

Clinical Triad For Diagnosing Occult Hip Fractures With Normal Radiographs

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Abstract

Study Design: Prospective observational study

Objectives: The critical appraisal of the three clinical signs in the validation of patients with symptoms of hip pain with negative X-rays.

Methods: 30 consecutive patients admitted with hip pain following a fall with no evidence of fracture on hip X-ray underwent MRI scanning. Mean age was 78 (range 67 - 88) years. 12 patients were male and rest were female.

Results: All patients with three positive signs — tenderness in groin area; unable to straight leg raise and painful limitation of rotation of hip movements had MRI scans which showed definite fracture neck of femur. Patients with only one positive sign had normal MRI scans.

Conclusion: The clinical triad of signs had 100% reproducibility and sensitivity in reliably diagnosing hip fractures in patients with normal radiographs.

INTRODUCTION

Elderly patients who present to emergency department with hip pain following trauma have X-rays and if suggestive of femoral neck fractures are treated operatively. Those patients who have no fractures on X-rays are either sent home or referred to care of elderly team for rehabilitation. Patients with persistent pain have MRI scans to rule out femoral neck fractures. In an attempt to improve the specificity of diagnosing of hip fractures clinically we have devised a clinical triad of signs.

CLINICAL TRIAD

1. Inability to straight leg raise
2. Limitation of rotation due to pain
3. Groin tenderness to deep palpation

We have formulated this triad to reliably diagnose hip fractures when X-rays are inconclusive. If all the three signs are positive, then there is a definite fracture. When two signs

are positive, possible diagnosis of neck of femur can be made. This can be confirmed with MRI scan. When only one of the above sign is positive, there is a possibility of hip pathology: arthritis of hip joint, avascular necrosis of the head of femur, synovitis, chondrolysis etc.

METHODS AND MATERIALS

A pilot study was carried out from June 2004 to December 2005 at Wexham Park hospital, UK. 30 consecutive patients admitted with hip pain following a fall after normal X-ray of hip (2 views) were included in this prospective observational study. The radiographs were reported as normal by the radiologists. The patients continued to complain of hip pain and were unable to mobilise and weight bear. They were examined and the clinical triad of signs were recorded in the medical notes by the author (SR). These signs were also demonstrated by another clinician in some of these patients. The patients were investigated further with MRI scans. Those who were shown to have fractures on MRI scan were operated on upon depending on the fracture pattern – intracapsular fractures had cannulated hip screw fixation or

hemiarthroplasty and extracapsular fractures had Dynamic Hip screw fixation. The patients were mobilised postoperatively and subsequently discharged successfully.

RESULTS

Of the 30 consecutive patients reviewed, 12 were male and 18 were female. The mean age was 78 (range 67-88). 14 patients who had all three signs positive showed definite fracture of neck of femur on MRI scans with 100% sensitivity. Out of 10 patients who displayed two signs positive, 7 had fractures on MRI scans giving 70% sensitivity. The 6 patients who had one positive sign showed no fracture on MRI scans. Of these, 5 patients showed osteoarthritic changes and one patient had avascular necrosis of the femoral head.

DISCUSSION

Hip fractures are a common occurrence especially in elderly people following a fall. It is usually easy to reliably diagnose hip fractures with radiographs¹. However, some patients continue to experience hip pain and difficulty in weight bearing despite X-rays having been reported as normal.

In such cases, further imaging in the way of CT scan, bone scan or MRI scan^{2, 3,4,5} may be very useful. Unfortunately, these are expensive and not always available on site and over weekends and patients may have to be referred to tertiary care centres for this imaging. This may delay the diagnosis and hence treatment of femoral neck fractures and cause increased morbidity⁶.

We have devised a set of three clinical signs, which we believe aids in the reliable diagnosis of femoral neck fractures in the clinical setting. Astute clinical examination can minimise inaccurate diagnosis, unnecessary investigations⁷, and even inappropriate surgical intervention.

We feel that by performing these simple clinical tests, clinicians with no easy access to further imaging facilities can reliably diagnose and treat femoral neck fractures. We also feel that these signs should be part of the armamentarium of clinical tests carried out by clinicians not specifically trained in the assessment of hip pain in elderly patients (namely A&E, peripheral clinics and GP clinics).

This clinical triad of signs are a valuable clinical tool with high reproducibility and good sensitivity that enhances clinical diagnostic accuracy and overall clinical efficiency. Further studies need to be carried out to validate these signs.

CONCLUSION

This study details a new diagnostic triad of signs, which is reproducible and sensitive, in patients with continued hip pain after a fall with normal X-rays. We were able to reliably diagnose hip fractures that were subsequently confirmed with MRI scans.

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