Oligometastatic and oligo-progressieve prostate cancer (castration-sensitive/naive and CRPC)

Answer of the nuclear medicine specialist

Stefano Fanti
Disclosures

GE Healthcare
Bayer
Sanofi
Novartis
ANMI
BED
Only 1 exam (imaging modality), exact localization, good sensitivity and specificity, follow up after therapy, costs and accessibility.

Are CT and bone scan sufficient?
Are CT and BS sufficient?

54. What approach to baseline and treatment monitoring do you recommend for men with poor prognosis, aggressive variant mCRPC?
   - Standard imaging by CT with bone scintigraphy
   - Standard imaging by CT without bone scintigraphy
   - Next generation imaging for prostate cancer (PET or whole body MRI)
   - Abstain
   - Unqualified to answer

61. What kind of imaging do you recommend for the majority of men with metastatic castration-sensitive/naive prostate cancer?
   - CT and bone scintigraphy
   - CT alone
   - Bone scintigraphy alone
   - Next generation imaging for prostate cancer
   - Abstain
   - Unqualified to answer

63. What kind of imaging do you recommend for the majority of men with mCRPC on first-line therapy?
   - CT and bone scintigraphy
   - CT alone
   - Bone scintigraphy alone
   - Next generation imaging for prostate cancer
   - Abstain
   - Unqualified to answer

85. What imaging test is sufficient to "exclude" distant metastases in high-risk and locally-advanced prostate cancer?
   - Bone scintigraphy alone
   - CT alone
   - Combination of bone scintigraphy and CT
   - Whole body MRI
   - PET/CT (PSMA, Choline or FACBC (Fluciclovine))
   - Abstain
   - Unqualified to answer
Are CT and BS sufficient?

Guidelines on Prostate Cancer

6.10.4 Assessment of metastases
6.10.4.1 Bone scan and abdominopelvic computed tomography
The standard workup to detect PCa metastases usually includes bone scan and abdominopelvic CT. However, because biochemical failure after RP or radiation therapy precedes clinical metastases by 7-8 years on average, the diagnostic yield of usual imaging techniques is poor in asymptomatic patients [718]. In men with PSA-only relapse after RP, the probability of a positive bone scan is < 5%, when the PSA level is < 7 ng/mL [719, 720]. A PSA doubling time (PSA-DT) < 6 months or a PSA velocity > 0.5 ng/mL/month are predictors of positive bone scan [719, 721].

CT sensitivity for detecting local recurrences or lymph node metastases is low. Only 11-14% of patients with biochemical failure after RP have positive CT [719]. In a series of 132 men with biochemical failure after RP, the mean PSA level and PSA velocity associated with positive CT was 27.4 ng/mL and 1.8 ng/mL/month, respectively [721]. Therefore, bone scan and abdominopelvic CT should only be considered in patients with biochemical failure after RP who have a high baseline PSA (> 10 ng/mL) or high PSA kinetics (PSA-DT < 6 months or PSA velocity > 0.5 ng/mL/month) or in patients with symptoms of bone disease [719].

However, more sensitive methods are needed to detect metastatic patients among candidates for local salvage treatment.
Final Version Consensus Questions for APCCC 2017

Definitions:

- **Symptomatic patients:** Requiring any regular pain medication for prostate cancer related pain.
- **Chemo-hormonal therapy:** Addition of six planned cycles of Docetaxel to ADT within 3-4 months of starting ADT as per CHAARTED and STAMPEDE criteria.
- **Next generation imaging for prostate cancer:** PET-CT with the following tracers of choice: PSMA, Choline and FACBC (Fluciclovine) and whole-body diffusion weighted MRI.
- **First generation AR antagonist:** Bicalutamide, Flutamide, Nilutamide
Only 1 exam

Local

Nodes

Bone
Only 1 exam

Pokémon
Gotta catch 'em all!

Local
Nodes
Bone

PSMA PET
GO
Exact Localization, Good Sensitivity and Specificity

Prostatectomy
PSA 1.3 ng/ml
DT 3 months
BS neg
Exact Localization

Prostatectomy
PSA 0.9 ng/mL
BS neg
Good Sensitivity and Specificity

PET/CT WITH $^{11}$C-CHOLINE FOR EVALUATION OF PROSTATE CANCER PATIENTS WITH BIOCHEMICAL RECURRENCE: META ANALYSIS AND CRITICAL REVIEW OF AVAILABLE DATA.

Stefano Fanti¹, Silvia Minozzi², Paolo Castellucci¹, Sara Balducci³, Ken Herrmann⁴, Bernd Joachim Krause⁶, Wim Oyen⁷, Arturo Chiti⁸,₉

<table>
<thead>
<tr>
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<th>All screened</th>
<th>Total</th>
<th>Total</th>
<th>Weight</th>
<th>Detection rate IV, Random, 95% CI</th>
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<td>0.62</td>
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Heterogeneity: $\tau^2 = 0.04$; $\chi^2 = 378.68$, $df = 17$ ($P < 0.00001$); $I^2 = 96$
Test for overall effect: $Z = 13.22$ ($P < 0.00001$)
Good Sensitivity and Specificity

Evaluation of Hybrid $^{68}$Ga-PSMA Ligand PET/CT in 248 Patients with Biochemical Recurrence After Radical Prostatectomy

Matthias Eiber$^1$,$^2$, Tobias Maurer$^3$,$^4$, Michael Sourvatzoglou$^1$, Ambros J. Beer$^1$,$^4$, Alexander Ruffani$^1$, Bernhard Haller$^5$, Frank-Philipp Graner$^4$, Hubert Kübler$^3$, Uwe Haberhorn$^6$, Michael Eisenhart$^6$, Hans-Jürgen Wester$^7$, Jürgen E. Gschwend$^1$, and Markus Schwaiger$^1$

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Good Sensitivity and Specificity

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$^c,d$, Damien Bolton$^a,d$, Nathan Lawrentschuk$^{a,c,d,*}$

In total, we analysed 16 studies involving 1309 patients who underwent a $^{68}$Ga-PSMA PET scan, of which 926 (70.7%) were positive. In an overall meta-analysis by cohort type, 40% (95% CI 19–64%) of scans were positive for patients undergoing primary staging and 76% (95% CI 66–85%) for those undergoing secondary staging (Fig. 3). There was high heterogeneity between groups and within all subgroups ($I^2 > 70$%). Egger's test for small-study effects did not reach significance ($p > 0.10$; Supplementary Figs. 1 and 2).

Fig. 7 — Summary sensitivity, specificity, and receiver operating characteristic (ROC) curves for the predictive ability of $^{68}$Ga-prostate-specific membrane antigen positron emission tomography on a per-patient and per-lesion basis. SENS = sensitivity; SPEC = specificity; AUC = area under the curve.

On per-patient analysis, the summary sensitivity and specificity were both 86%. On per-lesion analysis, the summary sensitivity and specificity were 80% and 97%, respectively.
Follow up after therapy

71 Y.O.
PSA 55 ng/ml

4 months later
ADT PSA 0,24 ng/ml
Cost and Availability
Cost and Availability
Conclusions

Oligometastatic and oligo-progressive prostate cancer (castration-sensitive/naive and CRPC)

Answer of the nuclear medicine specialist
Only 1 exam

Exact Localization, Good Sensitivity and Specificity
the NEXT generation
Conclusions

*depending on cost/availability/expertise; **PET/CT may be needed if WB-MRI used as the 1st step; BCR biochemical relapse; M0 = no detected metastases; M+ oligo-metastases; M++ poly-metastases; SACT systemic anticancer therapy