SCUOLA DI
DIAGNOSI E STADIAZIONE DEL CARCINOMA PROSTATICO

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Quale parametri possono essere considerati predittivi del N?
7.2 N-staging

The gold standard for N-staging is operative lymphadenectomy, either by open or laparoscopic techniques. It is worth pointing out that recent studies with more extensive lymphadenectomy have shown that the obturator fossa is not always the primary site for metastatic deposits in the lymph nodes, and pelvic lymph node dissection that is limited to the obturator fossa will therefore miss about 50% of lymph node metastases (47,48). When deciding on pelvic lymph node dissection, extended lymphadenectomy should be considered, despite its disadvantages: it requires surgical experience; it is time-consuming; and it often leads to more complications than the limited procedures. Furthermore, it may fail to identify lymph node metastases, however present, even outside the region of extended dissection (49).
Qual’è’ il ruolo della linfadenectomia nella RP

Stadiante

Terapeutica
### Conclusions

An extended pelvic lymph node dissection (eLND) is not necessary in low-risk, localised PCa, as the risk for positive lymph nodes does not exceed 7% (37).

An eLND should be performed in intermediate-risk, localised PCa if the estimated risk for positive lymph nodes exceeds 7%, as well as in high-risk cases. In these circumstances, the estimated risk for positive lymph nodes will be in the range 15-40% (37). A limited lymph node dissection should no longer be performed, as this will miss at least half of the nodes involved.

### Extended LND

<table>
<thead>
<tr>
<th>Indication for PLND</th>
<th>Extent of PLND</th>
</tr>
</thead>
<tbody>
<tr>
<td>EAU</td>
<td>High and intermediate risk</td>
</tr>
<tr>
<td>AUA</td>
<td>Reserved for high risk</td>
</tr>
<tr>
<td>NCCN</td>
<td>Exclude PLND if &lt;2% LNI</td>
</tr>
</tbody>
</table>

PLND pelvic lymph node dissection, EAU European Association of Urology, AUA American Urological Association, NCCN National Comprehensive Cancer Network
N-staging should be performed only when the findings will directly influence a treatment decision. This is usually the case in patients for whom potentially curative treatments are planned. High PSA values, stages T2b-T3 disease, poor tumour differentiation and peri-neural tumour invasion have been associated with a higher risk of the presence of nodal metastases (3,36,37). The measurement of PSA level alone is unhelpful in predicting the presence of lymph node metastases for an individual patient.

The nomograms could be used to define a group of patients with a low risk of nodal metastasis, i.e. < 10% (38). In such cases, patients with a serum PSA level of less than 20 ng/mL, stage T2a or less, and a Gleason score of 6 or less may be spared N-staging procedures before potentially curative treatment (3).

The extent of the Gleason 4 pattern in sextant biopsies has also been used to define the risk of N1 disease. If any core had a predominant Gleason 4 pattern, or > three cores any Gleason 4 pattern, the risk of nodal metastases was found to be 20-45%. For the remaining patients, the risk was 2.5%, supporting the idea that nodal staging is unnecessary in selected patients (39).
CONCLUSIONS

Our findings represent the first head-to-head comparison of LNI prediction ability of the NCCN guidelines nomogram, Partin tables, and D'Amico risk-classification. Our study was based on a large population-based cohort of patients treated with RP and PLND. In consequence, our results represent how the examined tools would really perform in everyday practice. The NCCN LNI nomogram had the highest discrimination accuracy. However, using the decision curve analysis, the Partin tables demonstrated the highest net benefit when a threshold probability of LNI is <4%. In contrast, the NCCN LNI nomogram had the highest net benefit when the threshold probability used to perform PLND is >4%.

Figure 2. Decision curve analyses for lymph node invasion (LNI) predictions. The graph depicts the net-benefit of using the NCCN LNI nomogram (thin solid line), Partin tables (dashed line), and D'Amico risk-classification (dotted line) predictive models. Gray line represents the assumption that all patients will harbor LNI. The thick solid line represents the assumption that no patients will harbor LNI.
5. Conclusions

We updated and internally validated the most accurate nomogram (AUC: 87.6%) predicting the probability of LNI in patients undergoing ePLND at RP. It is based on readily and routinely available clinical parameters, such as PSA, clinical stage, biopsy Gleason sum, and percentage of positive cores. Among these, the percentage of positive cores represents the foremost predictor of LNI and should be included in any LNI prediction model. Using a 5% nomogram cut-off, roughly two-thirds of patients would be spared ePLND, and LNI would be missed in only 1.5%. Therefore, in the absence of prospective data supporting the role of ePLND in PCa outcome, ePLND might be safely omitted in all patients with a nomogram-derived LNI risk <5%.

Fig. 1 - Nomogram predicting the probability of lymph nodes invasion (LNI) in patients undergoing extended pelvic lymphadenectomy based on pretreatment prostate-specific antigen (PSA), clinical stage, primary and secondary biopsy Gleason score, and percentage of positive cores. Instructions: Locate the patient's pretreatment PSA on the PSA axis. Draw a line straight upward to the point axis to determine how many points toward the probability of positive lymph nodes the patient receives for his PSA value. Repeat the process for each additional variable. Sum the points for each of the predictors. Locate the final sum on the total point axis. Draw a line straight down to find the patient's probability of having LNI.
Altre Indagini Nella Diagnosi Di N+

- CT
- MRI (High resolution- USPIO)
- CT-PET Colina
- Sentinel Node
7.2 N-staging

In the current published literature, the results indicate that CT and MRI perform similarly in the detection of pelvic lymph node metastases, although CT seems to be slightly superior (40) (LE: 2a). In either case, the decision about whether nodal involvement is present rests solely on whether there is enlargement of the investigated lymph nodes. A threshold of 1 cm in the short axis for the oval nodes, and 0.8 cm for the round nodes, has been recommended as the criteria for the diagnosis of lymph node metastases (41).

A fine-needle aspiration biopsy (FNAB) might provide a decisive answer in cases of positive imaging results. However, the lymph node can be difficult to reach because of the anatomical position. In addition, FNAB is not a highly sensitive staging procedure, and a false-negative rate of 40% has been reported (41).

High-resolution MRI with lymphotrophic ultra-small super-paramagnetic iron oxide particles (USPIO) was more recently suggested in the detection of small and otherwise occult lymph node metastases in patients with PCa (42,43).

In asymptomatic patients with newly diagnosed PCa and a serum PSA level of less than 20 ng/mL, the likelihood of positive findings on CT or MRI is approximately 1% (32). CT scanning may therefore be warranted in patients with a very high risk of harbouring lymph node metastases, as the specificity of a positive scan is
Ultrasmall superparamagnetic particles of iron oxide allow for the detection of metastases in normal sized pelvic lymph nodes of patients with bladder and/or prostate cancer.

Maria Triantafyllou, Urs E. Studer, Frédéric D. Birkhäuser, Achim Fleischmann, Lauren J. Bains, Giuseppe Petralia, Andreas Christe, Johannes M. Froehlich, Harriet C. Thoeny.

Fig. 2. Typical example of ultrasmall superparamagnetic particles of iron oxide (USPIO) uptake in positive and negative lymph nodes. Axial T2w-reconstructed images before (A) and after (B) the administration of USPIO in a 67-year-old prostate cancer patient. The benign lymph node (black arrow) shows a decrease in signal intensity after the uptake of USPIO; the malignant lymph node (white arrow) shows only partial posterior and medial signal decrease after the administration of USPIO.
Combined Ultrasmall Superparamagnetic Particles of Iron Oxide–Enhanced and Diffusion-Weighted Magnetic Resonance Imaging Reliably Detect Pelvic Lymph Node Metastases in Normal-Sized Nodes of Bladder and Prostate Cancer Patients

Harriet C. Thoeny, Maria Triantafyllou, Frederic D. Birkhaeuser, Johannes M. Froehlich, Dechen W. Tshering, Tobias Binser, Achim Fleischmann, Peter Vermathen, Urs E. Studer

Table 1 – Comparison of the diagnostic accuracies for the classic reading method\(^a\) versus the new USPIO-DW-MRI reading method\(^b\) with regard to histopathology

<table>
<thead>
<tr>
<th>Readings</th>
<th>Sensitivity</th>
<th>Specificity</th>
<th>Accuracy</th>
<th>PPV</th>
<th>NPV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Classic per patient</td>
<td>0.80</td>
<td>0.73</td>
<td>0.90</td>
<td>0.50</td>
<td>0.92</td>
</tr>
<tr>
<td>Classic per patient plus DW-MRI</td>
<td>0.80</td>
<td>0.87</td>
<td>0.90</td>
<td>0.67</td>
<td>0.93</td>
</tr>
<tr>
<td>Classic per pelvic side plus DW-MRI</td>
<td>0.71</td>
<td>0.94</td>
<td>0.90</td>
<td>0.71</td>
<td>0.94</td>
</tr>
<tr>
<td>New USPIO-DW-MRI per patient reader 1</td>
<td>0.80</td>
<td>0.93</td>
<td>0.90</td>
<td>0.80</td>
<td>0.93</td>
</tr>
<tr>
<td>New USPIO-DW-MRI per patient reader 2</td>
<td>0.60</td>
<td>0.80</td>
<td>0.75</td>
<td>0.50</td>
<td>0.86</td>
</tr>
<tr>
<td>New USPIO-DW-MRI per patient reader 3</td>
<td>0.80</td>
<td>0.87</td>
<td>0.85</td>
<td>0.67</td>
<td>0.93</td>
</tr>
</tbody>
</table>

PPV = positive predictive value; NPV = negative predictive value.
\(^a\) First pre- versus post-T2-weighted ultrasmall superparamagnetic particles of iron oxide (USPIO) (two readers; without and with diffusion-weighted magnetic resonance imaging [DW-MRI]).
\(^b\) First USPIO-DW-MRI (three independent blinded readers) on a per-patient (n = 20) and per-pelvic-side (n = 40) basis.

5. Conclusions

The present results suggest that USPIO-enhanced MRI in combination with DW-MRI is a novel, accurate, and fast method for detecting pelvic lymph node metastases even in normal-sized nodes of patients with bladder or prostate cancer.
The role of PET/computed tomography scan in the management of prostate cancer
Maria Picchio\textsuperscript{a,b}, Elisabetta Giovannini\textsuperscript{a} and Cristina Messa\textsuperscript{b,c,d}

Key points

- PET/computed tomography (CT) with $^{11}$C/$^{18}$F-choline is clinically recommended in the evaluation of patients with biochemical relapse, for lymph nodal and bone metastases detection.
- PET/CT with $^{11}$C/$^{18}$F-choline is not indicated for the diagnosis and staging of primary PCA.
- PET/CT with $^{11}$C-acetate, although promising, is still investigational for pretreatment and post-treatment management of prostate cancer patients.
- PET/CT with $^{18}$F-fluoride, although still investigational, could play a clinical role in the detection of malignant skeletal involvement in both pretreatment and post-treatment phase.

tailored to the patient [11\textsuperscript{*}]. Currently, pelvic lymphadenectomy is the gold standard to assess the status of pelvic lymph nodes, being final diagnosis defined by histology [4]. A diagnostic imaging tool to noninvasively explore patients and to detect metastases would be of particular help in clinical management. In lymph nodal detection, $^{11}$C-choline PET/CT specificity has been reported fairly high. However, its sensitivity is not appropriate [33]. A negative $^{11}$C-choline PET/CT study does not appear sufficient to rule out a lymphadenectomy [22,32,33]. However, when positive, PET/CT may be useful for patient management and treatment planning [9\textsuperscript{*},32,34]. Although few studies on the use of PET/CT with $^{11}$C-acetate in PCA are now available [19,23,32,34–36], its final role in clinical practice has not been conclusively defined.
Intraoperative Laparoscopic Fluorescence Guidance to the Sentinel Lymph Node in Prostate Cancer Patients: Clinical Proof of Concept of an Integrated Functional Imaging Approach Using a Multimodal Tracer

Henk G. van der Poel\textsuperscript{a,\,*}, Tessa Buckle\textsuperscript{b,\,*}, Oscar R. Brouwer\textsuperscript{b,\,*}, Renato A. Valdés Olmos\textsuperscript{b}, Fijis W.B. van Leeuwen\textsuperscript{b,\,*}

Fig. 1 - Protocol setup. (A) In situ formation of the multimodal radiocolloid that contains both a radioactive and a fluorescent component. (B) (1) Transrectal ultrasound-guided intraprostatic injection of the indocyanine (ICG)-\textsuperscript{99m}Tc-NanoColloid tracer; (2) preoperative single-photon emission computed tomography/computed tomography (SPECT/CT) (arrows indicate sentinel lymph nodes [SLNs]); and (3) intraoperative SLN detection using a near infrared (NIR)-laparoscopic D-light angle NIR fluorescence imaging system (screen I: fluorescence depicted in green). The da Vinci S surgical goggles using the system’s TilePro function were used to simultaneously depict the three-dimensional surgical field and the intraoperative NIR-laparoscopic image in blue (blue arrow; II). White circles highlight the fluorescent area.
Intraoperative Laparoscopic Fluorescence Guidance to the Sentinel Lymph Node in Prostate Cancer Patients: Clinical Proof of Concept of an Integrated Functional Imaging Approach Using a Multimodal Tracer


Conclusions: Initial data indicate that multimodal ICG-99mTc-NanoColloid, in combination with a laparoscopic fluorescence laparoscope, can be used to facilitate and optimize dissection of SLNs during RALP procedures.
La scintigrafia ossea: Quando dovrebbe essere eseguita?
Quando effettuare la scintigrafia ossea

- Quali parametri identificano un significativo rischio di metastasi ossea nello staging pretrattamento?

- Quale metodica di imaging identifica meglio una metastasi ossea?
Clinical Condition: Metastatic Bone Disease

Variant 7: Prostate nodule on physical examination proven to be a well- or moderately differentiated carcinoma and PSA <20 mg/ml. Patient asymptomatic.

<table>
<thead>
<tr>
<th>Radiologic Procedure</th>
<th>Rating</th>
<th>Comments</th>
<th>RRL*</th>
</tr>
</thead>
<tbody>
<tr>
<td>MRI area of interest without contrast</td>
<td>1</td>
<td></td>
<td>O</td>
</tr>
<tr>
<td>MRI area of interest without and with contrast</td>
<td>1</td>
<td></td>
<td>O</td>
</tr>
<tr>
<td>CT area of interest without contrast</td>
<td>1</td>
<td></td>
<td>Varies</td>
</tr>
<tr>
<td>CT area of interest with contrast</td>
<td>1</td>
<td></td>
<td>Varies</td>
</tr>
<tr>
<td>CT area of interest without and with contrast</td>
<td>1</td>
<td></td>
<td>Varies</td>
</tr>
<tr>
<td>X-ray radiographic survey whole body</td>
<td>1</td>
<td></td>
<td>★★★★</td>
</tr>
<tr>
<td>Tc-99m bone scan whole body</td>
<td>1</td>
<td></td>
<td>★★★</td>
</tr>
<tr>
<td>FDG-PET/CT skull base to mid-thigh</td>
<td>1</td>
<td></td>
<td>★★★★★</td>
</tr>
</tbody>
</table>

Rating Scale: 1,2,3 Usually not appropriate; 4,5,6 May be appropriate; 7,8,9 Usually appropriate

*Relative Radiation Level
Variant 8: Prostate nodule on physical examination proven to be a poorly differentiated carcinoma or PSA $\geq 20$ mg/ml. Patient asymptomatic.

<table>
<thead>
<tr>
<th>Radiologic Procedure</th>
<th>Rating</th>
<th>Comments</th>
<th>RRL*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tc-99m bone scan whole body</td>
<td>9</td>
<td></td>
<td>☀ ☀ ☀</td>
</tr>
<tr>
<td>CT area of interest without contrast</td>
<td>1</td>
<td>Varies</td>
<td></td>
</tr>
<tr>
<td>CT area of interest with contrast</td>
<td>1</td>
<td>Varies</td>
<td></td>
</tr>
<tr>
<td>CT area of interest without and with contrast</td>
<td>1</td>
<td>Varies</td>
<td></td>
</tr>
<tr>
<td>X-ray radiographic survey whole body</td>
<td>1</td>
<td>☀ ☀ ☀</td>
<td></td>
</tr>
<tr>
<td>MRI area of interest without contrast</td>
<td>1</td>
<td>O</td>
<td></td>
</tr>
<tr>
<td>MRI area of interest without and with contrast</td>
<td>1</td>
<td>O</td>
<td></td>
</tr>
<tr>
<td>FDG-PET/CT skull base to mid-thigh</td>
<td>1</td>
<td>☀ ☀ ☀ ☀</td>
<td></td>
</tr>
</tbody>
</table>

Rating Scale: 1,2,3 Usually not appropriate; 4,5,6 May be appropriate; 7,8,9 Usually appropriate

*Relative Radiation Level
McArthur et al. (http://www.ncbi.nlm.nih.gov/pubmed/21304009) have just reported data from a cohort of > 800 patients in whom they sought to ensure the feasibility of implementing the

- The entire database included 819 patients, of whom 633 were assessed retrospectively and 186 prospectively.
- 672/819 patients met all the inclusion criteria.
- The average (median) age of the eligible patients was 71 years (range, 39 to 93 years).
- 54/672 eligible patients (8 percent) had evidence of metastasis to bone based on their bone scans.
- PSA levels and Gleason scores were both independent predictors of a positive bone scan, and their predictive value was additive.
- 357/672 patients had a PSA level < 20 ng/ml and a Gleason score < 8 and none of these patients had a positive bone scan.

McArthur et al. very reasonably conclude that a bone scan “can be safely omitted” from the work-up of newly diagnosed prostate cancer patients with a PSA level < 20 ng/ml and a Gleason score < 8.
Unnecessary Imaging for the Staging of Low-risk Prostate Cancer Is Common

Hugh J. Lavery, Jonathan S. Brajtibord, Adam W. Levinson, Fatima Nabizada-Pace, Matthew E. Pollard, and David B. Samadi

Figure 1. Imaging examinations performed on low-risk prostate cancer patients (n = 677).

Figure 2. Radiographic interpretation for lymphadenopathy, bone metastases, and extracapsular disease on preoperative imaging in low-risk prostate cancer patients.
The role of PET/computed tomography scan in the management of prostate cancer
Maria Picchio\textsuperscript{a,b}, Elisabetta Giovannini\textsuperscript{a} and Cristina Messa\textsuperscript{b,c,d}

Key points

- PET/computed tomography (CT) with 11C/18F-choline is clinically recommended in the evaluation of patients with biochemical relapse, for lymph nodal and bone metastases detection.
- PET/CT with 11C/18F-choline is not indicated for the diagnosis and staging of primary PCA.
- PET/CT with 11C-acetate, although promising, is still investigative for pretreatment and post-treatment management of prostate cancer patients.
- PET/CT with 18F-fluoride, although still investigative, could play a clinical role in the detection of malignant skeletal involvement in both pretreatment and post-treatment phase.

As for distant metastases detection, the early detection or the exclusion of bone metastases is helpful to decide a proper treatment and to improve patient outcome. 18F-fluoride PET/CT has been proposed as a very sensitive diagnostic imaging tool to identify skeletal involvement with a sensitivity and specificity higher than the conventional bone scan scintigraphy in patients with high-risk PCA [35]. In a recent prospective study, the potential value of 18F-fluoride, compared with 18F-choline PET/CT for the detection of skeletal metastases in PCA patients, documented a sensitivity, specificity and accuracy of 81, 93, and 86% for 18F-fluoride, and 74, 99, and 85% for 18F-choline, respectively [37]. 18F-fluoride PET/CT presents an excellent diagnostic performance for the detection of metastatic bone tumour. However, the estimated effective dose and average cost effective ratio are disadvantageous compared with bone scintigraphy [38]. Actually, the use of 18F-fluoride PET/CT is not widely recommended in clinical practice yet [23,34].
Comparison of integrated whole body $[^{11}C]$choline PET/MR with PET/CT in patients with prostate cancer

Michael Souvatzoglou · Matthias Eiber · Toshiaki Takei · Sebastian Fürst · Tobias Maurer · Florian Gaertner · Hans Geinitz · Alexander Drzegla · Sibylle Ziegler · Stephan G. Nekolla · Ernst J. Rummensy · Markus Schwaiger · Ambros J. Beer

Fig. 1 PET/CT and consecutive PET/MR scan of a 78-year-old patient with biochemical recurrence of prostate cancer after radical prostatectomy (patient 22 in Table 1). a–d PET/CT imaging. Coronal (a) and axial (b) PET images show moderate focal $[^{11}C]$choline uptake at the level of the right common iliac artery (arrows; SUVmax 3.9, SUVmean 3.4). Coronal reconstruction of the CT scan (c) and PET–CT fused image (d) show a lymph node as morphological correlate of the focal uptake (arrows, maximum axial diameter 1.1 cm). The conspicuity of the focal uptake was rated as 1, and the anatomical allocation as 3. e–h PET/MR imaging. Coronal (e) and axial (f) PET images show no pathological focal $[^{11}C]$choline uptake. Retrospectively, a faint focal uptake is observable at the level of the right common iliac artery (SUVmax 2.5, SUVmean 1.6) corresponding to the uptake noted on the PET/CT images. However, the uptake is at the level of the background, and thus was not noted by the readers. Coronal T1-W TSE image (g) and PET fusion image (h) show the lymph node (arrows) as a hypointense signal alteration. Note the fairly good quality of the PET image from the PET/MR scan despite the late imaging time point.
Fig. 3 A 67-year-old patient with recurrence of prostate cancer after primary definitive radiation treatment (patient No 18 in Table 1). a–c PET/CT imaging. Coronal PET image (a) shows an intense focal ["C]choline uptake in the third vertebra of the lumbar spine (arrow, SUVmax 6.2, SUVmean 4.1). In the coronal reconstruction (bone window) of the CT scan (b) no trabecular changes can be seen in the respective vertebral bone. Therefore, no morphological correlate was noted on the CT scan. PET–CT fused image (c) shows the focal uptake in the vertebra (arrow). The conspicuity of the focal uptake was rated as 3, and the anatomical allocation as 2. d–f PET/MR imaging. Coronal PET image (d) shows an intense focal ["C]choline uptake in the third vertebra of the lumbar spine (arrow, SUVmax 6.3, SUVmean 3.9) corresponding to the uptake observed on PET/CT. Coronal T1-W TSE image (e) and fused PET image (f) show a focal hypointense signal alteration in the third vertebra of the lumbar spine (arrow) as a morphological correlate of the focal ["C]choline uptake observed on PET. The conspicuity of the focal uptake was rated as 3, and the anatomical allocation also as 3.
Clinicians Versus Nomogram: Predicting Future Technetium-99m Bone Scan Positivity in Patients With Rising Prostate-specific Antigen After Radical Prostatectomy for Prostate Cancer

Michael W. Kattan, Changhong Yu, Andrew J. Stephenson, Olliver Sartor, and Bertrand Tombal

Figure 1. Slovin nomogram used to predict patient-specific probabilities of bone scan positivity. Adapted with permission from the American Association for Cancer Research (http://dx.doi.org/10.1158/1078-0432.CCR-05-1668).\textsuperscript{11} bPSA, baseline prostate-specific antigen; PFS, progression-free survival; PSADT, prostate-specific antigen doubling time.
### Table C

<table>
<thead>
<tr>
<th>Indications</th>
<th>Initial Treatment Strategy (formerly Diagnosis and initial Staging)</th>
<th>Subsequent Treatment Strategy (includes Treatment Monitoring, Restaging and Detection of Suspected Recurrence)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prostate</td>
<td>NC (non-covered nationally – Not eligible for entry in the NOPR)</td>
<td>NOPR (covered only with entry in the NOPR)</td>
</tr>
</tbody>
</table>

#### Follow-Up & Additional Bone Imaging

If the physician who read and signed your bone scan report found something that he thought to be suspicious, but not definitive, he may suggest ordering additional imaging to rule out cancer metastasis. You will probably find different clinical opinions on what type of imaging is most useful, or even on when follow-up imaging is necessary. But here are some pointers that can help in your understanding.
Clinical Study
Diagnostic Role of $^{18}$F-FECH-PET/CT Compared with Bone Scan in Evaluating the Prostate Cancer Patients Referring with Biochemical Recurrence

Mustafa Takesh,1 Khaled Odat Allh,2 Stefan Adams,3 and Christian Zechmann1
1 Department of Nuclear Medicine, Heidelberg University Hospital, Im Neuenheimer Feld 400, 69120 Heidelberg, Germany
2 Department of Urology, Heidelberg University Hospital, Im Neuenheimer Feld 110, 69120 Heidelberg, Germany
3 Department of Nuclear Medicine and Radiology, Knappschaft Hospital, 66280 Sulzbach, Germany

5. Conclusion

No significant gain in sensitivity was achieved using bone scan compared with $^{18}$F-FECH-PET/CT. In lesion-based results, the diagnostic potential of both modalities varies in the different anatomical regions and shows $^{18}$F-FECH-PET/CT mostly of superior value. That was attributed to the higher spatial resolution and the additional benefit of accompanied CT except for its value in detecting the bone marrow involvement.

FIGURE 1: Comparison method between $^{18}$F-FECH-PET and BS (bone scan) (a). Bone scan (dorsal view). (d) Corresponding skeleton outline of bone scan. (c) Bone scan (ventral view). (d) Corresponding skeleton outline of $^{18}$F-FECH-PET. (e) $^{18}$F-FECH-PET (MIP).
Impact of $^{18}$F-fluoride PET-CT on implementing early treatment of painful bone metastases with Sm-153 EDTMP🎀

Giovanni Storto $^{a,*}$, Rosj Gallicchio $^{a}$, Teresa Pellegrino $^{b}$, Anna Nardelli $^{b}$, Serena De Luca $^{b}$, Daniela Capacchione $^{b}$, Cesare Sirignano $^{b}$, Leonardo Pace $^{c}$

$^{a}$ IRCCS, CROIR, Riomero in Vulture, Italy
$^{b}$ Institute of Nuclear Medicine and Radiology, National Research Council, Velletri, Italy
$^{c}$ Diagnostics per Immagini e Radioterapia, Università di Salerno, Salerno, Italy

with 12/12 body regions concerned. On a patient basis, the number of sites indicating bone metastases at PET was significantly higher compared with the $^{99m}$Tc-diphosphonate BS results ($p < 0.0001$)

Fig. 1. Patient with low-grade pain syndrome due to bone metastases from prostate cancer. Initially, 2516 MBq of Sm-153 EDTMP was administered early, on the basis of $^{18}$F-fluoride PET results, as well. Note the differences between the bone scans ($^{99m}$Tc-MDP, Sm-153 EDTMP) and the $^{18}$F-fluoride PET, all performed within three weeks. In Bone Metastases: A translational and clinical approach, Springer Netherlands, Volume 12, 2009, Radionuclide Therapy by Storto G.; Figure 16.1; With kind permission of Springer Science and Business Media.