Primary total hip arthroplasty in ankylosing spondylitis — An analysis of 47 hips

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Article Info

Keywords
- total hip arthroplasty (THA)
- ankylosing spondylitis (AS)
- heterotopic ossification
- hip function
- hip pain

Abstract

Ankylosing spondylitis (AS) is one of the major inflammatory arthropathies, with a reported involvement of hip joint in about 30% to 50% of patients. The results of primary total hip arthroplasty (THA) in patients with ankylosing spondylitis were studied to determine the utility of THA for these patients. A total of 24 patients with ankylosing spondylitis underwent 47 THAs; 23 patients (95.8%) had bilateral surgery. The mean follow-up was 6.3 years. The mean age at surgery was 36 years. Before surgery, 14 hips (29.7%) were found to be ankylosed. Postoperatively heterotopic ossification was noticed in 7 hips (14.8%); and one patient had functional impairment because of re-ankylosis. At final follow-up examination, 41 hips (87%) had an excellent (low) pain score, and 5 hips had a normal or near-normal function score (10.6%). THA provides long-term improvement in hip function for patients with ankylosing spondylitis.

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Materials and Methods

A retrospective review of the patients who underwent THA for AS at the Amrita Hospital by the senior author were selected for this study. All patients included in the current series met the diagnostic criteria of AS¹⁴ and had been under follow-up by a rheumatologist on a routine basis. The primary indication for THA was limitation in range of motion that was unresponsive to nonsurgical treatment and limiting activities of daily living. A total of 47 THAs were carried out in 24 patients. The mean age of patients was 36 years (range, 22–64 years). There were 6 women (25%) and 18 men (75%). The mean follow-up was 6.3 yrs (range 1–10 years). Demographic data, the pre-operative deformity, duration, Harris Hip Score, ambulatory status, need for walking aids, and status of the other joints form the essential ingredient of

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the clinical assessment. Intraoperative information was retrieved from the operative observations. All operative procedures were performed in a clean dedicated operating room. A posterior surgical approach was performed in 17 hips and modified Hardinge’s approach was used in 30 hips. Before surgery, 14 hips (29.7%) were found to be ankylosed. Three patients received bilateral THA in same sitting. Other patients were operated on sequentially. Operations were carried out in the lateral position for all hips. A cementless acetabular cup was used in 26 hips and cemented cups in 16 patients. Cemented stem was used in 33 hips and a cementless in 9 hips. Surface replacement was done in 5 cases.

**Perioperative Regimen** Prophylaxis for deep vein thrombosis and preoperative parenteral antibiotics were used in all patients. In addition, these patients received oral indomethacin (25 mg 3 times a day for 14 days) for prophylaxis against heterotopic ossification. No hips received postoperative radiation therapy. Patients were mobilized out of the bed the day after surgery, and those with uncented unilateral replacement were encouraged to walk with touchdown weight bearing using crutches and perform hip abductor and quadriceps strengthening exercises. Patients with bilateral simultaneous hip arthroplasty were allowed full weight-bearing with support.

**Clinical and Radiographic Analysis** Clinical assessment of pain, function, deformities, and ROM was based on the evaluation system of Harris. A Harris hip score of 90 points or more was defined as an excellent outcome; 80 to 89 points, a good outcome; 70 to 79 points, a fair outcome; and 70 points or less, a poor outcome. The preoperative and postoperative sum of ROM was defined as the sum of flexion, extension, abduction, adduction, internal, and external rotation movements achieved by the patients.

Radiologic assessment during each session included a standing anteroposterior radiograph of the pelvis centered at the pubic symphysis and a lateral radiograph of the operated hip joint taken at follow-up visit. According to the zone classification of DeLee and Charnley, the radiolucent lines of greater than 1 mm thick around the acetabular shell were recorded. In the resurfacing group, radiolucency and osteolysis on the femoral side were evaluated based on the zone classification of Amstutz et al., whereas in the THA group, the radiographic analysis of the femoral prosthesis was performed according to Gruen et al.. The uncemented femoral stems were evaluated radiographically using the system of Engh et al.. The bone prosthesis interface was evaluated for radiolucencies. Migration of the acetabular and femoral component center was evaluated by comparing the horizontal and vertical distances from the inferior points of the teardrops and the center of the lesser trochanter on the immediate postoperative and final radiographs. Ectopic ossification was classified according to the system described by Brooker et al..

**Data Analysis** Postoperative complications for hip resurfacing group included dislocation, infection, femoral neck fracture, nerve injury, and symptomatic deep venous embolism whereas for the THA group, dislocation, infection, nerve injury, and symptomatic deep venous embolism were considered as complications.

**Results** All patients experienced significant clinical improvement in function, range of motion, posture and ambulation.

**Clinical Results** The average preoperative Harris Hip Score was 49.5 (range, 44–65), and it improved to 82.6 (range, 74–88) postoperatively. 41 hips (87%) had an excellent (low) pain score, and 5 hips had a normal or near-normal function score. At the latest follow-up there was no complication that occurred in these groups.

Heterotopic ossification was seen in 7 (14.8%) of the patients. Brooker grade I ossification was seen in 3 hips, grade II in 2, and grade III in 1 and grade 5 in 1 hip. The patient with grade 5 heterotopic ossification leading to reankylosis underwent revision surgery elsewhere. Interestingly, 2 hips showed progressive loss of the range of motion without any demonstrable significant heterotopic ossification. The acetabular inclination was within the accepted range in 41 (87%) hips. Four (8.5%) cups were deemed vertical and 2 horizontal. According to Engh’s criteria, 85% of the stems implanted during the primary surgery had bony ingrowth and 15% were stable fibrous. Neutral position of the femoral stem was seen in 31 (66%) stems, 9 (19%) stems were in valgus, and 7 (14.8%) stems were in min varus position. A total of 4 acetabular components showed non progressive radiolucencies less than 1 mm in 2 zones (zones 2 and 3 in 3 hips, and zones 1 and 2 in 1 hips), 1 had non progressive radiolucencies less than 1 mm in all the 3 zones and the remaining cups showed good bony integration. All patients experienced significant clinical improvement in function, range of motion, posture and ambulation which was found statistically significant with a p value of <0.001 using paired t test.

**Discussion** Although concern has been expressed regarding long-term outcome in young patients who undergo THA, several recent reports have demonstrated excellent survivorship of THA in this group with high patient satisfaction. The major concerns regarding THA in these young patients involve choice of implants, the technical difficulties of performing THA, ensuring optimum positioning of components, heterotopic ossification and recurrence of ankylosis, pain, and loss of movements. Disabling pain is the most...
Figure 1. X-rays pelvis AP depicting a case of b/l ankylosed hip who underwent staged THR using uncemented stem and cup.

Figure 2. X-rays pelvis AP depicting a case of AS who underwent staged THR using cemented stem and cemented cup.

Figure 3. X-rays pelvis AP depicting a case of AS who underwent staged THR using hybrid fixation.

Acknowledged indication for THA. Although patients with bony ankylosis do not have pain, the presence of severe deformity, functional limitation, and remarkable improvements in function and quality of life after surgery justify THA in young patients. Astute attention to technical details is paramount in the course of surgery. Both patient as well as component positioning is extremely difficult and error prone. External rotation deformity of the femur and exaggerated femoral anteversion provide special problems. In patients with external rotation deformity sacrificing 2 to 3 mm of the posterior acetabular wall, dissecting anterior
to the abductors or performing the neck osteotomy under image-intensifier control are some of the options available. Often, the bone is osteoporotic due to disuse, and over reaming may compromise the acetabular bone stock. Tang and Chiu\(^{29}\) have reported the hyperextension at the hip in patients with AS, which is evident as the exaggerated longitudinal dimensions of the obturator foramen in plain standing radiographs.

**CONCLUSION**

Our study shows that THA in AS provides a satisfactory clinical and radiological outcome. However, the technically demanding nature of the procedure should not be underestimated.

**REFERENCES**


