Cement removal in revision hip arthroplasty

Experience with bone cement added to the cavity in 20 cases

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A new technique for cement removal is presented where bone cement is added to the cavity after removal of a femoral component. The old and new segments of cement are then removed together by using a threaded extractor. In 16 of 20 patients, the method was successful; the entire cement mass was extracted in 35 (25–50) min without complications or bone loss. In 4 of the patients, the technique had to be combined with traditional methods for cement removal.

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In revision hip arthroplasty, removal of the femoral cement mantle is often difficult and associated with complications. I describe a new technique for femoral cement extraction.

Method (Figure 1)

After exposure of the hip prosthesis, the femoral component is dislocated and removed. The remaining cement mantle is rinsed with saline and dried. The cavity is then filled with new cement (Palacos, Schering Corp., Kenilworth, NJ, U.S.A.). To facilitate complete filling of the cavity, a sterile plastic catheter is placed in the canal before adding the cement and suction applied. A threaded rod is pushed into the soft cement to the bottom of the canal and centered proximally. After the cement has cured, the threaded rod is removed, leaving a threaded canal. An extracting rod, with a 20- or 40-mm-long threaded section, is then screwed into this canal. A pulling force on the cement block is created by attaching a slap hammer to the rod.

The technique was tried on Charnley (Thackray, Leeds, England) femoral components cemented into human cadaveric femurs. It resulted in the extraction of either the entire cement block or just a segment of cement. If only a segment of cement was removed, the extracting rod was again screwed into the remaining cement and the procedure was repeated. Sometimes the cement below the tip of the prosthesis remained in place after the extraction procedure. In these cases, a drill and drill-guide were used to create a hole in the remaining cement. After tapping the drill hole the extraction rods were used, and the remaining piece of cement removed.

Patients

I report the results for the first 20 patients, 13 men and 7 women with a mean age of 72 (48–91) years. The primary indication for arthroplasty was arthrosis in all the patients and the time from the primary operation to revision was 6 months–9 years. All the patients had a

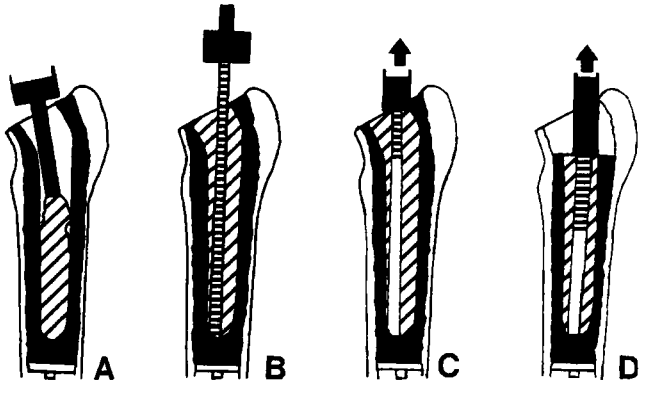

Figure 1. Technique for cement removal.

A. After removal of the femoral component the cavity is filled with new bone cement.

B. A long threaded rod is pushed down into the soft cement.

C. When the cement has cured, the long threaded rod is removed and an extraction rod screwed into the canal.

D. If only a segment of cement can be extracted, the procedure is repeated.

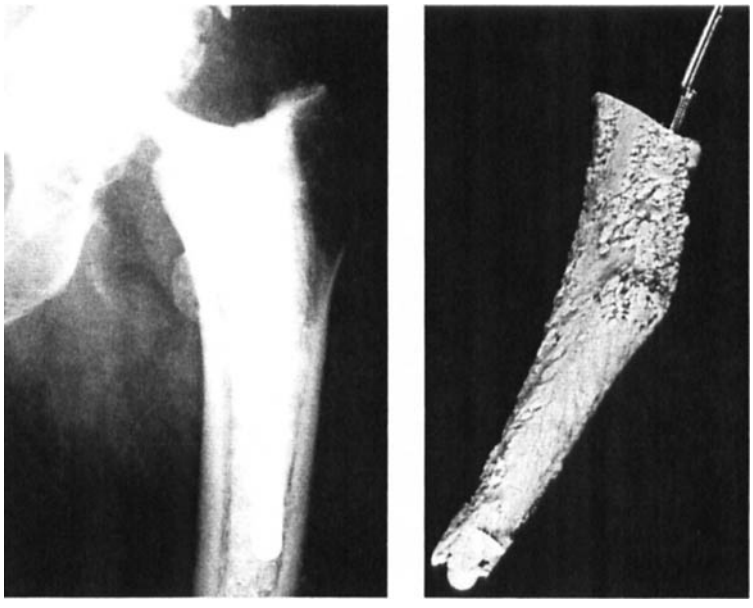

Figure 2. A. Aseptic loosening of a femoral component 2 years after primary arthroplasty with subsidence of the femoral component. B. The extracted cement from the femoral canal.

Charnley hip. The indications for revision were deep infection in 2 cases and aseptic loosening of the femoral component in 18 patients. 18 patients had radiographic signs of loosening, such as radiolucent zones between bone and cement of 2 mm or more and/or a subsidence of the femoral component of more than 1 mm. Two patients had normal radiographs but severe pain from the hip and, in both, the femoral component was loose at surgery. No patients had severe bone deficiencies in the proximal femur (Gustilo type III or IV; Gustilo and Pasternak 1988).

Results

In 16 patients, all cement could be extracted by the described method in one or several segments without complications. In these cases the average time for removal of all cement was 35 (25–50) min. The cement was detached at the interface to the bone without any bone loss. In one patient, a fracture of the major trochanter occurred during the extraction; the entire cement block was extracted in one piece and the fracture was fixed with cerclage wires and healed without complications. In 2 patients, only two-thirds of the cement could be extracted, and in one patient only a small proximal segment could be removed. In these patients, the extracting rod was pulled out from the threaded canal before the cement loosened. Since the thread in the canal was destroyed, the extracting rod could not be reattached. Thus, in these three patients the described technique had to be combined with traditional methods for cement removal.

Discussion

Several methods have been described for cement removal from the femoral canal in hip revision arthroplasty (Eftekhar 1977, Harris and Oh 1978, Dennis et al. 1987, Sydney and Mallory 1990). Usually chisels and drills are used and, if necessary, controlled perforation of the cortical bone or femoral osteotomies are performed (Sydney et al. 1990). All these methods are time-consuming and associated with complications. In the present study, the extraction system described, similar to the technique of Origin Medsystems Inc. (Muirhead-Allwood 1992) was quick and simple and succeeded in 16/20 patients. In the cases where the method failed, the cement was strongly attached to the bone and the extracting rod was pulled out of the threaded canal, destroying the thread. In such cases we now use a technique where a new hole is drilled and tapped in the cement-mass next to the old canal and the extracting rod reattached. No accidental femoral perforations or fractures (except the trochanteric fracture) occurred. Furthermore, in infected cases, it could be determined whether all cement had been removed or not by studying the extracted piece of cement. The method is now routinely used for easy revision cases

with deep infection and aseptic loosening of the femoral component at the author's institution. If the femoral component is not loose but still needs to be removed, the method can be used, but it has failed in one third of the cases.

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