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Case report

Sacral insufficiency fracture after pelvic radiotherapy: A diagnostic challenge for a radiologist

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ABSTRACT

Sacral insufficiency fractures can occur as a complication after pelvic radiotherapy. Despite several recent studies showing high incidence of sacral insufficiency fractures in elderly women after pelvic radiotherapy this condition still remains underdiagnosed. We present a case of sudden onset of low back pain in a female patient with a history of cervical cancer radiotherapy. Initial diagnostic imaging misinterpreted SIF for metastasis. Bone scan and single-photon emission-computed tomography with low-dose computed tomography revealed the correct diagnosis. Due to the reasons that sacral insufficiency fractures still remain underdiagnosed this report is important to practical routine work of oncologists and radiologists.

1. Introduction

Although relatively common in elderly and other patients with structurally weakened bones and low back or pelvic pain, sacral insufficiency fractures still remain underdiagnosed. Sacral insufficiency fracture (SIF) is a type of fracture which occurs within normal stress on bone, weakened by demineralization or decreased elastic resistance of bone matrix due to osteoporosis, previous radiotherapy, rheumatoid arthritis, prolonged use of corticosteroids, diabetes or renal failure [1,2].

Since the first description by Lourie in 1982 [3], SIF has been considered as relatively uncommon. Exact incidence of SIF still remains undetermined, however several recent studies revealed that in risk group patients such as pelvic radiotherapy, insufficiency fractures prevalence is 9.5%–11.4% [1,4,5]. These fractures can present as low back and sacral pain, radiating into the buttock or leg. Infrequently patients with SIFs can be asymptomatic. In oncologic patients after radiotherapy SIF can be misinterpreted as bone metastases. Incorrect diagnosis can lead to unnecessary expensive diagnostic tests and chemotherapy, whereas delayed diagnosis and treatment of SIFs can lead to immobility and

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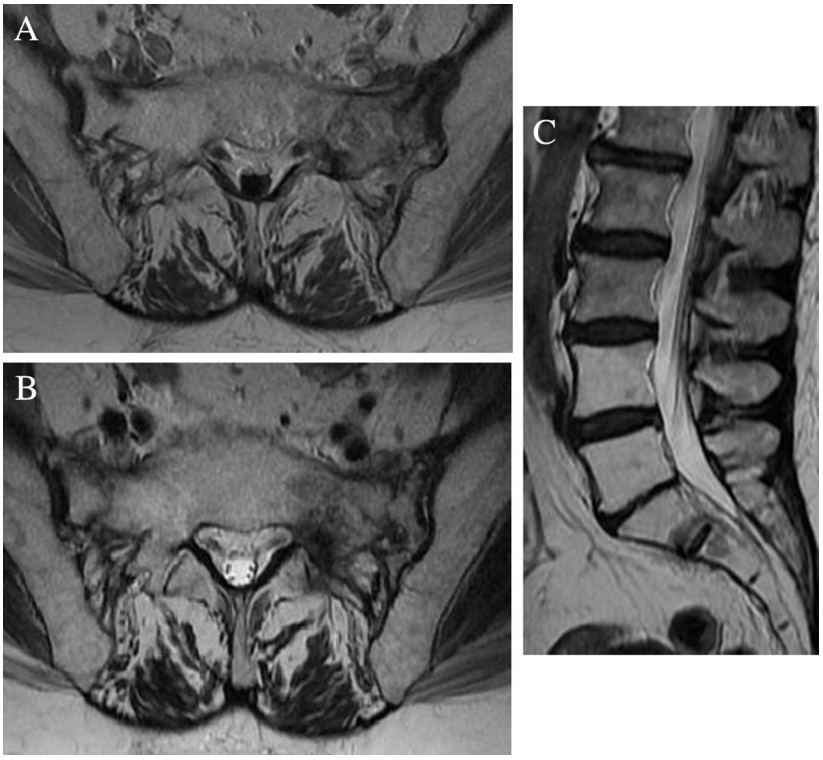

Fig. 1 – Focally heterogeneous signal is seen on magnetic resonance T1-weighted (A), T2-weighted (B) axial images in the left lateral part of the sacrum. Diffuse signal change in L4-5 and the sacrum on sagittal T2-weighted (C) image due to fatty infiltration of bone marrow after radiotherapy.

complications [6]. We would like to present a clinical case to emphasize the awareness of this condition, which is particularly important for radiologist to avoid misinterpretation of SIFs in the setting of concomitant oncologic disease.

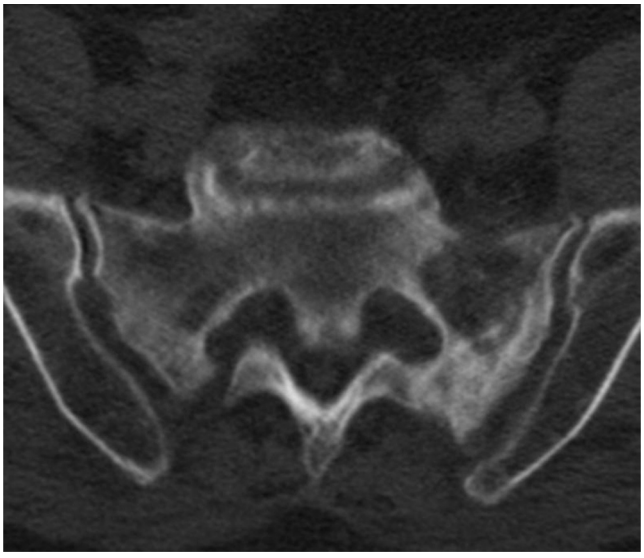

Fig. 2 – Axial CT images show focally decreased bone density, patchy sclerosis and loss of cortical bone integrity in the left part of S1.

2. Case report

A 72-year-old woman presented with a new onset of low back pain and had a previous history of cervical cancer. Two years ago patient had a diagnosis of cervical cancer T3bN0M0 and she received radiotherapy with total dose of 61.2 Gy. Neither surgery nor chemotherapy was applied due to numerous associated diseases such as bronchial asthma, hypertension, gastric ulcer and morbid obesity.

Regarding to the new onset of low back pain and previous oncologic history, bone metastases were initially suspected. The patient was referred to magnetic resonance imaging (MRI) of the lumbar spine in another institution (Fig. 1). This examination revealed changes in the sacrum which were described as possible metastasis and computed tomography (CT) of the lumbar spine was recommended to specify MRI findings (Fig. 2). CT was performed 3 weeks later and findings were reported as focal destruction in the left lateral part of the sacrum.

The patient was referred to an oncologist in the Institute of Oncology, Vilnius University, to assess possible relapse of cancer and assign chemotherapy. In addition the patient was referred to the Department of Nuclear Medicine to undergo a bone scan for evaluation of changes in the sacrum and detection of possible metastases in other bones. The patient received an intravenous injection of 640 MBq of Technetium-99m-methylene diphosphonate (99mTc-MDP) and an initial