PET/CT PROSTATE CANCER: CASES

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WARNING
CHEATING
69 years-old patient treated in June 2011 with RP for PCa (Gleason Score 4+3; pT3apN0MxR0; initial PSA 7.5 ng/mL).

In October 2012 a biochemical relapse occurred (PSA 0.42 ng/mL) and PSA values raised up to 0.86 ng/mL in January 2013 (PSAdt 3.6 months; PSAvel 1.51 ng/mL/year).

No ADT was administrated.

According to nomograms, a local relapse was suspected, thus the patient was scheduled for a salvage radiotherapy (S-RT) in the prostatic bed.
QUESTION

WOULD YOU SUGGEST IMAGING?

YES     MP MRI

YES     BS and CT

YES     FDG PET

YES     PC PET

NO
**CASE 1**

$^{11}$C-choline PET/CT was planned to restage the disease before S-RT. $^{11}$C-choline PET/CT (A low-dose CT; B fusion PET/CT; C maximum intensity projection: MIP) resulted positive in a single lymph-node in the left external iliac region. The already planned S-RT on prostatic bed was performed in an enlarged planning target volume (PTV), including the PET positive lymph-node. The PSA nadir after S-RT was < 0.2 ng/mL.
CASE 1
QUESTION

IN PTS SCHEDULED FOR SALVAGE
EBRT IS PC PET USEFUL?

YES IT IS MANDATORY

NO IT IS UNNECESSARY

YES IN SELECTED CASES

NO LACK OF DATA

YES BUT EXPENSIVE
72 years-old patient treated in October 2007 with RP + adjuvant ADT for PCa (Gleason Score 4+4; pT3bPN0MxR0; Initial PSA 14.1 ng/mL). In March 2009 a biochemical relapse occurred (PSA 0.3 ng/mL) and PSA values constantly increased up to 1.73 ng/mL. Conventional imaging was negative and patient was addressed to ADT. PSA levels remained not detectable until June 2011 when PSA levels became detectable (PSA 0.32 ng/mL). ADT was continued despite increasing PSA levels (castrate resistant PCa). In February 2012 PSA was 1.12 ng/mL (PSAdt 1.2 months; PSAvel 3.02 ng/mL/year).
QUESTION

WOULD YOU SUGGEST IMAGING?

YES     MP MRI
YES     BS and CT
YES     FDG PET
YES     PC PET
NO
11C-choline PET/CT resulted positive in a single bone lesion in the left pubis CT (A low-dose CT; B fusion PET/CT; C MIP). An intensity-modulated radiotherapy on the osteoblastic bone lesions was performed with PSA response (PSA 0.65 ng/mL) at six months after therapy.
QUESTION

IN CRPC IS PC PET USEFUL?

YES     IT IS MANDATORY
NO      IT IS UNNECESSARY
YES     IN SELECTED CASES
NO      LACK OF DATA
YES     BUT EXPENSIVE
80 yo, diagnosis of PCa in 2000, PSA before surgery 10 ng/mL, radical prostatectomy was performed in 2000 (Gleason Score: 3+4; TNM stage: pT3aN0Mx).

After surgery, PSA serum level set to zero. No hormone therapy or radiotherapy was performed after surgery.

In 2013 he presented a biochemical relapse with PSA level of 16.00 ng/mL.
WILL YOU SUGGEST IMAGING?

- YES  MP MRI
- YES  BS and CT
- YES  PC PET
- NO (ONLY CRPC)
- NO (TOO OLD)
QUESTION

TO IDENTIFY LOCAL RELAPSE WHICH IS THE BEST METHOD?

- CHOLINE PET
- PSMA PET
- MP MRI
- CE CT
CASE 4

72 yo, Radical prostatectomy performed in August 2011 (Gleason Score: 4+5; PSA before surgery 7.13 ng/mL; TNM stage: pT3bN1MxR1). After surgery, radiotherapy targeted on the prostatic bed was performed and hormone therapy was started.

In 2014 he presented a biochemical relapse with PSA level of 1.84 ng/mL.
QUESTION

WOULD YOU SUGGEST IMAGING?

- NO (ONLY AD NAIF)
- NO (PSA TOO LOW)
- NO
- YES PC PET
CASE 4

$^{11}C$-choline PET/CT showed multiple bone lesions and metastatic lymph nodes.
CASE 4 B
QUESTION

THE UPTAKE IN INJECTED ARM IS PARAPHYSIOLOGICAL?

YES (THE MUSCLE)
YES (THE VESSEL)
YES (THE NODE)
YES (WHATEVER)
NO
73 years-old patient treated in June 2013 with RP for PCa (Gleason score 4+5; pT3apN0MxR0; initial PSA 10.5 ng/mL). PSA nadir was 0.07 ng/mL. In July 2014 BR occurred. PSA in October 2014 was 0.48 ng/mL (PSAdt 4.9 months; PSAvel 0.41 ng/mL/yr)
QUESTION

WOULD YOU SUGGEST IMAGING?

YES     BS and CT

YES     PC PET

NO (PSA TOO LOW)

NO
CASE 5

Images provided by INNSBRUCK – Virgolini - Uprimny
**QUESTION**

IS PSMA SUPERIOR TO CHOLINE AS PC PET TRACER?

YES     BETTER ACCURACY

NO WORST ACCURACY

YES AT LOW PSA

YES AT HIGH PSA
57 years-old patient who underwent a RP on October 2013 for PCa (Gleason Score 4+5; pT3apN1MxR1; Initial PSA 22.4 ng/mL). PSA nadir after surgery was 1.15 ng/mL. Considering the persistence of detectable PSA levels (PSA 0.72 ng/mL during hormonal blockade) patient was scheduled for S-RT on prostate bed (BS and CT negative).
WHILE REPORTING A PC PET, SHOULD YOU ALSO LOOK AT CT?

YES     MANDATORY

NO     USELESS

YES     IF PC PET POSITIVE
CASE 7

59yo
Surgery 2013: GS 3+4
RT: no
PSA relapse: 2.0

Final diagnosis after PLND: disease relapse
11C-Choline PET/CT showed a moderately enlarged lymph node, with mildly increased tracer uptake.
QUESTION

HOW WOULD YOU HAVE REPORTED IT?

NEGATIVE

SUSPECT

POSITIVE
CASE 8

66yo
Surgery 2006: pT3AN0MxR1 GS 3+4
RT: 2007
PSA relapse: 14.7
CASE 8
CASE 8

11C-Choline PET/CT showed several enlarged lymph nodes, some of them with increased tracer uptake.
QUESTION

Which was the final diagnosis?

- Prostate Cancer Relapse
- Chronic Lymphatic Leukemia
- Mononucleosis
- Sarcoidosis