

Lateral Radiograph of the Hip in Fracture Neck of Femur: Is it a Ritual?

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Abstract

Introduction: Historically routine work up of a patient with a fracture neck of femur has always included an antero-posterior (AP) and a lateral view of the hip. The aim of the study was to know whether a lateral view of hip influenced the decision of an Orthopedic Surgeon regarding management at a District General Hospital.

Methods: A prospective study was conducted from February 2005 to September 2005 at Tameside General Hospital. X-rays of patients admitted with fracture neck of femur were shown to two independent observers in the daily trauma meeting. AP view of the hip was shown initially to observers and their classification and intended treatment was recorded. They were asked if they needed a lateral view to decide on management option and answers were recorded. The observers were then showed a lateral view of same hip and asked to comment on quality of film and also whether it would change their classification or intended management.

Results: There were 100 patients over six months. On AP view 56 were classified to have extra-capsular fracture, 37 were classified as displaced subcapital fracture and seven were classified undisplaced subcapital fracture. There was an interobserver variation in one patient between undisplaced or displaced subcapital fracture. The observers felt they would need a lateral X-ray on three occasions and there was a change in classification from undisplaced subcapital to displaced subcapital fracture on first occasion. There was no change in management plan in all the 100 patients after looking at a lateral X-ray.

Conclusion: We can conclude that unless required for management a lateral X-ray of hip should be avoided

routinely in all patients with fracture neck of femur as it would not only be cost effective but will also reduce radiation exposure to patient and relieve work pressure on radiographers, nursing and portering staff.

Key Words

Orthopedic trauma · Fractures of the proximal femur · Fractures

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Introduction

Acute femoral neck fractures are one of the commonest trauma admissions from the emergency department and accounts to about 86,000 cases per year in the UK representing a major component on health care costs [1]. Early diagnosis and appropriate management significantly decreases the morbidity and mortality of the patients [2–6]. Majority of these fractures are relatively easily diagnosed based on clinical findings and plain radiographs, although some studies quote up to 4.4% of them are occult fractures having negative initial radiographs [7]. Traditionally, plain radiographs in clinically suspected hip fractures have included both antero-posterior view (AP) and lateral views (LAT) of the injured hip. An AP view of the hip/pelvis is the standard film employed in the most widely accepted Garden's classification of the fracture. It also helps to delineate the fracture line and obliquity, the quality of the bone and the femoral head. The lateral views are useful to assess the degree of posterior comminution in these fractures. However, pre-opera-

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tive lateral views in routine cases have not found to have a significant impact on the diagnosis or further management of the fractures. There has been no literature commenting on the usefulness of lateral views in diagnosing occult fractures, i.e. negative AP radiographs in suspected fracture neck of femur. This prospective study was undertaken to assess the need of routine lateral views of the injured hip in clinically suspected cases of fragility fractures of the hip and its significance in diagnosis and further management of the fracture.

Materials and Methods

One hundred consecutive cases of isolated fracture neck of femur admitted to Orthopedic department during the period of February 2005–September 2005 were included in the study. We excluded cases which could have pathological fractures and also polytrauma cases. Only isolated fracture neck of femur cases were included in the study. Two trauma and orthopedic consultants were named as observers (observer 1 and observer 2) for the purposes of this study. All clinically suspected hip fractures underwent routine AP and lateral views of the affected hip. During the pre-operative trauma meeting, the observers were initially shown only the AP views of the pelvis independently and the comments based on (a) fracture classification (b) intended further treatment and (c) whether there was a need for lateral view for diagnosis or further management of the fracture. The fractures were classified into one of the three categories, i.e. undisplaced intra-capsular, displaced intra-capsular or extra-capsular fractures. The intended treatment was recorded as either hemiarthroplasty or internal fixation. The findings of both observers were documented separately. Later, the observers were shown the lateral views of the hip of the same patient and the comments based on (a) any change in classification from AP views (b) any change in the intended treatment from AP views and (c) quality of the lateral films were recorded independently. The lateral radiographs were classified as either poor or good quality films based on the exposure, adequacy and clarity of the film. The observers' findings for each patient were recorded as shown in Tables 1 and 2.

Results

Sixty-five percent of the patients were female with the age ranging from 52 to 92 years (mean 81 years), 56 out of 100 clinically suspected cases (56%) were extra-

Table 1. Findings based on AP views only.

| | Observer 1 | Observer 2 |
|-----------------------------|------------|------------|
| Classification of fracture | | |
| Intended management | | |
| Need for lateral radiograph | | |

Table 2. Findings after viewing lateral radiographs.

| | Observer 1 | Observer 2 |
|--|------------|------------|
| Any change in classification of fracture | | |
| Any change in intended management | | |
| Need for lateral radiograph | | |

Table 3. Results.

| | Observer 1 | Observer 2 |
|---------------------------------------|------------|------------|
| Need for lateral views | 3* | 3* |
| Change in the fracture classification | 1 | 2 |
| Change in the intended management | 0 | 0 |
| Poor quality lateral films | 64 | 66 |

Total number of cases = 100

* Observers 1 and 2 required lateral films in the same three cases out of 100

capsular fractures; 37 out of the 44 cases were displaced intracapsular fractures (37%) and the rest 7% of the patients had sustained undisplaced intracapsular fractures. Interestingly, there were no cases of occult fractures which needed further imaging (MR Scan) during the study period.

There was no inter-observer variation in the initial classification or intended treatment of the fracture based on AP radiographs. Observer 1 felt the need for the lateral films in three out of 100 cases (3%) to confirm the diagnosis. Observer 2 felt the need in the same three out of 100 cases for confirmation of the diagnosis. Although the fracture line was clearly seen on the AP views in these three cases, lateral views were necessary to assess the displacement in intracapsular fractures. After viewing the lateral radiographs, observer 1 noted a change in the AP classification from undisplaced intracapsular fracture to a displaced intracapsular fracture although the intended treatment of hemiarthroplasty did not change considering patient's age and co-morbidity. Observer 2, following visualization of lateral radiographs noted change in classification in two cases from undisplaced to a displaced intra capsular fracture. The intended treatment did not change for similar reasons of patient factors. There was an inter observer variation in the classifi-

cation of only 1 case where observer 1 considered the fracture was undisplaced intracapsular and observer 2 considered the fracture as displaced intracapsular fracture after viewing the lateral films, although there was no inter observer variation in the fracture treatment. Both observers agreed on one other case in which the classification changed to displaced intracapsular fracture following lateral radiograph visualization. Majority of the lateral radiographs were termed as poor quality films by both observer 1 (64%) and observer 2 (66%) with an inter-observer variation in only two cases. The inter-observer and the intra-observer variation was found to be insignificant with almost perfect degree of agreement beyond chance. In summary, the need for lateral views existed in just 3% of all the clinically suspected fracture femoral necks and the lateral radiographs did not influence the diagnosis or further treatment of the fracture. No fractures were identified in the lateral films that were not visualized on the AP radiographs. Also, nearly two-thirds of the lateral radiographs were poor making interpretation more difficult.

Discussion

The addition of lateral radiograph improves the reader ability to determine the displacement of the fracture [8]. As evident from our study the lateral radiographs did improve the ability to diagnose displaced fractures in a very small number of cases, but did not have a significant impact on the intended treatment.

In cases of displaced intracapsular fractures in the elderly especially where hemiarthroplasty is the best option, AP views demonstrate the fracture configuration clearly enough to decide the further management of the fracture. However, in some cases of undisplaced fractures or a displaced fracture in the relatively younger population where osteosynthesis is a better option, lateral views may provide the benefit of evaluating the fracture displacement and pattern to enable a better pre-operative planning of the type of fixation.

In cases of extracapsular fractures, we believe that in a large percentage of cases, the fracture pattern is clearly evident from the AP views to plan reduction and fixation. However, we do not dispute the fact that in some cases, lateral view provides the added advantage of evaluating the posterior comminution. We do advocate the need for lateral views in such minority of cases.

Although the reported incidence of occult fracture neck of femurs is about 1.6–4.4% [7, 9], incidentally we did not encounter any such case during this period.

However, we believe that a lateral film is a must in cases where fracture is not evident in AP films in cases of clinically suspected fracture neck of femur before proceeding to magnetic resonance imaging, which is still the gold standard [10].

Since the introduction of X-rays into medicine in 1895 the overall effect of X-rays has been to improve health care, but a balance has to be struck between their contribution to better management, which may be life saving and their dangers [11]. Each year around £600 million is spent on imaging in the UK and it accounts for over 90% of radiation exposure to the population of the UK [11]. Each hip X-ray subjects the patient to a radiation dose of approximately 30 times that of a standard chest X-ray and a lateral X-ray of the hip exposes the patient to a radiation of approximately 2.5 times that of an AP view.

Secondly, it was estimated that a single lateral radiograph at our district general hospital would approximately cost £5 per film. On an average there would be 200 patients admitted with fracture neck of femur incurring a spend £1,000 per year for the hospital and £430,000 every year for the country.

Thirdly, it would to some extent reduce the work pressure on the radiographers, nursing and portering staff and the stress over waiting times from the accident and emergency department.

Last, but not the least it would lessen the discomfort to the patient as well. Considering all these factors, it would be wise to avoid unnecessary radiation in majority of the cases (97% in our study). We do not disagree with the usefulness of a lateral film in fractures of the hip in certain cases, but disagree with the routine ritualistic lateral radiographs in every case without examination of the AP films.

Conclusion

We strongly suggest that the lateral radiographs in clinically suspected fracture neck of femurs must not be done as a blind ritual in every case and must be reserved for cases where (a) fracture is not clearly evident in AP radiographs and (b) there is a doubt existing in the displacement factor or fracture extension which would enable a better pre-operative planning.

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