



E-ISSN: 2395-1958
P-ISSN: 2706-6630
IJOS 2024; 10(2): 161-166
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<https://www.orthopaper.com>
Received: 02-02-2024
Accepted: 28-03-2024

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Total hip replacement with arthritis in adults patients: Clinical assessment and outcome

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DOI: <https://doi.org/10.22271/ortho.2024.v10.i2b.3547>

Abstract

Introduction: Total hip replacement (THR) replaces damaged and worn hip joints with a smooth, artificial prosthesis. This low-risk procedure offers improved hip function and flexibility, reduced pain, and better stability in 95% of patients. The success of Total Hip Replacement arthroplasty is its ability to relieve the pain associated with hip joint pathology, while maintaining the mobility and stability of the hip joint.

Objective: To assess the evaluation and outcome of total hip replacement with arthritis in adults patients.

Methods: A prospective study of clinical and radiological analysis of cemented total hip arthroplasties performed for various hip pathologies at Department of Orthopedic Surgery, Kurmitola General Hospital, Dhaka, Bangladesh from January to December 2023. 50 patients were included in our study in whom 50 arthroplasties were performed. All cases were done using Hardinge's direct lateral approach. Clinical assessment was done using modified Harris Hip Score, preop and post op at 6 weeks, 3, 6, 12, 24 months and at latest follow up and points were given accordingly.

Results: This series consisted of 50 patients with 50 diseased hips treated with cemented total hip replacement. This study is conducted on patients with age ranging from 50 to 85 years with a mean age of 59.68 years at the time of surgery. The patients were followed post operatively at 6 weeks, 3, 6, 12, and 24 months. The average follow-up period was 18.8 months, minimum period of follow-up being 12 months and maximum period follow-up was 24 months postoperatively. Out of 50 patients, 34(68%) are males and 16 (32%) are females thus showing a male preponderance. 20 patients were operated on left side and 30 patients on right side. One patient had superficial infection who was treated with wound debridement, antibiotics and delayed suture removal. Two patients (8%) had leg length discrepancy(shortening) who were treated with shoe rise. The immediate mean postoperative modified Harris hip score was 88.44 with a minimum of 74 and maximum of 95. The mean follow-up Harris hip score increased to 91.28 with a minimum of 77 and maximum of 97. All patients who were included in our study had poor score preoperatively. In the follow up 42(84%) had excellent results, 4(8%) had good result and 4(8%) had fair results in the follow-up which is a significant improvement in the modified Harris hip score.

Conclusion: Total hip arthroplasty remains unchallenged because of its spectacular results- relief of pain, preservation or increase in mobility, range of motion and easy rehabilitation. Most of our patients were elderly active treated with cemented total hip replacement and have shown excellent clinical and radiological results after an intermediate period of follow-up.

Keywords: Hip replacement, arthritis, adults patients, outcome

Introduction

Total hip replacement (THR) replaces damaged and worn hip joints with a smooth, artificial prosthesis. This low-risk procedure offers improved hip function and flexibility, reduced pain, and better stability in 95% of patients^[1]. The key to successful hip arthroplasty is its ability to maintain hip mobility and stability while reducing pain associated with hip pathology. Total hip arthroplasty is a surgical procedure that has relieved millions of people from debilitating hip pain. To warrant total hip arthroplasty, pain must respond to conservative measures such as administration of oral nonsteroidal anti-inflammatory drugs, weight loss, activity restriction, and use of assistive devices such as canes. The field of total joint replacement surgery is in an evolving stage. The first total hip replacement was performed in London by Philip Wiles in 1938^[2]. The process was further developed in the 1950s by pioneers such as McKee and

Farrar [3]. This early work laid the foundation for the groundbreaking work of Sir John Charnley, who in the late 1960s approached the problem of artificial hip joint design using biomechanical principles of human hip function [4, 5]. The incidence of chronic disabling conditions of the hip such as osteoarthritis, inflammatory arthritis and osteonecrosis is on the rise. The most common condition for which total hip arthroplasty is done is severe osteoarthritis of the hip, accounting for 70% of cases. At present it is the most commonly performed adult re-constructive hip procedure [1]. Regardless of the cementing technique, mechanical loosening occurs more commonly in young, heavy, active men and with certain prosthetic designs. Early complications of hip arthroplasty include fracture, nerve injury, dislocation, deep vein thrombosis and pulmonary embolism. Late complications include infection, heterotrophic ossification and loosening. Aseptic femoral and acetabular loosening which is a potential cause of pain and loss of function have emerged as the most serious complications of THR and the most common indication for revision [6]. Many designs have been studied in an attempt to minimize these adverse effects and thus improve outcome. Total hip replacement (THR) relieves the pain and functional disability experienced by patients with moderate to severe arthritis of the hip, improving their quality of life [7]. It is a highly cost-effective procedure [8]. The anatomically designed prosthesis can provide good results, with low prevalence of pain in the thigh and loosening of the component, in younger active patients. Evaluation of long term outcomes of an operative procedure is important to determine the durability of the procedures like total hip replacement (THR). Patient derived outcome scales have become increasingly important to surgeons and clinical researchers for measuring improvement in function after surgery.

Methods and Materials

Prospective study on clinical and radiological analysis of cemented total hip arthroplasty performed for different hip pathologies at the Department of Orthopedics, Kurmitola General Hospital, Dhaka, Bangladesh from January to December 2023. Our study included 50 patients who underwent 50 arthroplasties. All cases were performed using the Hardinge direct lateral approach. Clinical evaluation was performed preoperatively and postoperatively, at 6 weeks, 3 months, 6 months, 12 months, 24 months, and at the latest at follow-up examinations using the modified Harris Hip Score, and assessed accordingly, points have been assigned.

Inclusion Criteria

- Age group above 50 years.
- All patients who had significant disabling hip pain and moderate to severe functional limitation of activities of daily living due to various hip pathologies with any of the etiologies.
- Patients who had one or more of the following radiological signs namely loss of sphericity of the femoral head, collapse of the weight bearing area of the femoral head, flattening of the femoral head, joint space narrowing, acetabular changes, and osteoarthritic changes.

Exclusion Criteria

- Age less than 50 years.
- Patients with severe systemic diseases contraindicating surgical procedure.
- Revision total hip arthroplasties.

All patients came for regular follow up. All patient data and clinical history were noted with reference to pain, range of motion, gait, activities or function, pre operatively, at the time of discharge, at all follow ups. In our study we have used polyethylene-on-metal type of cemented total hip replacement in all our cases. 20 grams of cement is used for acetabular component and 40 gms for femoral component.

Preoperative Work Up

For the most part the success of total hip replacement depends on not only a sound technical surgical execution but on overall management which includes appropriate selection, proper motivation of the patient, effective and adequate post-operative management of the patient. A detailed history is taken and through physical examination is done. Medical consultation is always obtained. The patient is selected on the basis of patient's occupational and social requirements, the hip joint pathology, patient's age and agility for active life is assessed with respect to activity of the disease, the bone condition. Its density and texture, the functional status – Range of motion, suppleness, muscle power and the soft tissues about the hip are examined- skin for scarring or inflammation where incision is to be made, subcutaneous tissues suppleness and muscle for tone and power. Laboratory workup was done thoroughly and evolution of other joints was done by both clinically and radiologically. The patient is explained about the surgery, its limitations, the prognosis and the importance of maintaining only optimum weight. Epidural anesthesia is given to all the patients which help all the patients in post-operative analgesia. Blood Transfusion was given according to the post-operative Hb% and if clinical anaemia was present. Radiographic evaluation of both the hips was done and templating was done for both acetabular and femur components.

Technique

Under epidural anesthesia, patient in lateral decubitus position. Standard and adequate preparation is done. The limb is dropped free. An impermeable disposable steridrape is applied over the area of incision. The Hardinge's direct lateral approach was used. First we prepared the acetabulum and then the femoral canal. We used 20 gram of cement on the acetabular side and 40 gram on the femoral side.

Postoperative protocol

- Both the limbs were kept in abduction with a pillow in between the legs. Postoperative analgesia was adequately given in the form of epidural analgesia. Injectable antibiotics were used for 5 days, and then converted to oral antibiotics till suture removal.
- Heparin (LMW) was subcutaneously given for prevention of thromboembolic events for 7 days.
- Patients were encouraged to sit up in the bed from the first post op day. Quadriceps and knee bending exercises immediate postoperatively.
- Active abduction strengthening exercises were begun from the third post op day under the supervision of our physiotherapist.
- Ambulation training is started with walker on Day 1-2 followed by gait training with weight bearing as tolerated on Day 3-7. Full weight bearing on involved extremity can be started on Day 7.

Follow up Evaluation: Clinical assessment was done using modified Harris Hip Score pre-operative and post-operative at

6 weeks, 3, 6, 12, 24 months and at latest follow up and points were given accordingly. During each visit, medical history was taken and physical examination was done. The deformity and ROM were measured with goniometer. The clinical and functional outcomes were evaluated by Modified Harris Hip Score. Based on a total of 100 points possible, each question is awarded a certain number of points. Questions are further grouped into categories. The score is reported as 90-100 for excellent results, 80-89 being good, 70-79 fair, 60-69 poor and below 60 a failed result.

Radiological Evaluation

Her radiographs were taken at the end of the procedure and during follow-up examinations. The standard radiograph was an anteroposterior view of the pelvis, including both hips and the appropriate length of the femur. Radiographic evaluation includes positioning and alignment of the acetabular and femoral components, as well as complications such as periprosthetic fracture, loosening, osteolysis, dislocation, prolapse, and heterotrophic ossification.

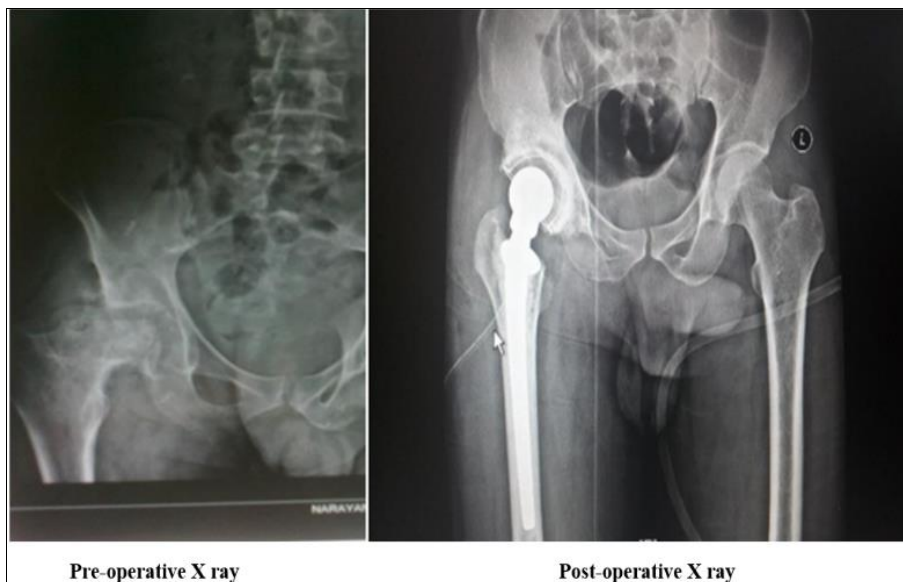


Fig 1: Shows the pre-operative X-ray and post-operative X-ray.



Fig 2: At final follow up.

Results

This series consisted of 50 patients with 50 diseased hips treated with cemented total hip replacement. This study is

conducted on patients with age ranging from 50 to 85 years with a mean age of 59.68 years at the time of surgery. The patients were followed post operatively at 6 weeks, 3,6,12, and 24 months. The average follow-up period was 18.8 months, minimum period of follow-up being 12 months and maximum period follow-up was 24 months postoperatively. Out of 50 patients, 34(68%) are males and 16 (32%) are females thus showing a male preponderance. 20 patients were operated on left side and 30 patients on right side. Although some cases showed bilateral involvement of arthritis in X-rays, patients came mainly with complaints on unilateral side. The main indication for surgery was secondary arthritis due to AVN in 34 patients (68%), 2 (4%) was due to ankylosingspondylitis, 2(4%) was due to rheumatoid arthritis which is confirmed by clinical evaluation and blood investigations. Two patents came with arthritis due to implant failure (table-3).

Table 1: Indication of total hip replacement with arthritis in adults patients (n=50)

Indication	Frequency	Distribution
Sec Oa Due To Avn	34	68%
Sec Oa Due To Neglected Ic	8	16%
Ankylosing Spondylitis	2	4%
Dhs Implant Failure With Arthritis Hip	2	4%
Rheumatoid Arthritis	2	4%
Protrusio Acetabulum With Amp Insitu	2	4%
Total (N)	50	100%

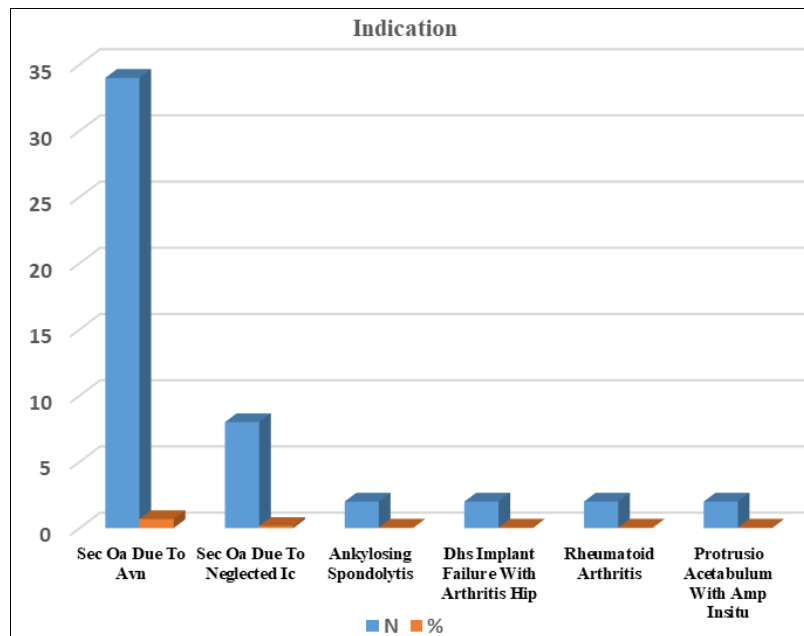


Fig 3: Indication of total hip replacement with arthritis in adults patients

Table 2: Complications of total hip replacement with arthritis in adults patients (n=50)

Complications	Frequency	Distribution (%)
Nerve Injury	0	0
Periprosthetic Fractures	0	0
Dislocations	0	0
Dvt/Pe	0	0
Superficial Infections	2	4
Anterior Thigh Pain	4	8
Varus Angulation	4	8
Heterotopic Ossification	0	0
Signs Of Loosening	0	0
Leg Length Discrepancy	4	8

In our study two patients (8%) had varus angulation of the stem who complained of anterior thigh pain postoperatively. This was relieved in subsequent follow-ups. One patient had superficial infection who was treated with wound

debridement, antibiotics and delayed suture removal. Two patients (8%) had leg length discrepancy (shortening) who were treated with shoe rise (table-2).

Table 3: Pre and post-operative score of total hip replacement with arthritis in adults patients (n=50)

Score	No. of Patients	Minimum	Maximum	Mean	Standard Deviation
Pre Op Score	50	21	62	45.040	10.51
Post Op Score	50	74	95	88.44	5.41
Follow Up	50	77	97	91.280	4.93

In our study the mean preoperative modified Harris hip score (Table 3) were 45.04 with minimum of 21 and maximum of 62. The immediate mean postoperative modified Harris hip score was 88.44 with a minimum of 74 and maximum of 95.

The mean follow-up Harris hip score increased to 91.28 with a minimum of 77 and maximum of 97. There was a significant improvement in the follow up Harris hip score (modified) with a p value of 0.044(<0.05).

Table 4: Outcome of total hip replacement with arthritis in adults patients (n=50)

Outcome of score	Pre-operative	follow up
poor	50 (100%)	0
fair	0	4 (8%)
good	0	4 (8%)
excellent	0	42 (84%)

All patients who were included in our study had poor score preoperatively. In the follow up 42(84%) had excellent results, 4(8%) had good result and 4(8%) had fair results in the follow-up which is a significant improvement in the

modified Harris hip score. All patients who were included in our study had poor score preoperatively. Clinical outcome score is shown in (table-4).

Table 5: Pre and post-operative Harris score of total hip replacement with arthritis in adults patients (n=50)

Harris score	Pre op Harris score	Post op Harris score
Garino and Steinberg-62	45	92
Katz RL, Bourne-63	39	88
Current study	45.04	88.44

Discussion

Total hip replacement eliminates osteoarthritis in the hip entirely. It may dramatically improve your quality of life by alleviating pain and restoring stability and range of motion to the hip. A surgeon performs total hip replacement using spinal or general anesthesia. Joint replacement surgery relieves the pain and stiffness of arthritis for most people. Some people may still have some symptoms of arthritis. It relieves pain and functional disability experienced by patients with moderate to severe arthritis of the hip, improving their quality of life [9] 95% of hip replacement patients and 90% of knee replacement patients felt better after the operation. The majority of patients thought the results of their operation were excellent, very good or good. This occurred for 93% of hip replacement patients and 87% of knee replacement patients. The study was carried out on 50 hips of 50 patients who underwent cemented Total Hip Replacement. In western literature, as per Harkness [10], Charney [11], Eftekhar [9] total hip arthroplasty has primarily been described for patients in older age group of sixty and above. In our study, all patients were found to be in the 50 and above age group, with age ranging from 50 to 85 years and a mean age of 59.68 years. Majority, 34 (68%) were males and 16 (32%) were females. The Harris hip score is the most widely used scoring system for evaluating hip Arthroplasty [12]. Arthritis was the most common indication for THR surgery in our study as well, most of which were caused secondary to Avascular necrosis. In our study, the average pre-operative Harris Hip Score of 45.04 improved to 88.44 at the time of discharge and to 91.28 at follow up. This increase in harris hip score may be attributed to the imposed restrictions on the patient in the immediate post op period and the regimen of rigorous physiotherapy advised to the patient after the first month. The post op Harris Hip Score observed in our study is comparable to that in the study conducted by Garino and Steinberg [13] who reported increase in the Harris Hip Score from 45 pre operatively to 92 in the post op period. In one study thirty-one patients with avascular necrosis of the hip were treated by 34 total hip arthroplasties (THAs). All patients were observed prospectively with a minimum two-year follow-up evaluation (average, 46 months; range, 24-84 months). The overall Harris hip score ratings were 88 in the cemented [14]. In our study the average follow-up period is 18.8 months (range 12-24 months) with an overall harris hip score at final follow-up is 91.28. Comparison of Harris hip score with other studies. In our series, after a minimum follow up of 2 years, 42 (84%) hips had excellent Harris hip scores, 4 (8%) had good scores, 4(8%) had fair scores similar to most previous studies [15] with cemented arthroplasties. Among them 38.1% had rheumatoid arthritis, 19.1% had ankylosing spondylitis and 42.8% had avascular necrosis. Regarding the functional outcome, 76.2% patients had excellent, 19.1% had good and 4.8% had fair outcome [16]. Two patient among 50 in our study developed infection (4%) which was treated with antibiotics and delayed suture removal, eventually it did not effect the outcome. Young HooKim [17] *et al.* reported incidence of infection in their study as 2%. Scott G Kantor *et al.* reported that 12.5% of cases came for revision for loosening at 10 years. In our study, no loosening observed in any of the 25 arthroplasties

during the follow-up of an average period of 18.8 months (maximum 93 follow up of 2 years). There is strong evidence to suggest that cement-stem deboning is important in aseptic loosening [18, 19]. Biomechanical studies have identified this interface, particularly the proximo-medial region and the tip of the prosthesis as the area of highest stress on loading [20]. Irregularities and defects of the cement cuff, eccentric placement of the implants, and direct contact between implant and bone promote fragmentation of the bone cement [21, 22]. Of the 142 hips in the 130 patients who were alive at a minimum of fifteen years, twenty-two (15 per cent) had been revised: fifteen (11 per cent), because of aseptic loosening; three (2 per cent), because of loosening with infection; and four (3 per cent), because of dislocation. No case in our study went to revision in a follow-up of minimum of 12 to 24 months [23]. The strength of this study is that all hips were primary arthroplasties, all were done using a uniform technique, done by same surgeon and no patient lost for follow-up. The limitation in our study is that the sample size is less and the follow-up duration is not very long so as to demonstrate the long-term complications of this procedure. Most hip replacements are performed on patients between 60 and 80 years old. As osteoporosis and other forms of arthritis are more common in older people, they are more likely to need partial or total hip replacement surgery. While uncommon, younger adults and teenagers have been known to require hip arthroplasty. Even the oldest patients notice their new hip joints allow them to move comfortably and accomplish daily tasks more effectively. In essence, hip replacement surgery can be a new lease on life for seniors who struggle with pain, poor balance, strength, and ambulation for years.

Conclusion

Total hip arthroplasty remains unchallenged because of its spectacular results- relief of pain, preservation or increase in mobility, range of motion and easy rehabilitation. The direct lateral approach used in our series gave excellent results and no incidence of dislocation was found. However, we do consider the individual surgeons preferences regarding the approach. Most of our patients were elderly active treated with cemented total hip replacement and have shown excellent clinical and radiological results after an intermediate period of follow-up. Though the study was not free of complications, the overall functional and clinical outcome showed good results.

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How to Cite This Article

Wafee A, Modak AK, Mohammad A. Total hip replacement with arthritis in adult's patients: Clinical assessment and outcome. *International Journal of Orthopaedics Sciences.* 2024;10(2):xxx-xxx.