

Case Report

Intertrochanteric Fracture After Hip Resurfacing Arthroplasty Managed with a Reconstruction Nail

利用重建式骨髓內釘治療髖關節表面置換術後之股骨粗隆間骨折



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ABSTRACT

Periprosthetic fractures after hip resurfacings are rare occurrences that can pose a challenge to orthopaedic surgeons. With hip resurfacings becoming more common, the prevalence of these fractures is likely to increase because these patients are usually younger and more active. We report a case of traumatic periprosthetic proximal femur fracture treated with a reconstruction intramedullary nail technique.

中文摘要

髖關節表面置換術後之假體周圍骨折是罕見的現象，它可以是骨科醫生的一個挑戰。隨著髖關節表面置換術越來越普遍，又因為這些患者通常是年輕和更活躍的，這些骨折的發病率可能增加。我們報告一創傷性近端股骨假體周圍骨折的病例，利用重建式骨髓內釘技術作治療方法。

Introduction

Hip resurfacing arthroplasty is a popular surgical option for young patients suffering from early osteoarthritis, particularly if they had physically demanding jobs or if they were quite active in sports previously. This increased activity theoretically increases the risk of dislocation with conventional hip replacements.^{1–4} Hip resurfacing arthroplasty aims to avoid the problems of conventional total hip replacements such as increased risk of dislocation in young active patients,^{1–4} volumetric wear, polyethylene debris, osteolysis, and loosening.⁵

The incidence of proximal femur fractures associated with hip resurfacing arthroplasty was approximately 0.5–4%.^{3,6–8} It was usually a subcapital fracture, either related to acute surgical complications acutely, avascular necrosis, or a delayed foreign body response to wear.⁵ Traumatic fractures were rarely reported. The management options were nonoperative⁹ and operative. The operative treatments included fixation with cannulated screws,¹⁰ blade plates,¹¹ reconstruction nail with cerclage wiring,⁵ locking the proximal femoral plate,¹² trochanteric cephalomedullary nail,¹³ distal femoral locking plate,^{14,15} and conversion to total hip replacement.¹⁶

There was only one reported case of a proximal femoral fracture fixed with a reconstruction nail.⁵ The nail was inserted through the piriformis fossa and was supplemented with cerclage wiring. We describe another case of intertrochanteric fracture with subtrochanteric extension, which was treated with a recon nail by using the greater trochanter as the entry point without wiring.

Case Report

A 51-year-old male while intoxicated was assaulted in a pub. He was knocked down, kicked in the leg, and punched on the chest. He had a history of juvenile rheumatoid arthritis and had undergone sequential bilateral Birmingham hip resurfacing arthroplasty 4 years earlier due to end-stage inflammatory arthritis. There were no perioperative complications involved in either surgery. The patient had been asymptomatic and active since the procedures.

On initial examination, the patient had a shortened and externally rotated right leg with normal sensation and pulses. The radiographs showed a comminuted intertrochanteric fracture of the right femur with subtrochanteric extension and varus deformity (Figure 1).

The patient had operative treatment under general anaesthesia 4 days after the injury. He was placed on a traction table and the fracture was reduced anatomically with the help of an image

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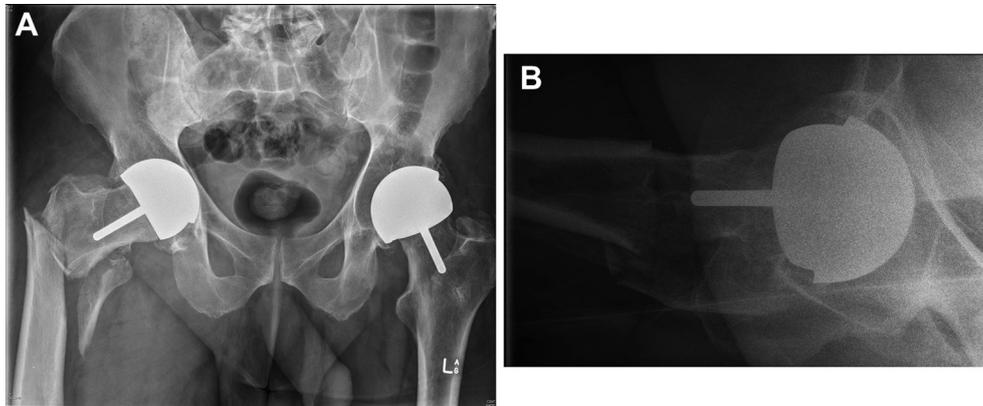


Figure 1. Initial X-rays showing periprosthetic intertrochanteric fracture: (A) anteroposterior and (B) lateral radiographs.

intensifier. A guide wire was inserted into the greater trochanter slightly more posterior than the usual entry point recommended. This ensured that the recon screws did not to hit on the femoral stem component of the Birmingham arthroplasty. An awl was used to enlarge the entry hole and serial reaming was employed. A ball-tipped guide wire was passed towards the distal metaphysis of the femur and the femoral canal was reamed to 14 mm in diameter. A Stryker (St. Leonards, New South Wales, Australia) T2 Recon nail (440 mm in length, 13 mm in diameter) was passed over the guide wire and down to the distal femoral metaphysis. The wire was then removed. With the proximal recon jig, a threaded guide pin was inserted into the distal hole of the proximal locking screw holes. It was checked with the image intensifier to ensure its postero-inferior location (Figure 2A and B). The proximal hole was drilled with a 6.5-mm step drill, and a 105-mm lag screw of 6.5 mm in diameter was then inserted. Another 115-mm lag screw of 6.5 mm in diameter was used for the distal hole fixation (Figure 3a and b). The drilling and screwing were done under fluoroscopy to avoid hitting on the prosthesis or cement so that destabilization of the femoral component would not happen. End caps were placed in the proximal end of the screws. The nail was then locked distally with two locking screws in static mode. The duration of the surgery was 90 minutes.

The patient was discharged 5 days postoperatively and advised non-weight bearing on the right leg for 6 weeks. He was reviewed at 2 weeks postoperatively and noted to have minimal pain. At 6 weeks, some callus was noticed on the X-rays. He was allowed to

have touch-down weight bearing from the 6th week to the 12th week postoperatively. He had no pain and the X-rays showed an abundance of callus. Full weight bearing was then allowed. During the follow-up at the 6th month, X-rays showed that the fracture united and the patient remained pain free with no functional deficit.

Discussion

As hip resurfacing arthroplasty becomes more prevalent for active young patients with osteoarthritis, periprosthetic fractures at the intertrochanteric and subtrochanteric regions will become more common. Various options for management were described^{5,9–16}; they all aimed at restoring the anatomy of a previously well fixed and functioning implant by internal fixation osteosynthesis. Most would agree that this was a better option when compared to conversion total hip arthroplasty in young active patients^{5,9–16} if there was no instability or loosening of the implants caused by the fractures.

The choice of fixation depends on the fracture patterns, availability of fixation implants, and the surgeon's preference. In our patient, we used the Stryker T2 femoral recon intramedullary nail to fix the intertrochanteric periprosthetic fracture. This implant would allow compression at the fracture site and the risk of non-union was lower. With two proximal lag screws, one could avoid the femoral prosthesis⁵ especially the femoral stem of the femoral component. Locking plates do not allow compression,^{14,15} and therefore they would increase the probability of non-union.¹⁵ Blade

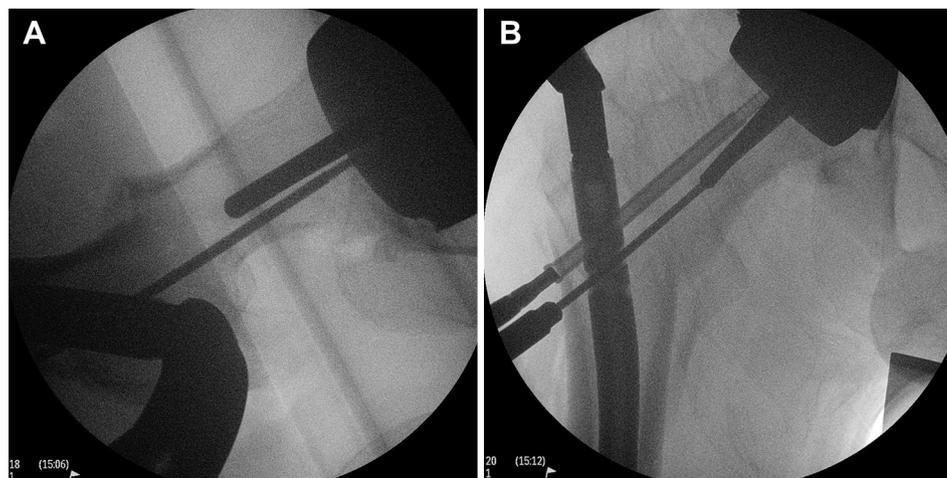


Figure 2. Intraoperative fluoroscopy showing threaded guide wire placement and insertion of proximal locking screws. (A) Lateral and (B) anteroposterior views.

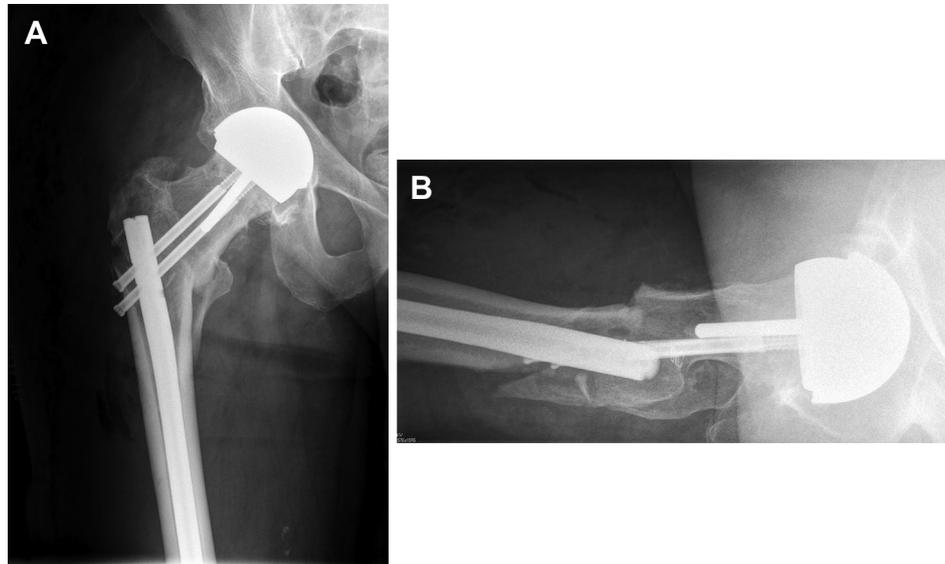


Figure 3. Postoperative X-rays of the reduction and fixation of the fracture with the reconstruction nail. (A) Anteroposterior and (B) lateral views.

plates are fixed-angle devices. Their usage is technically challenging and usually requires a larger incision with greater soft tissue destruction.^{11,13,15} Although most cephalomedullary nails shared the same entry point as the Stryker T2 recon nail, they had larger diameter lag screws and would increase the chance of hitting the femoral components.

In the literature, a similar case has been described⁵ in which cerclage wires were used to reinforce the fixation⁵ in addition to recon nailing.

Conclusion

In conclusion, periprosthetic fractures of hip resurfacing arthroplasty are becoming more prevalent. They can be fixed surgically to restore the normal anatomy and function without the need of conversion total hip arthroplasty if there is no instability or loosening of the implants caused by the fractures. We suggest using the recon nail for the management of periprosthetic intertrochanteric fractures with stable implants. It has the advantages of trochanteric entry point, paralleled proximal lag screws that avoid hitting the femoral prosthesis stem, less invasiveness, technically less demanding, and favourable biomechanics.

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