

Clinical and Radiological Evaluation of Early Postoperative Complications Following Total Hip Replacement (Uncemented or Hybrid)

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Abstract

Background: Total hip replacement (THR) is a definitive solution for end-stage hip pathology, but early postoperative complications can significantly impact long-term outcomes. This study evaluates the clinical and radiological early postoperative complications in patients undergoing uncemented or hybrid THR. **Material and Methods:** A prospective analysis of 20 patients (15 uncemented, 5 hybrid) was conducted. Clinical outcomes were measured using the Harris Hip Score (HHS) and Visual Analogue Scale (VAS) for pain. Radiological assessments included component alignment and stability via AP radiographs. **Results:** The mean HHS at 6 months was 87.27 for the uncemented group and 82.40 for the hybrid group. The uncemented group showed significantly lower VAS pain scores (0.53 vs. 1.20, $p=0.019$). No statistically significant difference was found in surgical time or blood loss, though hybrid THR tended toward higher estimated blood loss (552.00 ml vs. 409.67 ml). **Conclusion:** Both uncemented and hybrid techniques provide excellent early functional outcomes. Early radiological surveillance is crucial for identifying asymptomatic complications like minor fractures or component migration.

Keywords: Total Hip Replacement, Uncemented THR, Hybrid THR, Early Complications, Clinical Evaluation, Radiological Evaluation.

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INTRODUCTION

Total hip replacement (THR) has emerged as one of the most successful and transformative procedures in modern orthopaedic surgery. It offers substantial pain relief and mobility restoration for conditions such as advanced osteoarthritis, avascular necrosis, and femoral neck fractures.

Despite technological advances, the early postoperative period (first six weeks to three months) remains critical. Complications such as periprosthetic fractures, dislocations, surgical site infections, and limb length discrepancies (LLD) can compromise recovery and necessitate revision. Uncemented and hybrid techniques are widely practiced today to achieve biological osseointegration, especially in younger patients.^[1-4]

MATERIALS AND METHODS

Study Design

A prospective observational study was conducted involving 20 patients undergoing primary THR. This study was conducted over 2 years and patient were followed up for 6 months each.

Inclusion Criteria:

1. Patients who underwent uncemented or hybrid total hip replacement
2. Age group between 30 and 80 years
3. Diagnosed cases of osteoarthritis of the hip
4. Patients with dysplasia of the hip
5. Patients with avascular necrosis of the hip joint

Exclusion Criteria:

1. Spondylolisthesis
2. Previous surgical procedures on the hip
3. Tuberculosis of the hip
4. Malignancies
5. Recurrent dislocation of the hip
6. Age less than 30 years
7. Age more than 80 years

Surgical Technique: The surgical approach was chosen based on surgeon experience and patient anatomy, with the posterior approach commonly used. It involves accessing the hip joint through the posterior aspect, typically by splitting the gluteus maximus muscle and detaching the short external rotators to expose the posterior capsule. This approach provides excellent visualization of both the acetabulum and femur, facilitating accurate component placement and ease of femoral preparation.

Uncemented THR: Both femoral and acetabular components were press-fitted.

Hybrid THR: The femoral component was cemented, while

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the acetabular cup was uncemented.

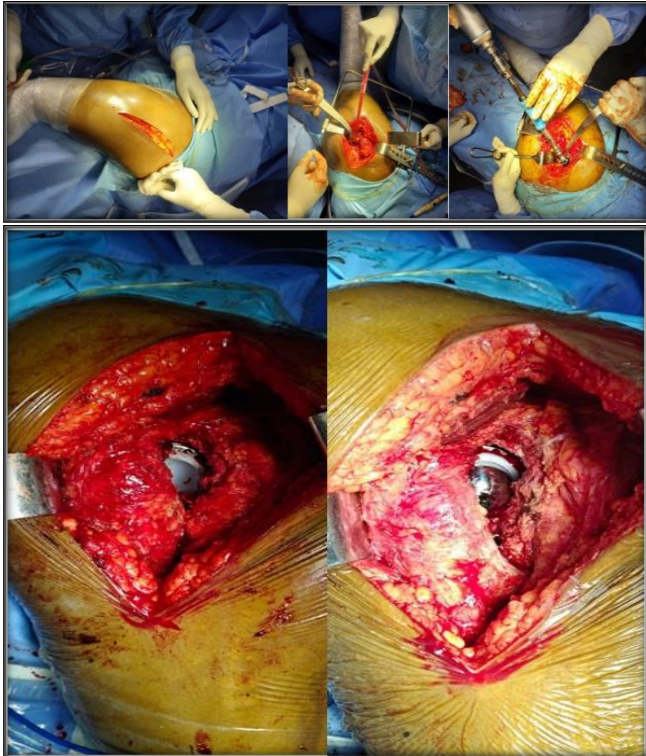


Figure 1: Intra-operative pictures of Total Hip Replacement

Evaluation Protocols:

Clinical: Patients were evaluated at baseline and at 6 weeks, 3 months, and 6 months using the Harris Hip Score (HHS) for function and the VAS for pain.

Radiological: Standard AP pelvis radiographs were used to assess cup inclination, anteversion, stem alignment, and signs of loosening or fracture.

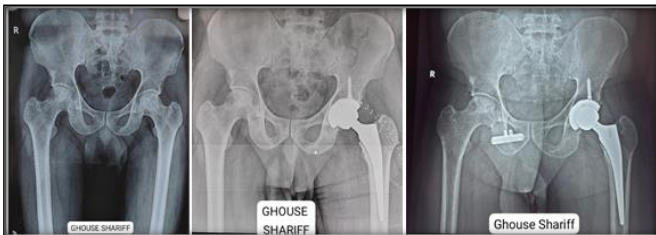


Figure 2: Radiographs of a patient who underwent Uncemented THR



Figure 3: Radiographs of a patient who underwent Hybrid THR



Figure 4: Clinical pictures of Uncemented THR case



Figure 5: Clinical pictures of Hybrid THR case

RESULTS

Patient Demographics and Indications: The primary indications were avascular necrosis (40%) and osteoarthritis (40%). Comorbidities included obesity (15%), hypertension, and diabetes. Out of 20 patients, 15 patients underwent Uncemented THR and 5 patients underwent Hybrid THR.

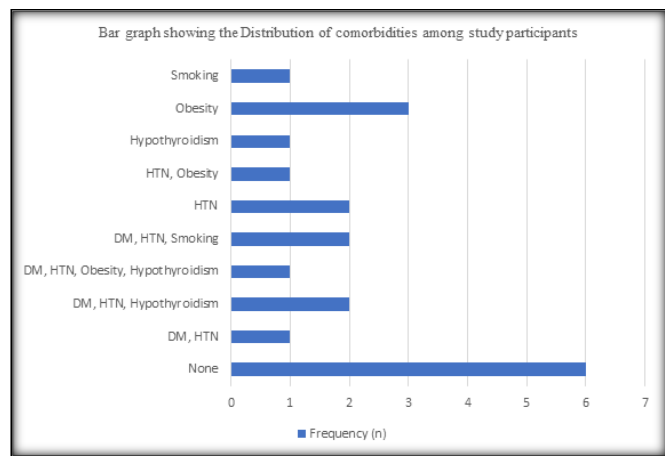
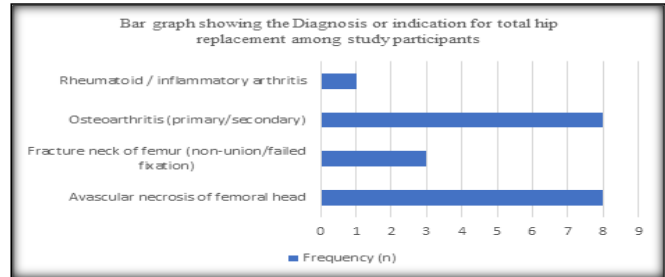
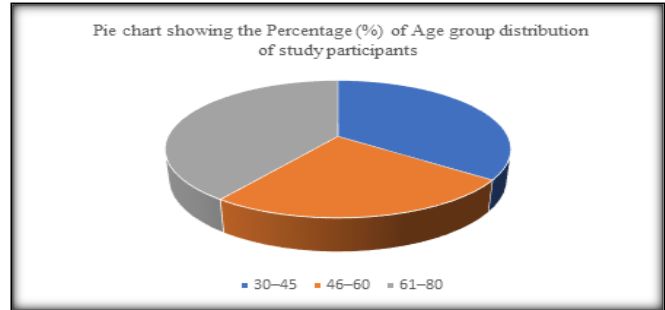
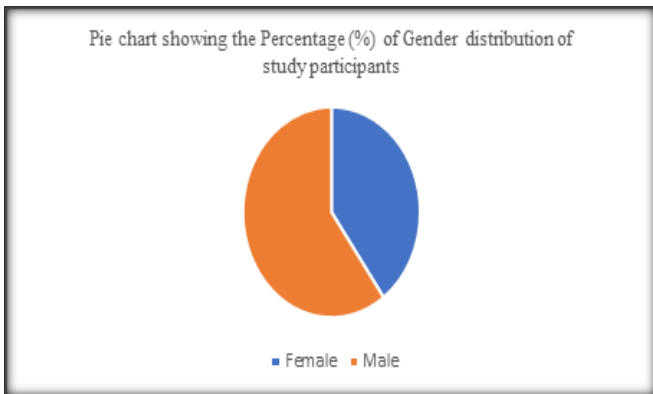
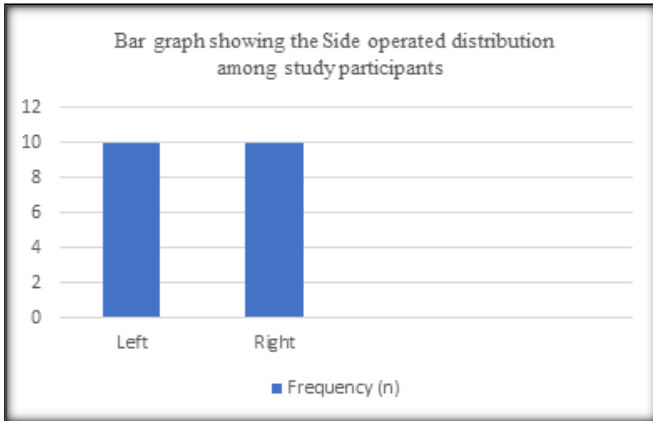


Table 1: Side operated among study participants

Side operated	Frequency (n)	Percentage (%)
Left	10	50.0
Right	10	50.0
Total	20	100.0

Table 2: Gender distribution among study participants

Gender	Frequency (n)	Percentage (%)
Female	8	40.0
Male	12	60.0
Total	20	100.0

Table 3: Age distribution of study participants

Age group (years)	Frequency (n)	Percentage (%)
30-45	8	35.0
46-60	5	25.0
61-80	7	40.0
Total	20	100.0

Table 4: Diagnosis/Indications for total Hip replacement among study participants

Diagnosis / Indication	Frequency (n)	Percentage (%)
Avascular necrosis of femoral head	8	40.0
Fracture neck of femur (non-union/failed fixation)	3	15.0
Osteoarthritis (primary/secondary)	8	40.0

Rheumatoid / inflammatory arthritis	1	5.0
Total	20	100.0

Table 5: Observed Co-morbidities among study participants

Comorbidities	Frequency (n)	Percentage (%)
None	6	30.0
DM, HTN	1	5.0
DM, HTN, Hypothyroidism	2	10.0
DM, HTN, Obesity, Hypothyroidism	1	5.0
DM, HTN, Smoking	2	10.0
HTN	2	10.0
HTN, Obesity	1	5.0
Hypothyroidism	1	5.0
Obesity	3	15.0
Smoking	1	5.0

Clinical Outcomes: Functional Scores: At 6 months, the mean HHS was 87.27 ± 9.86 for uncemented and 82.40 ± 5.68 for hybrid THR ($p = 0.314$).

Pain: The uncemented group reported significantly better pain relief, with a VAS of 0.53 compared to 1.20 in the hybrid group ($p = 0.019$).

Mobility: Hip flexion reached a mean of approximately

121–123 degrees across both groups by the 6-month mark.

Surgical Data

Surgical Time: 97.33 minutes for uncemented vs. 96.00 minutes for hybrid.

Blood Loss: Estimated blood loss was slightly higher in the hybrid group (552.00 ml) than in the uncemented group (409.67 ml), though this was not statistically significant ($p = 0.052$).

Table 6: Summary of key findings

Parameter	Hybrid	Uncemented	Statistical value	p-value
Duration of surgery (minutes)	96.00 ± 16.36	97.33 ± 16.78	$t = -0.155, df = 18$	0.879
Estimated blood loss (ml)	552.00 ± 165.55	409.67 ± 121.71	$t = 2.077, df = 18$	0.052
Harris hip score at 6 months	82.40 ± 5.68	87.27 ± 9.86	$t = -1.036, df = 18$	0.314
VAS pain score at 6 months	1.20 ± 0.45	0.53 ± 0.52	$t = 2.572, df = 18$	0.019
Hip flexion at 6 months (degrees)	123.20 ± 11.21	121.67 ± 9.43	$t = 0.301, df = 18$	0.767

DISCUSSION

The restoration of biomechanics is the primary goal of THR, involving the re-establishment of the centre of rotation and limb length. Our study confirms that while both techniques are effective, uncemented stems provide superior early pain reduction in appropriate candidates. The early postoperative period is a critical phase for determining the long-term success of Total Hip Replacement (THR). This study aimed to evaluate early clinical and radiological outcomes by comparing uncemented and hybrid fixation methods.

Operative Metrics and Blood Loss: Our findings indicate that the surgical duration for both techniques is comparable, with mean times of 96.00 minutes for the hybrid group and 97.33 minutes for the uncemented group. However, a notable difference was observed in estimated blood loss. The hybrid group experienced higher mean blood loss (552.00 ml) compared to the uncemented group (409.67 ml). While not statistically significant ($p = 0.052$), this trend likely reflects the additional surgical steps required for femoral cementation in hybrid constructs.

Clinical and Functional Recovery: Clinically, both groups showed substantial improvement by the 6-month mark. The uncemented group achieved a higher mean Harris Hip Score (HHS) of 87.27 compared to 82.40 in the hybrid group. Furthermore, the uncemented group reported a significantly lower mean VAS pain score (0.53) compared to the hybrid group (1.20). This suggests that while both techniques are effective, uncemented fixation may offer superior early pain

relief in the studied population.

Radiological Surveillance: Radiological evaluation remains indispensable for detecting complications that may be clinically silent, such as early subsidence or component malposition. In this study, standardized radiographs allowed for the assessment of cup inclination, stem alignment, and initial stability. Consistent with existing literature, the risk of early periprosthetic fractures was slightly higher in the uncemented group due to the press-fit nature of the stems, whereas hybrid constructs required vigilance regarding cement-bone interface integrity.

CONCLUSION

This study demonstrates that both uncemented and hybrid total hip replacement techniques provide excellent early clinical and radiological outcomes. However, the uncemented technique showed a statistically significant advantage in early pain reduction (VAS scores) and a trend toward better functional scores (HHS) at the 6-month follow-up.

While the hybrid technique is associated with slightly higher intraoperative blood loss, it remains a robust option, particularly in patients where femoral cementation is preferred for stability. We conclude that a systematic approach combining clinical scoring with structured radiological surveillance is essential for the early detection and management of complications. Further long-term studies are recommended to compare the durability of these fixation methods beyond the early postoperative phase.

Limitations

Small Sample Size: The study had a very small cohort of only

20 patients (15 uncemented and 5 hybrid), which limits the statistical power and the ability to generalize the findings to a larger population.

Short Follow-Up Period: The evaluation focused on "early" postoperative complications, with follow-ups conducted only at 3 and 6 months. This duration is insufficient to assess long-term outcomes, such as late aseptic loosening, wear-related issues, or late periprosthetic infections.

Uneven Group Distribution: There was a significant disparity between the two groups, with 75% of participants receiving uncemented prostheses and only 25% receiving hybrid prostheses. This imbalance complicates direct statistical comparisons between the two techniques.

Specific Study Setting: The research was conducted in a single department at a trauma care center in Mysore, which may reflect specific institutional practices or a particular patient demographic that does not represent all healthcare settings.

Narrow Inclusion/Exclusion Criteria: Patients with specific

conditions, such as previous hip surgeries, tuberculosis of the hip, or those outside the age range of 30–80, were excluded, potentially omitting data on high-risk populations.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

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