72-year-old man with high volume metastatic hormone-sensitive prostate cancer

Photo by Nicate Lee on Unsplash

Using PSMA-PET to detect high volume metastatic prostate cancer

Case courtesy of Associate Professor Melvin LK CHUA, National Cancer Centre Singapore

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CLINICAL PRESENTATION

Photo by Nicate Lee on Unsplash

72-year-old man with prostate cancer presents with several sclerotic bone lesions after a routine CT TAP scan (no comorbidities)

Investigations

- ^{18}F-FDG PET-CT scan (Jul 2021) – done as surveillance imaging for rectal cancer treated surgically 4 years ago: **3 pelvic bone lesions suspicious of metastatic lesions; no definite primary**
- PSA level (Jul 2021) 109
- MRI Pelvis (Jul 2021): Large prostate primary; Multiple pelvic bone lesions – sacrum, acetabulum
- **^{68}Ga-PSMA PET-CT scan (Aug 2021):** Tracer-avid bony mets in the T1 vertebra and multiple pelvic sites; **8 in total**
- Biopsy of the prostate not feasible due to previous APR

To treat as low or high Low or High volume mCSPC?

APR, abdominoperineal resection; CT TAP, computed tomography of thorax, abdomen and pelvis; FDG, fluorodeoxyglycose; mCSPC, metastatic castration sensitive prostate cancer; met, metastasis; PET, positron emission tomography; PSMA, prostate-specific membrane antigen

PSMA-PET is recommended for accurate staging in biochemical recurrent prostate cancer[1,2]

PSMA-PET is as or **more sensitive and specific in detecting micrometastatic disease** than conventional imaging tools for patients with biochemical recurrence[1,2]
-NCCN & EAU guidelines

PSMA-PET recommendations for biochemical recurrent prostate cancer[2]

- After radical prostatectomy if PSA level is > 0.2 ng/mL and results will influence subsequent treatment decisions
- After radiotherapy if patients are fit for curative salvage treatment

EAU, European Association of Urology; NCCN, National Comprehensive Cancer Network; PET, positron emission tomography; PSA, prostate-specific antigen; PSMA, Prostate-specific membrane antigen

1. National Comprehensive Cancer Network (NCCN). NCCN Clinical Practice Guidelines in Oncology (Prostate Cancer). Version 2.2022 (November 30, 2021). 2. Mottet N, et al. Eur Urol. 2021;79(2):243-262.

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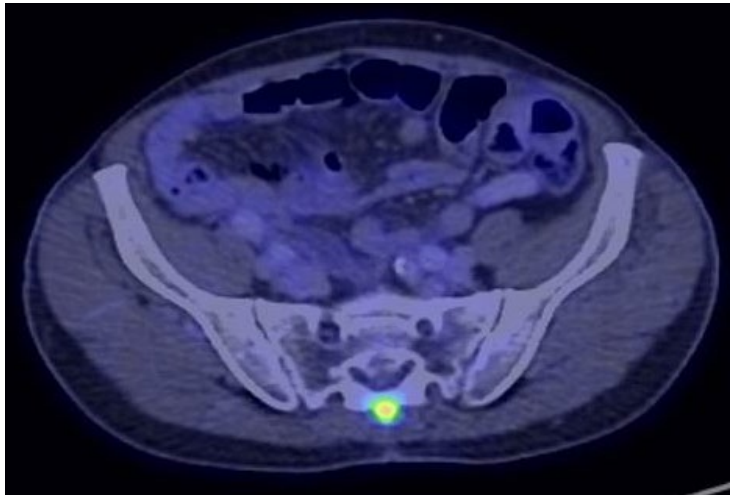
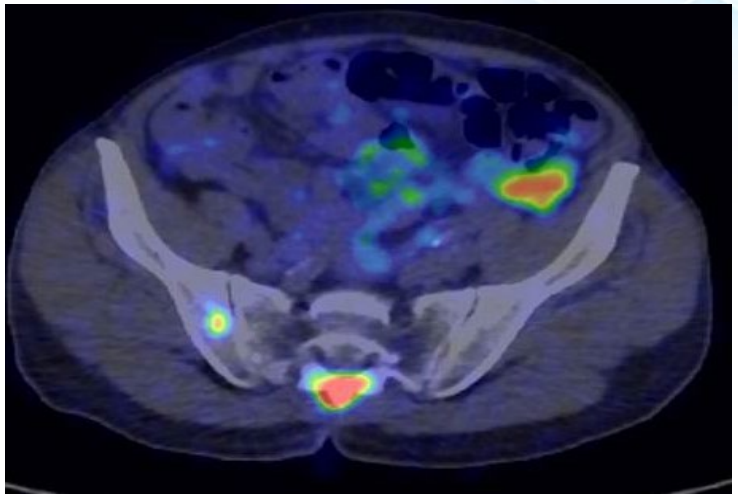
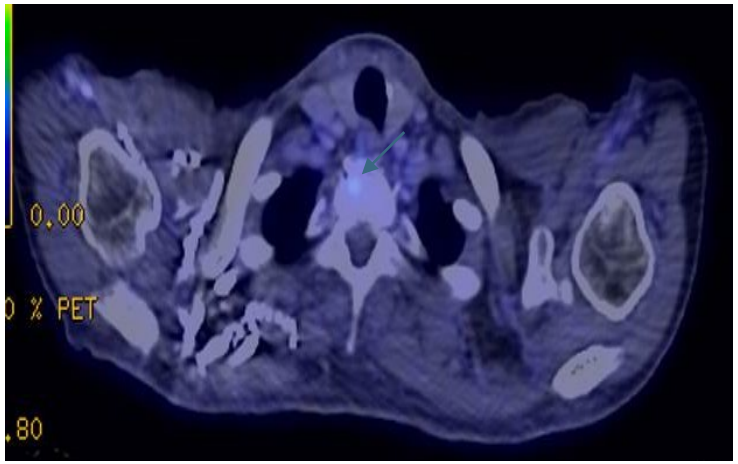
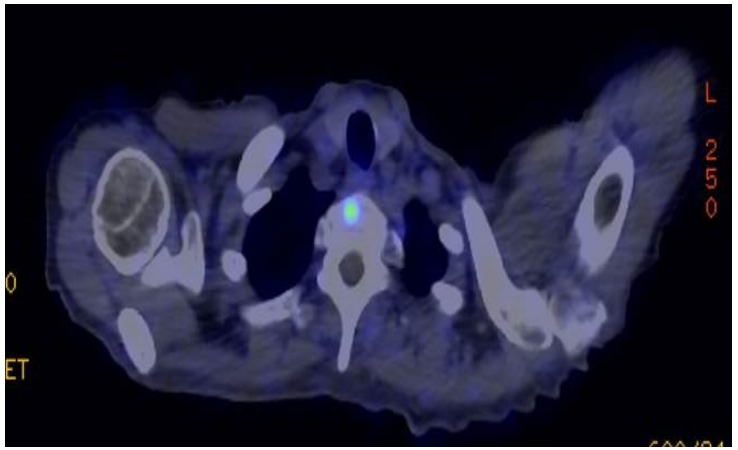
Low volume to High volume mCSPC following NGI

CT TAP	^{18}F-FDG-PET	^{68}Ga-PSMA-PET
		
		

FDG, fluorodeoxyglycose; mCSPC, metastatic castration sensitive prostate cancer; PET, positron emission tomography; PSMA, prostate-specific membrane antigen

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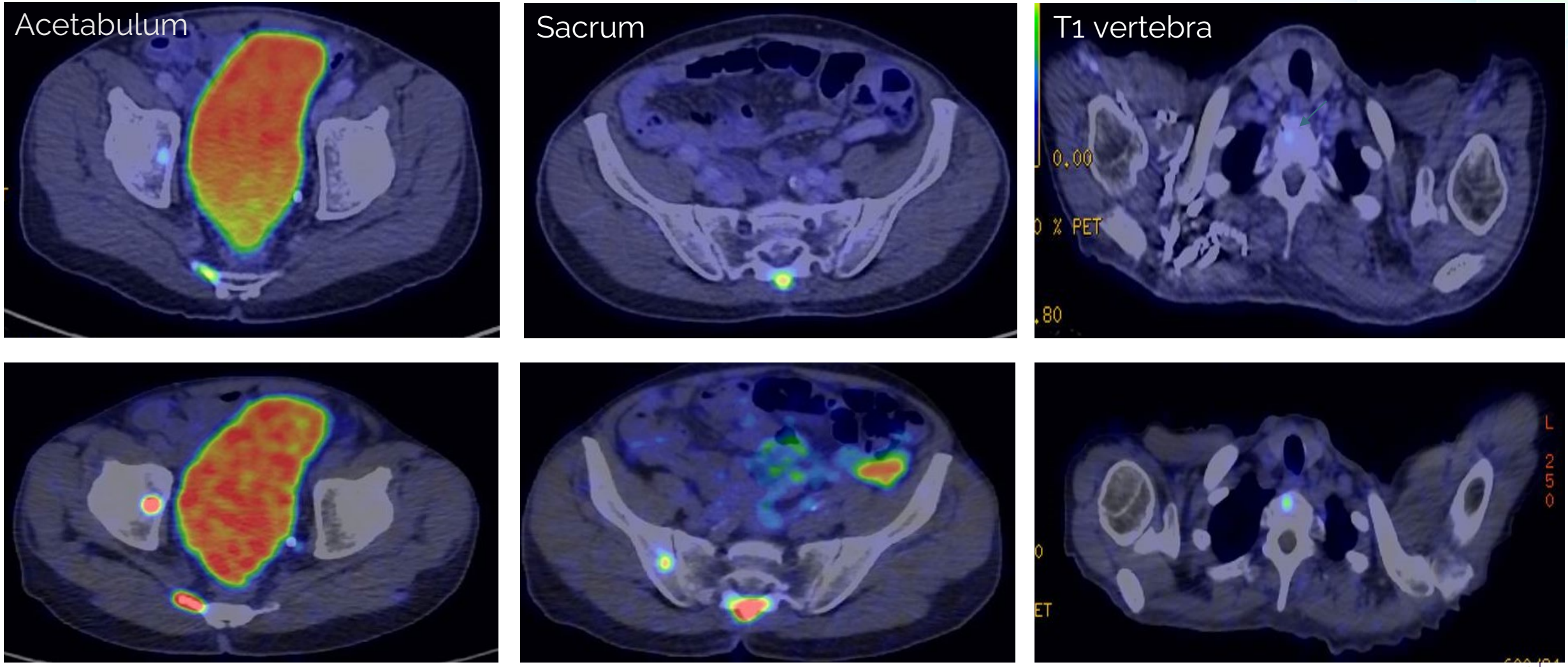
Concordance between ^{18}F-FDG & ^{68}Ga-PSMA in hormone-sensitive PCa

Metastases



FDG, fluorodeoxyglycose; PCa, prostate cancer; PSMA, prostate-specific membrane antigen

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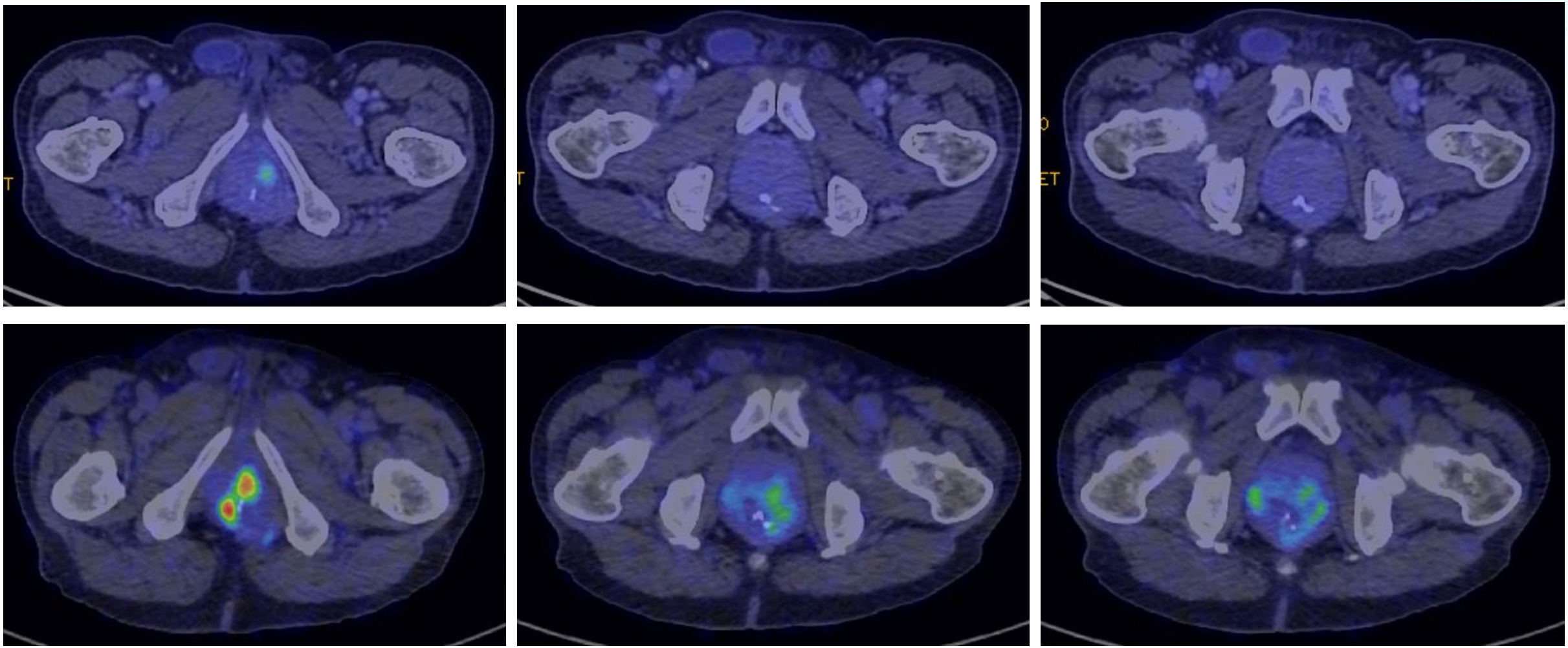
Concordance between ^{18}F-FDG & ^{68}Ga-PSMA in hormone-sensitive PCa

Primary tumour

^{18}F-FDG

^{68}Ga-PSMA



FDG, fluorodeoxyglycose; PCa, prostate cancer; PSMA, prostate-specific membrane antigen

INTERVENTION

Which of the following treatment options would you offer this patient?

ADT only	ADT + Chemotherapy	ADT + NHT
ADT + NHT + Chemotherapy	ADT + RT to Prostate	ADT + NHT + RT to Prostate

ABI, abiraterone; ADT, androgen-deprivation therapy; APA, apalutamide; ENZA, enzalutamide; NHT, novel hormonal therapy; PSMA, Prostate-specific membrane antigen

Case courtesy of Associate Professor Melvin LK CHUA, National Cancer Centre Singapore

INTERVENTION AND OUTCOMES

Treatments received

ADT (degarelix) + apalutamide

Good response to APA → to continue treatment

PSA drop from 109 → 0.07 after 3 mo of APA

Radiotherapy to the primary tumour??

ADT, androgen-deprivation therapy; APA, apalutamide.

PSMA-PET AND RADIOTHERAPY IN HIGH VOLUME METASTATIC PROSTATE CANCER

PSMA-PET is recommended for accurate staging in biochemical recurrent prostate cancer

Radiotherapy to primary tumour

Radiotherapy to primary tumour??

JAMA Oncology | Original Investigation

Association of Bone Metastatic Burden With Survival Benefit From Prostate Radiotherapy in Patients With Newly Diagnosed Metastatic Prostate Cancer

A Secondary Analysis of a Randomized Clinical Trial

- Original publication: SOC vs SOC + **RT to primary tumour**
- SOC is ADT +/- **Docetaxel (20%)**
- Overall cohort – no difference
- When stratified by CHAARTED volume criteria, no benefit with high-volume, but FFS benefit with low-volume (HR 0.76)
- STOPCAP meta-analysis (+HORRAD): **7% benefit for 3y OS for those with ≤5 mets**
- Systemic evaluation of metastatic burden on benefits of local RT

ADT, androgen-deprivation therapy; FFS, failure-free survival; HR, hazard ratio; met, metastasis; RT, radiotherapy; OS, overall survival; SOC, standard of care

Ali A, et al. JAMA Oncol 2021;7(4):555-563.

Radiotherapy to primary tumour??

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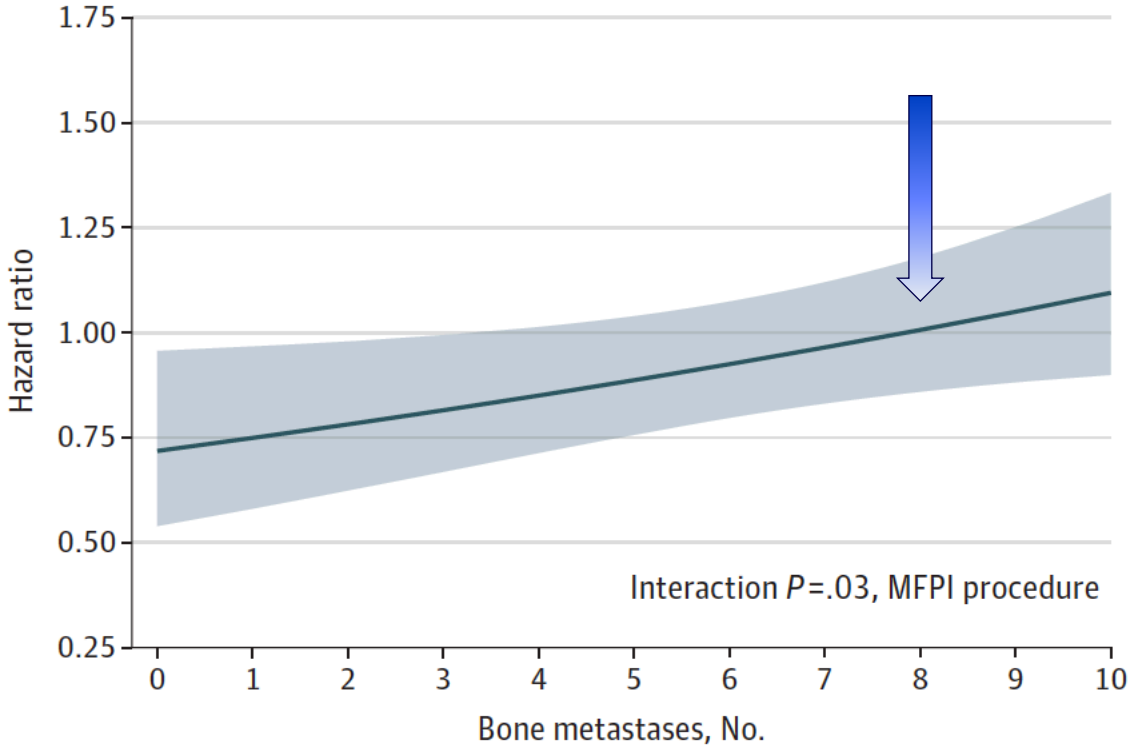
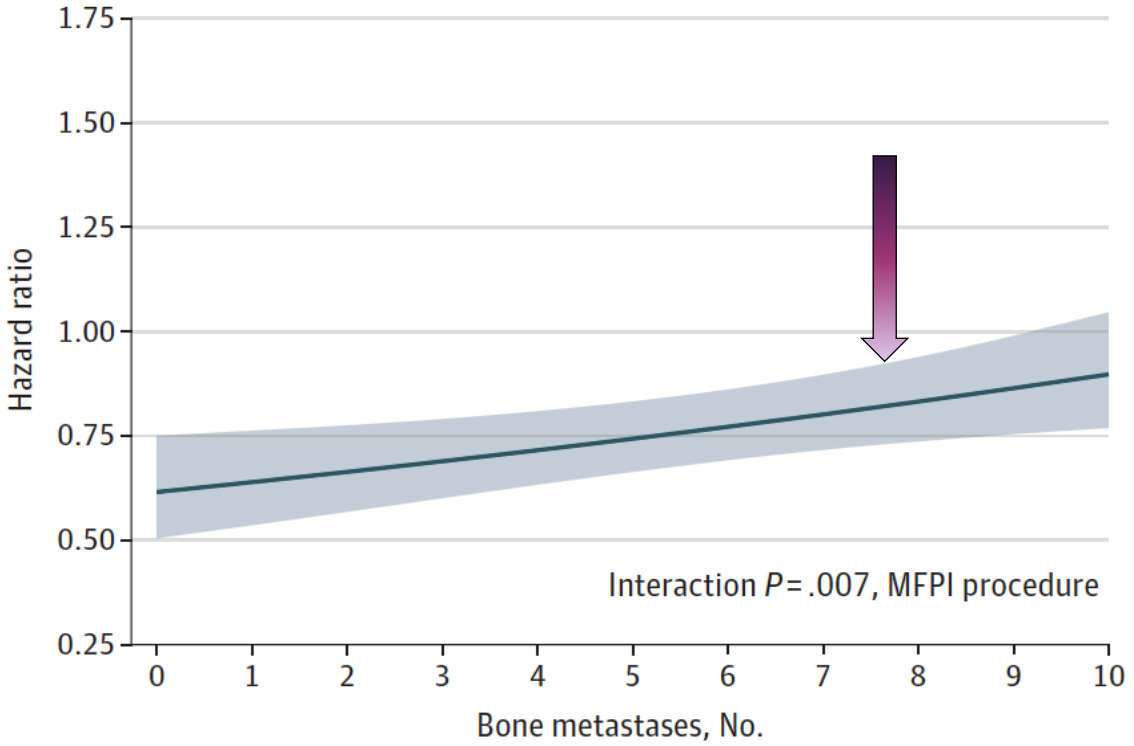
Overall survival



Failure-free survival



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Radiotherapy to primary tumour??

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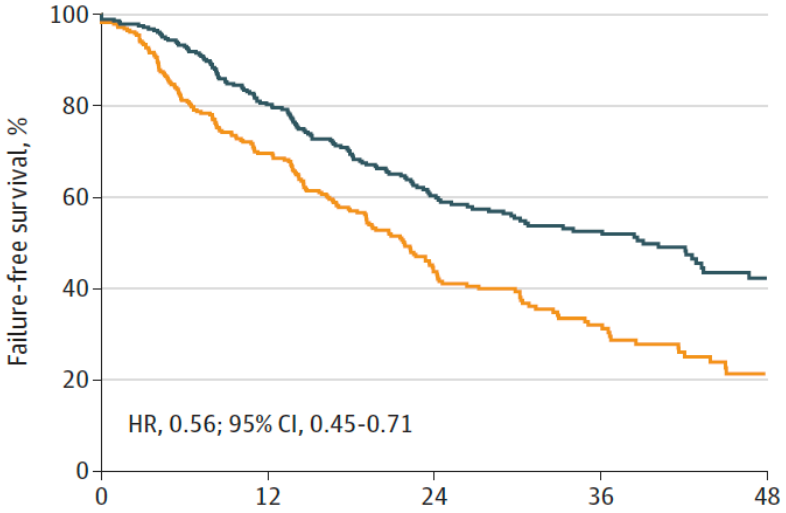
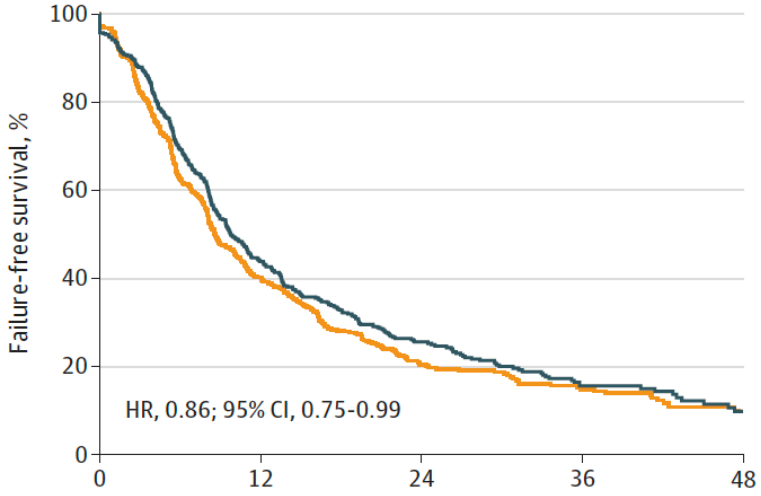
≤3 bone mets +/- RPLN



≥4 bone mets +/- RPLN



	Events/patients, No./No.			3-y KM survival, %	
	SOC	SOC + RT	HR (95% CI)[a]	SOC	SOC + RT
Overall survival					
Only NRLN metastasis	28/89	21/92	0.60 (0.33-1.09)	73	80
Bone metastases (±NRLN)	303/802	291/785	0.96 (0.82-1.13)	61	64
≤3 bone metastases	81/290	58/287	0.64 (0.46-0.89)	75	85
≥4 bone metastases	222/512	233/498	1.12 (0.93-1.34)	53	52
Any visceral or other metastasis	37/85	35/86	0.89 (0.55-1.42)	53	56
Failure-free survival					
Only NRLN metastasis	54/89	46/92	0.63 (0.42-0.94)	29	51
Bone metastases (±NRLN)	598/802	532/785	0.75 (0.67-0.85)	22	30
≤3 bone metastases	184/290	135/287	0.56 (0.45-0.71)	33	53
≥4 bone metastases	414/512	397/498	0.86 (0.75-0.99)	15	16
Any visceral or other metastasis	68/85	64/86	0.98 (0.68-1.39)	19	20

Ali A, et al. JAMA Oncol 2021;7(4):555-563.

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CONCLUSION

Next-generation imaging (^{68}Ga-PSMA) detected more lesions and was able to identify high volume mCSPC compared to conventional imaging (^{18}F-FDG)

Patient demonstrated good response to APA and drop in PSA levels from 109 to 0.07 after 3 months

Despite his advanced age, patient tolerated full dose APA. He developed G1 skin rash that was managed by topical steroids and emollients.

Based on the evidence,

- Bone metastasis count and metastasis location demonstrated OS and FFS benefit from prostate RT in M1 disease[1]

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FDG, fluorodeoxyglycose; FFS, failure-free survival; mCSPC, metastatic castration sensitive prostate cancer; RT, radiotherapy; OS, overall survival; PSMA, prostate-specific membrane antigen

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