Symptomatic trochanteric non-union following total hip replacement treated with reattachment combined with two-stage revision surgery of the femoral stem

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ABSTRACT

We present a case of symptomatic trochanteric non-union following total hip replacement treated initially with a Dall-Miles grip plate. After failure of this treatment, the patient had a two-stage revision.

Trochanteric non-union is one of the well-described complications after total hip replacement. It is frequently difficult to treat, while potentially causing weakness, altered gait and instability of the artificial joint.

We believe that reattachment of the trochanter combined with a staged revision of the femoral stem using a posterior approach for the second stage could be a valuable technique to be added to the orthopaedic armamentarium for recurrent and symptomatic trochanteric non-unions after primary total hip replacement, particularly after failure to treat with all the other techniques described in literature.

KEYWORDS

Trochanteric non-union – Hip – Femoral stem

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Introduction

We present a case of symptomatic trochanteric non-union following total hip replacement treated initially with a Dall-Miles grip plate. After failure of this treatment, the patient underwent a two-stage revision.

Case history

A 64-year-old woman had a cemented left total hip replacement with trochanteric osteotomy approach in the first instance. Six weeks after the operation the patient sustained a trochanteric displacement with failure of the wires (Figure 1) and eventually, developed a trochanteric non-union. Two years later the patient was still symptomatic and physical examination revealed significant tenderness over the greater trochanter in addition to a Trendelenburg lurch. An attempt was made to treat the trochanteric non-union with a Dall-Miles grip plate two years after the first surgery. The patient had an abduction orthosis and was on protected weightbearing for three months; however, she continued with trochanteric displacement and developed a trochanteric non-union again (Figure 2). The patient

remained symptomatic with a feeling of instability of the prosthetic hip. She also sustained a single episode of dislocation. Nine months after the second operation, a decision was taken to treat the patient with a two-stage revision of the femoral stem and a trochanteric plate.

The first stage included removal of femoral stem, stabilisation of the trochanter with a metal plate and three screws and a wire construction. The patient was left with a pseudarthrosis (Figure 3). After 12 weeks, computed tomography confirmed union of the greater trochanter and, finally, four months after the stem removal, a new cemented stem was inserted using a posterior approach. Postoperatively, the wound healed nicely. Initially, the patient reported weakness of the left hip but 14 months after the operation, follow-up radiographs showed no displacement of the greater trochanter and the patient reported having returned to almost full activity (Figure 4).

Discussion

The classic trochanteric osteotomy approach was initially proposed by Charnley for all total hip replacements, involving a flat cut of the trochanter with the trochanteric

Figure 1 Anteroposterior radiograph of the pelvis after the first surgery, showing migration of the left greater trochanter more than 1 cm and failure of the wire.

Figure 3 Anteroposterior radiograph the pelvis after the femoral stem was removed, the trochanter stabilised with a metal plate, three screws and a wire and the patient left with a pseudarthrosis of the left hip.

Figure 2 Anteroposterior radiograph of the pelvis after the first attempt at trochanteric reattachment showing trochanteric non-union at the left hip.

Figure 4 14 months after the second-stage follow-up, radiographs showed no displacement of the greater trochanter and the patient reported having returned to almost full activity.

fragment lateralised and placed distal to its original bed.¹ Today, the vast majority of arthroplasty surgeons prefer to use other approaches in routine primary cases while osteotomy of the trochanter remains an option for exposure of difficult primary replacements and revision cases.²

Non-union of the trochanter is still an unavoidable complication for the trans-trochanteric approach, leading to pain, limp and even dislocation.³ According to Woo *et al*, it

is reasonable to expect non-union of the trochanter in about 5% of the patients and, of those, approximately 15% will show signs of instability.⁴ Limp after trochanteric osteotomy is another complication, with displacement of more than 1 cm more likely to cause weakness of the abductors and a Trendelenburg gait.⁵

Various combinations of cables, cable-grip devices, locking plates, hook plates and release of the abductors to gain additional length can be used to reattach a migrated or non-united trochanter.^{6,7,8} One study reported achievement of 90.6% osseous union with locking plate in 32 patients, although only 6 cases were with trochanteric osteotomy.⁸ Fernandez *et al* reported 100% union with an articulated hook plate but only in a ten-case series at an average of 3.3 months postoperatively,⁷ and Patel *et al* reported 95.6% union rate in a 46-patient series with cable plate.⁹ In a 72-patient series, Hamadouche *et al* reported the highest rate of osseous union achievement when vertical wires had been used in conjunction with a claw plate.¹⁰ Fixation involving only wire or cable system showed less success in union compared with plate or combined systems.⁸

Our patient developed a symptomatic trochanteric non-union with a displacement of more than 1 cm (Figure 1). The first attempt of trochanteric reattachment with a plate-screws and cable construct combined with soft tissue release failed. The trochanter migrated again more than 1 cm and the patient reported instability with an episode of dislocation together with a Trendelenburg gait.

After this failure, the idea of a need for temporary removal of the femoral stem to relieve the abductor tension from the reattached trochanter until union is achieved seemed promising. Indeed, three months after the first stage of the stem removal, the computed tomography confirmed trochanteric union and one month later, the second stage was performed, inserting a cemented stem with a posterior approach. This led to a satisfactory clinical and radiological result (Figure 4).

In conclusion, trochanteric non-union after total hip replacement is one of the well-described complications

and frequently difficult to treat, while potentially causing weakness, altered gait and instability of the artificial joint. In this context, we believe that reattachment of the trochanter combined with a staged revision of the femoral stem using a posterior approach for the second stage could be a valuable technique to be added to the orthopaedic armamentarium for recurrent and symptomatic trochanteric non-unions after primary total hip replacement, particularly after failure to treat with all the other techniques described in literature.

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