Clinical Case Reports

Open Access

CASE REPORT

A case report of Progressive subluxation leading to an anterior dislocation of the hip following sliding hip screw fixation for pertrochanteric Extracapsular 4 part fracture neck of femur

Jaydeep Shah[1] & Ben A. Marson[2]

[1]Princess of Wales Hospital, ABM University NHS Health Board, UK
[2]Cheltenham General Hospital, UK

Correspondence
Jaydeep Shah, 23, Llwyn Y Groes, Bridgend, Mid Glamorgan CF31 5AJ, UK. Tel: +44 1656 649198; Fax: +01656753964; E- mail: shahjaydeep@hotmail.com

Funding Information
No sources of funding were declared for this study.

Received: 15 January 2015; Revised: 1 April 2015; Accepted: 16 April 2015

Clinical Case Reports **2015; 3(7): 542–547**

doi: 10.1002/ccr3.291

The work was carried out at Princess of Wales Hospital, ABM University Health Board, Bridgend, Mid Glamorgan, UK.

Key Clinical Message

Unstable 4 part pertrochanteric fractures without lateral cortical support presents considerable technical problem in treatment with high risk of failure with any implant. Anatomical or slight valgus reduction and subchondral central position of the lag screw (TAD <25 mm) reduces the chance of screw cut out and other complications.

Keywords

4 part pertrochanteric fracture, Complications, Hip dislocation, Sliding Hip Screw fixation, fracture neck of femur.

Introduction

Hip dislocation following Sliding Hip Screw (SHS) fixation for pertrochanteric extracapsular proximal femur fractures is a very rare complication in absence of infection. Gradual impaction and controlled collapse at the fracture site occurs after SHS fixation which allows the fracture to stabilize during the postoperative period [1].The most important surgical principle is to ensure adequate fracture reduction. The reduction of the fracture to a slight degree of valgus offers mechanical advantage in creating stability and significantly reduces the chance of fixation failure [1, 2]. The optimal position of the SHS lag screw should be central/inferior on the Anterioposterior radiograph and central on lateral radiograph with an aim of Tip Apex Distance (TAD) of less than 25 mm to prevent cut out of the implant [3]. There is a high risk of fixation failure in comminuted, unstable pertrochanteric proximal femoral fractures where the lateral support is fractured at the site of lag screw insertion due to excessive medial displacement of the femur. Despite this technical complexity, fixation of these unstable pertrochanteric proximal femoral fractures with SHS remains a popular choice in the United Kingdom and internationally, with evidence from the Cochrane Database supporting the selection of SHS in favor of intramedullary devices [4].

Dislocation of the hip following SHS fixation has been described in fewer than five cases. Melton, Yates, and Middleton describe two cases of atraumatic posterior dislocation in patients with deficient abductors. Both dislocations occurred between 21–27 days postoperation and both eventually required Girdlestone excision arthroplasty [5]. Munjal and Krikler also described hip dislocation with an avulsion of the anterior capsule from the trochanteric line 14 days following SHS fixation which was managed successfully with an open reduction and soft tissue repair. [6]. Anterior, atraumatic dislocation of the hip following SHS fixation has not been described previously.

This report details such a case, as well as the management strategy applied.

Case History

A 78-year-old female patient was admitted with displaced 4 part pertrochanteric fracture (AO 31-A2) in December 2010 (Fig. 1). Her comorbidities included dementia and previous cardiac arrest in the month of April in the same year. She underwent SHS fixation within 48 h (Figs. 2 and 3). As per the local rehabilitation protocol, the patient was permitted to mobilize full weight bearing following fixation. However, the patient had poor mobility prior to the fall because of her comorbidities and continued to have poor mobility postoperatively. The operative wound healed primarily. Her hip radiographs were repeated at 2 weeks postoperatively and it showed SHS fixation in situ with impaction at the fracture site, which normally occurs following such dynamic implant fixation. In addition, the X-ray images showed migration of the femoral shaft proximally and medially (Figs. 4 and 5).

She continued to have poor mobility and therefore the radiographs were repeated at the 6 week postoperative review. This demonstrated lateral subluxation of the hip joint (Figs. 6 and 7). The radiographs also showed evidence of callus formation suggestive of fracture healing. There was no evidence of infection at the operative site and her inflammatory markers were within normal limits. Serial radiographs over the next 6 months showed progressive hip joint subluxation and at the 6 month review the hip joint had dislocated anteriorly and laterally

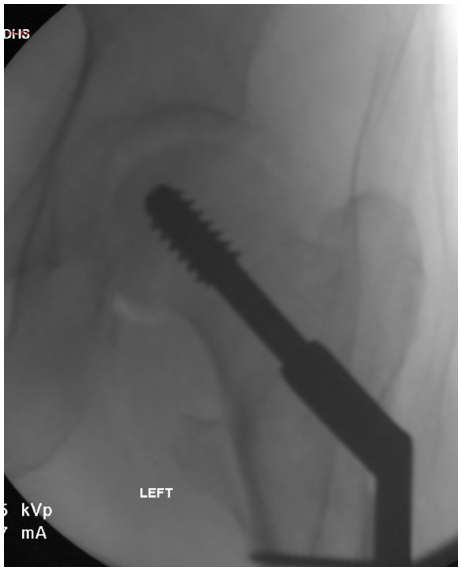

Figure 2. Intraoperative image of SHS lag screw position on AP view.

(Figs. 8 and 9). This was further visualized on CT scan, which also demonstrated a mal union of the initial fracture (Figs. 10 and 11).

Hip aspiration showed clear fluid and did not grow any organisms on extended enriched culture. The serial inflammatory markers including C-reactive protein (CRP) and White Blood cell (WBC) count were normal over 6 months with highest CRP result being 19 at 7 months postoperative period. She underwent revision surgery with calcar bearing uncemented total hip replacement (Figs. 12

Figure 1. 4 part Pertrochanteric Extra-articular fracture neck of femur.

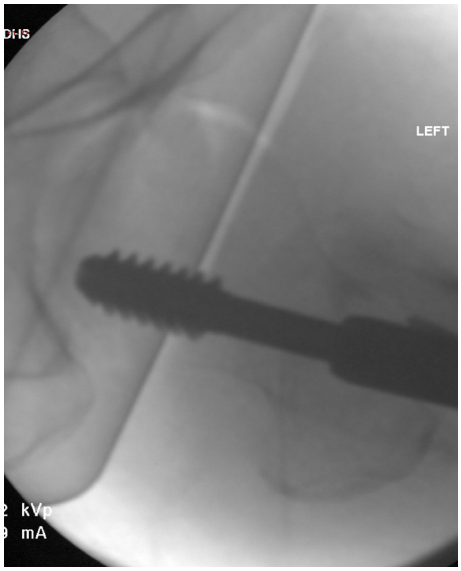

Figure 3. Intraoperative image of poor fracture reduction and posterior lag screw position.

Figure 4. Postoperative position of the SHS lag screw and fracture reduction.

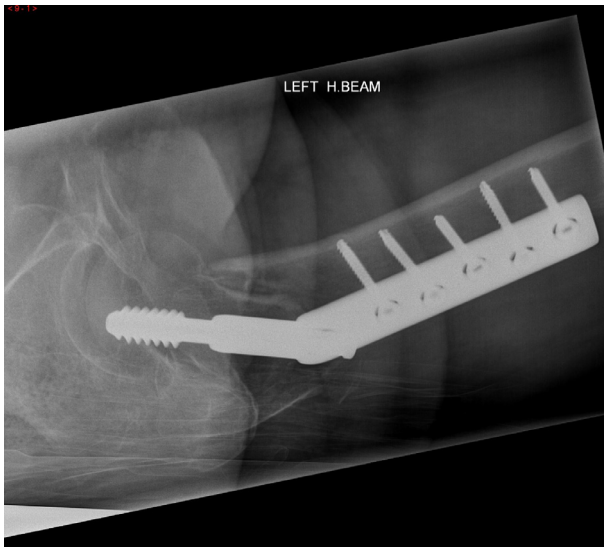

Figure 5. Proximal and Anterior migration of the femur shaft and collapse at the fracture site at 2 weeks postop. period.

and 13). Intraoperatively; the surgeon noted a malunited fracture with excessive anteversion of the femoral neck.

Outcome and Follow-Up

The patient underwent revision surgery with calcar bearing uncemented hip replacement 7 months after the index operation. Following revision the patient was discharged

Figure 6. Lateral subluxation of the hip at 6 weeks.

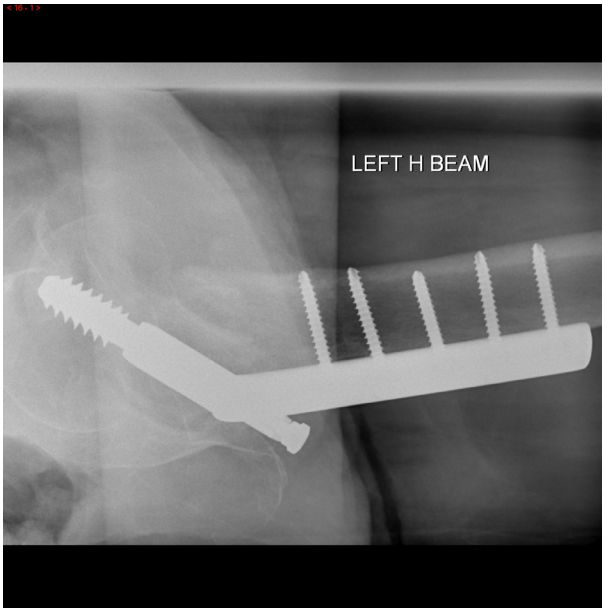

Figure 7. Anterior subluxation of the hip at 6 weeks.

to a residential home where she passed away few months later.

Discussion

Sliding Hip Screw fixation for pertrochanteric fractures of the proximal femur is a popular fixation method as it allows controlled collapse at the fracture site [7]. Anatomical or slight valgus reduction of the extracapsular

Figure 8. Lateral dislocation of the hip with SHS implant in situ.

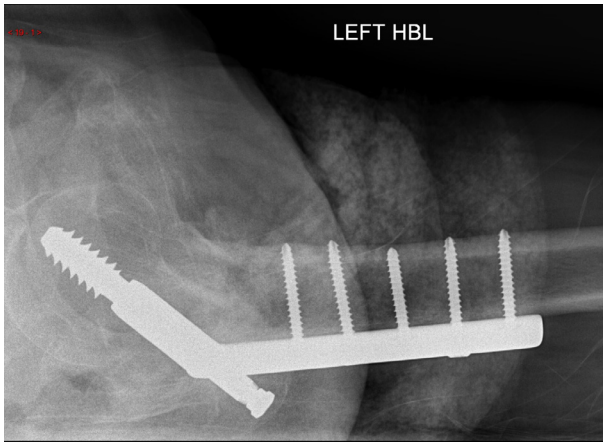

Figure 9. Anterior subluxation of the hip with proximal and anterior migration of the femur shaft.

fracture, position of the SHS lag screw in the center of the femoral head with TAD less than 25 mm are recommended for optimal fixation and to decrease the risk of failure [1–3].Unstable 4 part pertrochanteric fractures are difficult to treat, especially when the lateral support is involved in the fracture or posteromedial weight bearing cortex comminution is present. When there is no lateral cortical support, the shaft of the femur displaces medially reducing the area of bone to bone contact between fragments and may cause delayed union [8].

The selection of the SHS for the fixation of this fracture represents standard care in our unit. Other options would include an intramedullary device, compression plate or trochanteric extension plate. Of these, there is

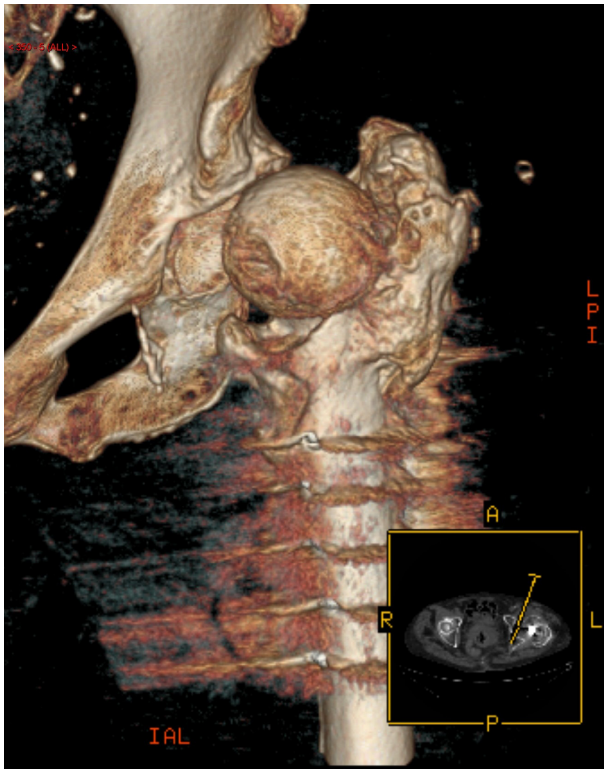

Figure 10. CT reconstructed image of anterior and lateral dislocation of the hip.

little current evidence that intramedullary nails are superior for pertrochanteric AO 31-A1 or A2 fractures [4] and equivocal evidence that compression plates confer an outcome advantage [9]. Trochanteric extension plating has been showed to reduce lateralization of the greater trochanter, and to potentially prevent excessive collapse of the fracture [10]. Despite this advantage, trochanteric extension plating is yet to become standard practice in the U.K.

Hip dislocation following SHS fixation for pertrochanteric fractures of the proximal femur is a very rare complication. Previous cases have described posterior dislocations in the absence of trauma. Common features between these posterior dislocations and our case include poor tissue quality and delay to dislocation. In Melton, Yates, and Middleton's cases, abductor tissue quality was poor due to age and Parkinson's disease in one patient, and alcoholism in another. In these cases the femoral neck had been fixed in a retroverted position, which would have predisposed to the posterior dislocation [5]. Munjal and Krikler's case involved another elderly patient who dislocated hip at 2 weeks after surgery, which was noticed with shortened leg and painful hip rotations, without additional trauma. This was a bedbound patient

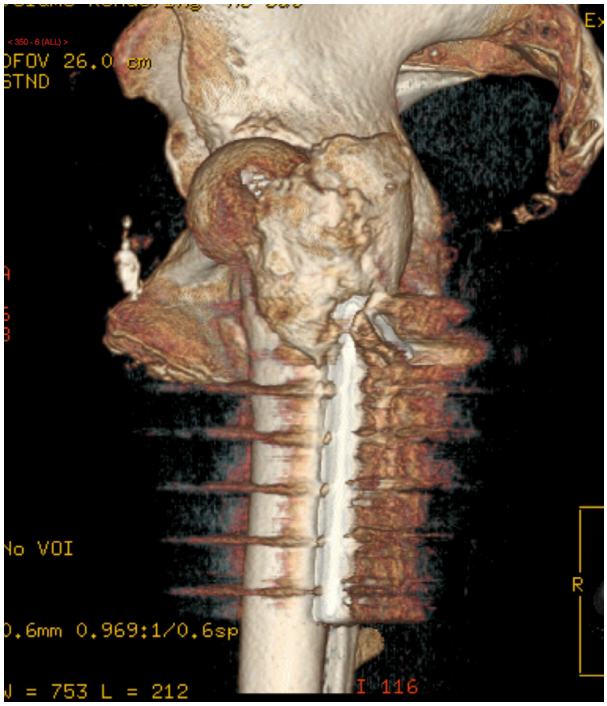

Figure 11. Lateral view of the CT reconstruction.

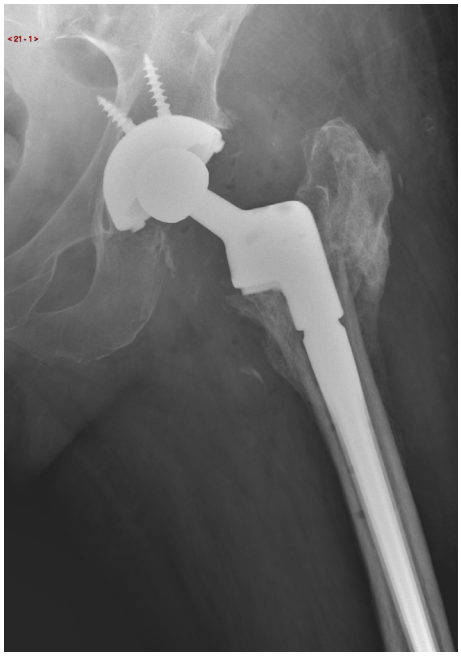

Figure 12. Revision Calcar bearing Uncemented Total hip replacement.

who suffered a dislocation and during open reduction an anterior capsular reattachment was required. The direction of the dislocation has not been mentioned in the case report. There was no indication that the implant had been placed in anteversion or retroversion, and the patient succumbed to chest infection before long term follow-up could be obtained [6].

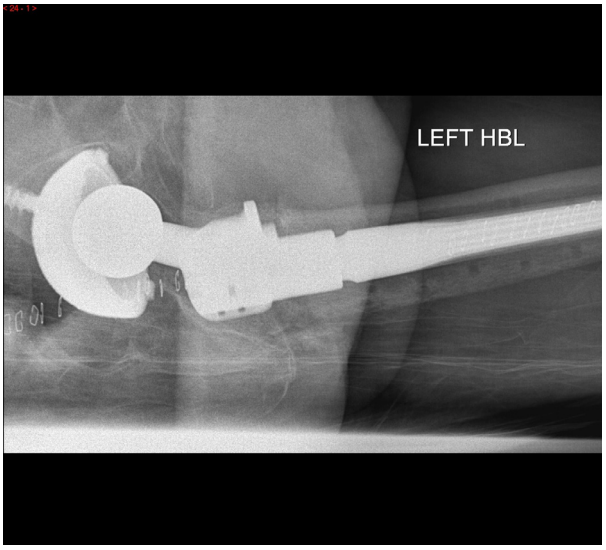

Figure 13. Lateral view of the hip replacement.

Aside from poor tissue quality and implant positioning, other reports have identified infection and trauma as causes for dislocations following SHS fixation of pertrochanteric fractures[11]. In our case we were mindful to exclude infection via inflammatory markers and joint aspirate as this would have a significant bearing on management options. It is possible that progressive subluxation is more common than reported, as many patients are unable to complete extended follow-up due to mortality. Such a phenomenon has been described by Kaneko et al. [12] in Japan, where a patient experienced pain following SHS fixation of a pertrochanteric fracture. Unlike our case, this was revised to a hemiarthroplasty before dislocation occurred and the patient survived to 15 month follow-up with a good functional outcome. A further case of progressive subluxation leading to a posterior dislocation has been described in a 36-year-old patient with a similar unstable fracture, but this appears to be due to the high energy injury and avascular necrosis which was not a feature of this case [13].

Poor reduction, poor positioning of the implant, particularly posterior placement of the SHS lag screw and torn capsule possibly led to an incongruent hip joint. Subsequent weight bearing leading to repetitive stress/trauma on the torn capsule may have led to progression of the subluxation to a dislocation. The surgeon, at the time of revision surgery, noted excessive anteversion of the proximal femur. Excessive anteversion of the femoral head puts more stress on the damaged anterior capsule leading to anterior dislocation rather than more common posterior dislocation.

Learning Points

1 Unstable 4 part pertrochanteric fractures of the proximal femur without lateral cortical support presents considerable technical problem in treatment and the risk of failure is high with any implant.
2 Anatomical or slight valgus reduction and subchondral central position of the lag screw in femoral head are of paramount importance in comminuted 4 part Extracapsular fracture NOF with osteoporotic bone. The aim should be of TAD less than 25 mm for reducing the chance of screw cut out as well as other complications.
3 Postoperatively, if the patient is not progressing as per the expectation, high index of suspicion should be maintained for potential complications. Careful serial clinical examination of the patient and supplementary investigations should be carried out in all patients including patients with dementia.

Conflict of Interest

There is no conflict of interest.

References

1. Parker, M. J. 1993. Valgus reduction of trochanteric fractures. Injury 24:313–316.
2. Sarmiento, A. 1963. Intertrochanteric fractures of the femur. J. Bone Joint Surg. 45:706–722.
3. Baumgaertner, M. R., S. L. Curtin, D. M. Lindskog, and J. M. Keggi. 1995 July. The value of the tip-apex distance in predicting failure of fixation of peritrochanteric fractures of the hip. J. Bone Joint Surg. (Am). 77:1058–1064.
4. Parker, M. J., and H. H. G. Handoll. 2010. Gamma and other cephalocondylic intramedullary nails versus extramedullary implants for extracapsular hip fractures in adults (Review). The Cochrane Library 9:CD00093. doi: 10.1002/14651858
5. Melton, J. T. K., P. Yates, and R. G. Middleton. 2007. Dislocation of the hip following valgus fixation of unstable pertrochanteric hip fractures: a complication. Injury Extra 38:61–63.
6. Munjal, S., and S. J. Krikler1995. Dislocation of the hip following intertrochanteric fracture. Injury 27:645–646.
7. Pugh, W. 1955. A self-adjusting nail-plate for fractures about the hip joint. J. Bone Joint Surg. Am. 37:1085–1093.
8. Parker, M. J. 2002. *Trochanteric and Sub-trochanteric* fractures. 1st ed. Volume 3, Oxford textbook of Orthopaedics and Trauma; 2228–2239.
9. Parker, M. J., and A. Das. 2013. Extramedullary fixation implants and external fixators for extracapsular hip fractures in adults. Cochrane Database Syst. Rev. 2: CD000339.
10. Babst, R., N. Renner, M. Biedermann, R. Rosso, M. Heberer, F. Harder, et al. 1998 Aug. Clinical results using the trochanter stabilizing plate (TSP): the modular extension of the dynamic hip screw (DHS) for internal fixation of selected unstable intertrochanteric fractures. J. Orthop. Trauma 12:392–399.
11. Evans, P. E. 1981. Septic dislocation of the hip after internal fixation of trochanteric fractures. Injury 13:185–187.
12. Kaneko, K., R. Murotani, A. Mogami, H. Okahara, O. Ohbayashi, H. Iwase, et al. 2004. Subluxation of the hip joint after internal fixation of a trochanteric fracture. Injury 35:203.
13. Younge, D., and P. A. Loisel. 1997. A rare case of hip dislocation after internal fixation of a femoral neck fracture without infection. Can. J. Surg. 40:56–58.

