



TECHNICAL NOTE

An irreducible variant of intertrochanteric fractures: a technique for open reduction

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KEYWORDS

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Summary We report five cases of intertrochanteric fractures that needed open reduction after failed closed reduction techniques. In all cases the shaft fragment included the lesser trochanter, and there was a long spike on the head–neck fragment. This was evident clinically as the proximal shaft, pulled by the iliopsoas tendon, produced a swelling in front of the hip joint. Radiographically, the fracture was minimally comminuted. The anteroposterior view revealed upward riding of the shaft fragment, while lateral view showed the femoral shaft in front of the head and neck.

We describe a three-step technique, which was applied for open reduction in these unusual cases. With the patient supine on a standard operating table, the fracture site was exposed. The limb was placed in full adduction and external rotation to slacken the iliopsoas tendon. A Hohmann retractor was then passed medial to the shaft and behind the fractured surface of the sunken femoral neck, levering it anteriorly. Traction in abduction and internal rotation was applied to complete the reduction. Additional iliopsoas tenotomy was performed in two patients. All cases were fixed with a dynamic hip screw and all fractures united uneventfully.

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Introduction

Surgical treatment of intertrochanteric fractures gives good results if fixed internally in a stable reduced position.^{1,2} In most cases reduction is achieved by closed manipulation³ but occasionally open reduction is needed.^{4,5}

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Materials and methods

We reviewed all displaced intertrochanteric fractures treated in our institution from January 1999 to December 2002; five patients needed open reduction after failed closed reduction techniques. All were middle aged male patients (44–56 years). Two were involved in motor car accidents, two fell from a height and one fell from a standing height. An associated pelvic fracture was present in one patient.

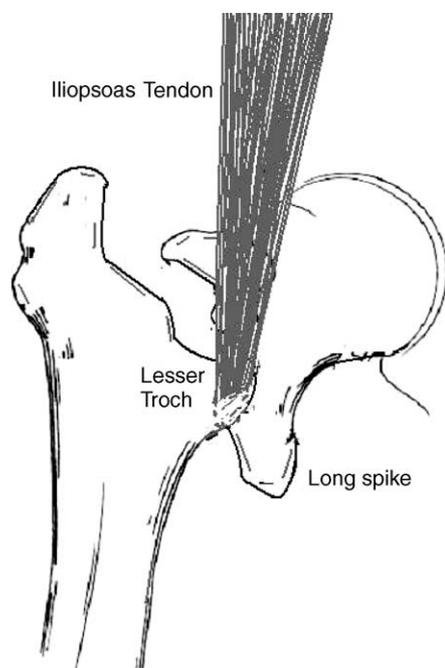


Figure 1 Illustration of an irreducible variant of intertrochanteric femur fracture. The iliopsoas tendon remains attached to the lesser trochanter, and the long spike on the head–neck fragment often gets caught between the iliopsoas and the lesser trochanter. Open reduction and extraction of interposed iliopsoas tendon is necessary to achieve a satisfactory reduction.

The preoperative radiographs of these patients showed that the fracture was minimally comminuted. A characteristic feature was the inclusion of the lesser trochanter with the shaft fragment, and a long spike on the head–neck fragment (Figs. 1 and 2). Clinically this condition was evident as the overriding upper shaft produces a swelling in front of the hip joint, as the iliopsoas muscle pulls the shaft upward and anterior to the capsule of the hip joint. The anteroposterior views revealed upward pull of the shaft fragment, while the lateral views showed the femoral shaft in front of the head and neck.

A technique for open reduction

On a standard operating table and with the patient supine, the fracture site was exposed laterally by cutting the vastus lateralis muscle fibres arising from the trochanteric line. The reduction technique involved three steps: firstly, full adduction and external rotation of the limb to slacken the iliopsoas tendon; secondly, a Hohmann retractor was then passed medial to the shaft, to hinge behind the fracture surface of the sunken femoral neck, levering it anteriorly, and lastly traction in abduction and internal rotation was done to complete the reduction. An additional iliopsoas tenotomy was needed



Figure 2 Anteroposterior radiograph of the right hip region showing the criteria of the irreducible variant of intertrochanteric fracture. A characteristic feature is upward riding of the shaft fragment with an intact lesser trochanter and a long spike on the head–neck fragment. An associated fracture pelvis can be seen.

to achieve reduction in two patients who presented two and three weeks after the fracture.

All fractures were fixed with a dynamic hip screw (Fig. 3a and b). Standard postoperative care and follow-up were provided.

Results

The average follow-up was 20 months, with a range of 12–30 months. All fractures united uneventfully.

Discussion

Classically, an intertrochanteric fracture occurs along a line between the greater and lesser trochanters. The goal of surgical treatment is stable fixation in a reduced position. In most cases reduction is achieved by closed reduction, with longitudinal traction, slight abduction, and slight internal or external rotation according to the fracture comminution.^{1,2,3} However, certain fracture patterns should suggest the need for open reduction.^{4,5} Tronzo noted difficulty in closed reduction of specific intertrochanteric fractures in which the lesser trochanter remained intact and there was a large spike on the proximal fragment.

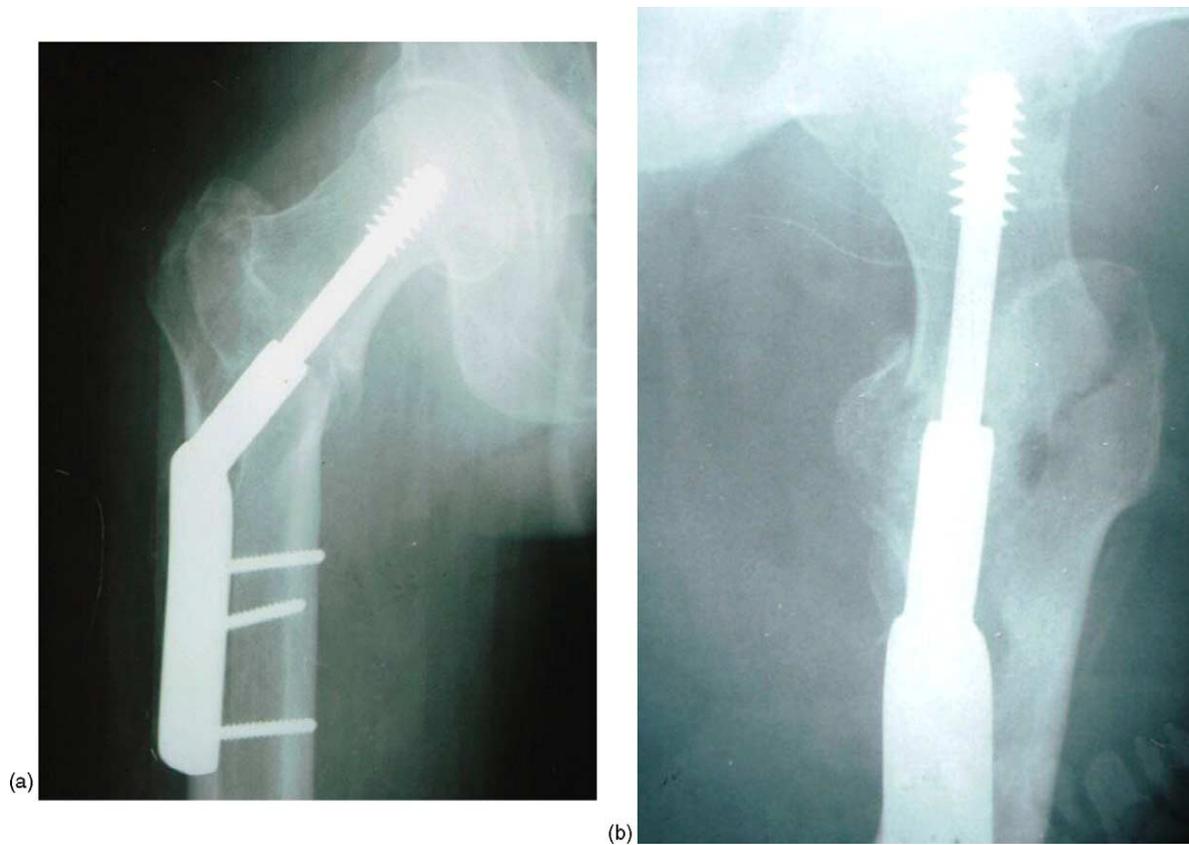


Figure 3 (a and b) Postoperative anteroposterior and lateral radiographs after open reduction and standard internal fixation with dynamic hip screw.

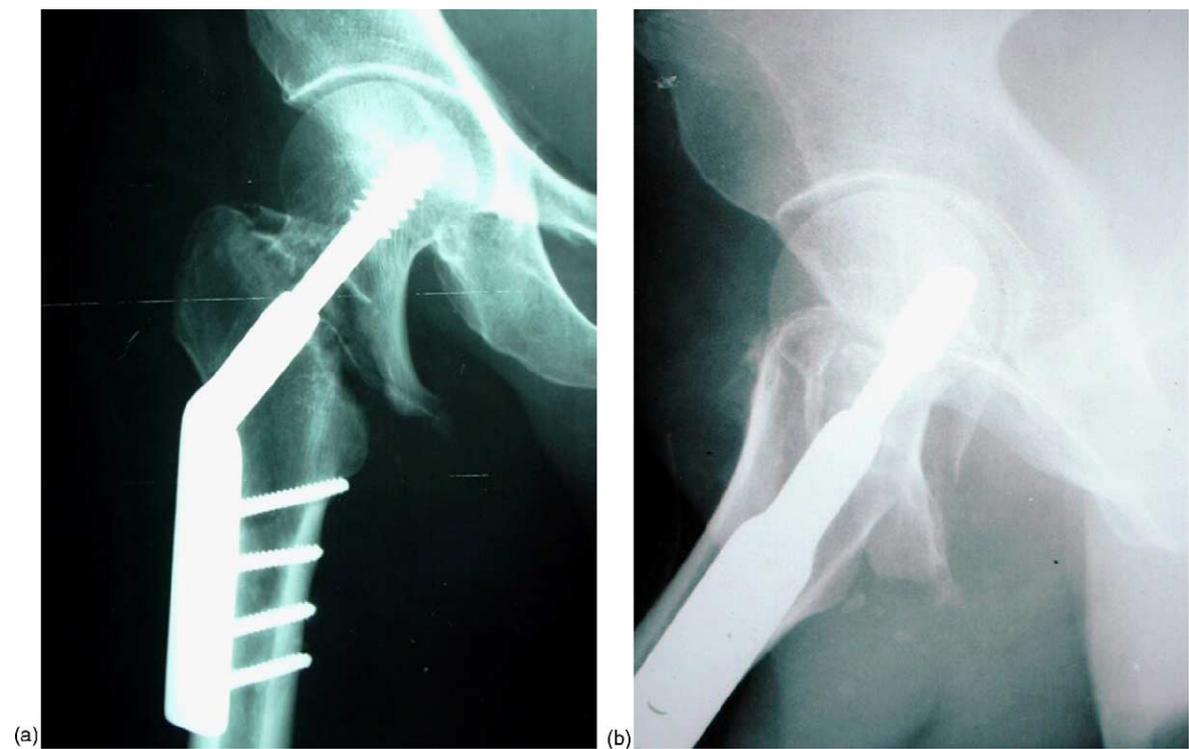


Figure 4 (a and b) Anteroposterior and lateral radiographs of the right hip after failed reduction of such variant of intertrochanteric fractures. The surgeon did not anticipate this difficulty and used the fracture traction table that rendered reduction impossible.

In our patients, the cause of irreducibility was the interposed iliopsoas tendon. In these fractures, the iliopsoas tendon remains attached to the lesser trochanter, and the long spike on the head–neck fragment often gets caught between the iliopsoas and the lesser trochanter. Even with strong traction, this fracture tends to remain in varus displacement. As the lesser trochanter remains attached to the femoral shaft, the iliopsoas muscle pulls the shaft upward and in front of the capsule of the hip joint. Clinically, the overriding upper shaft produces a swelling in front of the hip joint, and radiologically there is upward riding of the shaft fragment with an intact lesser trochanter. Anticipating this difficulty from the clinical and radiological picture will enable the surgeon to plan for open reduction. In such cases, the use of the regular operating table is preferred because the fracture traction table may render the open reduction more difficult or even impossible (Fig. 4a and b). Open reduction was achieved in all our patients using a three-step technique developed by the authors to extract the bone interposed under the iliopsoas tendon. Despite this, in two patients the tendon had to be divided to obtain fracture reduction. Significant trauma was

noticed in almost all patients. We feel that this variant of intertrochanteric fracture occurs in relatively younger age groups with stronger bone due to high-energy trauma compared to the classic intertrochanteric fracture that usually occurs in older, osteoporotic age groups after low energy trauma.

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