

A PROSPECTIVE STUDY ON OUTCOMES OF TOTAL HIP REPLACEMENT FOR VARIOUS AETIOLOGIES IN A TERTIARY CARE HOSPITAL

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Abstract

Background: Total hip replacement (THR) has been one of the most successful procedures since its inception, and it remains the preferred treatment for long-term functional restoration in patients with a range of hip problems. The objective is to evaluate functional outcomes in primary total hip replacement in adults using the Harris Hip (Modified) score. **Materials and Methods:** It is a prospective study and was conducted in the Department of Orthopaedics for one year including patients who consented and underwent Total Hip Replacement with a sample size of 20 by using a simple random technique. Following this, they were subjected to a thorough clinical examination and general condition was assessed and accordingly, corrective measures were taken to correct the general well-being of the patients. Routine blood investigations were done for all the patients. Patients were evaluated according to the Harris hip scoring system. **Result:** In this study, we have noted excellent outcomes in 4 operated hips (20%), good in 14 hips (60%) and fair results in 2 hips (10%). No poor results were noted. Hence, excellent or good results were noted in 18 hips (90%) whereas fair or poor results were noted in 2 hips (10%). Avascular necrosis was seen in 8 patients (40%). Fracture neck of the femur was present in 4 patients (20%). Ankylosing spondylitis was the preoperative diagnosis in 3 patients (15%). Rheumatoid arthritis was present in 3 patients (15%). 2 patients (10%) had osteoarthritis. **Conclusion:** Our experience and results conclude that primary total hip replacement still holds its place in India and is an excellent procedure in the management of arthritic hip especially in the elderly with abrupt change in the restricted lifestyle post-surgery.

INTRODUCTION

Total hip replacement (THR) is one of the most popular and successful surgical procedures.^[1] THR is used to treat pain and restore function to the hip joint in people with end-stage osteoarthritis (OA).^[2] Orthopaedic surgeons have traditionally measured the outcome of THR using morbidity and death rates, or implant survival rate indices.^[3,4] The 10-year survival rate of the THR implant has been reported to be as high as 95%, with 15-year survival exceeding 85%.^[5]

It is reported that 6 to 15% of individuals undergoing THR experience prolonged discomfort and functional impairment,^[6] and 6-7% are dissatisfied with the outcome of the operation after one year.^[7,8] Patients are often less satisfied with their outcomes than surgeons,^[9] hence assessments based on patient-reported outcome measures (PROMs) are

recommended.^[10] PROMs are currently widely employed in arthroplasty registrations.^[11]

However, the majority of clinically significant improvement following primary joint replacement occurs within the first six months after surgery,^[12] and continued gain in perceived physical functioning (but not in everyday activities) may be predicted even after this period.^[13] The one-year follow-up scores are supposed to be two to three times higher than the baseline values tested before THR in various PROMs.

Total hip replacement (THR) has been one of the most successful procedures since its inception, and it remains the preferred treatment for long-term functional restoration in patients with a range of hip problems.^[14,15] THR is commonly used in Western countries to treat primary osteoarthritis (OA), ankylosing spondylitis (AS), avascular necrosis (AVN), rheumatoid arthritis (RA), and trauma.^[16,17]

Varied etiologies produce varied biomechanics for hip arthroplasty. While AVN hip affects younger patients with healthy musculature, those with primary OA may have wasted musculature due to advanced age. Hips with post-traumatic sequelae may have physical deformities as a result of the main trauma or any subsequent primary operations. With such diverse and vivid indications for a conventional procedure, whether or whether the indication itself influences the outcome is a valid question that requires a response. In India, literature is scarce on the epidemiology of primary THR cases. The lack of a regional or nationwide arthroplasty registry is a major contributor to this insufficiency.

The purpose of this prospective study is to evaluate the short-term functional outcome of total hip replacement in adults.

Objectives: Evaluation of functional outcome in primary total hip replacement in Adults using Harris Hip (Modified) score.

MATERIALS AND METHODS

Study Design: Hospital-based prospective study.

Study area: The study was conducted in the Department of Orthopaedics.

Study Period: 1 year.

Study population: Patients who consented and underwent Total Hip Replacement.

Sample size: The study consisted of a total of 20 subjects.

Sampling Technique: Simple Random technique.

Inclusion Criteria

- Pain, stiffness and deformity of the hip not relieved by analgesics, physiotherapy, or lifestyle modifications.
- Age greater than 40 years.
- Patients with degenerative arthritis of the hip (osteoarthritis, avascular necrosis, rheumatic arthritis, post-traumatic osteoarthritis, non-union fracture neck of femur, ankylosing spondylitis)

Exclusion criteria

- Age less than 40 years
- Patients having neurological comorbid conditions like hemiplegia, quadriplegia, and cerebral palsy.
- Patients medically unfit for surgery
- Patients with active infection.
- Patients with cognitive or behavioral problems

Ethical consideration: Institutional Ethical committee permission was taken before the commencement of the study.

Study tools and Data collection procedure: On admission to the ward, a detailed history of the patients was taken according to proforma. Following this, they were subjected to a thorough clinical examination and general condition was assessed and accordingly, corrective measures were taken to correct the general well-being of the patients. Routine blood investigations were done for all the patients. Special attention was paid to CRP and ESR and if these were abnormal, surgery was deferred. Standard

anteroposterior and lateral X-rays were taken including the pelvis with both hips. Analgesics, antibiotics, and blood transfusions were given as needed before surgery.

The patients were evaluated according to the modified Harris hip scoring system. The scores taken into account were of pain, function, range of motion, and deformities. Also, a mention of the limb length discrepancy and flexion contracture is made. The physical fitness of the patient undergoing major surgery was assessed. Physical examination included examination of the spine and lower extremities including the opposite hip, knees and foot. Trendelenburg test to assess the abductor musculature mechanism was done.

Follow-Up: At the time of discharge, the patients were asked to come for follow-up after 6 weeks and for further follow-up at 3 months and 6 months. Thereafter every six months. The patients who turned in for follow-up were finally taken up for the assessment of functional results. At follow-up, a detailed clinical examination was done systematically.

Patients were evaluated according to the Harris hip scoring system for pain, limp, the use of support, walking distance, ability to climb stairs, and ability to put on shoes and socks (in our study for some patients ability to cut toenail was enquired about) sitting on the chair, ability to enter public transportation, deformities, leg length discrepancy and movements. All the details were recorded in the follow-up chart. The radiograph of the operated hip was taken at regular intervals, at each follow-up.

Statistical analysis: Collected data entered in the Microsoft Excel sheet. Data analysis was done by SPSS software Version 20. Continuous variables were categorized as either normal or abnormal and the patients in either category were reported as a proportion. Pearson's chi-square test also known as the Chi-square test for independence and the Chi-square test of association was used to detect if there was any relationship between two categorical variables. ANOVA was used to compare the two means. A p-value of 0.05 is taken as significant.

RESULTS

This series consisted of 20 patients with 20 diseased hips treated with total hip replacement. The follow-up was for a minimum of 6 months. Results were analyzed both clinically and radiologically.

Out of 20 patients, 7 patients (35%) belonged to age 40-49 years, 4 patients (20%) belonged to the age group between 50-59 years, 8 patients (40%) belonged to the age group between 60-69 years, One patient (5%) belonged to the age group between 70-79 years.

Out of 20 patients, 13 (65%) were males and 7 (35%) were females, thus showing a male preponderance.

In our study, 11(55%) patients had right-side affection and 09(45%) patients had left-side affection.

Avascular necrosis was seen in 8 patients (40%). It was due to steroids in 4 patients, it was post-traumatic in 2 patients and idiopathic in 2 patients. Fracture neck of the femur was present in 4 patients (20%). 2 cases were of failed hemiarthroplasty operated 1 year

and 1½ years back respectively. 1 patient was the case of fresh trauma, and 1 case was an old neglected fractured neck femur presenting after 6 months of trauma. Ankylosing spondylitis was the preoperative diagnosis in 3(15%) patients. All patients had spine and sacroiliac involvement. Rheumatoid arthritis was present in 3(15%) patients. 2(10%) patients had osteoarthritis as a preoperative diagnosis.

Table 1: Age Distribution

Age in years	No. Of patients	Distribution
40-49	07	35%
50-59	04	20%
60-69	08	40%
70-79	01	05%

Table 2: Etiologies

Indications	No. Of patients	Distribution
Avascular necrosis	8	40%
Non-union fracture of	4	20%
Rheumatoid arthritis	3	15%
Ankylosing spondylitis	3	15%
Osteoarthritis	2	10%

Table 3: Pre-operative and post-operative Harris hip score

The mean pre-operative Harris hip score was 42, ranging from 30-49. This score had improved postoperatively to 86 (Range = 75 - 95).

Pain:

Description of pain	Preoperative	Postoperative
Marked Pain	20	0
Moderate Pain	70	0
Mild Pain	10	0
Slight Pain	0	30
No Pain	0	70

Preoperative, marked pain was present in 20% of our patients, moderate pain was present in 70% of patients, and mild pain was present in 10%. At the latest follow up 70% of patients had no pain. Only 30% of patients had slight pain for which analgesics were required.

Limp: While 100% of patients had a limp preoperatively, only 10% of the patients had moderate limp post-operatively. 90% of patients had slight or no limp.

Limp	Preoperative (%)	Postoperative (%)
Severe	80	0
Moderate	20	10
Slight or None	0	90

Support: While 100% of patients required support for ambulation preoperatively, only 10% required support postoperatively. 90% of patients required no or occasional support for walking.

Distance walked: Preoperatively most of the patients were restricted to indoor activities or bed only. Postoperatively, 90% of patients could walk for long distances and 10% were restricted to less than 500 meters only.

Deformity: 75% of the patients had a significant preoperative deformity (more than 30 degrees fixed flexion, more than 10 degrees fixed adduction, more than 10 degrees fixed internal rotation in extension, and a limb length discrepancy of more than 3.2 cm). Postoperatively, only 5% of the patients had any significant deformity remaining.

Table 4: Harris Hip Score

Results	No. Of hips	Distribution
Excellent	04	20%
Good	14	70%
Fair	2	10%
Poor	0	0%

All patients had poor Harris hip scores preoperatively. 90% of patients had good or excellent results postoperatively. Two (10%) patients had fair results.

RADIOGRAPHIC RESULTS

The results of the radiographic evaluation on all hips on all follow-up visits were as follows

Femoral Component:

The femoral component was in neutral alignment in 17 hips (85%), with less than 10 degrees of valgus in 2 hips (10%) and less than 5 degrees of varus in one hip (5%). At the last follow-up, no radiographs showed any evidence of a new radiolucency, any shift in the position of any femoral component or any crack in the cement mantle.

Acetabular Component:

Acetabular cups were positioned on an average of 40 degrees of abduction (Range = 30-55 degrees). At the latest follow up 20 of the 20 acetabular components did not show any evidence of horizontal or vertical migration. No radiolucent lines were seen at the bone-cement prosthesis on any radiographs. There were no fractures.

Table 5: Complications

Complications	No. Of Hips	Distribution
Nerve injuries	1	5%
Superficial wound infection	1	5%
Haemorrhage	-	-
Bladder injuries	-	-
Limb length discrepancy	-	-
Dislocation	-	-
Thromboembolism	-	-
Loosening	-	-
Heterotopic ossification	-	-
Stem failure	-	-

Complications:

Superficial wound infection: A superficial stitch infection was noted in one patient on routine wound inspection on the 5th postoperative day. The wound was explored and no communication was found beneath the deep fascia. So superficial tissues were debrided and they healed well on antibiotics.

Dislocation: We had no case of posterior dislocation in our study. The patients were discharged and regularly followed-up. No episodes of dislocation were noted.

Nerve Injury: In our study, it was found that in one patient there was sciatic nerve neuropraxia it was due to excessive stress on the nerve intraoperatively, the patient was advised passive dorsiflexion and plantar flexion exercises and was given below knee drop foot splint to prevent equines deformity. Patients recovered from the neuropraxia in 6 weeks. Weight-bearing was delayed in this patient. No other complications were noticed in the patients during the period of this study.

DISCUSSION

Total hip replacement has revolutionized the treatment of arthritic hips over the last four decades, providing a permanent solution to hip discomfort caused by a variety of illnesses. The operation aims to relieve discomfort while also preserving joint motion and stability.

One of the most common complications of total hip arthroplasty is component loosening caused by osteolysis. As a result, the overall survival rate of hip components is lowered. Improved cementing procedures have shown that cemented femoral acetabular fixation provides long-term benefits. However, acetabular component fixation demonstrated loss of fixation in several individuals after ten years.

While our study was limited to 20 T.H.A., Berger et al,^[18] performed 150 T.H.A., Harris et al,^[19] performed 126 T.H.A., and Goldberg et al,^[20] performed 125 T.H.A. This is because this study was limited to a very short duration. Also, financial constraints and unawareness of this procedure to the patient limited the number of patients for this study. The strength of this study is that all hips were primary replacements, all were done using a uniform technique, done at the same hospital and no patient was lost for follow-up. The limitation of this study is the follow-up duration which is relatively short to demonstrate the long-term complications that are bound to occur.

Many series have shown that the rate of loosening and revision of total hip arthroplasty is high in younger patients. The cemented acetabular component has been the source of most of these failures. The short-term results of the cement-less acetabular reconstruction have been encouraging in young patients. Berger et al,^[18] reported a 10-year survival of 98.8% in patients younger than 50 years. The most common diagnosis in the present series was avascular necrosis (40%) followed by a fractured neck of the femur (20%). There were 3 cases of Ankylosing Spondylitis, 3 cases of rheumatoid arthritis and 2 cases of osteoarthritis. Studies in the West report Osteoarthritis as the most common diagnosis (63% by Harris et al,^[19] & 77% by Berger et al.^[18] Avascular necrosis is the second most common diagnosis in the Western literature (10% by Harris et al,^[19] & 7% by Berger et al.^[18] In this series, the difference in diagnosis might suggest a high rate of A.V.N. and a low rate of osteoarthritis in Indian patients. A study for a longer period and with longer follow-up is needed to establish this fact and determine the reason for this difference.

Chemoprophylaxis was routinely carried out in all patients. No patient developed a deep infection and

only one case of superficial infection was detected. All surgeries were performed in conventional operating theatres. Wilson et al reported a significant fall in the infection rates when prophylactic antibiotics were used from 11% to 1%. Goldberg et al,^[20] reported a rate of 0.8% of deep infection using vertical laminar flow operating rooms and body exhaust systems. No case of deep infection in the present study highlights the importance of proper operating room discipline along with prophylactic antibiotics can significantly reduce infection rates.

Patients were evaluated after discharge at 4 weeks, 2 months, 6 months, 1 year, 1½ yrs and then yearly. The average follow-up was 11 months in this study, as compared to much larger follow-ups available in Western literature (42 months by Harris et al,^[19] 8.6 years by Goldberg et al,^[20] and 103 months by Berger et al).^[19] The mean Harris hip score improved from 42 points preoperatively to 86 points postoperatively. 90% of the hip were graded as good or excellent in this study, 10% were graded fair and no poor results were reported.

Harris et al,^[19] reported improvements in Harris hip score from 57 preoperatively to 93 points postoperatively. 96% good to excellent results, 4% fair and no poor results were reported. Goldberg et al,^[20] reported an improvement in Harris hip score from 47 preoperatively to 88 points postoperatively. 85% good to excellent results, 13% fair and 9% poor results obtained in his series. These figures were comparable to our results. Pain relief was also dramatic following THR. 20% of the patients had marked pain preoperatively and 70% had moderate pain. Postoperatively 90% of patients were relieved of pain and 10% of patients had slight pain. A similar result was obtained by Harris et al,^[19] (98% complete pain relief) and Berger et al,^[18] (94.5% complete pain relief).

Slight or no limp is seen in 90% of patients in this study. Moderate limp was present in 10% of patients. In a study by Harris,^[19] 63% of patients had no limp and 28% of patients had slight limp. Berger et al,^[18] also reported a low rate of limping. The limping improves over a while with progressive abductor exercises. As this study has a follow-up of 11 months, percentages of patients limping are expected to decrease with time.

90% of patients needed no support or only an occasional cane for walking long distances. 10% of patients required a cane full-time. This finding is comparable to the results comparable to the results obtained by Harris et al (95% of patients used a cane occasionally). Radiographical results were also excellent. No hip showed any evidence of loosening or osteolysis in the femoral and acetabular components. In the series by Harris et al., no femoral component was definite or probably loose and one acetabular component showed migration. Goldberg et al,^[20] reported revisions of one acetabular component for recurrent dislocation (0.8%) and one stem revision for mechanical loosening, one stem radiographically loose. However, as our study has a

very short follow-up, definite conclusions can only be drawn after a longer follow-up.

Low complications were seen in our series. 1 superficial infection and 1 sciatic neuropraxia were seen. Harris et al reported 5 cases of trochanteric non-union (8%), 19 cases of deep vein thrombosis (15%), 9 dislocations (7%), 2 partial femoral and sciatic nerve paralysis and 2 patients had peroneal nerve paralysis (1.5% each). Goldberg et al.²⁰ had 3 dislocations (2.4%), 1 deep infection (0.8%) and 3 deep vein thrombosis (2.4%).

In this study, we have noted excellent outcomes in 4 operated hips (20%), good in 14 hips (60%) and fair results in 2 hips (10%). No poor results were noted. Hence, excellent or good results were noted in 18 hips (90%) whereas fair or poor results were noted in 2 hips (10%). The outcome noted in this series is comparable to other studies which had a long follow-up period.

Table 6: Comparison of Results

Study	Year	Result
Kavanagh, ^[21]	1989	excellent or good results were noted in 78% of the Hips
Schulte, ^[22]	1993	86% excellent or good results and 14% fair or poor
Goldberg, ^[20]	1996	85% good to excellent
R C Siwach, ^[23]	2007	75% good results were noted.
Rajendra Nath, ^[24]	2010	80% excellent to good results.
Our study	2017	90% excellent or good, 10% -fair or poor results

CONCLUSION

Our experience and results conclude that primary total hip replacement still holds its place in India and is an excellent procedure in the management of arthritic hip especially in the elderly with abrupt change in the restricted lifestyle post-surgery. The assessment of clinical results of total hip replacement has shown that there is a definitive improvement concerning pain, function and range of motion post-operatively.

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REFERENCES

1. I.D. Learmonth, C. Young, C. Rorabeck The operation of the century: total hip replacement, *Lancet*, 370 (2007), pp. 1508-1519.
2. R. Pivec, A.J. Johnson, S.C. Mears, M.A. Mont. Hip arthroplasty, *Lancet*, 380 (2012), pp. 1768-1777.
3. S.J. Birtwistle, K. Wilson, M.L. Porter. Long-term survival analysis of total hip replacement, *Ann. R. Coll. Surg. Engl.*, 78 (1996), pp. 180-183.
4. C. Varnum, Outcomes of different bearings in total hip arthroplasty - implant survival, revision causes, and patient-reported outcome. *Dan. Med. J.* (2017), p. 64.
5. T. Evans, J.P. Evans, R.W. Walker, A.W. Blom, M.R. Whitehouse, A. Sayers. How long does a hip replacement last? A systematic review and meta-analysis of case series and

- national registry reports with more than 15 years of follow-up. *Lancet*, 393 (2019), pp. 647-654.
6. L. Nikolajsen, B. Brandsborg, U. Lucht, T.S. Jensen, H. Kehlet. Chronic pain following total hip arthroplasty: a nationwide questionnaire study. *Acta Anaesthesiol. Scand.*, 50 (2006), pp. 495-500.
 7. R.E. Anakwe, P.J. Jenkins, M. Moran. Predicting dissatisfaction after total hip arthroplasty: a study of 850 patients. *J. Arthroplasty*, 26 (2011), pp. 209-213.
 8. Swedish hip arthroplasty register. Annual Report 2015, Svenska Höftprotesregistret, Gothenburg, Sweden, 1979-2018.
 9. P.C. Noble, S. Fuller-Lafreniere, M. Meftah, M.K. Dwyer. Challenges in outcome measurement: discrepancies between patient and provider definitions of success. *Clin. Orthop. Relat. Res.*, 471 (2013), pp. 3437-3445.
 10. M.J. Halawi. Outcome measures in total joint arthroplasty: current status, challenges, and future directions. *Orthopedics*, 38 (2015), pp. e685-689.
 11. I. Wilson, E. Bohm, A. Lubbeke, S. Lyman, S. Overgaard, O. Rolfson, et al. Orthopaedic registries with patient-reported outcome measures. *EFORT Open Rev.*, 4 (2019), pp. 357-367.
 12. M. Canfield, L. Savoy, M.P. Cote, M.J. Halawi. Patient-reported outcome measures in total joint arthroplasty: defining the optimal collection window. *Arthroplasty Today*, 6 (2020), pp. 62-67.
 13. Z.H. Dailiana, I. Papakostidou, S. Varitimidis, L. Liaropoulos, E. Zintzaras, T. Karachalios, et al. Patient-reported quality of life after primary major joint arthroplasty: a prospective comparison of hip and knee arthroplasty. *BMC Musculoskel. Disord.*, 16 (2015), p. 366.
 14. Kumar P, Sen R.K, Kumar V, Dadra A. Quality of life following total hip arthroplasty in patients with acetabular fractures, previously managed by open reduction and internal fixation. *Chin. J. Traumatol.* 2016; 19: 206-208.
 15. Gomez P.F, Morcuende J.A. A historical and economic perspective on Sir John Charnley, Chas F. Thackray Limited, and the early arthroplasty industry. *Iowa Orthop. J.* 2005; 25: 30-37.
 16. Furnes O, Lie S.A, Espehaug B, Vollset S.E, Engesaeter L.B, Havelin L.I. Hip disease and the prognosis of total hip replacements. A review of 53,698 primary total hip replacements reported to the Norwegian Arthroplasty Register 1987-99. *J. Bone Joint Surg.* 2001; 83: 579-586.
 17. Guo P, Gao F, Wang Y, et al. The use of anticoagulants for prevention and treatment of osteonecrosis of the femoral head: a systematic review. *Medicine (Baltim).* 2017; 96: e6646.
 18. Berger R A et al: Primary cementless acetabular reconstruction in patients younger than 50 years old. *Clin. Orthop.*, 249; 216-226, 1997.
 19. Harris W H; Maloney W J: Hybrid total hip arthroplasty. *Clin. Orthop.*, 249; 21-29, 1989.
 20. Goldberg V M et al: Hybrid total hip arthroplasty 7 to 11 year follow up. *Clin. Orthop.*, 333; 147-154, 1996.
 21. Kavanagh, BF, Dewitz MA, Ilstrup DM, Stauffer RN, Coventry MB. Charnley total hip arthroplasty with cement. Fifteen-year results. *J Bone Joint Surg Am* 1989; 71:1496-1503.
 22. Schulte KR, Callaghan JJ, Kelley SS, Johnston RC. The outcome of Charnley total hip arthroplasty with cement after a minimum twenty-year follow-up. The results of one surgeon. *J Bone Joint Surg Am* 1993; 75:961-975.
 23. Siwach RC, Kadyan VS, Sangwan SS, et al: A retrospective study of total hip arthroplasty. *Indian J Orthop* 2007; 41:62-66.
 24. Rajendra Nath, Anil Kumar Gupta, Unmesh Chakravarty, Rohit Nath: Primary cemented total hip arthroplasty: 10 years follow-up. *Indian J Orthop* July 2010; Vol. 44(3):283-288