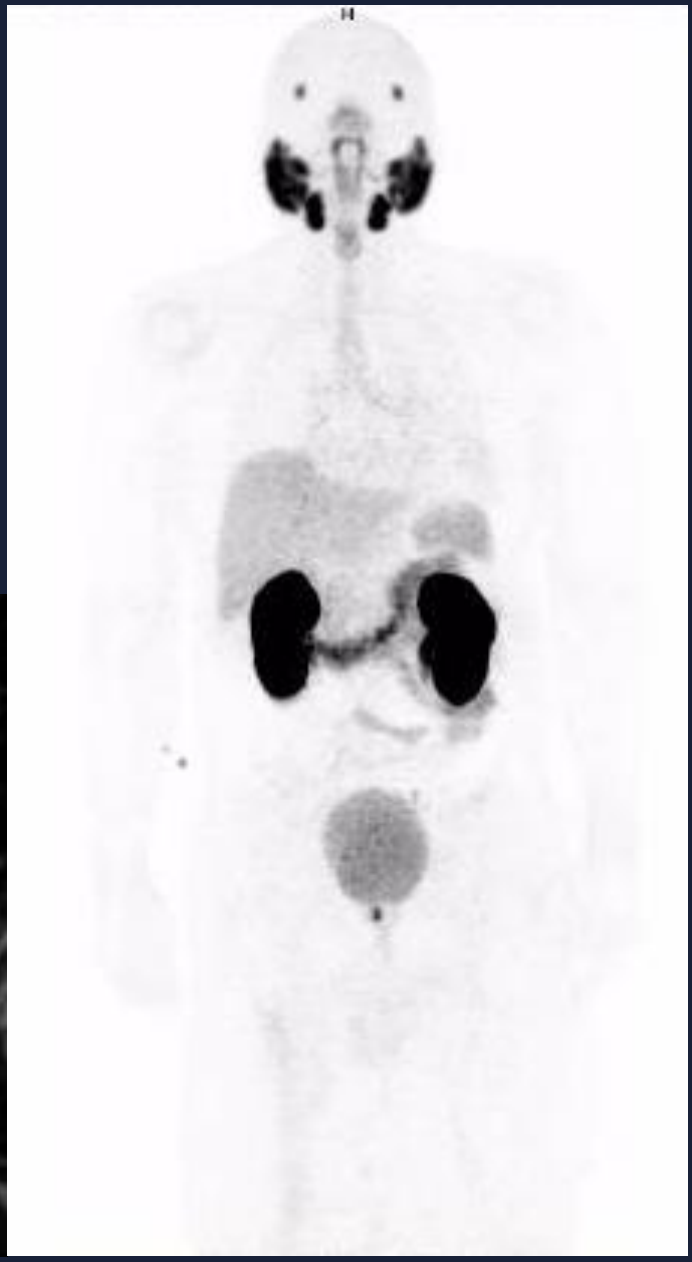
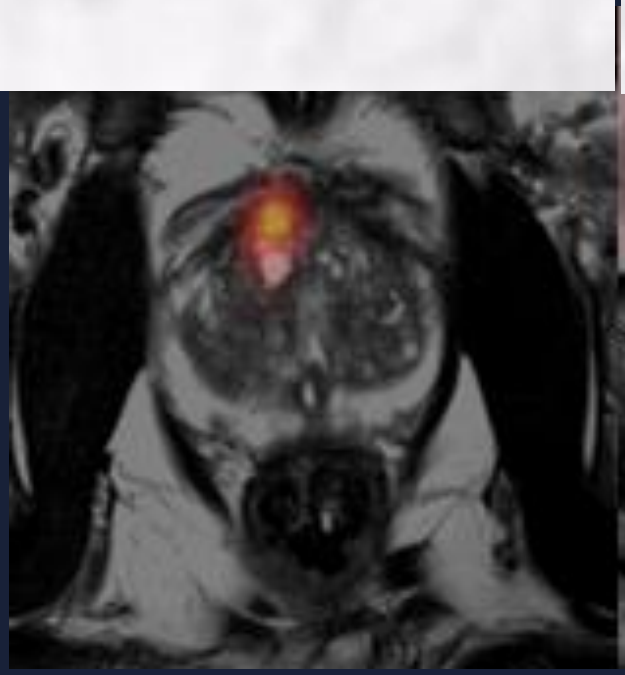
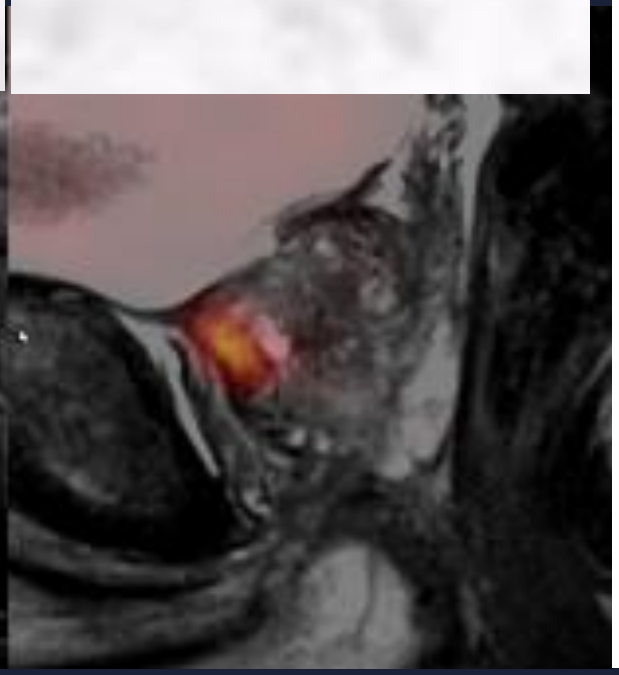




PIRADS 5





PET-RMmp com PSMA (60 minutos de exame)

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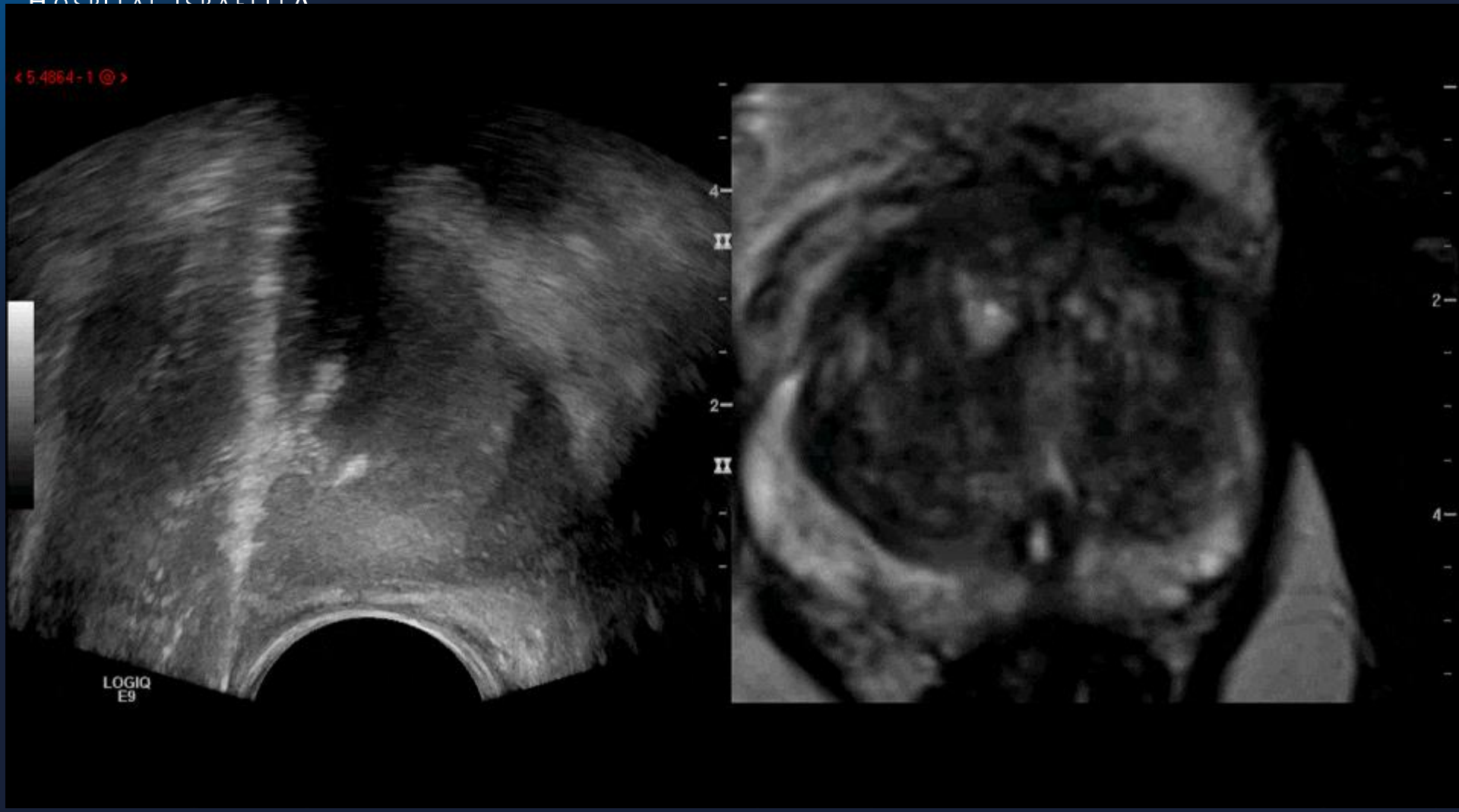

PEÇAS RADICAIS E PUNÇÕES

Exame Anatomopatológico
Passagem: 20534121

Dados Clínicos

Nódulo suspeito no PET com PSMA em terço médio direito anterior

Espécimes e Procedimentos

Próstata, biópsias seriadas por agulha

Microscopia e Conclusões
Diagnósticas

Adenocarcinoma acinar usual da próstata de Gleason 7 (4+3), comprometendo:
Próstata - terço médio direito: extensão linear máxima de 10,3 mm; cerca de 45% da amostra, neoplasia compromete 5 de 10 fragmentos;

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Conclusão

- RMmp é o exame de escolha para detecção tumoral
  - A biópsia de próstata será sempre precedida por uma RMmp
  - RMmp irá reduzir biópsias de próstata randomizadas e desnecessárias
  - O exame de RMmp irá se tornar mais rápido, barato, acessível e inócuo
- RMmp é o exame de escolha para estadiamento local
- Estadiamento linfonodal / ósseo
  - PET/CT com ^{68}Ga-PSMA
- ***Detecção, estadiamento local, linfonodal e a distância***
  - ***PET/RM com ^{68}Ga-PSMA (multiparamétrica + molecular)***

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HOSPITAL ISRAELITA

Obrigado!