

Postablation Insufficiency Fracture of the Iliac Crest: Management by Percutaneous Screw Fixation

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Introduction

The bony skeleton is the third most common metastatic site from cancer after the lungs and liver. Prostate, breast, and lung cancer represent the three most common tumours that tend to metastasize to bones. Recently different percutaneous techniques have been used to offer pain palliation resulting from bone metastases [1–3]. Although cementoplasty is used strictly for osteolytic lesions in weight-bearing bones and only with palliative intent, thermal ablation techniques can be used both for lytic and sclerotic lesions. Furthermore, in cases of solitary or oligometastases or metastases from neuroendocrine tumours, complete ablation with sufficient safety margins can improve life expectancy or even offer a chance for cure [4].

We herein present the case of a solitary painful lung metastasis in the right iliac wing treated with curative cryoablation and complicated with an iliac crest insufficiency fracture that was subsequently treated percutaneously with screw fixation. Institutional Review Board

approval for retrospective studying of the patient's file was not required.

A 55-year-old woman with history of right lobectomy for lung adenocarcinoma (pT4N2M0) presented on 2-year follow-up with a painful right iliac wing metastasis confirmed on positron-emission tomography (PET)-computed tomography (CT) and percutaneous biopsy (Fig. 1A). The metastasis was single, and a multidisciplinary decision to treat the patient with percutaneous cryoablation with a curative intent was made. Informed patient consent was obtained.

Procedure

The procedure was performed with the patient under general anaesthesia and under combined CT (Somatom Definition AS; Siemens, Erlangen, Germany) and fluoroscopic guidance (Arcadis Orbit; Siemens). One dose of prophylactic antibiotic therapy (1 g of cefazolin) was administered intravenously on the day of the procedure. Six 17-gauge cryoablation probes (Ice Rod Galil Medical, Yokneam, Israel) were positioned coaxially through 10-gauge vertebroplasty needles (Optimed, Erlangen, Germany) with a 2-cm distance in between. Two 10-min freezing cycles separated by a 10-min passive thawing cycle were performed. CT imaging at the end of the second freezing cycle confirmed complete coverage of the lesion with a 1 cm safety margin (Fig. 1B). The patient experienced significant pain reduction 48 h after the procedure.

Six months after cryoablation, and after relatively increased physical activity (8-h hiking without trauma), the patient's case was complicated with a painful, displaced iliac crest insufficiency-fracture, which was confirmed on

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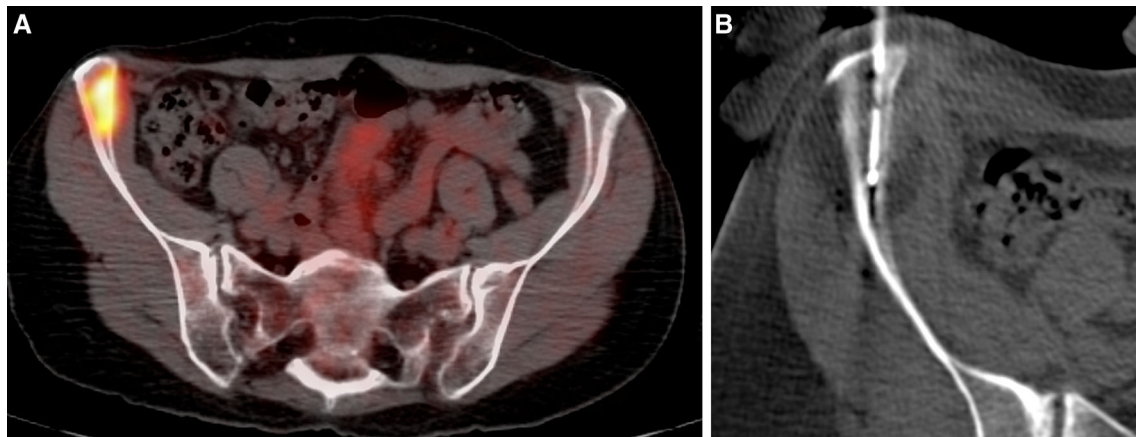


Fig. 1 A PET-CT scan image showing the hypermetabolic lesion on the right iliac crest. Biopsy confirmed the lung adenocarcinoma metastasis. B Percutaneous curative cryoablation under CT guidance

was performed. Note the hypodense iceball covering the lesion with a 1-cm safety margin

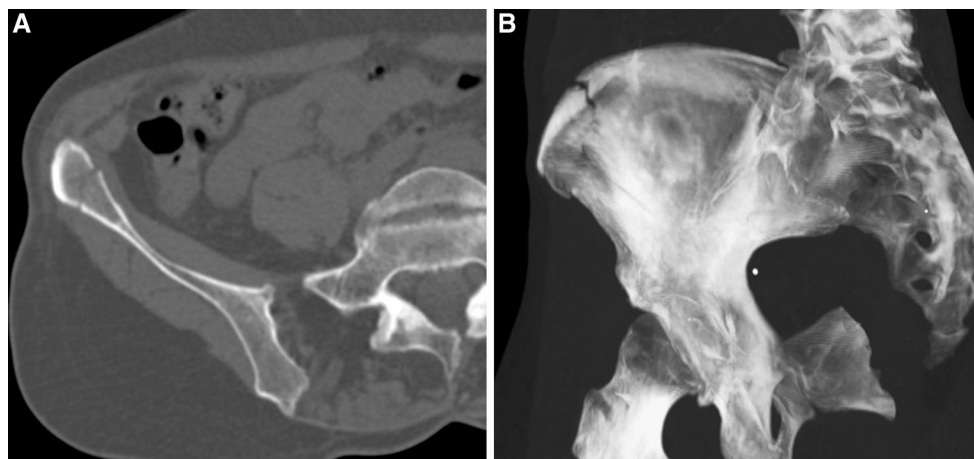


Fig. 2 A, B Axial CT and 3D volume rendering image showing insufficiency fracture of the right iliac crest

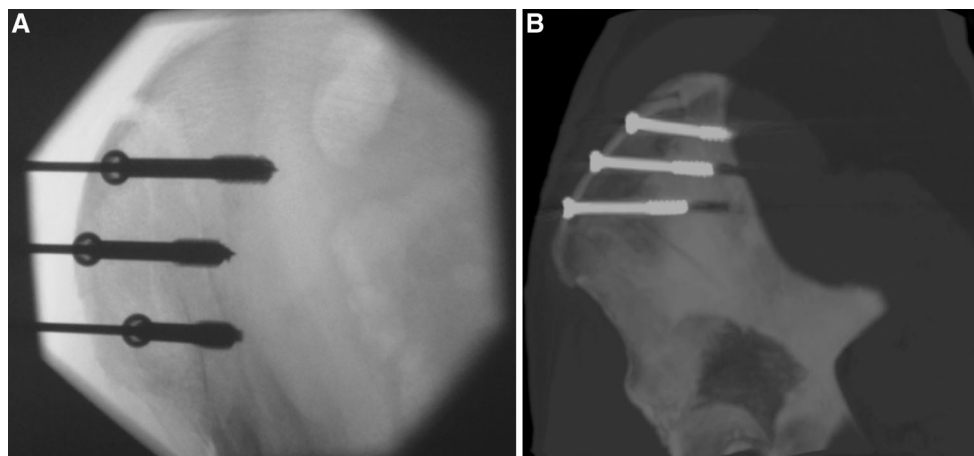


Fig. 3 A, B Three cannulated cancellous screws were positioned over guide pins under combined CT and fluoroscopic control interfragmentary and vertical to the fracture line. The guide pins were removed once the screws were in optimal position

CT (Fig. 2A, B). After failure of conservative therapy (bed rest) to control the pain, a decision to stabilize the fracture with percutaneous screw fixation was made. The fracture stabilization was performed with the patient under conscious sedation. Three guide pins were positioned under combined CT and fluoroscopic control interfragmentary and vertical to the fracture line. Three cannulated cancellous screws (length 40–44 mm) were then placed over the guide pins. Once the screws were in optimal position, the guide pins were removed (Asnis III cannulated screws; Stryker, Montreux, Switzerland) (Fig. 3A, B). The patient was symptom free and discharged home the day after the procedure. At 7-month follow-up, the patient remained symptom free, and imaging (PET-CT) confirmed the absence of recurrence or disease progression.

Discussion

Image-guided percutaneous techniques have rapidly evolved and are widely used for curative or palliative treatment of bone metastases. Palliative thermal ablation has proved to be efficient for the treatment of pain related to musculoskeletal metastases and refractory to conventional treatments (i.e., oral analgesics, radiotherapy) [1–3]. McMenemy et al. [4] recently showed that image-guided cryoablation is a safe and effective treatment to achieve local tumour control and short-term disease remission in patients with limited metastatic disease to the musculoskeletal system.

Cryoablation

Compared with other thermal ablation techniques (radiofrequency, microwave), cryoablation has the advantage of visualisation of the ablation zone with CT and MR imaging, thus reassuring complete coverage of the lesion and permitting safe ablation of lesions in proximity to vital structures (nerves, bowel). Moreover, with the simultaneous use of multiple cryoprobes, a voluminous ablation zone can be achieved. Thacker et al. [5] compared cryoablation with radiofrequency ablation and found that the former achieves greater pain reduction and a shorter hospital stay.

The complication rate after cryoablation is relatively low (2–5 %) [1, 4, 6]. Most common complications are infection, thermal damage to collateral structures, and skin burn (frostbite). Few reports exist in the literature regarding postablation insufficiency fractures. Most cases refer to

stress fractures encountered after radiofrequency ablation of osteoid-osteoma [7]. Abdel-Aal et al. [8] reported a case of postcryoablation pathologic fracture of the femur.

We presented a case of insufficiency postcryoablation fracture of the iliac crest. We decided to address this complication percutaneously with the interfragmentary placement of three cannulated cancellous screws. The needle position and length were calculated using CT images. The therapeutic goal was to achieve anatomical reduction and stable fixation of the fracture. Cement injection was not indicated because the fracture was unstable and susceptible to torsion forces. The clinical and imaging results were satisfactory.

Conclusion

Although postablation insufficiency fractures are rare, physicians should keep them in mind in case of recurrent pain. When the fracture is encountered in non-weight bearing bones and anatomical reduction of the fracture is needed, screw fixation is necessary and can be performed percutaneously.

Conflict of interest None.

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