Update in ^{68}Ga-PSMA PET/CT Reporting

KHATAM
مرکز پت‌سی‌تی خاتم
PET / CT CENTER

Prepared By:

- Maghsudi Mehdi, MD, Nuclear Medicine Physician
- Amini Hamidreza, MD, Nuclear Medicine Physician
- Divband GhasemAli, MD, Nuclear Medicine Physician

Staging:

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European Association of Urology

Review – Prostate Cancer

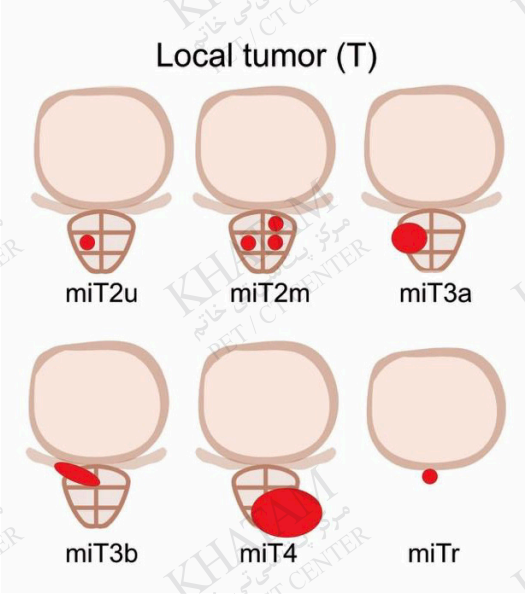
Second Version of the Prostate Cancer Molecular Imaging Standardized Evaluation Framework Including Response Evaluation for Clinical Trials (PROMISE V2)

Whole-body miTNM staging system for standardized PSMA-PET interpretation

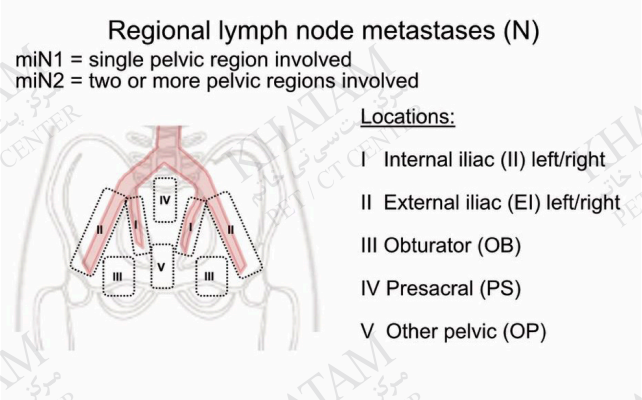
Local tumor (T)			
miT0		No local tumor	
miT2		Organ-confined tumor	
	u	Unifocality	
	m	Multifocality	
miT3		Non-organ-confined tumor	
	a	Extracapsular extension	
	b	Tumor invades seminal vesicle(s)	
miT4		Tumor invades adjacent structures other than seminal vesicles, such as external sphincter, rectum, bladder, levator muscles, and/or pelvic wall	
miTr		Presence of local recurrence after radical prostatectomy	
Intrapelvic nodes (N)			
miN0		No positive pelvic lymph nodes	
miN1		Single lymph node region harbors lymph node metastases, report location by a standardized template	Lymph node regions: Il internal iliac, laterality (L/R) El external iliac, laterality (L/R) OB obturator, laterality (L/R) PS presacral OP other pelvic
miN2		Multiple (≥2) lymph node regions harbor lymph node metastases, report location(s) by a standardized template	
Distant metastasis			
miM0		No distant metastasis	
miM1		Distant metastasis	
	a	Distant lymph node region(s)	miM1a regions: CI common iliac, laterality (L/R) RP retroperitoneal SD supradiaphragmatic OE inguinal and other extrapelvic
	b	Bone(s), additionally report pattern and involved bone(s) in case of unifocal or oligometastatic	Bone uptake patterns: uni unifocal oligo oligometastatic (n ≤ 3) diss disseminated dmi diffuse marrow involvement
	c	Other site(s), additionally report involved organ (hep, pul, adrenal, brain, other). Other includes pleural or peritoneal invasion	

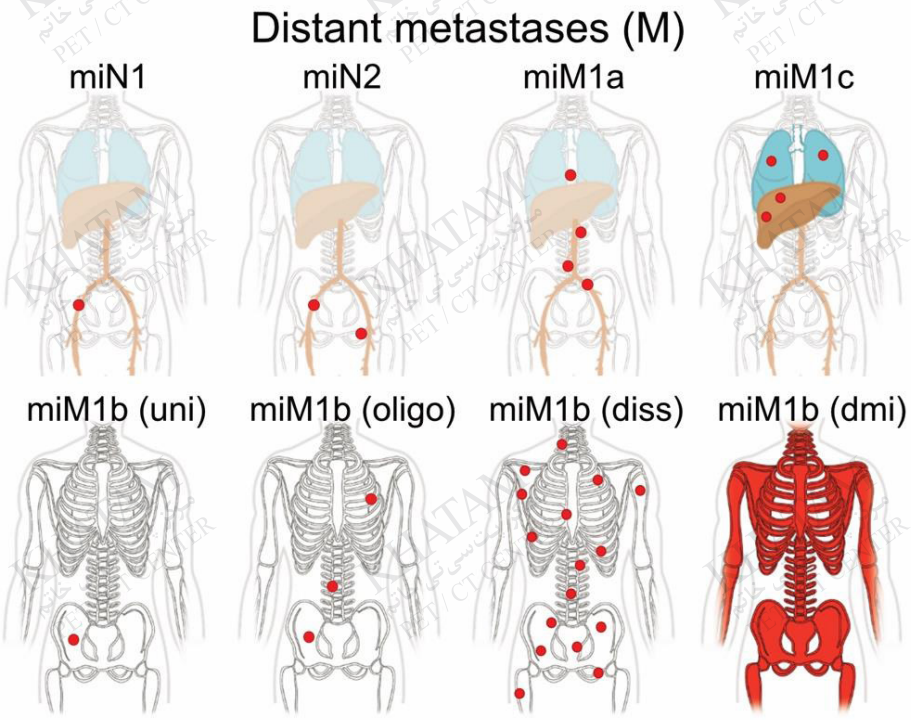
PSMA-PET = prostate-specific membrane antigen targeting positron emission tomography.

A


Local tumor (T)
miT2u
miT2m
miT3a
miT3b
miT4
miTr

B


Regional lymph node metastases (N)
miN1 = single pelvic region involved
miN2 = two or more pelvic regions involved
Locations:
I Internal iliac (II) left/right
II External iliac (EI) left/right
III Obturator (OB)
IV Presacral (PS)
V Other pelvic (OP)


Distant metastases (M)
miN1
miN2
miM1a
miM1c
miM1b (uni)
miM1b (oligo)
miM1b (diss)
miM1b (dmi)

Diagnosis (+ Staging) of Prostate Cancer:

JNM
The Journal of Nuclear Medicine

Research Article | Clinical Investigation

Reproducibility and Accuracy of the PRIMARY Score on PSMA PET and of PI-RADS on Multiparametric MRI for Prostate Cancer Diagnosis Within a Real-World Database

Louise Emmett, Nathan Papa, William Counter, Jeremie Calais, Francesco Barbato, Irene Burger, Matthias Eiber, Matthew J. Roberts, Shikha Agrawal, Anthony Franklin, Alan Xue, Krishan Rasiah, Nikeith John, Daniel Moon, Mark Frydenberg, John Yaxley, Phillip Stricker, Keith Wong, Geoff Coughlin, Troy Gianduzzo, Boon Kua, Bao Ho, Andrew Nguyen, Victor Liu, Jonathan Lee, Edward Hsiao, Tom Sutherland, Elisa Perry, Wolfgang P. Fendler and Thomas A. Hope

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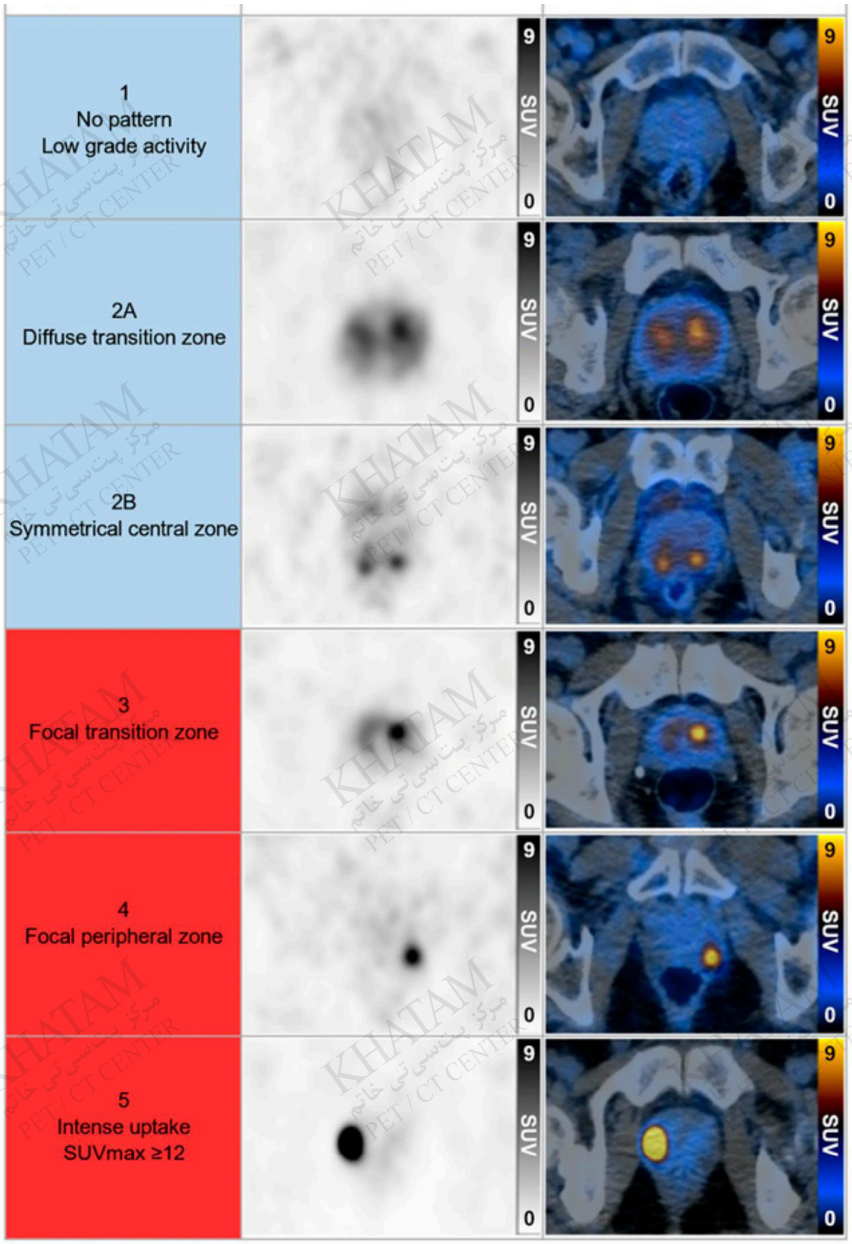
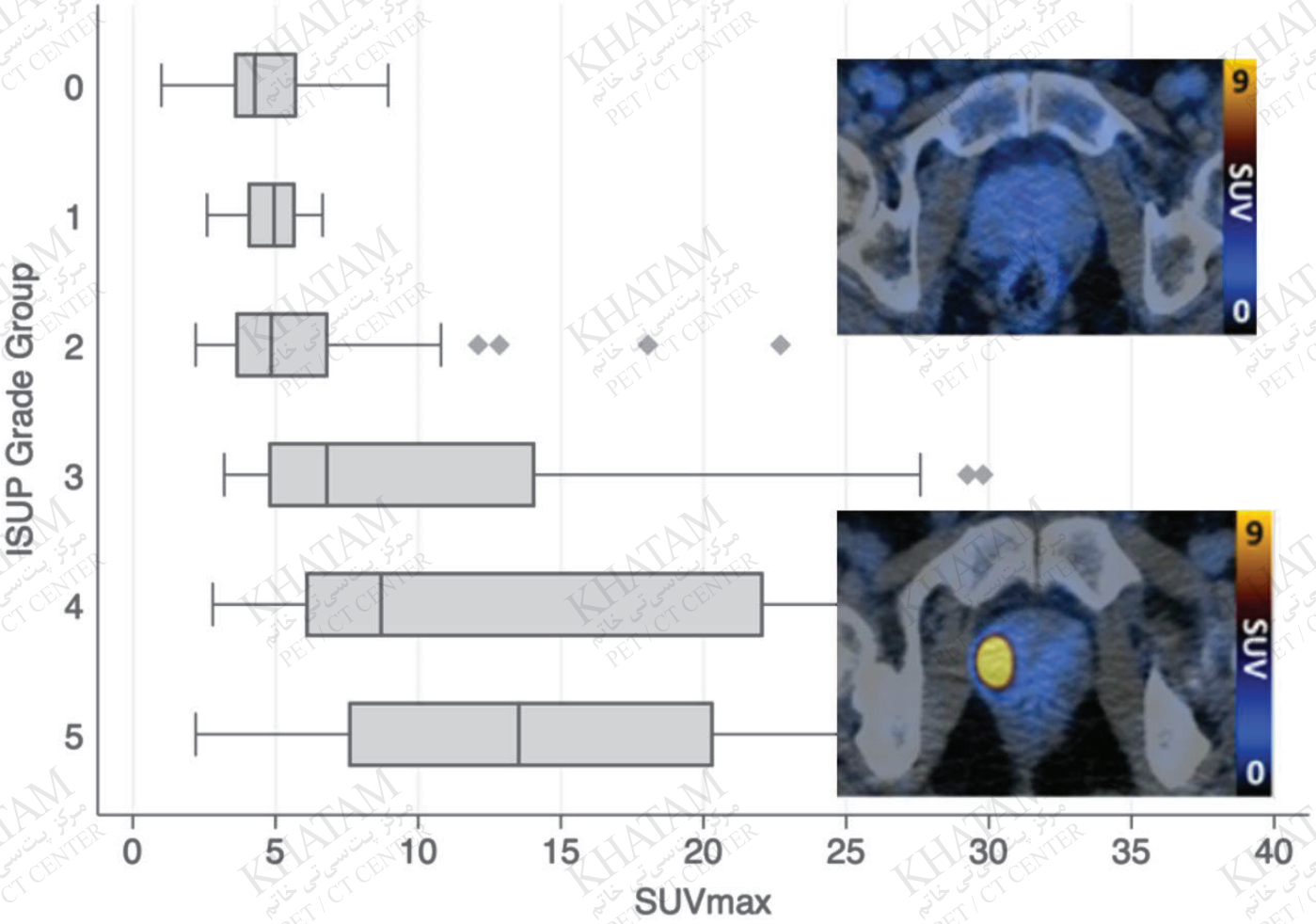
PRIMARY Score Definition



Diagnostic Accuracy for PI-RADS from mpMRI, PRIMARY from PSMA PET, and Combination

Parameter	Sensitivity	Specificity	Positive predictive value	Negative predictive value
PRIMARY	86% (79%-91%)	76% (64%-85%)	88% (82%-93%)	72% (61%-81%),
PI-RADS	89% (83%-93%)	74% (63%-84%)	88% (82%-93%	76% (65%-86%)
Combination	94% (89%-97%)	68% (56%-78%).	86% (80%-91%)	85% (73%-93%)

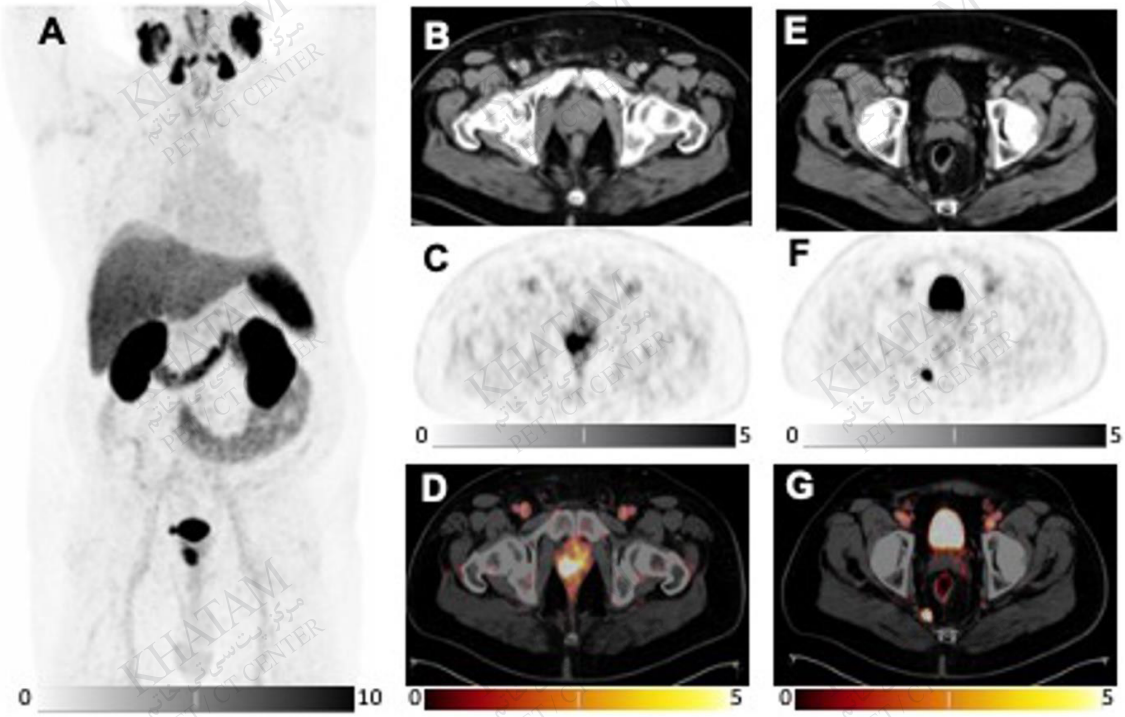
Association between PSMA PET SUVmax and ISUP grade group



Patient 1:

A -65year-old patient with PSA level of 34.5 ng/mL was diagnosed with ISUP Gleason Grade Group 3 prostate cancer. Subsequent PSMA-PET/CT showed a singular pararectal lymph node metastasis. MIP (A) and axial CT, PET and fused images demonstrate high PSMA-ligand uptake of the primary tumor (B-D) and a single lymph node metastasis (E-G).

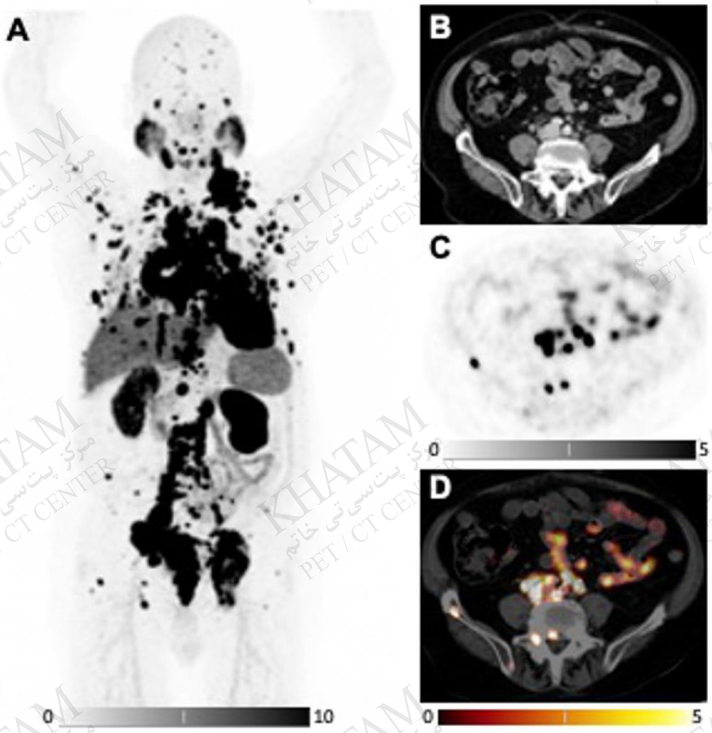
PROMISE code: miT2m N1(OP) M0, PRIMARY5, PSMA expression score lowest and highest 3



Patient 2:

A -76year-old patient underwent PSMA-PET/CT to determine PSMA-expression prior to ^{177}Lu-PSMA therapy. The patient was initially diagnosed with ISUP Gleason Grade Group 5 prostate cancer showing synchronous metastatic disease in the lymph nodes and bone with high tumor volume according to CHAARTED. He was primarily treated with androgen deprivation therapy and with docetaxel. After castration-resistance, the patient was treated with abiraterone and subsequently with cabazitaxel. MIP (A) and axial images (B-D) show lymph node and bone metastases with PSMA uptake higher than liver.

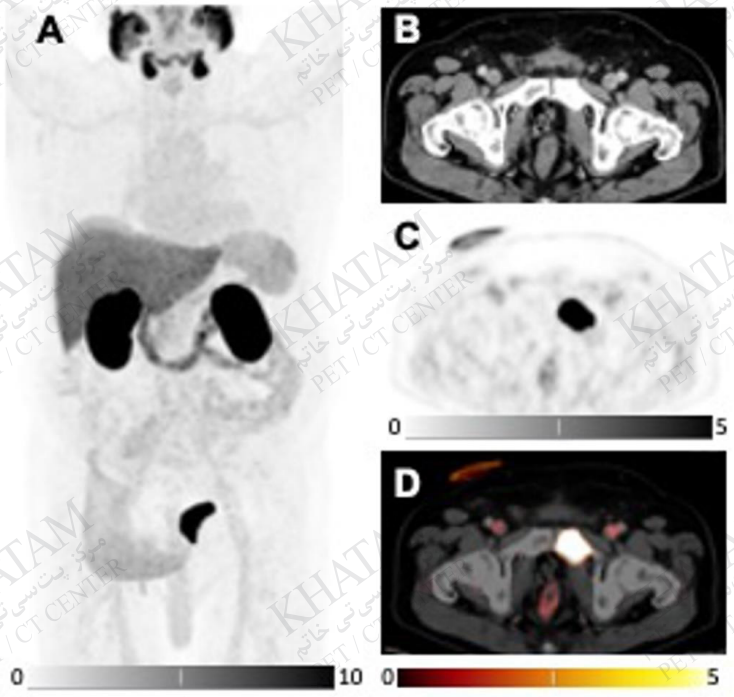
PROMISE code: miT0 N2 M1a 1b (diss), PSMA expression score lowest 2 and highest 3



Patient 3:

A -72year-old patient developed biochemical recurrence 1 year after radical prostatectomy of locally advanced ISUP Gleason Grade Group 5 prostate cancer. PSMA-PET/CT showed oligometastatic disease with a single bone metastasis in the pelvis with intense PSMA uptake shown in the MIP (A) and the axial images (B-D).

PROMISE code: miT0 N0 M1b (uni), PSMA expression score lowest and highest 3



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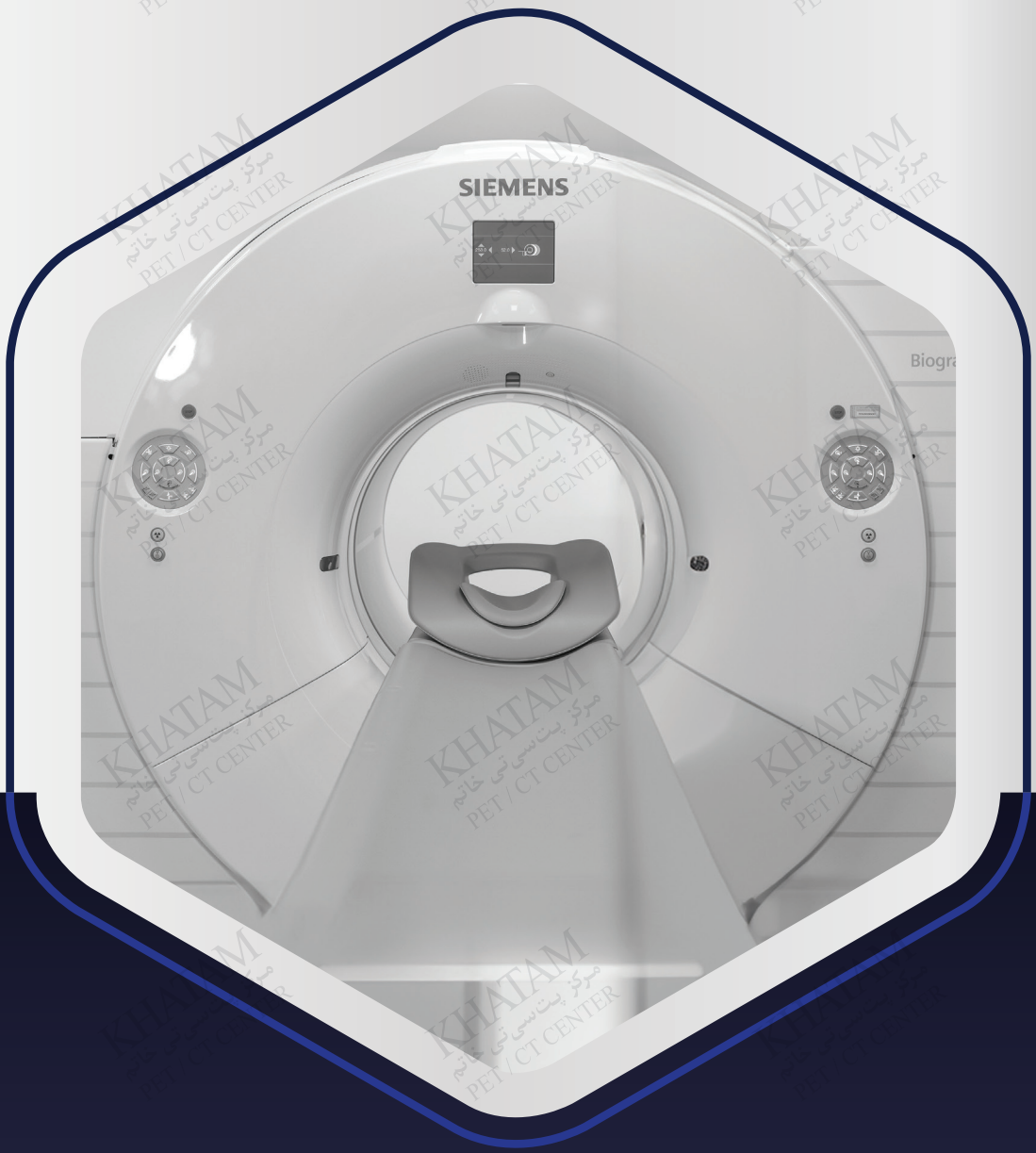
2. Emmett L, Papa N, Counter W, Calais J, Barbato F, Burger I, Eiber M, Roberts MJ, Agrawal S, Franklin A, Xue A. Reproducibility and accuracy of the PRIMARY score on PSMA PET and of PI-RADS on multiparametric MRI for prostate cancer diagnosis within a real-world database. Journal of Nuclear Medicine. 2024 Jan 9-94:(1)65;1.



KHATAM
PET / CT CENTER
www.petctkhatam.ir

خط ویژه:
۰۲۱-۹۲۰۰۲۲۰۲

info@petctkhatam.ir
www.petctkhatam.ir
petct.khatam

خیابان ولیعصر (عج)، بالاتر از میرداماد،
خیابان رشید یاسمی، جنب بیمارستان
خاتم الانبیاء (ص)، ساختمان یاس،
طبقه همکف