An atypical femoral neck fracture: a management dilemma

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Abstract
Femoral neck fractures are common in the elderly and are broadly grouped into either intracapsular or extracapsular fractures. We report an unusual femoral neck fracture that had features of both and discuss the management of such a case.

Keywords
Femoral neck fracture; intracapsular; extracapsular; sliding screw; hemiarthroplasty.

Introduction
Proximal femoral fractures are generally classified as extracapsular or intracapsular depending on which side of the capsular attachment the fracture lies. This distinction is important for the correct management of these fractures as prosthetic replacement is recommended in elderly patients for a displaced intracapsular fracture of the neck of the femur[1,2]; undisplaced intracapsular and extracapsular femoral neck fractures are usually fixed internally with a compression device. We report an unusual fracture of the neck of the femur that starts within the capsule in the subcapital region superiorly and laterally and ends extracapsularly inferiorly and medially involving the calcar.

Case report
A fit and well 71-year-old woman, who was independently mobile, was admitted following a mechanical fall while out shopping. She complained of left hip and groin pain and on examination was found to have a tender, shortened and externally rotated left lower limb. Anterioposterior pelvic and lateral hip radiographs demonstrated an unusual pattern of fracture involving the intracapsular femoral neck and extracapsular trochanteric region (Figs. 1 and 2). The fracture started superiorly in the subcapital region and extended vertically down to exit in the lesser trochanteric region involving the calcar. The radiology report described this fracture as “an intracapsular fracture which crosses the intertrochanteric line”.

This fracture was treated with a dynamic hip screw (DHS-AO, synthes). Postoperatively, she received routine postoperative care and started full weight bearing on the first postoperative day. She was discharged from hospital without any complications and reviewed at regular 3-monthly

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intervals for 2 years postoperatively. The radiograph at 2 years follow-up (Fig. 3) showed full union of the fracture with no clinical evidence of pain in the hip and the patient recovered to her full pre-fracture activity levels.

Discussion

Although fractures of the neck of the femur can broadly be classified as intracapsular or extracapsular, a fracture like this is difficult to put into any group. Moreover, this fracture type also poses a management problem, whether to treat it with osteosynthesis like an extracapsular fracture or with arthroplasty like an intracapsular fracture.

The main argument in favour of arthroplasty in cases of intracapsular femoral neck fractures is the high incidence of avascular necrosis of the femoral head as the blood supply to it is disrupted in these fractures\cite{1-3}. But in relatively undisplaced fracture like our case, the chances of avascular necrosis are significantly lower compared with displaced fractures\cite{4} and it is reasonable to try and salvage the patient’s femoral head by fixing it rather than replacing it\cite{5}.

Furthermore, prosthetic replacement is associated with problems in such a fracture as it extends beyond the lesser trochanter involving the calcar and will leave a gap on the medial
aspect, after a routine neck cut is made. If the neck cut is made at the lower level of the fracture line, it will remove part of the calcar, resulting in gross shortening, decreased offset and hence, increased chances of dislocation of the prosthetic hip. Therefore, the use of a calcar-bearing hemiarthroplasty is precluded in such a situation and the solutions left are either to do a collarless femoral stem hemiarthroplasty or to fix this fracture internally using a compression device such as DHS/CHS. The use of a collarless stem is not justified in this case as while cementing there will be gap on the medial side after the neck cut has been made through which cement could extrude out and could lead to an unstable prosthesis which might sink within the femoral canal. Also, the use of a collarless stem for a relatively undisplaced femoral neck fracture in a physiologically young patient is unjustified.

On the other hand, the treatment of choice for extracapsular fractures is a compression device (DHS/CHS) as the blood supply is good and the chances of non-union and avascular necrosis are minimal. This allows controlled collapse at the fracture site leading to compression and ultimately, bony union. One might argue that such a device might not work in a vertical fracture (Pauwel type 3) because of high shear stresses and the risk of failure might be high. But, the sliding hip screw by virtue of its fixed neck-shaft angle may minimise shear at the fracture site.

Also, a recent study has not found a high failure rate with internal fixation in these vertical fractures. All these studies were done in intracapsular neck of femur fractures and to our knowledge there are no reports of the treatment of a combined intra-/extracapsular fracture with a compression device (DHS/CHS). Also, the pattern of fracture in our case does lend itself to compression despite being vertical in orientation because the femoral neck changes its orientation from horizontal to semi-vertical as we approach the inferior part of fracture in the lesser trochanter. Thus, instead of producing shear it produces compression of the proximal (neck) fragment against the distal (trochanteric) fragment, thus helping bony union.

We therefore did not replace the femoral head and internally fixed this fracture using a DHS with a view to producing compression at the fracture site to aid healing and accelerate rehabilitation and above all retain the patient’s own femoral head as she was a fit and well and active 71-year-old woman. The results at 2 years show the fracture to be fully united with no signs of avascular necrosis and the patient has no problems with leg length or gait.
Teaching point

The treatment of a fracture of this type does pose management problems and thought must be given to the procedure selected on an individual patient basis.

References