

Missed hip fractures

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SUMMARY

From a series of 825 consecutive admissions with a hip fracture there were 16 cases in which the diagnosis was not made when the patient was initially seen in hospital. The reason for the delay in diagnosis was failure to correctly interpret X-rays in 10 cases and failure to X-ray the hip in three cases. The fracture was radiologically invisible in only three patients. Fifteen of the fractures were initially undisplaced, but as a consequence of the delay in diagnosis displacement occurred in 75% of subcapital fractures and all extracapsular fractures.

INTRODUCTION

Determination of the correct diagnosis of a proximal femoral fracture may not occur when the patient initially presents with pain in the hip. Eastwood (1987) found delayed diagnosis occurred in 33 out of 374 patients (9%). In 13 of these patients the patient did not present to hospital immediately, whilst in the remaining 20 patients the doctor failed to make the correct diagnosis.

As part of a prospective study into the treatment and outcome of hip fractures, the details of those patients in whom the diagnosis of a hip fracture was not made at initial presentation to hospital was noted. The cause for the delay and the resultant consequences are summarized here.

PATIENTS AND METHODS

A 'missed fracture' was defined as being any patient in which the diagnosis was not made when initially seen in hospital by a medical practitioner. Sixteen patients out of 825 consecutive admissions for a hip fracture fulfilled this criteria. The initial notes, X-rays and details of subsequent treatment were reviewed for all these patients.

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RESULTS

At presentation X-rays of the hip were taken for 13 of the 16 patients and in all cases they were initially interpreted as normal. Eight of the fractures subsequently diagnosed were intracapsular and eight were extracapsular.

Intracapsular fractures

The average age of these eight patients was 73 years (range 36–91). Half the patients were male. X-rays of the hip were taken in six cases, in one patient who presented with pain in the knee, films of this area only were obtained and in one case no X-rays were taken. Four patients were seen only by the casualty Senior House Officer (SHO), two were seen by an orthopaedic SHO also, and one by an orthopaedic registrar. One patient was admitted directly to a geriatric ward and was not assessed in a casualty department. Of those seen in casualty, five were allowed home and two were transferred to a geriatric ward.

As a general rule all X-rays taken in casualty are reported by a radiologist. However, for two cases this did not occur as the patients had been admitted to a geriatric ward in another hospital. For the patient only admitted directly to the geriatric ward an Anteroposterior (AP) film of the pelvis was taken with no lateral view, the report read 'slightly suspicious of a fracture', however, no further action was taken. In one case a fracture was reported and the patient recalled immediately and in the other two cases the X-rays were reported as normal. A review of the original X-rays for all these patients showed that a fracture was visible in all cases although in two instances the changes were minimal. All fractures were of the impacted type (Garden grade 1 or abduction fracture) as illustrated in Fig. 1. and can be compared with a normal hip X-ray (Fig. 2).

The time interval between the initial injury and establishment of the diagnosis was 2–34 days (average 16 days). At the time of final diagnosis the fracture had become displaced in six cases, whilst in the other patients the fracture remained undisplaced. Four of the patient were treated with replacement of the femoral head by an arthroplasty, three by internal fixation and one was treated conservatively.

Extracapsular fractures

Eight patients were later diagnosed as having an extracapsular fracture. The average age of the patients was 76 years (range 63–89), seven were female. All patients were initially seen by a Casualty SHO, two were also seen by an Orthopaedic SHO and one by an Orthopaedic Consultant.

X-rays were taken in seven cases and all initially interpreted as normal. In five of these cases the films were reported as normal and in two the films were not reported, as one patient was transferred to another hospital and the other patient re-attended the same day with a displaced fracture before the films were reported. A review of all the films showed the fracture was visible in four cases although in two cases the films were of poor quality obscuring details of the fracture, for the other three cases no fracture was visible even with knowledge of the site of the fracture.

The average time from injury to final establishment of the diagnosis was seven

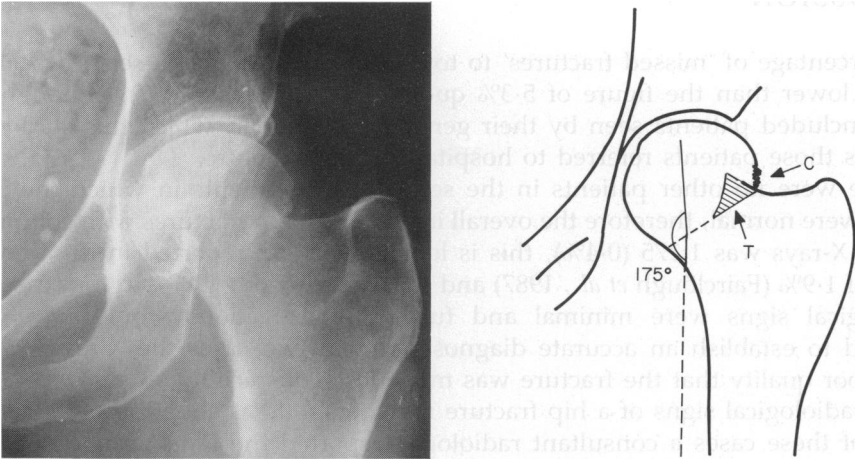


Fig. 1. Impacted subcapital hip fracture, showing the increase in trabeculae angle to 175° with a break in the trabeculae at the site of the fracture. In addition there is loss of the concave contour in the lateral part of the neck of the femur (C) and a triangular area of impacted bone (T). - - - - = line of fracture.

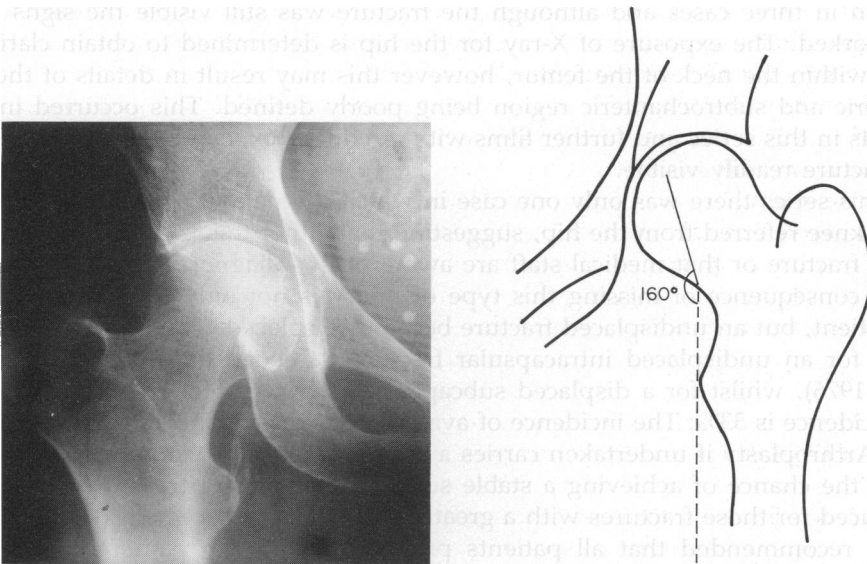


Fig. 2. Normal hip X-ray, showing normal trabeculae angle of 160°.

days (range 1–17 days). All but one of the fractures were undisplaced when initially X-rayed, whereas at the time of diagnosis all fractures were displaced. Four fractures were trochanteric, three subtrochanteric and one basal.

All patients were treated by surgical fixation of the fracture.

DISCUSSION

The percentage of 'missed fractures' to total hip fractures in this series was 1.9%. This is lower than the figure of 5.3% quoted by Eastwood (1987), although that series included patients seen by their general practitioner, whilst this study only includes those patients referred to hospital for assessment.

There were no other patients in the series of 825 patients in which the initial X-rays were normal, therefore the overall incidence of hip fractures with completely normal X-rays was 1:275 (0.4%), this is lower than that reported in the previous series of 1.9% (Fairclough *et al.*, 1987) and 1.3% (Eastwood, 1987). In four cases the radiological signs were minimal and further investigations would have been required to establish an accurate diagnosis and in two cases the X-rays were of such poor quality that the fracture was made less conspicuous.

The radiological signs of a hip fracture may be subtle as shown by the fact that in six of these cases a consultant radiologist reported the films as normal. Interpretation of possible abnormalities in the neck of the femur may be made more difficult if the AP view of the hip is taken with the leg in external rotation, as the greater trochanter obscures part of the femoral neck. Rotating the leg into 10° of internal rotation will bring the neck parallel to the X-ray plate. For the patients within this series with subcapital fractures the AP X-ray was taken in external rotation in three cases and although the fracture was still visible the signs were less marked. The exposure of X-ray for the hip is determined to obtain clarity of detail within the neck of the femur, however this may result in details of the trochanteric and subtrochanteric region being poorly defined. This occurred in two patients in this series and further films with a reduced exposure would have made the fracture readily visible.

In this series there was only one case in which the patient presented with pain in the knee referred from the hip, suggesting that either this is a rare presentation of hip fracture or that medical staff are aware of this diagnostic pitfall.

The consequence of missing this type of injury is not only continued pain for the patient, but an undisplaced fracture becomes displaced. The incidence of non-union for an undisplaced intracapsular fracture has been quoted at 1% (Barnes *et al.*, 1976), whilst for a displaced subcapital fracture treated by internal fixation the incidence is 33%. The incidence of avascular necrosis is increased from 16% to 28%. Arthroplasty if undertaken carries a greater morbidity than internal fixation, whilst the chance of achieving a stable surgical fixation of a trochanteric fracture is reduced for those fractures with a greater degree of displacement (Jensen 1980).

It is recommended that all patients presenting with hip pain receive careful assessment particularly with regard to interpretation of X-rays. The patient with a hip fracture whose initial X-ray is entirely normal is rare, however, if careful review of the films and clinical examination reveals the patient is unable to bear weight on the affected leg, consideration should be given to admitting the patient for further investigation. Patients who are transferred to other hospitals require their X-ray to be reported on arrival.

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