CASE REPORT

Bilateral fixation of a periprosthetic intertrochanteric hip fracture below Birmingham hip resurfacing

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Accepted 23 February 2017

SUMMARY

This case report involves a 59-year-old woman with a traumatic right intertrochanteric hip fracture below a previous Birmingham hip resurfacing (BHR). This woman had almost an identical fracture on the left hip 3 years before which was treated with a proximal femoral locking compression plate. Of note periprosthetic fractures following hip resurfacing are usually subcapital and treated with a revision or conservative management. We present an unusual surgical problem that has occurred twice in the same patient and has been treated effectively on both occasions using proximal femoral plating. To the best of our knowledge, there have been no other reports of bilateral periprosthetic fractures being treated in this way.

BACKGROUND

The most common cause of failure of a resurfacing prosthesis is fracture (1–2% incidence, F>M). These fractures are usually subcapital and spontaneous (early) or secondary to avascular necrosis (late). This is an unusual presentation and management involving an extracapsular fracture after a traumatic event (of note extracapsular fractures are more common than intracapsular fractures after a traumatic event with a hip resurfacing in situ).^{1–3}

CASE PRESENTATION

A 59-year-old woman presented to hospital unable to weight bear after a fall onto her right side. On examination, her leg was neurovascularly intact and clinically shortened with evidence of external rotation. This was a similar presentation to a fall onto her left side 3 years prior. Of note there was a

history of previous bilateral Birmingham hip resurfacing (Smith and Nephew) with the left side 8 years prior to admission and the right side 4 years before. Medical history included osteoarthritis affecting hands, hips, knees and spine, as well as hypertension and tablet-controlled type 2 diabetes.

INVESTIGATIONS

On arrival to the emergency department, given the clinical history, the patient received initial standard investigation and management for a suspected fractured neck of femur. An X-ray image demonstrated a right intertrochanteric hip fracture below a previous Birmingham hip (Figure 1A, B). Also from this X-ray, we are able to note the previous surgery that was carried out on the left side in early December 2012.

TREATMENT

The case was discussed and X-rays were reviewed at the daily X-ray meeting in the presence of multiple orthopaedic consultants. As with the left side; due to her age it was felt that preservation of bone stock and avoiding revision to a total hip prosthesis were preferable.

On further review of the available images specifically looking at the radiological outcome of the previous surgery, it was felt that the same procedure would be possible. The options were discussed with the patient who was happy with her functional outcome on the left side. It was decided that using a proximal femoral plate would provide a good functional outcome as well as preserving bone stock if a future revision was required.

Figure 1 (A) AP right hip. (B) AP pelvis.

To cite: Macdonald J, Pagoti R, Cusick L. *BMJ Case Rep* Published online: [please include Day Month Year] doi:10.1136/bcr-2016-218840

Surgical technique

Operation performed: Open reduction internal fixation of right hip periprosthetic fracture.

Operative findings: Previous Birmingham hip resurfacing with an intertrochanteric fracture.

Operative procedure: The patient was positioned on a traction table, and closed reduction was achieved. Through a lateral approach, the proximal femur was exposed. A LCP proximal femoral plate was used.⁴ A combination of locking and non-locking screws were used with two passing posterior and one passing anterior to the stem of the BHR prosthesis. Figure 2 shows the postoperative outcome. In contrast to the previous surgery, cable wire was deemed unnecessary, as the fixation was felt very stable.

OUTCOME AND FOLLOW-UP

Postoperatively, the patient progressed well with physiotherapy. However, she developed a urinary tract infection, which was treated with oral antibiotics. She was discharged home 9 days postoperatively to finish oral antibiotics. She was to remain light partial weight bearing for 6 weeks until her clinical review.

At the initial clinic review, 6 weeks postoperatively the patient was getting on well and there was good callus formation (Figure 3). Her mobility was improving, and her range of

Figure 2 Postoperative AP pelvis.

Figure 3 AP pelvis at 6 week review.

Figure 4 AP right hip at 3 months.

movement was good. She was allowed to progress to full weight bearing and start to wean herself from the walking aids.

At her next clinical review ~3 months from surgery, it was noted that her fracture had slipped into very minimal varus position; however, there has been evidence of union (Figure 4). The patient was able to mobilise full weight bearing unaided and encouraged to start building her activity back to her baseline.

At her 6 month review, she had no pain on mobilisation and only reported mild trochanteric pain when lying on her side. Her radiographs at this stage showed ongoing bone healing. Also her mobility was back to baseline.

DISCUSSION

The majority of reported fractures below a BHR are intracapsular, with revision to a total hip prosthesis being the treatment of choice; however, non-operative management has also been found to be effective. Traumatic fractures are commonly extracapsular.^{3 5-7} The overweight, older female patient appears to have a greater risk of fracture.¹ A combination of intraoperative notching, varus placement of the femoral component and osteoporosis have also been shown to be risk factors for fracture.¹ This particular patient did not have any of the above risk factors.

There is little literature available on internal plate fixation of these fractures. In the available literature, we found six cases regarding a similar fracture pattern below a BHR with one of these being this patient's first surgery. Three cases used a femoral plate, one used cannulated screws while the other two used intramedullary fixation.^{5 8-12}

This patient had presented for a second time with the same type of injury which had previously been treated effectively.⁸ In both instances, it was an intertrochanteric fracture secondary

to trauma which would explain the fracture pattern. We feel this could be secondary to the decreased range of movement in the hip post-resurfacing compared to normal joint movements; as a result extracapsular fractures are more common.¹³

For this case, conservative management was not considered. Previous reports have shown successful treatment with retention of a well-functional implant.¹² Conservation of bone stock with a view to possibly requiring later revision surgery was felt to be the best option given the patient's age. On discussion with the patient and looking at the outcome of her surgery on the left side, a decision was made to preserve the current implant, which had been performing well, and again use an internal fixation device. On both occasions, the fracture slipped slightly into a varus position; however, to date, this has not had any adverse functional outcome. We understand that the slip in position may result in altered biomechanics acting on the resurfacing prosthesis causing increased wear. The patient will remain under review with regard to her hip resurfacing.

Learning points

- It has been demonstrated that surgical fixation of fractures below Birmingham hip prosthesis can be adequately carried out with good functional recovery.
- Factors such as fracture configuration, mobility, age, bone quality and likelihood of requiring later revision surgery need to be taken into account.
- We would recommend consideration of proximal femoral plate for fixation of rarely reported extracapsular fractures below hip resurfacing prostheses and some varus collapse at fracture does not affect functional outcome.⁸

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Contributors JM and RP collected patient information and wrote the paper. LC edited and redrafted the paper (consultant in charge).

Competing interests None declared.

Patient consent Obtained.

Provenance and peer review Not commissioned; externally peer reviewed.

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