

Segmental Fracture of Femoral Neck: a Case Report

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Abstract: Segmental hip fractures are rare. Most of the previously reported cases are combined ipsilateral femoral neck and intertrochanteric fractures. This paper describes an unusual case of segmental femoral neck fracture in a young woman with chronic renal disease successfully managed by closed reduction and fixation with cannulated screws. No clinical or radiological signs of avascular necrosis were observed in the fifteenth month of follow-up.

Key words: Insufficiency; Hip; Ipsilateral; Concomitant; Segmental; Neck of femur; Intracapsular; Transcervical; Femoral neck; Fracture.

INTRODUCTION

Segmental hip fractures are rare. Most of the previously reported cases are combined ipsilateral femoral neck and intertrochanteric fractures (Pemberton *et al*, 1989; Perry and Scott, 2008), while in other cases, ipsilateral head and neck of femur fractures are concomitant particularly following hip dislocation (Pemberton *et al*, 1989). These injuries may be the result of low energy (Pemberton *et al*, 1989; Perry and Scott, 2008; Kumar *et al*, 2001; An *et al*, 1989) or high energy trauma (Loupasis *et al*, 2010). In addition, femoral neck fractures, especially the subcapital types, commonly occur following sliding hip screw fixation (Pemberton *et al*, 1989; Perry and Scott, 2008). However, there was only one case of segmental femoral neck fracture that has been reported in the English literature in 1989 (Pemberton *et al*, 1989). In the present report, another unusual case of pure segmental femoral neck fracture is described.

Case Report:

A 25-year-old woman presented to the emergency room complaining of right hip pain and inability to bear weight after a low energy fall on her side. She is a known case of uncontrolled type 1 Diabetes and chronic renal disease. She denied having any previous history of groin pain or discomfort. Examination of her right lower limb was remarkable for shortening and external rotation. Anteroposterior plain radiographs of the right hip with the limb kept in internal rotation (figure 1) showed an unusual segmental fracture of neck of femur. Computerized tomography (CT) imaging (figure 2 and 3) was done to help delineate accurately the fracture lines and displacement before surgery. CT images revealed two oblique fracture lines. The first line appears in proximity to the subcapital area and it is displaced (Garden class 3), while the second one appears to be in proximity to the basicervical area and it is undisplaced (Garden class 1). On the same day, the patient was taken to the operating room after obtaining an informed consent for closed reduction and fixation after optimizing her medical condition.



Fig. 1: Plain radiograph of the right hip (AP view) with internal rotation of the limb, demonstrates two parallel fracture lines through the neck of the right femur. The proximal fracture looks displaced, while the distal one is undisplaced. No sclerosis seen at fracture edges. The underlying bone quality appears to be good.

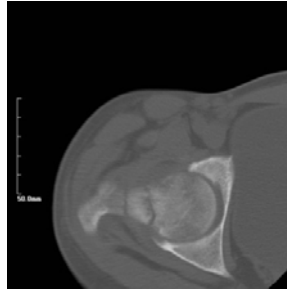


Fig. 2: Axial reformat of right hip C.T. (Computerized tomography) scan.

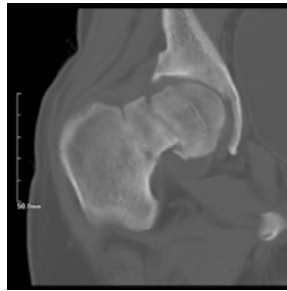


Fig. 3: Coronal reformat of right hip C.T. scan.

Under general anaesthesia, the patient was positioned on fracture table. Gentle closed reduction was successful under image intensifier guidance. Three cannulated screws with washers were inserted in a triangular fashion. Postoperative radiograph showed a satisfactory reduction and fixation (figure 4).



Fig. 4: AP radiograph of the right hip demonstrates postoperative acceptable reduction and good screw fixation.

Postoperatively, the patient was mobilized on axillary crutches with non-weight bearing on the right leg.

After femoral neck fracture has healed, the patient has no hip pain or discomfort. Plain radiographs of the fifteen month follow up (figure 5) showed no signs of avascular necrosis.



Fig. 5: AP radiograph of the right hip demonstrates healed neck fracture. Preserved head contour. No signs of avascular necrosis.

Discussion:

Segmental femoral neck fracture was first described by Pemberton *et al* in a 73-year-old osteoporotic lady who sustained trivial trauma. The fracture involved both subcapital and basicervical regions. Its occurrence was attributed to the presence of stress point in the subcapital region, which becomes evident after any hip trauma and, as a result, basicervical fracture developed (Pemberton *et al.*, 1989; Perry and Scott, 2008; Todd *et al.*, 1972). Furthermore, similar stress points may evolve in young healthy patients with repetitive stresses (e.g. in athletics), in patients with deficient bone (e.g. osteoporosis), or in patients with pathologic bone (e.g. in tumors) (Dorne and Lander, 1985). In the case reported here, renal osteodystrophy, secondary hyperparathyroidism and other metabolic changes associated with the chronic renal disease could explain the presence of insufficiency fracture prior to the injury (Tarr *et al.*, 1988).

In the present case, the fracture lines involved both subcapital and basicervical regions but with more proximal location of the distal line than that in the case reported by Pemberton *et al* (Pemberton *et al.*, 1989). However, the distal fracture line, in the present case, crosses the posterior distal half of the neck which is not covered by the hip capsule (DeLaMora and Gilbert, 2002). Therefore, this case is similar to the one reported by Pemberton *et al* as both combined intracapsular and extracapsular femoral neck fractures were found (Pemberton *et al.*, 1989).

Perry *et al* reported a case of segmental fracture, in an elderly osteoporotic woman caused by a simple fall, in which there were two fracture lines involving subcapital and intertrochanteric regions (Perry and Scott, 2008). However, it is not accurate to label their case as segmental femoral neck fracture because the intertrochanteric area is not a part of the femoral neck.

Although segmental femoral neck fractures are rare, obtaining good radiographs is a must if such injury is suspected to plan the surgical management. (Perry and Scott, 2008; Lawrence and Isaacs, 1993)

In spite of the successful surgical treatment of this case and the great orthopaedic concern of vascularity preservation as the usual femoral neck fractures, there is no standard surgical treatment of such rare fracture pattern.

Conclusion:

Segmental femoral neck fractures are rare. These injuries should be suspected in patients with high risk of insufficiency fractures presented with trivial trauma to the side of the hip. Care should be directed to the proper diagnosis and appropriate treatment of such fractures in order to preserve femoral head vascularity especially in young patients.

Competing Interests:

The author declares that he has no financial or non-financial competing interests in relation to this manuscript.

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