Section: Orthopaedics

Original Research Article

RESULTS OF UNCEMENTED TOTAL HIP ARTHROPLASTY IN FAILED PRIMARY HIP REPLACEMENT

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ABSTRACT

Background: Primary objective of the study: To assess the clinical, functional and radiological outcomes of uncemented total hip arthroplasty performed for failed primary hip replacement. **Secondary Objectives of the study:** 1. To assess improvement in pain and functional mobility after surgery.
2. To analyse implant stability and osseointegration on follow-up imaging.
3. To determine the incidence of perioperative and postoperative complications.
Material and Methods: This prospective study was carried out on 32 patients, who underwent revision total hip arthroplasty in our institute, Sri Balaji Medical College, Hospital & Research Institute, Tirupati from October 2024 to November 2025. Patient follow up was for a minimum of 6 weeks to maximum of 24months.
Results: In the present study, about 50% of cases underwent uncemented revision total hip arthroplasty are less than 3years old postoperative case of primary total hip replacement or hemiarthroplasty. In 28 cases modular series was used for uncemented total hip arthroplasty, of which calcar replacement was done in seven cases, one case with only stem revision was done and in one case constrained liner was placed. 90% the patients were satisfied with the outcome of the uncemented total hip arthroplasty and considered their hip to have better function than prior to surgery. The limitation in our study is a relatively short follow-up period and therefore, we could not come to a conclusion about the long term radiological complications of revision total hip arthroplasty.
Conclusion: The present study concluded that uncemented revision total hip arthroplasty is the procedure of choice for the patients with failed primary total hip arthroplasty or hemiarthroplasty providing pain relief, preservation of mobility, range of motion and easy rehabilitation. The S-ROM (stability, range of motion) modular prosthesis is the implant of choice for uncemented revision total hip arthroplasty as it provides stability and in growth, as well as the ability to control leg length, offset and version. This study has shown the outcome of the uncemented total hip arthroplasty in failed primary replacement as good to fair results in terms of pain relief, increased walking distance, and functional capabilities of the patients.
Keywords: Total hip arthroplasty, S-ROM, modular prosthesis, Pain relief, Mobility.

INTRODUCTION

Total hip arthroplasty (THA) is one of the most successful orthopaedic procedures, providing significant pain relief and functional improvement in patients with degenerative and traumatic hip disorders. However, despite advances in implant design, surgical techniques, and perioperative care, a proportion of primary hip replacements eventually fail due to factors such as aseptic loosening, infection, instability, periprosthetic fracture, and implant wear. These failures necessitate revision surgery, which is technically more demanding and associated with higher complication rates than primary procedures.

Uncemented total hip arthroplasty has gained increasing popularity in revision settings due to its potential for biological fixation, preservation of bone stock, and long-term implant survival. Modern uncemented implants are designed to achieve stable initial fixation and promote osseointegration, even in the presence of compromised bone quality. As a result, they are widely used in revision hip arthroplasty, particularly in younger and more active patients.

However, the clinical and functional outcomes of uncemented THA following failed primary replacement vary across studies, and there remains a need for systematic evaluation of its effectiveness, safety, and durability in different patient populations. Assessing pain relief, functional recovery, implant stability, and complication rates is essential for guiding surgical decision-making and optimizing patient care.

This study aims to evaluate the clinical, functional, and radiological outcomes of uncemented total hip arthroplasty performed for failed primary hip replacement, thereby contributing to the existing evidence on its role as a revision strategy.

MATERIALS AND METHODS

Study design

The study was carried out on 32 patients of revision total hip arthroplasty operated in our institute, Sri Balaji Medical College Hospital & Research Institute, Tirupathi from October 2024 to November 2025. This is a prospective study and patient follow up was for a minimum of 6 weeks to maximum of 24months. The following Inclusion/ exclusion criteria were used for recruitment of patients in the study.

Inclusion Criteria

Patients with failed primary hip arthroplasty which includes failed total hip arthroplasty and hemiarthroplasty both cemented and uncemented due to:

- Aseptic loosening
- Protrusio acetabuli
- Dislocation
- Breakage of implant leading to loss of function
- Periprosthetic fracture
- Acetabular osteolysis

Exclusion Criteria

- Total hip arthroplasty in patients with internal fixation of proximal femoral fractures.
- Primary total hip arthroplasty (cemented or uncemented) in pathological hip joint.

All the patients planned for surgery were investigated according to a standard protocol. Detailed history and proper clinical examination were done to find out – duration of illness, focus of infection in the body, sensory and motor examination, vascularity of the limb, ambulatory status of the patient, deformities of the hip, Range of Movements (ROM) of the hip and status of the other joints. All the patients were assessed using Harris hip score. All patients were operated under combined spinal and epidural anaesthesia. In our study we used the posterior approach (Moore's) to hip joint, factiously labelled "The Southern Exposure".

Radiological assessment

Radiographs of the pelvis with both hips with proximal half of shaft of femora – AP View and lateral view of the involved side was taken for all patients. The radiograph was evaluated for

- Loosening of the prosthesis
- Calcar resorption
- Cortical hypertrophy
- Periprosthetic fracture
- Acetabular index
- Bone stock of the acetabulum
- The structural integrity of the acetabulum
- Need for bone grafting
- Size of the femoral canal.

Pre-operative decision regarding the choice of implant was made depending upon the presence or absence of calcar, extent of osteolysis of proximal femur, cortical perforations if any and the degree of acetabular erosions. In patients with cortical erosions at the tip of the prosthesis, a revision femoral stem was so selected that it bypassed the defect by at least 5cms. Cementless acetabular component was used in all hips.

Post operative protocol

Both the limbs were kept in abduction with a pillow in between the legs. Post operative analgesia was adequately given in the form of epidural analgesia. Injectable antibiotics were used for 3 days, and then converted to oral antibiotics till suture removal. Epidural catheter removed after 24 hours and low molecular weight heparin was given subcutaneously for 2 days followed by oral aspirin for 1month for prevention of thromboembolic events (deep vein thrombosis). Gradual weight bearing walk with walker was started from first post op day after evaluation of post op check x-rays.

In patients with split fracture of proximal femur and fracture greater trochanter that occurred intraoperatively during the process of metaphyseal reaming or during reduction of the prosthesis,

circumferential SS wiring of proximal femur and tension band wiring of greater trochanter was done. In these cases, partial weight bearing was advised for 3 weeks followed by gradual weight bearing in 6 – 12 weeks depending on the assessment of post op x-rays at regular intervals.

Follow up

The patients were followed up at 6 weeks, 3 months, 6 months, one year and at yearly intervals. Patient follow up was for a minimum of 3 months to maximum of 24 months (2 years). During each visit, medical history was taken and physical examination was done. Range of movements (ROM) were recorded. The clinical and functional outcomes were evaluated by Harris Hip Score evaluation. A radiograph was taken at the end of the procedure and during follow up visits. The standard radiograph was an anteroposterior view of pelvis including both hips and sufficient length of femur. The radiological assessment included positioning and alignment of the acetabular and femoral components and complications such as loosening, dislocation, prosthetic fractures and heterotopic ossification.

RESULTS

All 32 patients in the present study returned for clinical and radiological examinations subsequently. Patients were reviewed after 2months, 4months, 6months, 12months, 18months and 24months postoperatively. Male patients constitute 68.75% in our study group. Average age of patients in our study is 50.53%, youngest being 28 years and the oldest 70 years. Majority of the patients are in the middle age group with high functional demands. In this study about 30% of patients belong to failed primary total hip replacement (cemented/ uncemented) and 70% with failed hemiarthroplasty (Bipolar/Austin Moore prosthesis). A total number of 33 uncemented total hip arthroplasties in 32 patients are included in the study out of which one case is bilateral. The average follow-up period was 8.6 months with minimum patient follow-up was 2 months and maximum follow-up was 24 months. Majority of the patients were followed up during the period of 2 – 12 months (67.73%).

Clinical outcome

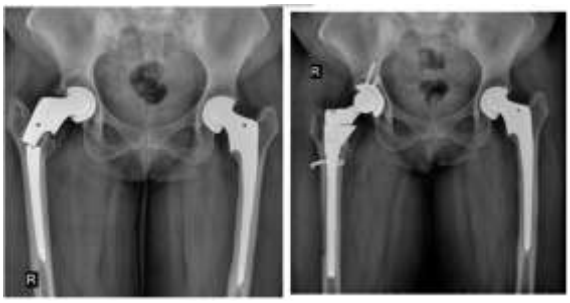
The average pre operative Harris Hip Score was 45.28 and the Harris Hip Score at most recent follow-up was 80.28. The result was excellent in 8 patients, Good in 13 patients, fair in 8 patients and poor in 3 patients. 90% the patients were satisfied with the outcome of the uncemented total hip arthroplasty and considered their hip to have better function than prior to surgery.

Radiological outcome

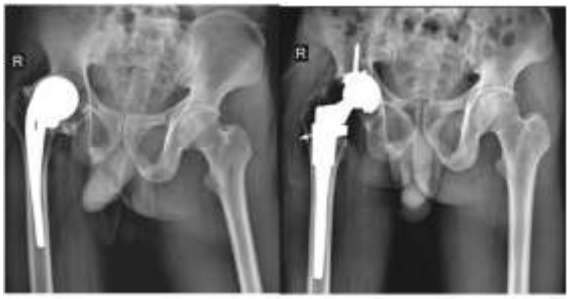
In majority of the cases (55.57) in our study the postoperative acetabular cup angle is less than 50 with normal femoral stem placement in 84.37% cases, and normal offset in 90% patients. Post operative radiological complications are very few. Stress shielding was noticed in 6 cases postoperatively, and dislocation occurred in one case which was reduced by closed reduction with immobilisation for 6 weeks and later followed by gait training with no evidence of further dislocations. Heterotopic ossification was noted in one case and none of the postoperative cases got infected till the last follow-up indicating satisfactory radiological outcome in revision total hip arthroplasty. As the limitation in our study is a relatively short follow-up period and therefore, we could not come to a conclusion about the long term radiological complications of revision total hip arthroplasty.

Preop and postop radiographs

Case 1



Case 2



Case 3

DISCUSSION

The purpose of the present study was to review the clinical and radiographic results of uncemented revision total hip arthroplasty in cases with failed primary replacement or hemiarthroplasty. The technique of revision was constant throughout the study period and involved the use of modular prosthesis in the majority of the patients (87.5%). It was hoped that the use of components without

cement would partially eliminate the problems associated with revisions performed with cement.

At least two requirements must be met in order to achieve bone in growth and long-term stability of implants inserted without cement. First, there must be intimate contact between the host bone and the porous surface of the implant and, second the implant must be stable. In the setting of revision arthroplasty, although a long stem may provide initial stability, conditions in the proximal part of the femur may not be favourable for biological fixation. The bone of the metaphysis may be thin and expanded, the endosteal surface may be grossly abnormal, and the contact between the host bone and the implant frequently is minimum. In retrospect, it is clear that the deficient bone stock in the proximal part of the femur commonly encountered in revision operations is a poor environment for bone ingrowth. A theoretical advantage of femoral implants inserted without cement is preservation or enhancement of existing bone stock.

Ours is a prospective study comprising of 32 patients with 33 revision total hip arthroplasties. The mean age of patients in the group is 50.53 years (range 28 to 70 years), which is comparable to the study done by D. J. Engelbert and his colleagues who reported the results in 134 patients mean age of 59.2 years (range 25 to 85 years).

The average pre operative Harris Hip score in our study is 45.28 which is similar to the pre operative average Harris Hip score in the studies done by B.D. Mulliken[10] and his colleagues. They studied 52 cementless total hip arthroplasties in 51 patients with average pre operative Harris Hip score of 46. Craig J. Della Valle[8] and his associates studied 131 patients of cementless acetabular reconstruction in revision total hip arthroplasty with average pre operative Harris Hip score of 49.

In our study the average pre operative Harris Hip score of 45.28 improved to 80.28 postoperatively at last follow-up. The increase in Harris Hip score is attributed to the surgical technique, type of the implant used, post operative care and physiotherapy advised to the patients.

The postoperative Harris Hip score observed in our study is comparable to the study conducted by Craig J. Della Valle and his associates who reported increase in the Harris Hip score from 46 points pre operatively to 80 points at the most recent evaluation. It is also comparable to the study conducted by Christopher L. Peters and his colleagues who reported improvement from 54 points preoperatively to 84 points at the time of the latest follow-up.

In our study excellent results were obtained in 25% of the cases, good in 40.62%, fair in 25% and poor in 9.37%. 26/32 (81.25%) patients could walk unlimited distance, 24(75%) patients walked without support, 26(81.25%) patients could use public transport. 90% of the patients who were employed prior to the surgery returned to work. 26 patients were completely pain free and 4 patients complained of slight pain and 2 patients with moderate pain.

Anthony K. Headley[3] and his colleagues reported the results of 136 cementless revision arthroplasty performed for various failed hip arthroplasties, 56 hips of the uncemented total hip series were rated clinically excellent or good, 3 hips were rated fair, and 3 were considered poor.

Christopher L. Peters[9] reported intermediate term results of 49 revision total hip arthroplasties without cement, 19 hips (39%) had an excellent result, 14 (29%) a good result, 10(20%) a fair result and 6(12%) a poor result. D.J. Engelbrecht[5] and his colleagues reported the results of 138 revision hip arthroplasties in 134 patients. 123 (92%) reported satisfactory reduction of pain, the others being unhappy with the degree of pain relief. In our study, the results were similar to the study done by Christopher L. Peters and Craig J Della but long term follow-up is awaited.

In majority of patients in our study (87.5%), modular prosthesis (S-ROM stem) was used. The modular design makes it possible to achieve independent sizing in the distal canal and proximal metaphysis. Its modularity poses minimal risk and allows for a staggering number of combinations to handle a wide variety of femoral defects. The design provides both proximal and distal stability along with intimate bone apposition, helping to ensure bone ingrowth while minimizing the incidence of stress shielding. Calcar replacement was done in 7 cases and only stem revision was done in 1 case where constrained liner was placed. One patient in our study presented with dislocation post-operatively where closed reduction was done with immobilisation for 6 weeks and later mobilised with walker with no further recurrent dislocation at the last follow-up.

The incidence of infection has dramatically decreased from a high of 11% in the 1960s to 0.5% to 2% in the more recent literature. Friedrich Bottner and Thomas P. Sulco[11] reported that in patients who underwent total hip replacement between 1986 and 1989, the incidence of infection was estimated to be approximately 2.3%. In our study none of the case reported with infection post-operatively.

In our study one patient (3.12%) presented with foot drop indicating sciatic nerve injury which was not recovered at the last follow-up. Sciatic nerve injury following revision total hip arthroplasty remains one of the most devastating complications for both patient and surgeon. The widely accepted incidence of postoperative neuropathies about the hip ranges from 0.6% to 2.9% for primary total hip arthroplasty and from 1.8%to 7.6% for revision total hip arthroplasty, which is comparable to our study. The sciatic nerve, specifically the peroneal distribution of the sciatic nerve is involved in nearly 80% of the cases.

Extended slide trochanteric osteotomy was done for 5 patients in our study (4 cemented THR + 1 cemented bipolar) and closed by circumferential SS wiring at three levels. The extended slide trochanteric osteotomy allows extensive acetabular and femoral exposure, facilitates removal of distal cement or a well fixed porous-coated stem, and allows reliable attachment and healing of the trochanteric fragment.

Union of the osteotomy site with callus formation was noticed in all patients at last follow up. Weiming chen[4] and his colleagues reviewed the results for 46 hips in 45 patients who underwent a revision total hip arthroplasty with an extended slide trochanteric osteotomy between December 1991 and December 1996. At a mean of 44 months after operation, the rate of union of the distal osteotomy site was 98% (44 of 45 hips), with no change in the femoral component position, which is comparable to our study.

The patients in our study were followed up for an average period of 8.6months (minimum of 2 months and maximum of 24 months). In the period that we followed the patients, we did not encounter any sign of loosening, peri-prosthetic fracture and infection. Limb length discrepancy > 2cms was present in 6 cases (18.75%) post operatively which was compensated by increasing the height of the sole on the same side in cases of shortening and in the opposite limb in cases of lengthening.

The limitation in our study is a relatively short follow-up and therefore we could not come to a conclusion about the late complications and long term results of uncemented revision total hip arthroplasty.

CONCLUSION

Uncemented revision total hip arthroplasty is the procedure of choice for the patients with failed primary total hip arthroplasty or hemiarthroplasty providing pain relief, preservation of mobility, range of motion and easy rehabilitation. The S-ROM (stability, range of motion) modular prosthesis is the implant of choice for uncemented revision total hip arthroplasty as it provides stability and bone ingrowth, as well as the ability to control leg length, offset and version. The posterior approach used in our series gave good results with incidence of one dislocation. This study has shown the outcome of the uncemented total hip arthroplasty in failed primary replacement as good to fair results in terms of pain relief, increased walking distance, and functional capabilities of the patients. The complications like aseptic loosening and particle wear requiring re-revision have not been found in our study, nor any analysis regarding survivorship and longevity of the arthroplasty. Long term follow-up is mandatory to analyse these aspects.

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