

Ultimate Outcome in Immediate Postoperative Total Hip Arthroplasty Instability

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Abstract: The objective of this study was to determine the ultimate outcome of patients who experienced immediate postoperative instability after primary total hip arthroplasty using regional anesthesia. Thirtyone patients whose radiographs demonstrated dislocation or subluxation immediately after total hip arthroplasty were evaluated as to the ultimate outcome of hip function and stability. Once a dislocation has occurred, the risk of redislocation is high. In this study, of the 29 patients who did not have revisions immediately after surgery, 3 (10.3%) have had recurrent dislocation and 1 (3.5%) has had a subluxation event. Recurrent instability or the need for revision surgery is significantly greater when compared with those patients who have no evidence of postoperative instability. **Key words:** primary hip arthroplasty, subluxation, dislocation, regional anesthesia, postoperative instability.

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Dislocation remains a common and problematic complication after primary total hip arthroplasty (THA). Most authors' report dislocation rates of approximately 2% to 5% in primary THA [1-3]. Risk factors known to predispose patients to dislocation include the presence of previous hip surgery, neuromuscular disorders, cerebral dysfunction, psychosis, alcoholism, and female sex [1,4]. Factors under the control of the surgeon include component orientation and restoration of soft tissue tension. Prosthetic options lowering the risk of dislocation include increasing the size of the prosthetic femoral head, keeping femoral neck circumference to a minimum, and optimizing the geometry of the

acetabular component. Postoperatively, patients should be expected to comply with standard hip precautions [1].

Once a dislocation has occurred, the risk of redislocation is high. The incidence has been reported at approximately 33% [5]. Time of dislocation has been implicated as an important factor. Ali Khan et al [6] reported a 40% recurrence rate after dislocations occurring within 5 weeks of surgery and a 60% recurrence rate after later dislocation.

Regional anesthesia produces extended neuromuscular dysfunction and can increase the incidence of hip instability during transfer and postoperative positioning. The treatment of this at our institution is immediate closed reduction, allowing the regional anesthetic to wear off, and assessment of component position using standard radiographs.

A previous study looked at a series of 13 THAs, done under perioperative epidural anesthesia where immediate postoperative radiographs revealed axial subluxation [7]. The care of these

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patients was otherwise uncomplicated. At a minimum follow-up of 36 months, only 1 patient had a subsequent hip dislocation. The authors recommended no change in postoperative care based on these findings.

The purpose of this study is to examine the outcomes of patients who experienced subluxation or dislocation in the immediate postoperative period after primary THA using regional anesthesia, looking specifically at the presence or absence of recurrent instability or pain.

Materials and Methods

An institutional review board–approved study was undertaken, identifying patients with immediate postoperative instability after THA using medical records and radiology databases. The search was limited to patients who underwent primary THA and also had a dislocation event (according to *International Classification of Diseases, Ninth Revision* code). This search generated a list of 324 patients who had a primary THA and had been treated for dislocation of that extremity between December 1989 and July 2001. The authors reviewed the medical records and radiographs of each patient and further contacted patients to obtain a thorough perspective of their follow-up status. As a result, our study is based on 31 patients who had a primary THA and dislocated in the postoperative recovery during that period.

Standard demographic data were obtained from the medical records. Radiographs obtained during the patients' standard follow-up visits and measurement of component position, component migration, and possible leg-length discrepancies were recorded. Hips were considered dislocated when the head of the femoral component was not in contact with the polyethylene of the acetabulum. The hips were considered subluxated when not centered in the acetabular component, but in contact with some portion of the acetabular component.

The surgical procedure was similar in all cases. The procedures were performed by 9 experienced adult reconstructive surgeons. All patients were operated on under hypotensive epidural anesthesia through a posterior, gluteal splitting approach. After division of the fascia of the tensor fascia lata and gluteus maximus, the capsule, piriformis tendon, and conjoint tendon were routinely divided and tagged. The distance from the center of rotation of the femoral head to the lesser trochanter was measured before cutting the femoral neck. Upon insertion of the trial component,

this distance was remeasured and matched with the trial and the final component. The femoral component was cemented in 24 cases and uncemented in 7 cases. After completion of the hip arthroplasty, the short external rotator tendons and capsule were repaired through 2 drill holes in the posterior aspect of the greater trochanter after reduction of the hip.

Patients demonstrating hip subluxation in the recovery room underwent repeat radiographs after cessation of the effect of the epidural anesthetic. All patients with subluxation showed reduction of the prosthesis without hip manipulation. In cases of dislocation, a closed reduction was performed.

Of the 16057 primary THA performed at our institution between the dates of December 1989 and July, 2001, our retrospective review revealed 14 cases of full dislocation (0.09%) and 17 cases of subluxation (0.11%) immediately after THA. The preoperative diagnosis was osteoarthritis in 28 patients, osteoarthritis secondary to developmental dysplasia of the hip in 1 patient, osteoarthritis secondary to slipped capital femoral epiphysis in 1 patient, and avascular necrosis in 1 patient. There were 13 left hips and 18 right hips, 14 females and 17 males. The average age at the time of surgery was 58.9 years (range, 36-84 years).

Results

Two patients required revision for instability, one who had a dislocation in the recovery room and the other who experienced multiple subluxations during their hospitalization. Both of the hips were anterior and too anteverted and, therefore, their revisions involved decreasing anteversion of malaligned acetabular components and were completed within 2 weeks of the original procedure. No further dislocations have occurred in these 2 patients at an average follow-up of 3.3 years. These patients were removed from the final analysis as malpositioned components were assumed to be the cause of their instability. Because the hypothesis seeks to determine if immediate postoperative instability poses risks for repeat instability in the long term, the 2 patients whose instability was treated surgically during their initial hospital visit do not adequately reflect the potential long-term risk for patients with immediate postoperative instability.

The remaining 29 patients were followed at an average of 3.97 years and were split into 2 groups. Group A was made up of the 13 patients whose initial instability was a dislocation in the

postoperative recovery room. The remaining 16 patients, those who experienced subluxation in the recovery room, made up group B. Of the 13 patients in group A, 2 of these patients had further instability for an overall re-dislocation rate of 15.4% (2/13). One of the patients with further instability in group A had 1 subsequent subluxation and the other patient has had multiple dislocations, each treated with closed reduction, and has not undergone further surgery. In group B, 2 of the 16 patients had further instability for an overall re-dislocation rate of 12.5% (2/16). Both of the patients with further instability in group B have had 1 subsequent dislocation.

Of the 29 patients who experienced immediate postoperative instability, either a dislocation or a subluxation, 4 have had further instability for an overall re-dislocation rate of 13.8% (4/29). Of the 29 patients, 22 denied pain or functional deficits at their latest follow-up. Seven patients complained of mild pain in their hips, but did not feel that it limited their activities and did not require further surgery.

Postoperative radiographs of the patients who had further instability were compared with those who did not. In all cases, leg lengths varied 5 mm or less. The acetabular component abduction angle and version (presumed anteversion) were 42° and 20° for those with no further instability and 36° and 17° for those with further instability, respectively [8].

The severity of the initial instability event was assessed. Two of the patients who experienced further instability were initially considered subluxed in the immediate postoperative period and 2 dislocated. The 1 patient with multiple dislocations had a full dislocation initially in the postoperative period.

Discussion

Dislocation after THA remains a common and problematic complication. In the absence of radiographic abnormalities, most surgeons treat first-time dislocation with closed reduction. Most studies have shown patients with instability to be predisposed to further dislocation events in the future [1,2,4].

Little has been reported on the outcome of immediate THA instability. Miric et al reported on 13 patients who had immediate postoperative subluxation of their prosthesis. In each of these subluxation cases, no reduction maneuver was necessary and each resolved spontaneously after

muscle recovery from epidural anesthesia. Only 1 patient experienced a further dislocation event (7.6% [1/13] of the cohort).

Our study reports the outcome of 31 cases of immediate hip instability that occurred over an 11-year period. After eliminating 2 cases that had identifiable factors requiring operative intervention, our study was made up of 29 patients and had an average follow-up of 4 years. The overall dislocation rate for this group was 13.8% (4/29), which is higher than the Miric study.

There are some possible explanations for the higher dislocation rate in our series. Dislocation rates have been shown to continue to increase throughout the life of a patient who has had a THA. Although our overall follow-up was 4 years, there were a number of patients who were more than 5 years out from their THA. This could have predisposed the subjects of this study to a higher rate of dislocation.

Another possible explanation for the increased rate is the inclusion of patients who were considered to have frank dislocations immediately after their THAs. In all patients, a posterior repair of the capsule and short external rotator tendons was performed. In prosthetic subluxation, the repair is likely unaffected. However, with a complete dislocation, the repair is likely disrupted. Of the 4 patients with recurrent instability, 2 had complete dislocations immediately postoperatively. Furthermore, the one patient who has had multiple dislocations had a dislocation postoperatively.

In patients who have a dislocation in the recovery room and also have gross malposition of the components, revision surgery should be performed. In the absence of malposition, postoperative care of the patient with a subluxation should be conservative without manipulation. The epidural anesthetic should be discontinued and a radiograph should be repeated to ensure a complete reduction occurs after muscle function returns. If, however, the hip is fully dislocated, a reduction maneuver should be performed before reversal of the anesthetic. Although we cannot definitively recommend braces or significant flexion restrictions based on this study, patients should be informed of the possibility of further instability based on our dislocation rate of 13.8% (4/29).

References

1. Mahoney CR, Pellicci PM. Complications in primary total hip arthroplasty: avoidance and management of dislocations. *Instr Course Lect* 2003;52.

2. Berry DJ. Unstable total hip arthroplasty: detailed overview. *Instr Course Lect* 2001;50:265.
3. Morrey BF. Dislocation. In: Morrey BF, An KN, editors. *Reconstructive surgery of the joints*. 2nd ed. New York: Churchill Livingstone; 1996. p. 1247.
4. Giurea A, Zehetgruber H, Funovics P, et al. Risk factors for dislocation of a cementless total hip endoprosthesis—a statistical analysis. *Z Orthop Ihre Grenzgeb* 2001;139:194.
5. Woo RYG, Morrey BF. Dislocations after total hip arthroplasty. *J Bone Joint Surg Am* 1982;46:1295.
6. Ali Khan MA, Brakenbury PH, Reynolds ISR. Dislocation following total hip replacement. *J Bone Joint Surg Br* 1981;63:214.
7. Miric A, Kahn B, Waldman B, et al. Characteristics and natural history of transient postoperative pseudosubluxation after total hip arthroplasty. *J Arthroplasty* 2000;15:736.
8. Hassan DM, Johnston GH, Dust WM, et al. Radiographic calculation of anteversion in acetabular prostheses. *J Arthroplasty* 1995;10:369.