Cement leakage into the hip joint during TFN-A cement augmentation in a revision surgery of an extra-capsular hip fracture

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ABSTRACT

Introduction: The intra-articular migration of the spiral lamina or screw, after close reduction and internal fixation (CRIF) with an intramedullary cervicodiaphyseal nail (cut-through), is one of the most frequent postoperative complications. We present a patient with a cut-through and cement leakage into the hip joint after TFN-A cement augmentation and spiral lamina replacement.

Methods: A 83-year-old man, suffered a cut-through after CRIF of his left extracapsular hip fracture during the third postoperative month. A revision surgery was planned, including spiral lamina replacement and cement augmentation. Cement leakage into the hip joint was confirmed in the immediate postoperative radiograph and a new intervention was indicated with the removal of the third bodies.

Results: The patient presented good clinical evolution, without functional limitation or pain. In routinely postoperative radiographic controls, no differences were observed respect to the immediate postoperative one.

Discussion: Current literature dealing with implant revision surgery and associated cement augmentation are scarce.

Conclusion: As far as we are concerned, this is the first case in the literature of a re-revision surgery of an extracapsular hip fracture due to a three month postoperative cut-through and a posterior cement leakage into the hip joint after TFN-A cement augmentation and spiral lamina replacement with the need of a posterolateral approach for removal.

Introduction

The intra-articular migration of the spiral lamina or screw, after close reduction and internal fixation (CRIF) with an intramedullary nail (cut-through), is one of the most frequent postoperative complications for the treatment of pertrochanteric fractures [1,2]. Multiple treatment options have been proposed, such as blade replacement [3], the cement augmentation technique [1], and total hip arthroplasty [4]. We present a patient with a cut-through and cement leakage into the hip joint after TFN-A cement augmentation and spiral lamina replacement.

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Methods

A 83-year-old male was referred to our emergency unit due to a low energy fall. Physical examination revealed an externally rotated, abducted and shortened leg with severe pain on his left hip. CRIF was performed on the first day after admission. Postoperative recovery was uneventful and the patient was discharged at the 3rd day after surgery.

After 3 months of being discharged, the patient was readmitted during routinely postoperative control at our clinic. He complained of severe hip pain and impossibility for weight bearing. Radiographs and a CT-scan were indicated. Intra-articular cephalic spiral lamina migration was evidenced (Fig. 1A, B, 2A, B and C). A revision surgery was planned, including the spiral lamina replacement and cement augmentation due to poor bone stock quality.

A polypropylene mesh was introduced into the femoral head to prevent cement leakage. Hip joint surface integrity was reassured through contrast injection and intraoperative radioscopic control. After cephalic spiral lamina revision and during augmentation, a

![Fig. 1. Anteroposterior (A) and Lateral (B) radiographs of the hip showing the cut-through of the cephalic screw.](image1)

![Fig. 2. Computed Tomography Scan. Coronal (A), axial (B) and sagittal (C) that certify the intra-articular migration of the screw.](image2)
cement leakage was observed and contrasted with the injected radiopaque solution (Fig. 3, A and B). In the immediate postoperative radiographic control, the presence of intraarticular cement was confirmed (Fig. 4).

A new intervention was indicated and a posterolateral approach was performed, followed by a meticulous capsulotomy of the joint and direct observation of the migrated material (Fig. 5). The foreign body was in intimal contact with the hip loading area and was successfully extracted. As a consequence, an additional osteochondral lesion of the femoral head was also identified without other associated labral or acetabulum lesions. Finally, profuse irrigation and meticulous closure of the joint capsule was performed (Fig. 6).
**Results**

In the immediate postoperative period, the weight bearing of the affected limb was restricted for 48 h. Partial and full weight bearing was indicated progressively as tolerated. Postoperative recovery was uneventful and the patient was discharged at the 4th.
postoperative day. Routinely postoperative controls were done as expected on the outpatient clinic.

During the 12 successive months the patient was monitored on an outpatient basis. He presented good clinical evolution, without functional limitation and absence of pain. At latest follow-up, the Harris Hip score (HHS) was 86 points (range, 0–100 points). In routinely radiographic controls no differences were observed respect to the immediate postoperative control of the last surgical procedure and a proper consolidation of the fracture was achieved (Fig. 7).

Discussion

Cut-through is one of the most frequent complications associated with the use of cervical-diaphyseal intramedullary nails for the treatment of pertrocanteric hip fractures. The axial migration of the cephalic component of the implant (cut-out) [1,2] was also widely reported in the literature. However, these complications are rare in relation to the totality of procedures performed, being 1.9% as reported by different authors [5–8].

Some authors propose the cement augmentation of the spiral lamina to improve the anchorage in case of patients with osteoporotic bone [9–11]. Scola et al. reported a case of a cut-out treated with revision of the spiral lamina and cement augmentation, with poor outcome and the patient's death 4 weeks postoperatively [3]. However, current literature dealing with implant revision surgery and associated cement augmentation are scarce. Hanke et al. developed a technique for cement leakage prevention during augmentation, placing a plug at the subchondral level inside the femoral head, similar to the one used during cementation in hip arthroplasty [12]. However, this technique was described in experimental cadaveric models without osteoporosis or associated osteochondral defects in the femoral head.

Brunner et al. reported 28 cases of cut-through treated with different salvage procedures. Sixteen where treated with lamina exchange without augmentation, 6 with lamina exchange and cement augmentation and the remaining 6 with total hip replacement (THR). From the group of 16, 8 of them failed and needed a new surgery. In the augmentation group, 2 of them failed and needed a new surgery too. On the other hand, none of the patients treated with THR needed a new surgical procedure [13].

In our particular case, we think the cement augmentation was the most appropriate technique considering the age of the patient and the bone stock quality. Performing only the lag screw exchange would be insufficient considering the femoral head osteochondral lesion. On the other hand, a suitable mechanism to prevent cement leakage should have been applied instead of a polypropylene mesh, such as an autologous bone graft or a plug as Hanke et al. have described.

Conclusion

The cement augmentation of the spiral lamina or the cephalic screw is a technique described for the treatment of extracapsular
hip fractures in patients with osteoporosis, and for cases when a revision surgery, such as a cut-through, is indicated. Intraoperative radioscopic control and contrast injection during surgery are essential to avoid a possible leakage of intra-articular cement.

As far as we are concerned, this is the first case in the literature of a re-revision surgery of an extracapsular hip fracture due to a three months postoperative cut-through and a posterior cement leakage into the hip joint after TFN-A cement augmentation and spiral lamina replacement with the need of a posterolateral approach for removal.

Declaration of Competing Interest

Each author certifies that he or she has no commercial associations (e.g., consultancies, stock ownership, equity interest, and patent/licensing arrangements) that might pose a conflict of interest in connection with the submitted paper.

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