Case 16003
Extensive metastases from prostate carcinoma mimicking Paget's disease

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Section: Musculoskeletal System
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Patient: 68 year(s), female

Clinical History

A 68-year-old man diagnosed with prostate carcinoma in 1999, was treated with external beam radiation. Recently the patient developed severe pain in his left knee, but without other complaints. PSA = 312 ng/ml, revealed progressive increase lately.
In this context, he was referred to our imaging department for further evaluation.

Imaging Findings

Skeletal radiography showed bone insufflation, medullary densification and periosteal reaction on the left lower limb, especially on the distal femur (Fig. 1a-c).
Bone scintigraphy performed with 99m-TC HDP showed an intense increase uptake compatible with secondary bone involvement in the lateral portion of the 7th and 8th right ribs and left iliac. It also showed an extensive involvement of the left lower limb bones, but not presenting the usual pattern of secondary bone involvement, and it was suggested that it could be related to Paget's disease (Fig. 2).
Whole-body CT revealed that prostate has small dimensions and textural heterogeneity. No other relevant changes were identified in the remaining examination (Fig. 3a-b).
MRI study revealed abnormal intramedullary signal with bone insufflation of all left lower limb, but without evidence of cortical bone rupture. There weren't soft tissues masses, but significant signs of diffuse edema of the surrounding soft tissues (Fig. 4a-b).

Discussion

Prostate cancer is the second most diagnosed cancer in the developed world, and the skeleton is the primary site of haematogenous spread (1).
Imaging for metastases should be undertaken when PSA is >4 ng/dl, however an elevated PSA is a common but nonspecific finding, being more useful in patient follow-up after treatment. So the underlying question here is how to properly diagnose bone metastases.
Conventional radiography has been used for many years as first exam although not being sensitive to small lesions. In recent years, bone scintigraphy has played a major role in the detection of bone metastases. Bone scintigraphy is performed with technetium-labeled diphosphonate and a gamma camera. The degree of tracer uptake reflects the osteoblastic reaction to the presence of tumor cells (2, 3, 4, 5). It is a very sensitive method, however, very unspecific, as illustrated in this case. Here it showed an intense, extensive and diffuse uptake of the left lower limb bones, favouring the diagnosis of Paget's disease, which gives rise to an increased bone turnover.
CT is not accurate at detecting in situ prostate cancer because of its low sensitivity and specificity but plays an important role in the evaluation of local infiltration of lymph nodes or distant metastasis. Our case showed very well this lack of specificity in the characterization of prostatic changes (6).
MRI study in this case was performed especially for excluding lesions of surrounding soft tissues. In fact, although all imaging studies and the PSA value indicated diffuse metastization of recurrent prostate carcinoma, Paget's disease still could not be safely excluded as an incidental finding in the left lower limb. A bone biopsy is almost always needed to make the definite diagnosis.
In our patient, the suspicion of prostate cancer was raised by the osteoblastic bone lesions and by the very high level of PSA (312 ng/ml) and so bone CT guided biopsy of the left distal femur was performed. The result of the immunohistochemistry revealed: Neoplastic cells have a strong and diffuse expression for AE1 / AE3 and PSA, and they are negative for CK7 and CK20. Morphological and immunohistochemical findings compatible with epithelial carcinoma, favouring prostatic origin."

Written informed patient consent for publication has been obtained.

Final Diagnosis

Prostate adenocarcinoma with disseminated bony metastatic disease.

Differential Diagnosis List

1. Osteoblastic metastases (prostate carcinoma), 2. Osteoblastic metastases from other cancer, 3. Paget Disease, 4. Fibrous Dysplasia

Figures

Figure 1 X-ray of the lower limb

Frontal X-ray of left lower limb with diffuse, coarse, patchy areas of hyperdensity and periosteal reaction.

Area of Interest: Bones;
Imaging Technique: Conventional radiography;
Procedure: Diagnostic procedure;
Special Focus: Neoplasia;

Frontal X-ray of left lower limb with diffuse, coarse, patchy areas of hyperdensity and periosteal reaction.

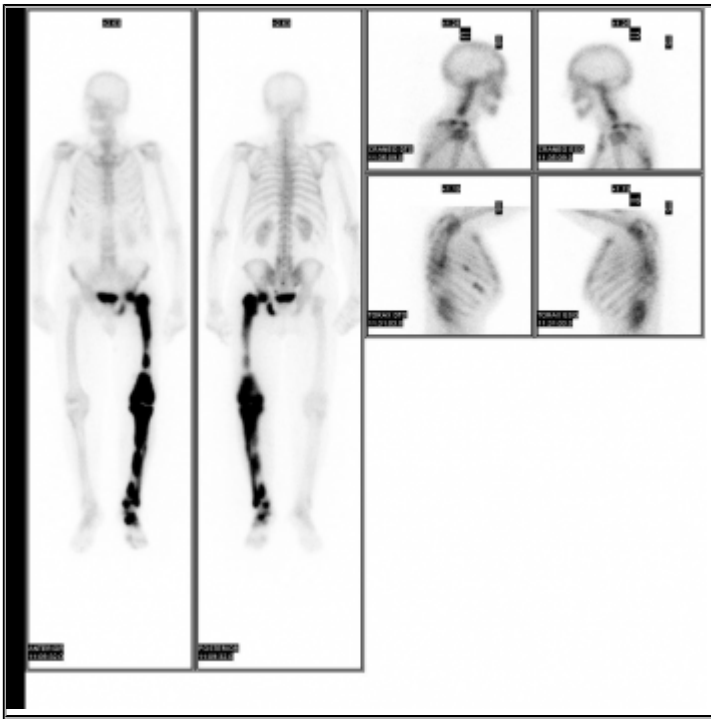
Area of Interest: Bones;
Imaging Technique: Conventional radiography;

Procedure: Diagnostic procedure;
Special Focus: Neoplasia;

Frontal radiograph of the pelvis showing asymmetry. It presents diffuse, thick and irregular areas of hyperdensity and periosteal reaction on the left side.

Area of Interest: Bones;
Imaging Technique: Conventional radiography;
Procedure: Diagnostic procedure;
Special Focus: Neoplasia;

Figure 2 Bone scintigraphy



Whole-body bone scintigraphy showing a few randomly distributed foci of increased uptake in the skeleton in accordance with bone metastases. Increased uptake in the left lower limb.

Area of Interest: Bones;

Imaging Technique: Nuclear medicine conventional;
Procedure: Diagnostic procedure;
Special Focus: Neoplasia;

Figure 3 CT study

CT study showed prostate with small dimensions and textural heterogeneity.

Area of Interest: Oncology;
Imaging Technique: CT;
Procedure: Diagnostic procedure;
Special Focus: Neoplasia;

CT study showed prostate with small dimensions and textural heterogeneity.

Area of Interest: Oncology;
Imaging Technique: CT;

Procedure: Diagnostic procedure;
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Figure 4 MRI study

MRI study (T1-weighted coronal images) showed abnormal intramedullary bone signal. There wasn't soft tissues masses, but significant signs of diffuse edema of the surrounding soft tissues.

Area of Interest: Musculoskeletal bone;
Imaging Technique: MR;
Procedure: Diagnostic procedure;
Special Focus: Neoplasia;

MRI study (T2FS-weighted coronal images) showed abnormal intramedullary bone signal. There wasn't soft tissues masses, but significant signs of diffuse edema of the surrounding soft tissues.

Area of Interest: Musculoskeletal bone;
Imaging Technique: MR;
Procedure: Diagnostic procedure;
Special Focus: Neoplasia;

References

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Citation

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