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Case Report

Mismatching of Different-Offset Exeter Long Stems: A Problem with Cement-In-Cement Technique: Technical Note

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Abstract

Description of The Case: We describe a case of a 78-year-old lady with dementia and very low physical demands who presented to the clinic with posterior dislocation of bipolar hemiarthroplasty. An Exeter 37.5 mm offset long stem was implanted by using cement-in-cement technique after removal of an Exeter 44 mm offset long stem. The new stem has a stop when trial insertion was done, so careful reaming of intramedullary cement canal had to be performed in order to allow its introduction.

Discussion: Although the cement in cement technique is a simple method for exchanging cemented stems, it may be technical demanding. The mismatching of Exeter long stems of different offset can be a problem with this technique. The consequences of this fact and the surgical pitfalls are discussed.

Conclusions: Cement-in-cement technique with different offset long stems can be a demanding technique, so preoperative planning and operative instruments for reshaping the canal are advisable.

Keywords: Cement in Cement; Hip Joint; Revision; Total Hip Arthroplasty

Description of the Case

We describe a case of a 78-year-old lady with body mass index of 25, medical history of Lewy body dementia, Parkinson´s disease symptoms and very low physical demands who presented to the clinic with shortening and internal rotation deformity in her right hip without traumatic history. The patient had been operated for femoral neck fracture one month ago with implantation of bipolar hemiarthroplasty. Due to intraoperative perforation of the diaphysis, a long 44x220 Exeter stem had been employed to bypass the area of perforation as well as cerclages and a bipolar cup. The family of the patient referred a decrease in the patient activity about one week ago. The x-ray showed dislocation of the hemiarthroplasty and bone fragments around the joint that suggested trochanteric gluteus avulsion (Figure 1).

Figure 1: Radiological image showing hemiarthroplasty dislocation.

The diagnosis was neglected hemiartrhroplasty posterior dislocation (7-10 days) with impaired abductor mechanism. In an attempt to perform closed reduction of the prosthesis, the patient was carried to the operating room under general anesthesia, but it was impossible to achieve. A revision hip surgery was scheduled a few days later. The planned surgery was to use a constrained cup due to the abductor mechanism deficiency in a patient with low physical demand and dementia. Our planning included also exchanging the long femoral stem by other with less offset in order to decrease the mechanical loading to the constrained liner. Besides, to allow reduction and leg length discrepancy, a long but shorter, smaller size stem was prepared to be placed in a deeper situation. A posterolateral approach was performed with the patient in lateral decubitus position. Gluteus maximus distal insertion was transected to facilitate the surgery. Avulsion fracture of the greater trochanter was assessed during surgery. An attempt to reduce the hemiarthroplasty to check stability was done without success. The cement of the proximal lateral part of the femur (over the shoulder of the stem) was removed by using a chisel. The stem was removed by using an extractor device applying moderate strength. Re-cutting of the remaining femoral neck was done in order to place the stem in a deeper position.

A constrained cup (tripolar cup, Stryker®) was inserted press-fit and reinforced with 3 screws. A 205 cm in-length 37.5 offset Exeter stem (fully tapered) was selected for re-cementing the femur. When we tested it by manual insertion we realized that it didn´t fit in the mould of the cement of the previous stem, being completely blocked for insertion with about 6 cm-length outside. Progressive diameter intramedullary reamers were employed in order to insert the new stem. When enough space was obtained, the canal was prepared for cement-in-cement technique following the principles of the Exeter team and the new stem was inserted. No modification of the version was done as we considered the previous was correct. Reduction was achieved without problems. As the muscles were completely retracted, no attempt of reattachment to the greater trochanter was done. No intraoperative complications occurred at the time of the surgery. The postoperative x-ray showed a satisfactory result, with adequate cement mantle (Figure 2).

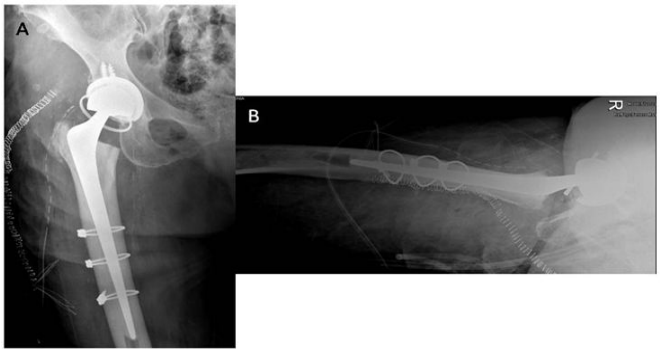

Figure 2: Postoperative x-ray (A: AP view: B: cross-table view).

The postoperative blood test revealed a low level of hemoglobin (8.4 g/dl), so the patient received transfusion of 2 packed red blood cells. The postoperative protocol consisted on weight bearing protection of the operated extremity for 4 weeks, and progressive limb loading assisted by a walking frame. One month after the surgery the patient had no pain and the x-ray showed no mobilization of implants (Figure 3).

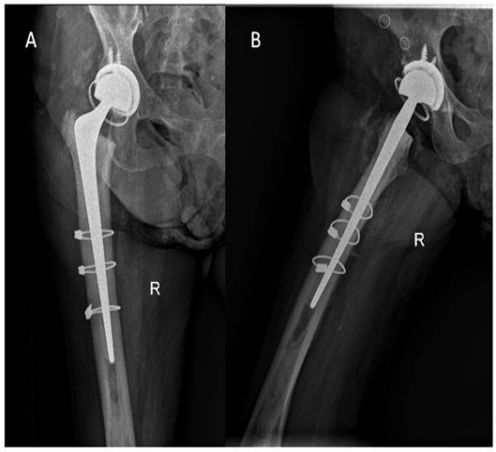

Figure 3: Radiological image 1 month after surgery.

Discussion

The femoral cement-in-cement technique (also called cement-within-cement technique) consists on the re-cementing of a new stem when the mantle of cement is well-fixed to the host bone [1]. It has a variety of indications that include the revision of a damaged/broken stem (or with incompatible taper), to change the version of the implant in cases of instability [2] and selected cases of periprosthetic fractures [3,4]. Although it has been also proposed as an alternative in cases of hip infection to avoid the morbidity associated with the removal of the cement [5,6], a recent report seems to contraindicate this option [7]. Before the application of the new mantle of cement, rasping and drying is recommended. The mechanical properties of the new mantle of cement obtained by this technique have been tested in the laboratory, observing only a decrease of 6% in shear strength at the created interface if compared with a uniform layer of cement [1]. The good clinical results have been validated by a number of reports [7-10].

Although cement-in-cement technique is usually a simple procedure for exchanging cemented stems, some authors suggest that the cement mantle can seldom be left without some degree of preparation for the new inserted stem [11]. The Exeter team has developed the short 125x44 offset stem that facilitates the procedure by its small length and distal section, and is available from 2006. The aim of this technical note is to warn against cement-in-cement technique. One may think that downsizing the offset and length of the stem the new stem will fit easily to the old mantle of cement, which is not true, at least not for all stem designs. That

was recently addressed by [11], who found in vitro that the Exeter system can be problematic in that way, not only for long stems [11]. In the case that we present, we found the cement reshaping procedure complex and time consuming. As the patient had a previous diaphyseal cortical perforation stabilized with cerclages, our aim was to downsize the offset as well as the length of the stem but maintaining the by-pass effect of the previous fracture, so we considered the best option the fully tapered 37.5 mm offset long stem.

The different morphology of the stems (the 37.5 mm offset long stem is fully tapered, while the 44-mm offset long stem has a proximal tapered part and a distal cylindrical part) was an issue, so the cement mantle had a narrow isthmus cavity that blocked the entrance of the new stem (Figure 4).

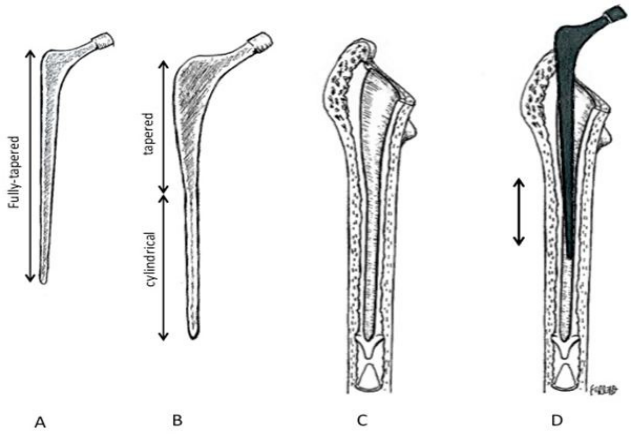

Figure 4: Schematic representation of 37.5 offset long stem (A), 44 mm offset long stem (B), sagital section of femur with the cement mould after removal of a 44-mm offset stem (C) and blocking effect of the cement to the entrance of the 37.5 mm offset stem (D) due to the narrow isthmus area (double-headed arrow).

The consequences of aggressive reaming inside the mantle of cement can be adverse. There is a possibility of excessive or eccentric reaming, which is not desirable as it may weaken or even provoke a fracture of the remaining mantle of cement. It may be also a source of complications such as intraoperative periprosthetic fracture. We recommend making a rigorous preoperative clarification that may include the consultation of the stem compatibility for in-cement revision [11], and adequate instrumentation to be prepared for reshaping the mantle of cement, not only for insertion but to change the version of the new stem in cases when it was necessary.

Conclusion

Cement-in-cement technique with different-offset Exeter long stems can be a demanding technique, so preoperative planning and operative instruments for reshaping the canal are advisable.

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