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Total hip arthroplasty in ankylosing spondylitis in young patients: A prospective study

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Abstract

Background: Ankylosing spondylitis (AS) is a chronic seronegative inflammatory arthritis of unknown etiology characterized by inflammation of joints of the axial skeleton. It primarily affect the spine and pelvis but peripheral arthritis and enthesitis are common features. The mean age of onset of symptoms is between 15 to 25 years and it is more common in males. Severe disability and functional impairment can result rapidly due to a combination of axial spine and hip involvement. When painful degenerative changes occur, Total Hip Arthroplasty (THA) has been shown to alleviate pain and improve function. The aim of this study is to evaluate the clinical, radiological and functional outcome of uncemented THA in young patients of ankylosing spondylitis.

Materials and Methods: This prospective study was carried out in 12 male patients of ankylosing spondylitis all aged above 25 years. Uncemented THA was done in all 12 cases of AS. The study was conducted for a period of 12 months and cases were followed up for a period of 6 months. Functional outcome of hip were evaluated using Harris Hip Score (HHS) at regular intervals.

Results: 12 young male AS patients were selected for the study and average age of surgery is 36 years. The final functional outcome of hip on the basis of Harris Hip Score(HHS) were 8(67%) patients good result, 3(25%) patients excellent result and 1(8%) patient have shown fair result. Radiological outcome was passed on the basis of Anterior-posterior (AP) radiograph taken immediate postoperatively and then at 1,2,3,6 months. Radiological outcome was satisfactory except in 3 cases where heterotrophic ossification were noticed in AP radiograph later after 6 months of surgery.

Conclusion: This study concludes that uncemented Total Hip Arthroplasty (THA) in young patients done for ankylosing spondylitis provide substantial clinical and functional outcome in patients function. The improvement of in functional outcome and quality of life and postoperative reduction of pain have justified the need of THA in these stiff hips in AS.

Keywords: Total Hip Arthroplasty (THA), Ankylosing Spondylitis (AS), bony ankylosed hip joint, painful stiff hip, functional outcome, Harris Hip Score (HHS), BASRI-Hip Score

Introduction

Ankylosing spondylitis (AS) is a chronic inflammatory type arthritis ^[1]. A seronegative inflammatory rheumatologic disease of unknown etiology characterized by inflammation of joints of the axial skeleton ^[2]. It is one of a number of Human Leucocyte Antigen (HLA) B27 associate inflammatory disorder which are classified under the umbrella terminology of Spondyloarthritis ^[2]. It primarily affect the spine and pelvis but peripheral arthritis and enthesitis are common features ^[1]. Hip involvement occur in 30-50% of patients with AS, and 90% patients among those with the affected hip have bilateral involvement ^[6]. The mean age of onset of symptoms is between 15 to 25 years and it is more common in males ^[1]. Severe disability and functional impairment can result rapidly due to a combination of axial spine and hip involvement ^[1]. When painful degenerative changes occur, total hip arthroplasty (THA) has been shown to alleviate pain and improve function in ankylosing spondylitis patients ^[1]. Standerd treatment option for advanced hip disease is THA ^[5]. Total hip arthroplasty in ankylosing spondylitis patients is a challenging procedure owing to multiple factors ^[1]. The approach and exposure of the hip can be difficult due to presence of an ankylosed joint ^[1]. There is risk of implant malposition due to sagittal plane malrotation of pelvis ^[1]. Bone quality is affected by disuse osteopenia, resulting in an increased risk of fracture and there is a subsequent risk of re-ankylosis of the joint after arthroplasty ^[1].

Patients were evaluated on the basis of clinical, radiological and functional outcome on the basis of Harris Hip Score (HHS). The aim of this study is to evaluate the clinical, radiological and functional outcome of uncemented THA in young patients of ankylosing spondylitis.

Surgical Procedure

All the procedures were performed under spinal anaesthesia. Operations were performed either by senior author or under his direction. All THA were done using posterior Moore's approach. Patients were placed in lateral decubitus position on operation table. Involved limb was draped freely to facilitate hip dislocation and to permit maneuverability. The skin incision begins 5 cm distal to the greater trochanter, centered on the femoral diaphysis. The incision continues proximal to the greater trochanter, at that point, it curves towards the posterior superior iliac spine for 6 cm. After incising fascialata, fibres of gluteus maximus are bluntly splitted down to short external rotators. The sciatic nerve was carefully protected. After identification of piriformis, the short external rotators and piriformis were tenotomised at their insertion onto the greater trochanter. They were then tagged with a braided suture for identification and repair at the end of the procedure. Posterior joint capsule was incised to reveal femoral head and neck, most of the time it is very difficult to identify. In fully ankylosed hip where dislocation of head is not possible, in those cases after femoral neck osteotomy head was removed in peacemeal. The osteophytes were removed. Identification of the original joint line while reaming the acetabulum is very difficult. Foveal soft tissue and incomplete grey ossifying cartilage aid in identifying the original joint line, otherwise intraoperative radiographs were helpful in difficult cases. A femoral neck osteotomy is then performed. Acetabulum was prepared after excising the soft tissue attached to it and serial reaming was done upto the bleeding subchondral bone. Acetabular cup sizes used were one size higher than the reamer used. The femur was exposed and delivered out by the internal rotation of the limb. The femoral canal was hand reamed to the anticipated stem size. On introducing the femoral stem, the stability was tested to rotational and extraction forces and care was taken not to fracture the proximal femur. The femoral head is reduced, the stability confirmed through a functional range of motion. Wound was closed placing a suction drain.

Results

12 young male AS patients were selected for the study all above 25 years and average age of surgery is 36 years. As all patients in our study were young and fall in Dorr's type-A thus in all cases uncemented THA stems were used. Bony ankylosis was detected in 12 cases and acetabular protrusion noticed in 8 hips in preoperative radiographs. Dorr's classification was used as a guide for femoral component selection. Out of 12 cases 5 patients fall between age 25-30years, 3 patients fall between age 30-35 years and 4 patients fall between age 35-40 years. Out of the 12 cases Bilateral THR was done in 8 patients at different sittings and in 4 cases unilateral THR was done. Out of the 12 cases 10 patients have significant pain relief postoperatively, 2 patients experienced mild pain occasionally. On the basis of Harris Hip Score (HHS) 8(67%) patients have shown Excellent result (90-100), 3(25%) patients have shown Good result (80-90) and 1(8%) patient have shown Fair result (70-80).

Radiological outcome was passed on the basis of Bath Ankylosing Spondylitis Radiology Hip Index (BASRI-Hip) of Antero-posterior (AP) radiograph taken preoperatively, immediate postoperatively and then at 1, 2, 3, 6, 9, 12 and at 18 months. Radiological outcome was satisfactory except in 3 cases where heterotrophic ossification were noticed in AP radiograph later after 6 months of surgery. In 3 cases immediate postoperative posterior hip dislocation was seen due to inflexibility of spine.



Case 1: 34 years male with bilateral bony ankylosis of hip joint due to Ankylosing Spondylitis (with proper consent)



Case 2: 28 years male with unilateral bony ankylosis of right hip joint due to Ankylosing Spondylitis (with proper consent)

Table 1: Preoperative patient details and surgery outcome

Case No.	Age	Type of implant and fixation	Surgery Unilateral (U/L) or Bilateral (B/L)	BASRI HIP Score	Harris Hip Score Points Right/Left	Harris Hip Score Result
1	28	Uncemented	U/L	4	92	Excellent
2	27	Uncemented	U/L	4	86	Good
3	38	Uncemented	B/L	4	86/84	Good
4	39	Uncemented	B/L	4	86/82	Good
5	29	Uncemented	B/L	4	84/82	Good
6	34	Uncemented	B/L	4	82/84	Good
7	28	Uncemented	U/L	4	78	Fair
8	33	Uncemented	B/L	4	86/82	Good
9	34	Uncemented	B/L	4	82/84	Good
10	38	Uncemented	B/L	4	84/82	Good
11	29	Uncemented	U/L	4	94	Excellent
12	39	Uncemented	B/L	4	86/82	Good

Discussion

THA in patients with fused hips in Ankylosing spondylitis is a challenge to the orthopaedic surgeons. Technical challenge of performing THA in these patients are mainly due to, bone loss, osteopenia and acetabular protrusion. Another challenge arise in some severely increased pelvic tilt AS patients. The phenomenon that the acetabular antversion changes as the pelvic tilt changes have significant influence on decision making of antversion angle of the acetabular prosthesis. Understanding the interaction between the lumbrosacral spine and the pelvis is important for the outcome following THA. Satisfactory position of acetabular prosthesis can be achieved by including changes in the pelvic tilt into preoperative planning of THA.

Guoyue Yang *et al.* in their study found that patients with severe spinal deformity or those with high sagittal pelvic mobility, the effect of pelvic tilt on the position of the acetabular prosthesis should be considered to obtain joint stability under the supine, sitting and standing positions, thereby reducing the probability of wear, as well as the dislocation and looseness of the prosthesis. For proper correction they recommended preoperative lumbar and pelvic lateral radiographs in the supine, sitting and standing positions.

D. phan *et al.* in their study found that sagittal imbalance of the lumbar spine, combined with spinal fusion or ankylosis from degenerative changes, influences acetabular antversion during THA. To determine the amount of influence, patients can be screened with standing and sitting lateral lumbar radiographs. Based on the assessment of flexibility and balance of the spine, the postoperative range of motion of the hip in the standing and seated position can be estimated. They suggested that patients with pathology at the spino-pelvic junction are require special consideration before THA.

Girish Marappa *et al.* in their prospective study found that outcome of the THA was good in majority of the patients and also most of them reported the improvement of HHS's. THA

is inevitable in patients with end stage arthritis due to inflammatory etiology as it limits their posture and restricts activities.

Halldor Baldursson *et al.* in their study found that THA play very important role in the rehabilitation of patients with AS, but young and active patients with their rigid spines do not treat their prosthesis gently, they must be kept under supervision for a long time after THA, probably for their rest of the lives. They considered that the most important factor in preventing deterioration of hip mobility after THA is patient instruction and regular supervision, preferably by a team consisting of an orthopaedic surgeon, a rheumatologist and a physiotherapist.

Rajesh Malhotra *et al.* in their study found that THA provide long term pain relief in a large percentage of AS patient. The range of hip movement is significantly increased leading to a marked improvement in their overall walking ability. The concludes that the percentage of clinically significant heterotrophic ossification and re-ankylosis rate is low.

David lin *et al.* in their study found that bilateral total hip arthroplasty is a safe and effective treatment of advanced hip disease in AS and results in significant improvement in objective outcome measures. They suggest that specific patient factors should be considered when performing this surgery on AS patients and informed decisions made during the preoperative planning stage.

Anil Thomas Oommen *et al.* found that THA enhances movement and functional activity with significant improvement in outcome and both cemented and cementless THA have shown good long term result. From their study they have suggested that care should be taken to avoid increased antversion to avoid posterior impingement and anterior dislocation in fused hips with posterior pelvic tilt.

Conclusion

Uncemented Total Hip Arthroplasty (THA) in young patients done for ankylosing spondylitis provide substantial clinical

improvements in patients function and pain. Postoperatively hip range of movement greatly improves. The improvement of functional outcome and quality of life have justified the need of THA in these stiff hips in AS. Intraoperative blood loss is a major complication in THA done in AS. Postoperative late heterotrophic ossification is another complication. This study on uncemented THA in this subgroup done for shorter duration of follow-up and therefore any definite conclusion about their longevity cannot be made.

Conflict of Interest: None

Fund received for the study: None

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