

## Is a Sub-Capital Fracture in an Arthritic Hip Evidence of Underlying Infection?

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### Introduction

It is widely accepted that fractures of the femoral neck in patients with osteoarthritis (OA) of the hips are associated with an extra-capsular, inter-trochanteric type fracture pattern [1-3]. Intra-capsular fractures in these circumstances are unusual. This case report looks at a patient with septic arthritis of the hip presenting with an intra-capsular fracture of the femoral neck in an apparently osteoarthritic hip.

### Case Report

An 88-year-old woman was admitted to hospital under the general physicians with a history of increasing confusion and decreased mobility. She was known to suffer with mild dementia and lived in a warden controlled flat. She was found at home by her daughter, unable to stand or walk and the patient denied having fallen. She was acutely confused and was initially seen by her general practitioner who diagnosed an urinary tract infection (UTI) and started Trimethoprim 200 mg twice daily (bd) and referred for admission to hospital.

On admission a history of recurrent UTIs, and atrial fibrillation was noted but no history of previous hip problems. She was on Digoxin and Aspirin. She was a non-smoker and non-drinker.

On examination, she was confused with a Glasgow coma scale score was 14/15. She had a temperature of 38° Celsius and she was mildly tachycardic. Her chest was clear and oxygen saturations were recorded as 98% on air. The Boehringer Mannheim (BM) test recorded a blood sugar of 7.3 mmol/L.

Abdominal examination revealed slight distension, it was soft to palpation and bowel sounds were documented as “normal”. There was tenderness on palpation of the right groin, and with passive movements of the right hip. There was no shortening or external rotation of the right lower limb.

Full blood count (FBC) showed a white cell count (WCC) of  $16.1 \times 10^9 \text{ L}^{-1}$  with a neutrophil count of  $12.8 \times 10^9 \text{ L}^{-1}$ . Urea and electrolytes were normal, and serum glucose was  $9.7 \text{ mmol L}^{-1}$ . Urine dipstick were positive for nitrites and increased white blood cells confirming the diagnosis of a UTI. A chest radiograph showed no abnormalities and the abdominal radiograph showed faecal loading. An antero-posterior radiographic view of the pelvis showed gross osteoarthritis of the right hip, but no fracture (Figure 1).

The patient was treated for a UTI and referred to the physiotherapists for mobilisation. Thirteen days following admission, the patient developed a left upper respiratory tract infection (URTI) and melaena. The URTI was treated with a combination of Augmentin and Clarythromicin. An oesophagoscopy was booked to investigate the intestinal bleeding. Repeat FBC showed a haemoglobin count of  $10.0 \text{ g/dL}^{-1}$ , WCC  $14.7 \times 10^9 \text{ L}^{-1}$  with a neutrophil count of  $12.7 \times 10^9 \text{ L}^{-1}$ . Two units of packed red blood cells were given.

Repeat radiographs of the right hip were taken (Figure 2).

These radiographs were reported by one of the hospital’s consultant

radiologists, and were found to show “severe OA of the right hip, but no fracture”. A Doppler ultrasound excluded a deep vein thrombosis. At 22 days following admission, the physicians reported that her left URTI was much improved.

The patient had a fall on the 26<sup>th</sup> day following admission. On examination the right leg was shortened and externally rotated. A third right hip radiograph showed a displaced fracture of the femoral neck (Garden type IV) (Figure 3).

The patient was referred to the orthopaedic team who made the decision that due to appearances suggestive of severe OA of the hip joint, a total hip replacement (THR) was indicated. A pre-operative



**Figure 1:** A-P radiograph of the pelvis taken on admission. OA changes were noted.



**Figure 2:** A-P radiograph of the right hip taken after 13 days of admission. This was reported as ‘Severe OA changes’.

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**Figure 3:** A-P radiograph of the right hip. An intracapsular femoral neck fracture is seen.

FBC showed a WCC  $17.8 \times 10^9 L^{-1}$ . The patient was taken to the operating theatre two days post fracture. On exposing the hip, pus was found in and around the hip joint and the femoral head was found to be grossly abnormal and partly destroyed. At this stage the plan to perform a THR was abandoned. Pus samples were taken and a Girdlestone excision arthroplasty and thorough washout was performed instead. Two deep drains were inserted and the wound was closed. The patient was initially started on intravenous (IV) Cefuroxime and put on skin traction. Pus cultures grew *Staphylococcus aureus* sensitive to Flucloxacillin and Fucidin. The antibiotic regime was subsequently changed to intravenous Flucloxacillin and Fucidin.

## Discussion

It is well accepted that a fracture of the femoral neck associated with an osteoarthritic hip usually follow an extra-capsular, intertrochanteric type configuration [1-3]. In a retrospective study Wand et al., looking at radiographs of a cross-section of 300 hip fracture patients and 300 age and sex matched controls, showed that osteoarthritis was associated with a low incidence of intracapsular fractures [4]. A study of 440 consecutive patients with hip fractures confirmed that the presence of OA was most likely to produce a fracture in the trochanteric region [5]. Jordan et al. showed that osteoarthritis offered protection against sub-capital fractures [6,7]. Their study showed that the percentage area of cancellous bone doubled throughout the femoral neck cross section in the presence of osteoarthritis when compared to control samples matched for age and gender. It also showed evidence suggesting that increased cancellous bone was related to an increase in bone formation in this circumstance. Finally, it showed that lacunar density was decreased in cancellous bone in OA patients compared to the control sample, and there was a significant inverse relationship between osteocyte lacunar density and percentage cancellous area. This means there is an expansion of wall width of the cancellous bone in OA. And since cancellous bone buttresses and stiffens the cortex, it reduces the risk of buckling therefore explaining in part the ability of patients with OA to resist the intracapsular fracture of the femoral neck during a fall [8].

The initial radiographic appearance in our patient was suggestive of osteoarthritis with narrowing of the joint space, subchondral cysts and subchondral sclerosis. However, with the subsequent findings intra-operatively, the initial radiographs were re-evaluated by the same consultant radiologist that had reviewed them previously. He concluded that his initial diagnosis of osteoarthritis was indeed correct, but there was also early evidence of sepsis in the hip joint including periosteal reactions around the acetabular rim and the femoral neck.

The presence of an intracapsular fracture in an osteoarthritic hip with a concomitant history of infection elsewhere, and raised inflammatory markers should have alerted us to the possibility of sepsis within the hip. Talbot et al. reported a pathological fracture of the hip following intracapsular spread of a psoas abscess [8]. Their case also involved a patient with radiographic osteoarthritis developing a subcapital fracture. It was felt that the OA might have offered reduced resistance to the spread of infection into the femoral neck. Lombardi et al. reported a case of an intracapsular fracture, complicating fixation of an intertrochanteric fracture [9]. Histological examination showed evidence of ischaemic necrosis at the fracture site. As the patient had none of the risk factors associated with failure of sliding screw plate fixation, these authors concluded that the chronic osteomyelitis and consequent ischemic necrosis were responsible for the fracture.

In our case, underlying septic arthritis was present. Although the elevated inflammatory markers were attributed to an underlying UTI, in fact, this may well have been in part or wholly due to the sepsis within the hip joint. The sepsis may have led to weakening of the femoral neck leading to fracture and also confused the radiographic appearances.

## Conclusion

An intracapsular fracture of the femoral neck in the presence of osteoarthritis of the hip should alert the clinician to the possibility of an underlying infection especially when other signs of infection are present. An aspiration of the joint and culture should be considered as the first line of surgical treatment before definitive management is undertaken.

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