

Original Research Article

A prospective study on functional outcome of uncemented total hip arthroplasty in patients with inflammatory arthropathies

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ABSTRACT

Background: Although medical management has improved the outcome and may have reduced the need for surgery, total hip arthroplasty (THA) is often required to manage pain and restore function and mobility. The successful functional outcome of THA in patients with inflammatory arthropathies is essential in understanding the need for THA, and its benefits in those undergoing it. Objective of the study is to evaluate the functional outcome of total hip arthroplasty in patients suffering from inflammatory arthritis using Harris hip score (HHS) and to assess the post operative complication in these patients.

Methods: In a prospective study conducted on patients with inflammatory arthritis treated with THA between a study period of January 2018 to January 2020. All the patients after assessing them clinically and radiologically were operated with uncemented THA through posterolateral approach. Functional outcomes of hip were evaluated using HHS at various intervals.

Results: In this study, patients were followed up to 24 months. About 46.7% of patients were diagnosed with rheumatoid arthritis, 33.3% of patients were diagnosed with ankylosing spondylitis, 20% of patients were diagnosed with sero negative arthritis. 90% of patients had no limb length discrepancy, no other post-operative complications were noted. The final functional outcome of hip according to HHS were 13.3% of excellent, 56.7% good results and 30% of fair results.

Conclusions: This study concludes that THA in patients with inflammatory arthritis with restricted activities of life had improved in short term follow up and ease of rehabilitation and return to function.

Keywords: Total hip arthroplasty, Harris hip score, Inflammatory arthritis, Rheumatoid arthritis, Ankylosing spondylitis

INTRODUCTION

Total hip arthroplasty (THA) in patients with inflammatory arthritis historically presents as a challenge for clinicians and orthopedic surgeons. Clinically, hip joint involvement in inflammatory arthritis is marked by pain, limitation of range of motion, and rapid-onset cartilage destruction, which can affect other lower extremity.¹ The prevalence of inflammatory arthritis ranges from 0.05% to 1% in the general population, with many patients needing

surgical treatment such as THA because of articular degeneration.² Since the introduction of corticosteroids and non-steroidal anti-inflammatory drugs (NSAIDs), in the 1950s, it was clear that this approach resulted in multiple side effects without affecting disease progression.² Over the last decades, the introduction of conventional synthetic disease modifying anti-rheumatic drugs (csDMARDs) such as methotrexate and the acknowledgement of the importance of early diagnosis, prompt treatment, and treat-to-target approach have led to

the improvement of inflammatory arthritis management.² The development and introduction in clinical practice of biological DMARDs (bDMARDs) and, more recently, of targeted synthetic DMARDs (tsDMARDs) such as tofacitinib have dramatically changed the prognosis of patients with rheumatoid arthritis.² The modern treatment of inflammatory arthritis has reduced the need for THA, but this procedure is still frequently performed and a multidisciplinary approach is required to reduce the risk of adverse events.² Surgical treatment in patients with inflammatory arthritis is often debated among surgeons because of the fear of infections, disease flares, and negative surgical outcomes.² As many such studies have not been done in India, this study was taken up to understand the functional outcome and complications following THA for inflammatory arthritis. Inflammatory arthritis includes a group of arthritis accompanied by joint pain, swelling, warmth, and tenderness in the joints and morning stiffness.² Because most of the inflammatory forms of arthritis are systemic, symptoms which are related to inflammation may occur in other parts of the body which includes skin rashes, eye inflammation, hair loss, dry mouth, and fever.² The increased number of cells and inflammatory substances within the joint causes irritation, in turn, leads to cartilage destruction and swelling of the synovium and progressive arthritis of joints.² The annual incidence of early inflammatory arthritis ranges from 115 to 271 per 100,000 adults, and the incidence of undifferentiated inflammatory arthritis (UA) ranges from 41 to 149 per 100,000 adults. Out of which, 13% to 54% of patients with UA will develop rheumatoid arthritis (RA), and in 21% to 87% UA will persist as such. A specific diagnosis can be made at the presentation in about 70% of such patients, the most common being rheumatoid arthritis.³⁻⁵ The successful functional outcome of THA in patients with Inflammatory arthropathies is essential in understanding the need for THA, and the benefits in those undergoing it. Objective of the study is to evaluate the functional outcome of THA in patients suffering from inflammatory arthritis using Harris hip score (HHS) and to assess the post-operative complication in these patients.

METHODS

The present study was a single centre, observational, longitudinal prospective study. Our cohort comprised of 26 patients (30 hips) diagnosed inflammatory arthritis of hip aged between 18 to 80 years treated with THA in the Department of Orthopaedics, of Vydehi Institute of Medical Sciences during the study period of January 2018 to January 2020. Clearance from the institutional ethics committee was obtained before the study was started. An informed, written consent was obtained from all patients before surgery. The patients were defined as having inflammatory arthritis if they have clinical, radiological and laboratory findings suggestive particular disease. All patients undergoing THA for proven case of inflammatory arthritis in skeletally matured patient were included in

study. Patients with arthritis of hip other than inflammatory arthropathy, patient with active infection anywhere in body, patients with previous hip fractures with distorted anatomy, patients with psychiatric illness, patients unfit for anesthesia were excluded from the study. Any patient with hip pain, limp was carefully evaluated clinically, radiologically to confirm and also evaluate the etiology behind inflammatory arthropathy. Radiography of the pelvis with both hips with proximal half of shaft of femur AP view was taken for all patients. The radio-graph was evaluated for size of the acetabulum, bone stock of the acetabulum, the structural integrity of the Acetabulum, protrusion, need for bone grafting, size of the femoral canal. Templating was done for the acetabular and femur components. The appropriate acetabular cup size, and ante version was determined. On the femoral side, using a template, appropriate neck length, offset and stem size of the implant is chosen.

The patients were evaluated clinically and radio logically before surgery and at 6 weeks, 12 weeks and 24 weeks. Each case was followed minimally for 12 months. Functional outcome is assessed by HSSs where the score ranges from 70 to 100 and the interpretations are as follows. Less than 70 is poor, 70 to79 is fair, 80 to 89 is good and 90 to 100 is excellent.

Surgical technique

All the procedures were performed under spinal anesthesia. All operations were performed by the senior author or under his direction. Standard posterolateral approach was used for exposure. The short external rotators were tagged and separated from its insertion by keeping it under tension by flexing the knee and rotating it externally. The capsule was excised and the Hip was dislocated posteriorly by flexion, adduction, and gentle internal rotation of the hip. On dislocating, femoral neck osteotomy was made, the femoral head was extracted. If it was not possible to dislocate like in ankylosis of hip, femoral neck osteotomy was done first and head is removed as peacemeal. The osteophytes were removed. Acetabulum was prepared after excising the soft tissues attached to it and serial reaming was done up to the bleeding subchondral bone. Acetabular cup sizes used were one size higher than the reamer used. Screws were used to fix the acetabular cup in the postero-superior quadrant with the centre of the offset placed superiorly or postero-superiorly. The acetabular cup placed was covered with gauze to protect it from any debris. The femur was exposed and delivered out by internal rotation of the limb. The femoral canal was hand reamed to the anticipated stem size and maintaining the ante version. 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 was reduced; the stability confirmed through a functional range of motion. Wound was closed over a suction drain.

All intraoperative findings were noted with respect to blood loss, operative time, intraoperative difficulties including intraoperative fractures that occur during various steps. After the surgery, patient was put on NSAID and intravenous fluids. DVT prophylaxis was also given. Patients were followed every day till the discharge with dressing and postoperative day 3 and 5. Medications given for inflammatory arthritis were restarted postoperatively. Patients were discharged after they were mobilized with assistance of physiotherapist. Functional and clinical outcome was measured at 6 weeks, 3-months, 6-months, 1 year and 2 years postoperatively according to HSS. The deformity and ROM were also measured postoperatively in each follow-up. Information collected were entered in proforma.

Statistical analysis

The data thus obtained was compiled using Microsoft Excel sheet and transferred and analyzed using Graph pad prism version 8. Descriptive statistics was used summarize the data. The data was analyzed using proportion test, Chi-Square test. Microsoft word and excel was used to generate graphs, tables etc.

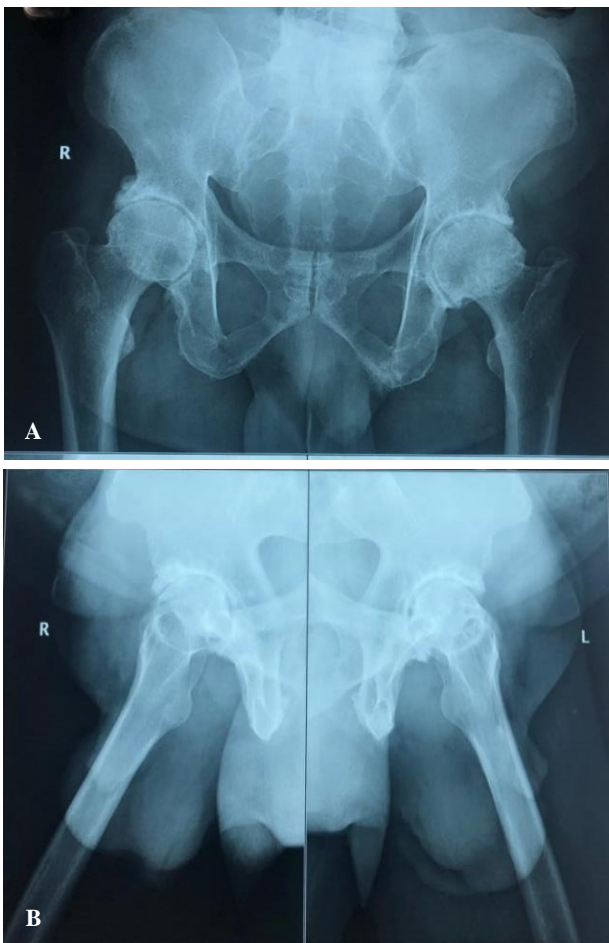


Figure 1 (A and B): Preoperative X-ray showing bilateral ankylosis of hip.

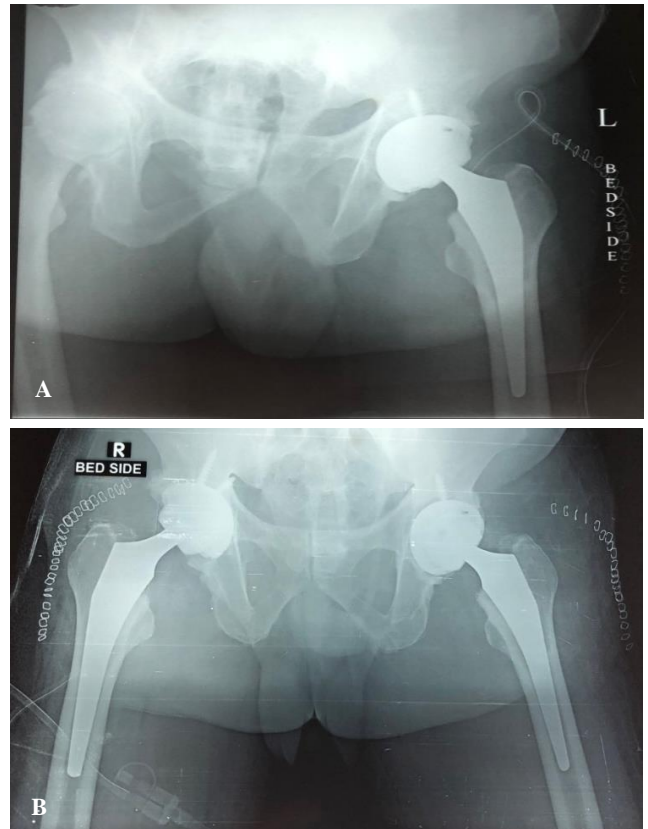


Figure 2 (A and B): Immediate post operative X-ray.

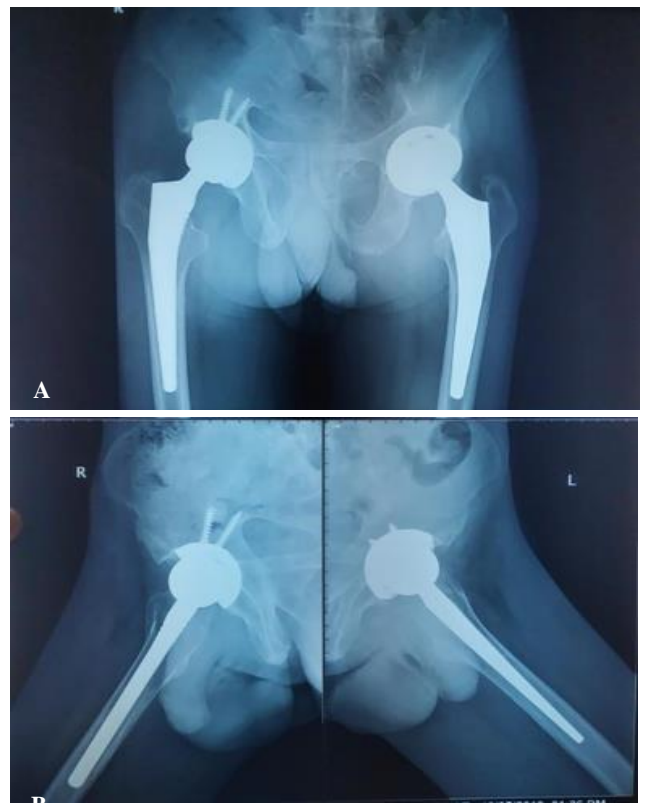


Figure 3 (A and B): Follow-up X-ray at 1 year.

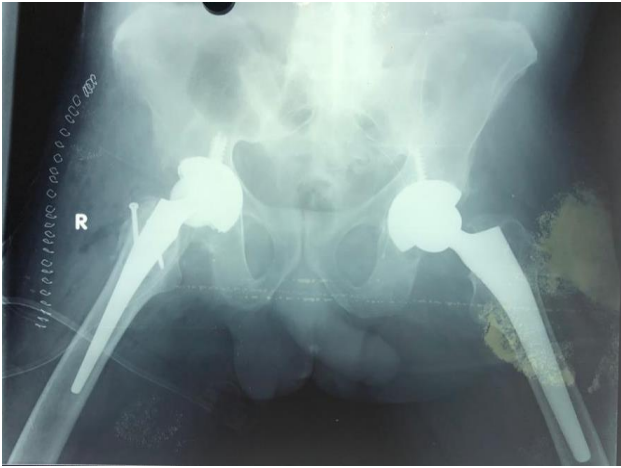


Figure 4: Intra operative greater trochanteric Vancouver’s type A1 fracture was seen in a patient of ankylosing spondylitis which was treated with cancellous screw fixation.

RESULTS

A prospective study was conducted on patients with inflammatory arthritis treated with uncemented THA in the Department of Orthopaedics, Vydehi Institute of Medical Sciences and Research Centre, White field, Bangalore, during the study period of January 2018 to June 2019.

A total 30 patients with inflammatory arthritis treated with uncemented THA in the Department of Orthopaedics, Vydehi Institute of Medical Sciences and Research Centre, White field, Bangalore constituted the sample size.

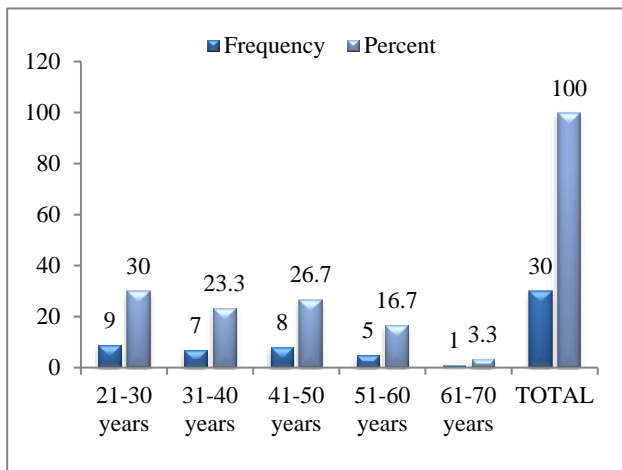


Figure 5: Distribution of the study group according to age.

In our study increased incidence of involvement of about 30% was seen in age group of 20 to 30 years (Figure 5).

The sex-wise distribution had shown that, 70% were males and 30% belonged to females (Table 1).

Table 1: Distribution of the study group according to sex.

Sex	Frequency	Percentage
Male	21	70
Female	9	30
Total	30	100

About 46.7% had involvement on left side in this study.

Diagnosis

Inflammatory arthritis involves rheumatoid arthritis, ankylosing spondylitis, sero negative arthritis. In our study 46.7% were diagnosed with rheumatoid arthritis, 33.3% were diagnosed with ankylosing spondylitis, 20% were diagnosed with sero negative arthritis (Figure 6).

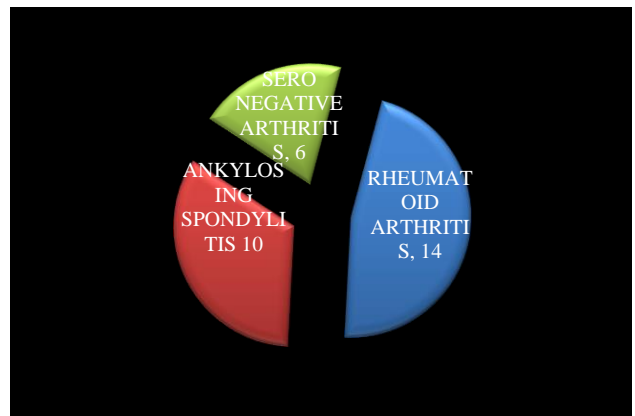


Figure 6: Distribution of the study group according to diagnosis.

Co morbidities

About 12.5% of the patients in this study had diabetes mellitus and 15% had hypertension.

Duration of hospital stay

About 50% of the patients were hospitalized for 12 to 15 days and 47.5% stayed in the hospital for 16 to 20 days.

Outcome of THA

The outcome of the arthroplasty was excellent in 13.3% of the patients, good in 56.7% of patients, fair in 26.7% of patients and poor in 3.3% of patients in this study (Table 2).

Complications

The post operative limb shortening by 1 cm was present in 10% of the patients. Intra operative greater trochanteric Vancouver’s type A1 fracture was seen in a patient of ankylosing spondylitis which was treated with cancellous screw fixation. Other Intraoperative complications like

acetabular wall breach was seen in 0% of the patients. Immediate post-operative complications like DVT, Infections, and dislocations were seen in 0% of the patients. Long term complications like osteolysis, heterotopic ossification was seen in 0% of the patients.

Table 2: Distribution of the study group according to final outcome.

Final outcome (HHS)	Frequency	Percentage
Excellent	4	13.3
Good	17	56.7
Fair	9	30
Total	30	100

Type of anesthesia

About 86.7% of the patients had spinal with epidural anesthesia in this study.

Duration of follow up

About 46.7% of the patients were followed up for 12 months and 13.3% were followed up for 14 months.

HHS

The Harris hips score was 68.17 preoperatively, 75.53 at the end of 6 weeks of follow up, 78.83 at the end of 12 weeks and 81.60 at the end of 24 weeks (Table 3).

Table 3: Distribution of the study group according to HHS.

HHS	Mean	Std. deviation
6 weeks	76.06	5.90
3 months	78.5	5.94
6 months	82.2	5.86
1 year	83.6	5.7

Table 4: Distribution of the study group according to comparison of HHS.

HHS	Mean difference	SD	T value	P value
Preop vs 6 weeks	7.333	3.427	11.72	<0.0001
Preop vs 3 months	9.76	3.19	16.76	<0.0001
Preop vs 6 months	13.47	3.256	22.65	<0.0001
Preop vs 1 year	10,32	3.36	17.72	<0.0001

The improvement of HHS

The mean difference in HHS preop vs. 6 weeks was 7.367, preop vs. 12 weeks was 10.67, preop vs. 24 weeks was

13.43. There was a statistically significant difference in the HHS in the period of follow-up. No studies compared these results (Table 4).

DISCUSSION

The treatment of inflammatory arthritis with hip involvement is a challenge to the orthopaedic surgeons. The medical treatment has improved during the last 25 years, which is reflected by a 40% decrease in the rate of hip and knee surgery since a peak that was observed in the mid-1990s. Seventeen percent of patients with inflammatory arthritis patients undergo an orthopaedic intervention within 5 years of initial diagnosis. Over a third of patients will need a major joint replacement, of which the majority will receive a total hip replacement (THR).^{6,7,9} In a study by Prakash et al showed the mean age of onset of ankylosing spondylitis was 21.2 year whereas in our study 30% was seen in age group of 20 to 30 years.¹² In a study by Biant showed higher incidence of RA in females whereas in our study, the sex-wise distribution had shown that, 70% were males and 30% belonged to females.¹³

Technical challenges of performing THR in these patients are mainly due to bone loss, osteopenia and protrusio acetabuli. These patients are not suitable for hip resurfacing because of the risk of secondary osteoporosis. Until recently there has been little evidence to support the use of cemented over uncemented THR.⁹

Protrusio acetabuli is a common occurrence in the Rheumatoid hip and technical difficulties can be encountered due to medial wall deficiency.⁹ In our study, we encountered similar problems not only in patients with rheumatoid arthritis but also with patients of ankylosis of hip. Another problem was unable to dislocate the femoral head due to ankylosis, in such cases, we did neck osteotomy first and then removed the head as peacemeal. The indications for total joint replacement are evolving. When THR were originally introduced and popularized in the 1970s, they were deployed as interventions of last resort for patients with substantial interference with activities of daily living.⁸ However, the risks of complications and early revisions have diminished in the last two decades. In addition, studies have demonstrated that patients operated upon later in the course of functional decline have worse functional outcomes than patients operated upon earlier. Thus, the indications are expanding and the option of total joint replacement is now typically presented to patients earlier in the course of arthritic progression and its associated functional decline.⁸

In a study conducted by Schnaser et al showed when compared to patients with OA, patients with rheumatoid arthritis, SLE, and ankylosing spondylitis had significantly more inpatient medical and orthopedic complications immediately after THA (p<0.01).¹⁴ Patients with Juvenile Idiopathic Arthritis (JIA) had the highest orthopedic complication rate (2.8%). Specific orthopedic complications by subtype included wound dehiscence for

rheumatoid arthritis and ankylosing spondylitis peri-prosthetic fractures for JIA and increased mortality for systemic lupus erythematosus patients. There were no significant differences in medical or orthopedic complications seen in patients with psoriatic arthritis.¹⁰

CONCLUSION

This study was undertaken in order to study the outcome of uncemented THA in patients with inflammatory arthritis. This study had shown in short term follow up that the outcome of the THA was good in majority of the patients and also most of them reported the improvement of HHSs. Most of the recent articles show improved and better outcomes of uncemented THR over cemented Arthroplasty in these individuals usually with long term follow up. THA is inevitable in patients with end stage arthritis due to inflammatory etiology as it limits their posture and restricts activities.

With 56.7% having good result and 13.3% having excellent result, based on the HHS, overall functional and clinical outcome had shown good results. In our short term follow up study we prove uncemented THA as a primary surgery in individuals with arthritis of hip secondary to inflammatory etiologies with limited activities. The limitations of the study include- small sample size of 30 patients and a short follow up period of average 1 year. Further research in this direction can bring out more facts about the disease.

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Conflict of interest: None declared

Ethical approval: The study was approved by the institutional ethics committee

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