

Case Report

Preliminary Presentation of Metastatic Non-Small Cell Carcinoma of the Lung as Atraumatic Avulsion Fracture of the Lesser Trochanter

Adam Creissen^a Aysha Rajeev^a Kumud Jain^b Paul Banaszekiewicz^{a, c}

^aOrthopaedic Department, Queen Elizabeth Hospital, Gateshead, UK; ^bClinical Pathology, Queen Elizabeth Hospital, Gateshead, UK; ^cNorthumbria University, Newcastle, UK

Keywords

Lesser trochanter · Avulsion fracture · Metastasis · Lung carcinoma · Pathological fracture · Non-small cell lung cancer · Bone metastasis

Abstract

Traumatic avulsion fractures of the lesser trochanter are usually seen along with fractures of the proximal femur and with young adolescents involved in high-intensity sporting injuries. Atraumatic isolated lesser trochanter avulsion in adults are most commonly associated with malignancy. We describe a case of a female in her sixties who was previously fit and healthy with no systemic illness and no history of trauma presenting with groin pain. The X-ray demonstrated an isolated lesser trochanter avulsion fracture. Further imaging including MRI and a staging CT scan of the neck, chest, abdomen and pelvis revealed a pulmonary tumour. Biopsy later confirmed this as a non-small cell carcinoma of the lung. At the time of publication, she had been started on palliative chemotherapy (afatinib) with encouraging results.

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Introduction

Spontaneous isolated avulsion fracture of the lesser trochanter is not a common injury in adults [1]. It is usually seen in children and the adolescent age group, especially those who are involved in contact sports and whose growth plate is not fused [2, 3]. Avulsion fracture of the lesser trochanter in young adolescents occurs due to a quick and unexpected strong contraction of the iliopsoas tendon [4]. In the absence of trauma and with a history of groin

Dr. Adam Creissen
Orthopaedic Department
Queen Elizabeth Hospital, Sheriff's Hill
Gateshead NE9 6SX (UK)
adam.creissen@nhs.net

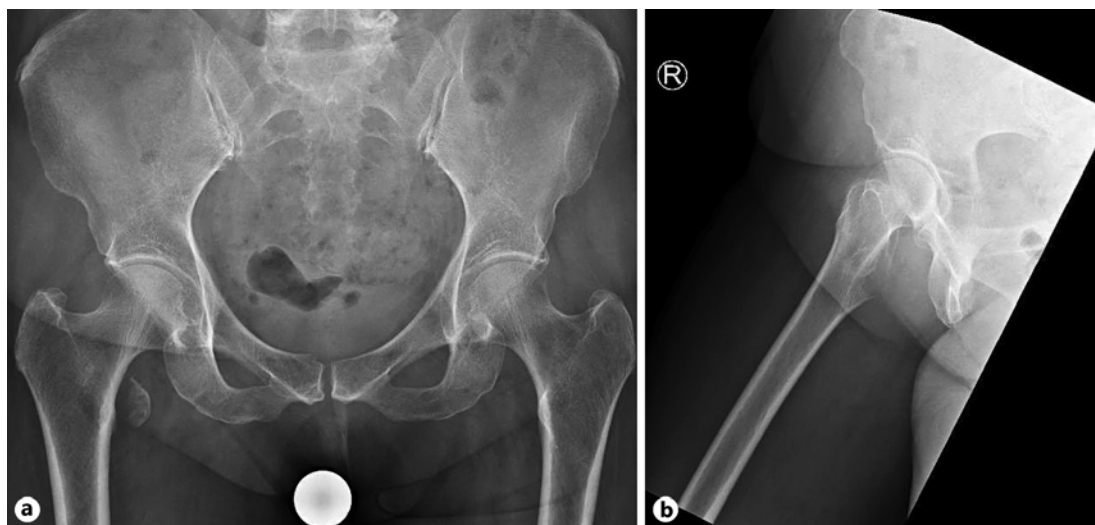


Fig. 1. X-ray of the pelvis and lateral view of the hip showing avulsion fracture of the lesser trochanter.

pain in adults, it is suggestive of a malignant process [5–7]. Before embarking on definitive orthopaedic management, patients should be investigated for a primary source of the tumour [5]. We report a case of a 66-year-old female who presented with sudden onset of groin pain and atraumatic avulsion fracture of the lesser trochanter. Further investigations confirmed a diagnosis of secondary pathological fracture due to metastasis from primary lung carcinoma.

Case Report

A 66-year-old woman presented to a walk-in centre with a 1-week history of right medial thigh and groin pain. She denied trauma or a fall describing a “popping” sensation and sharp pain in her left groin as she sat. She had noted extensive bruising to the supero-medial right thigh and groin area and had had considerable pain on mobilising since the incident. Her medical history was unremarkable. She was a life-long non-smoker and drank alcohol only occasionally. She reported to feel fit and well, fully independent in her day-to-day activities. She had noted no recent weight loss, night sweats or other systemic features of illness.

On review, bruising now fading to yellow was noted in the right groin with particular tenderness on palpation of this area; no obvious other deformity was seen in the lower legs. The range of movement of the right hip was reduced, with pain and guarding on passive hip flexion. The patient was walking with a slightly antalgic gait, although getting most pain when trying to stand from a low chair or seated position. Examinations of all other systems including the respiratory system were unremarkable; no lymphadenopathy was identified.

X-rays were taken of the pelvis, which demonstrated an avulsion fracture of the right lesser trochanter (Fig. 1). This was noted to be pathognomonic of a metastatic cancer; therefore, urgent MRI and computed tomography (CT) scan of the chest, abdomen, and pelvis were requested. The patient was admitted to ensure the timely manner of the scans, and made non-weight bearing with crutches and prescribed analgesia (paracetamol, codeine phosphate, and liquid morphine sulphate). Blood demonstrated raised liver enzymes: ALP (340 U/L), GGT (368 U/L), and ALT (97 IU/L). Serum-adjusted calcium was also raised (2.72 mmol/L). All other blood markers were normal.

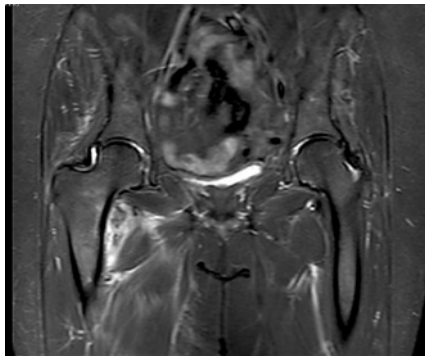


Fig. 2. Coronal MRI STIR images of the pelvis showing infiltrative marrow metastasis.

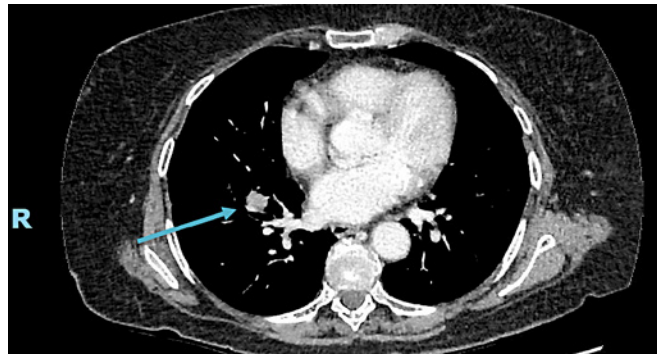


Fig. 3. CT scan of the chest showing a small tumour mass in the right lower lobe.

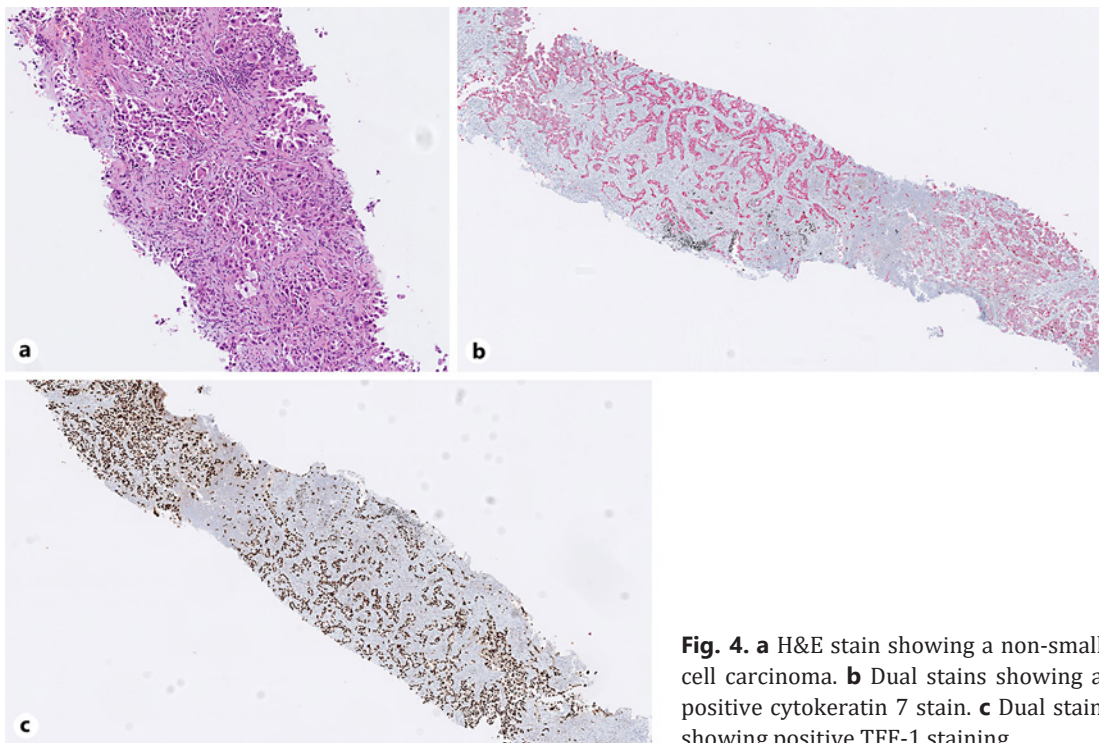


Fig. 4. **a** H&E stain showing a non-small cell carcinoma. **b** Dual stains showing a positive cytokeratin 7 stain. **c** Dual stain showing positive TTF-1 staining.

MRI demonstrated an irregular low T1 marrow signal in the right femur at the avulsion site in keeping with an infiltrative marrow metastasis (Fig. 2). CT scan of the chest demonstrated a T1c small right lower lobe mass, right lower paratracheal adenopathy and several prominent nodes in the mediastinum and left supraclavicular area (Fig. 3).

The patient was then referred to the respiratory team and ultrasound-guided biopsy of the enlarged left supraclavicular lymph nodes was arranged, which confirmed a non-small cell carcinoma (Fig. 4). Unfortunately, the procedure was complicated by damage to the left subclavian artery. This required urgent intervention at the local specialist centre and was repaired with an endovascular approach. The resulting haematoma took 3 months to resolve.

Final staging of the tumour was a T2a, N3, M1b non-small cell carcinoma; due to metastases, the patient was started on palliative chemotherapy (afatinib). At the time of writing, there had been a good response to this with the latest CT scans demonstrating a marked reduction in the tumour bulk.

Discussion

Avulsion fractures of the lesser trochanter are an unusual presentation. In younger adults, the cause is almost always from high-intensity sport [1–3]. In older people, such a presentation necessitates investigation for malignancy, the proximal portion of the femur being a common site for metastases [5–8]. Isolated avulsion of the lesser trochanter is rare in the absence of pathology in adults [4].

Bertin et al. [9], in 1984, first reported a series of 36 cases of lesser trochanter fracture; 4 cases were due to secondary metastasis, the primary from the thyroid, pancreas, prostate and adenocarcinoma of unknown origin. Later, Khoury et al. [10] reported a case series where, similarly to the case we present, lesser trochanter fracture was the first indication of malignancy with no pre-existing symptoms. Primary neoplasm of the bone causing avulsion of the lesser trochanter was described by Afra et al. [11] in their report of a case series of 4 primary bone tumours (chondrosarcoma, Ewing's sarcoma and solitary plasmacytoma).

MRI scan is the investigation of choice as it is able to delineate the extension of the tumour to the soft tissues and also give us a guideline regarding the margin of excision of the tumour if needed [7]. Our patient also had an MRI scan which demonstrated marrow oedema and a low signal in the femur at the site of the avulsion, suggesting a malignancy process. Bone scan can also be utilised to identify other sites of metastases [11, 12]. The staging of the tumour is done by CT scan of the chest, abdomen and pelvis. It also helps us to find the source of the primary tumour and to plan treatment options [13]. Our patient had a staging CT scan of the chest, abdomen and pelvis, which revealed the pulmonary tumour. Core biopsy of the lesion of the proximal femur can be done to find the type of tumour [13]. However, in our patient, an ultrasound-guided biopsy of the supra-ventricular lymph node was carried out, providing a diagnosis of non-small cell carcinoma of the lung.

The treatment of these cases depends on the type and stage of the primary tumour. Mirel [14] has set out the criteria and guidelines for prophylactic fixation of metastatic bone tumours depending on the pain, type of lesion, part and extent of the bone involved. The review article by Haentjens et al. [15] recommended that prophylactic surgery should be considered in patients with persisting or increasing local pain despite the completion of radiation therapy, a solitary well-defined lytic lesion greater than 2.5 cm or a solitary well-defined lytic lesion circumferentially involving more than 50% of the cortex and metastatic involvement of the proximal femur associated with a fracture of the lesser trochanter. Rouvillain et al. [6] reconstructed the proximal femur using a tumour endoprosthesis for a solitary isolated secondary metastasis of the lesser trochanter. Our patient did not have any surgical stabilisation as the MRI scan demonstrated the avulsion to be isolated with no propagation of the fracture line in the proximal cortex of the femur.

The most common primary tumours that metastasise to the bones are from the breast, prostate, kidney and the lung. In breast cancer, the bone is the first site to be involved in 50% of the cases [16] and common sites are the spine and proximal femur [17]. In 30% of the patients, skeletal metastasis is the first presentation of malignancy [18].

Conclusions

Groin and upper thigh pain in adults without a definitive history of trauma and radiological features suggesting an isolated lesser trochanteric avulsion should raise the suspicion of an infiltrative malignant pathology. MRI scans should be performed to confirm the diagnosis as well as to identify the presence of propagated fracture lines into the trochanteric and subtrochanteric region. A staging CT scan of the chest, abdomen and pelvis is mandatory to find the source of the primary tumour and establish the appropriate treatment protocol for the patient.

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Statement of Ethics

Authors obtained written informed consent from the patient for the publication of the case and accompanying images.

Disclosure Statement

The authors have no conflicts of interest to declare.

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Author Contributions

A.C. identified the case, sought consent from the patient, wrote and edited the manuscript. A.R. wrote and edited the manuscript. K.J. prepared the histology slides and diagnosed the pathological condition. P.B. wrote the discussion section and edited the manuscript.

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