

QUIZ

Radiology Series: Could this be a malignant bone lesion?

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Case history

A 58-year-old Caucasian man had a radiograph carried out for an abdominal complaint that subsequently turned out to be spurious. He had no symptoms related to the bone. As there were concerns over the radiographic appearances, further investigations were carried out, including an isotope bone scan. The isotope bone scan revealed abnormal tracer uptake confined to the pelvic bone.

Q.1 What are the radiological findings?

Anteroposterior radiograph of the pelvis (Fig. 1) showed patchy increase in bone density in the right ilium, right ischium and right pubic bone, as well as in the right ala of the sacrum. All these bones are slightly expanded, compared to the contralateral side. There is thickening of the right iliopectineal and right ilioischial lines. Isotope bone scan (Fig. 2) showed intense increased tracer uptake in almost all the bones forming the right hemipelvis, corresponding to location of the radiographic abnormalities.

Q.2 What is the diagnosis?

The diagnosis is Paget disease. The disease process comprises of three overlapping stages which give rise to the distinctive radiological features of bony expansion, cortical thickening and patchy sclerosis. In the acute stage, there is increased osteoclastic activity resulting in areas of radiographic radiolucency. This is followed by the intermediate stage when osteoblastic activity predominates, manifested as cortical thickening, bony expansion, poor corticomedullary differentiation, and a coarse bony trabecular pattern. Sclerosis is

seen in the late stage, also known as the quiescent stage, when osteoblastic activity ceases.

The pelvis is the most common bone to be involved by the disease process, followed by the sacrum, spine, skull and long bones.¹ Pagetic change involving the pelvis is usually asymmetrical, giving rise to an enlarged hemipelvis associated with coarse trabecular pattern, and thickened iliopectineal and ilioischial lines. Complete sclerosis of the vertebral bodies in the late stage may give rise to 'ivory vertebrae'. Distinctive changes in the skull include osteolysis, especially in the frontal and occipital regions (osteoporosis circumscripta), followed by sclerosis which gives rise to a 'cotton-wool' appearance. In the long bones, a flame-shaped 'blade of grass' appearance is classical. Paget disease is seen more commonly in Caucasians, compared to Asians. No inciting agent has been established, although a viral cause was suggested.

Q.3 What are the complications of this disease?

The most important complication is sarcomatous transformation into chondro-, osteo- or fibrosarcoma, occurring in up to 5% of cases. Pathological fractures may develop as the bone is structurally weak, producing 'banana' fractures in lower extremity long bones and compression fractures of vertebrae. Bony expansion of the skull base may compromise the neural foramina, resulting in neurological deficits. Bony overgrowth in the spine and vertebral compression fractures may also produce spinal stenosis and neurological deficits. High output heart failure may result from the shunting that occurs in the highly vascularized Pagetic bone.²

Q.4 Could bone metastases give this radiological appearance?

Prostatic metastases must be considered in all cases of bony sclerosis, specially in the older men. Like Paget disease, it more commonly affects Caucasians as compared to Asians, rising to an incidence of 60% for men

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Figure 1 Frontal radiograph showed sclerosis of the right ilium, ischium, pubis and right sacral ala. All these bones are slightly expanded, with cortical thickening.



Figure 2 Isotope bone scan showed intense tracer uptake in the right hemipelvis, corresponding to the radiographic abnormalities.

in their 80s. Prostatic cancer tends to be detected in the late stage, with patients having advanced and disseminated disease at the time of detection. The axial skeleton, with its greater amount of red bone marrow, is the preferred site for bony metastases. The vertebrae are commonly involved, followed by the sternum,

pelvis, ribs and femur. On radiographs, osteoblastic metastases are seen as round dense foci. Isotope bone scans show multiple focal areas of increased tracer uptake, with a predilection for the marrow containing skeleton, such as the skull, spine, ribs, pelvis, humeri and femora.

References

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- 2 Dahnert W. *Radiology Review Manual*, 2nd edn. Baltimore: Williams & Wilkins, 1993; 86–7.