

Original Research Article

A study to assess functional outcome of cemented and uncemented total hip replacement in a tertiary care center

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Received: 26 July 2019

Revised: 12 August 2019

Accepted: 13 August 2019

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ABSTRACT

Background: Total hip replacement (THR) is the most successful and cost effective treatment with aim of pain relief and functional rehabilitation for hip disorders. As the implant designs of THR have evolved over time, the functional outcome and survivorship has improved. Even after so many advancements, it remains unclear that which implants are better, uncemented or cemented. Hence, we took up this study to analyze which of the uncemented or cemented THR have better functional outcome.

Methods: This was a longitudinal study conducted during 2014 to 2018. Hundred cases were randomized into groups of 50 each. All patients with age between 55-80 years in whom THR was indicated were included in the study. Uncemented THR was done in Group A and cemented THR was done in Group B. Patients were followed up at 12 weeks, 6 months, 12 months, and 3 years. At follow-up, functional examination in terms of visual analogue scale (VAS) score and Harris hip score (HHS) was done.

Results: The mean age of patients in Group A (uncemented) and Group B (cemented) was 62.5 years and 60 years respectively. We found that the difference of VAS score and HHS between Group A and B was statistically significant at 12 weeks and 6 months. The difference of VAS and HHS scores between Group A and B at 12 months and 3 years was not significant.

Conclusions: We conclude that cemented THR has better functional outcome at short term. They are cost effective option at age $\geq 55-60$ years.

Keywords: Uncemented THR, Cemented THR, Functional outcome

INTRODUCTION

Hip joint is one of the most important joint for mobility as well as transmitting the body weight. Proximal femur undergoes physical changes to carry the above functions. Thus any affection to hip joint severely affects locomotion.¹ The disability caused by affection of hip are accommodated by various compensatory mechanisms. Most of the hip joint disorders are treated by total hip replacement (THR). It is the most successful and cost effective treatment with aim of pain relief and functional rehabilitation.² As the implant designs of THR have

evolved over time, the functional outcome and survivorship has improved. Uncemented implants rely on press-fit stability and later on bony on-growth or ingrowth depending on the surface coating. Stability of cemented implants depends on the bone cement interdigitation at the time of cementing.³⁻⁵ Major advancement in cemented THR was use of cold curing acrylic (PMMA) for fixation. Also use of low viscosity cement, pressurization, vacuum mixing, use of cement restrictors and stem centralizers. In uncemented THR use of porous coated or hydroxyapatite coated implants provides durable fixation.⁶⁻⁹ Even after so many advancements, it

remains unclear that which implants are better, uncemented or cemented. We took up this study to analyze which of the uncemented or cemented THR have better functional outcome.

METHODS

This was a longitudinal study conducted in an Orthopedic Outpatient department during 2014 to 2018 in a tertiary care center in Mumbai. Hundred cases were randomized into groups of 50 each. All cases were operated during the year 2014 and 2015. All patients with age between 55-80 years in whom THR was indicated were included in the study. Patients with infection, previously operated THR, neurological deficit and Dorr type C were excluded from the study. Uncemented THR was done in Group A and cemented THR was done in Group B. All surgeries were done by senior author. Posterolateral (Southern-Moore) approach was done in all cases. In the postoperative period all patients were mobilized from day 1. Patients were followed up at 12 weeks, 6 months, 12 months, and 3 years. At follow-up functional examination in terms of visual analogue scale (VAS) score and Harris hip score (HHS) was done. SPSS version 21.0 was used for analysis of data.

RESULTS

In this observational study, the mean age of patients in Group A (uncemented) was 62.5 years (55–75 years). There were 35 males (70%) and 15 (30%) females. Mean duration of disability was 9 months. Total 18 patients had co-morbidities like hypertension, diabetes mellitus and thyroid disease. In Group B (cemented), average age was 60 years (55–77 years). There were 36 males and 14 females. Mean duration of pathology was 9.5 months. Out of 50, 20 patients had co-morbidities like hypertension and diabetes. It was found that the relationship of age, sex and duration of disease between two groups was statistically not significant to affect the outcome of study. Distribution of patients according to diagnosis in both the groups is been depicted in Figure 1.

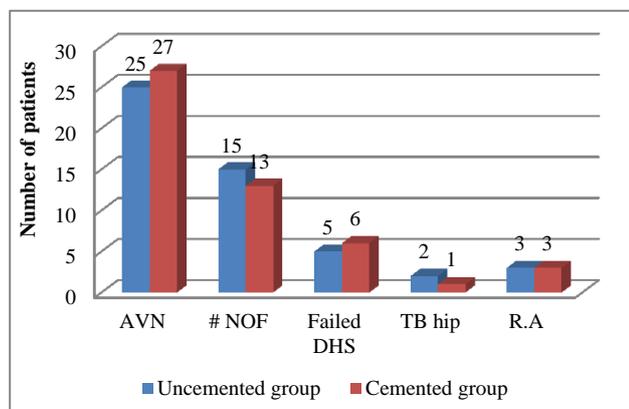


Figure 1: Distribution of patients according to diagnosis in both the groups.



Figure 2 (A and B): Figure showing pre-operative and postoperative X-ray of uncemented THR.

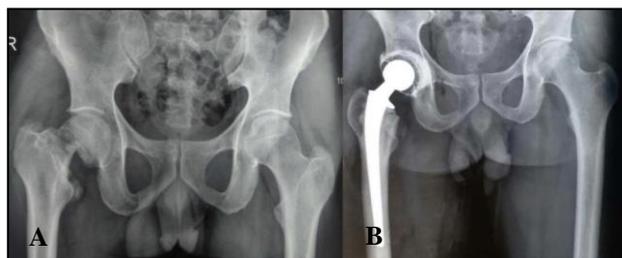


Figure 3 (A and B): Figure showing pre-operative and postoperative X-ray of cemented THR.

Table 1: Comparison of VAS scores between group A and group B at 12 weeks, 6 months and 1 year.

Follow-up period	Group A (n=50)		Group B (n=50)		P value
	Mean	SD	Mean	SD	
12 weeks	6.2	1.7	5.5	1.4	0.05
6 months	4.2	1.1	3.2	0.9	0.04
1 year	1.9	0.5	1.8	0.4	0.135

Table 2: Comparison of HHS between group A and group B at 12 weeks, 6 months and 1 year.

Follow-up period	Group A (n=50)		Group B (n=50)		P value
	Mean	SD	Mean	SD	
12 weeks	62.4	14.2	77.7	12.9	0.05
6 months	73.9	12.5	87.5	8.8	0.01
1 year	90.1	7.89	92.5	9.2	0.124

VAS score was compared at each consecutive follow ups. We found that the change in VAS score was statistically significant at 12 weeks (p=0.05) and 6 months (p= 0.04). The difference in VAS score at 12 months and 3 years between Group A and B was not significant (p=0.135). Similarly, HHS was compared with consecutive follow-ups and it was found that the difference of HHS between Group A and B was statistically significant at 12 weeks (p≤0.05) and 6 months (p=0.01). The difference in HHS at 12 months and 3 years was not significant (p=0.124) (Table 1 and 2) In our study, 82% and 87% of patients showed good to excellent results according to HHS in uncemented and cemented group respectively. Also, none

of the patients showed radiological evidence of osteolysis and implant loosening (Figure 2 and 3). Few complications were seen in the study. Two cases in uncemented group developed postoperative haematoma and two other developed superficial wound complication. Three cases in cemented group developed superficial wound complication and one developed deep venous thrombosis (DVT) of popliteal vein. DVT was managed with subcutaneous enoxaparin. Postoperative dislocation was not seen in any of the group.

DISCUSSION

We found that cemented THR has better functional outcome and lower VAS scores at 12 weeks and 6 months. At 12 months and 3 years, we found no difference in outcome of cemented and uncemented THR. Radiologically, we found no loosening or osteolysis but 3 years is too early to comment on major complications like component loosening or osteolysis.

There are multiple studies which report cemented THR as equal or superior to uncemented THR and also conclude cemented THR as cheaper option. A randomized controlled study in 2015 reported cemented THR group performed better than uncemented group with better HHS and short musculoskeletal function assessment questionnaire dysfunction score at 4 and 12 months. They also do not support the use of an uncemented stem for treatment of neck of femur fracture in elderly.¹⁰ A systematic review and meta-analysis in 2013 concluded that there is no significant difference between cemented and uncemented group in terms of implant survival as measured by the complication rate, mortality and revision rate. Also better short term clinical outcomes like improved pain score can be obtained from cemented fixation.¹¹ Morshed et al in a meta-analysis reported that cemented fixation continues to outperform uncemented fixation.¹² One study also reported that cemented THR have excellent outcomes in form of survivorship and lower revision rates. Cemented stems can be placed in the position optimum for the patient's anatomy and can be used in femoral deformities, osteoporotic bone and old patients. They reported cemented THR as a cost effective option. Also the risk of mortality in cemented THA has not been found to be higher than uncemented counterpart.¹³ Hailer et al in a survival analysis of THR components reported that 10 year survival of uncemented THR is less than that of cemented THR. He attributed this to the poor performance of uncemented cups. Uncemented stems perform better than cemented but intraoperative femoral fractures going unrecognized may be reason for early failure.¹⁴ A study by Mäkelä et al performed in Nordic nations reported that cemented THR has higher survivorship than uncemented THR in patients age ≥ 65 years.¹⁵ Pennington et al reported that cemented THR is cost effective and cheapest option available. They also found that uncemented THR did not provide sufficient clinical outcome to justify their higher cost. Patients older than 55-60 years can be treated with

cemented THR in developing countries where cost is major issue.¹⁶

CONCLUSION

We conclude that cemented THR has better functional outcome at short term. They are cost effective option at age ≥ 55 -60 years. Early weight bearing with good functional outcome can be achieved with cemented THR.

Funding: No funding sources

Conflict of interest: None declared

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

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Cite this article as: Shah KA, Desai MM. A study to assess functional outcome of cemented and uncemented total hip replacement in a tertiary care center. *Int J Res Orthop* 2019;5:828-31.