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Original Research Article

Comparative study between outcome of noncemented and cemented total hip replacement

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ABSTRACT

Background: To resolve the damage and pain in the joint in the hip, total hip replacement (THR) is used. There are some methods used to give THR, but cemented and noncemented THR are common to improve the result of the cemented THR as patients face some complications after replacement. In this study we compared the outcome of the noncemented and cemented THR. The aim of this study was to compare the outcome of noncemented and cemented THR and find out the favorable outcome.
Methods: This was a randomized, comparative type of observational study and was conducted in the Department of Orthopedics of National Institute of Traumatology and Orthopaedic Rehabilitation, Bangladesh during the period from 2019 to 2020 on 60 patients, of which 2 groups were made with 30 patients in each group. The age range was less than 50 to more than 70. In group-A cemented THR was done and in group-B noncemented THR was done. Percentage was calculated to find out the proportion of the findings. Further statistical analysis of the results was done by computer software devised in the statistical packages for social scientist (SPSS-23) and MS excel.
Results: After comparing outcomes, we saw that most of the patients get better result at the 2nd revision conducted in 6th months. There was no significant difference between the results of the two groups.
Conclusions: Though noncemented THR had better result in pain and infection occurrence after treatment, the instability is higher comparing cemented THR. Besides, patients cemented THR also had many complications after treatment.

Keywords: Cemented, Noncemented, Outcome, THR

INTRODUCTION

Hip replacement surgery is used when the hip joint is damaged and the patient in pain. There are many reasons for hip damage such as osteoarthritis, septic arthritis, rheumatoid arthritis, hip fracture, disorder that cause unusual bone growth etc.[1] THR is one of the most successful and cost-effective of surgical procedures for hip replacement with the primary goals of pain relief and restoration of function.[2] There are several types of methods used for total hip replacement, in this study we compared between cemented and noncemented THR. Cemented implants achieve stability from cement-bone mechanical interlock, once the polymethy lmethacrylate has cured.[3,4] Cementless fixation relies on primary press-fit stability with long-term stability occurring secondary to endosteal microfractures at the time of preparation and subsequent bone on growth or ingrowth.[5,6] Advocates of cemented implants cite the excellent and reliable long-term reported survivorship, whereas proponents of cementless fixation contend that this method is equally reliable and in fact superior in younger, high demand patients.[7-15] Furthermore, cementless implants provide a broader range of options especially for the acetabulum where liner exchange may be required for postoperative instability; the commonest cause for early re-operation in

all primary THR.[16] Modular cups also offer the option for changing the femoral head diameter which may improve the functional outcome especially in the younger or more active patient. A hybrid THR, where the stem is cemented and the cup uncemented, has been suggested to provide the benefits of both fixation methods although the reported results have been mixed.[17,18] The aim of the study was to compare the outcome of noncemented and cemented THR and find out the favorable outcome.

Objectives

To find out favourable outcome of THR (total hip replacement) comparing two surgical technique of cemented and noncemented.

METHODS

This was a randomized, comparative type of observational study and was conducted in the Department of Orthopedics of National Institute of Traumatology and Orthopaedic Rehabilitation, Bangladesh during the period from 2019 to 2020. A total number of 60 patients were selected for the clinical study, of which 2 groups were made with 30 patients in each group by a randomized selection. The age range was less than 50 to more than 70. In group-A cemented THR was done and in group-B noncemented THR was done. All the surgeries were done by single surgeon using poster lateral approach. Follow-up data was collected at 3 months and 6 months of post-surgery in which complete functional examination in terms of pain score and HHS was done. All the primary data were compiled on a master chart first, and then organized by using scientific calculator and standard statistical formula. Percentage was calculated to find out the proportion of the findings. Further statistical analysis of the results was done by computer software devised in the statistical packages for social scientist (SPSS-23) and MS excel.

Inclusion criteria

This study was simple random sample, every member of the population has an equal chance of being selected. Inclusion criteria were patients of both gender, patients with resolve the damage and pain in the joint in the hip.

Exclusion criteria

Exclusion criteria were patients who would not give consent, unstable patients with resolve the damage and pain in the joint in the hip.

RESULTS

In this study both group-A and group-B, which were patients with cemented THR and noncemented THR respectively, were comparable in age distribution. Each group had 30 patients from which maximum patients from group-A was 10 (40%) in the age group of more than 70 years, then 8 (32%) patients in the age group of 60-70, then 7 (28%) in the age group of 50-60 and minimum patients from group-A was 5 (20%) from age group of less than 50 years. Then maximum patients from group-B was 10 (40%) in the age group of 50-60 years, then 9 (36%) patients in the age group of less than 50 years, then 8 (23%) patients in the age group of 60-70 years and minimum patients from group-B was 3 (12%) in the age group of more than 70 years (Table 1).

Table 1: Age distribution in two groups.

Age	Cemented (group-A)		Noncemented (group-B)	
	N	%	N	%
<50	5	20	9	36
50-60	7	28	10	40
60-70	8	32	8	32
>70	10	40	3	12

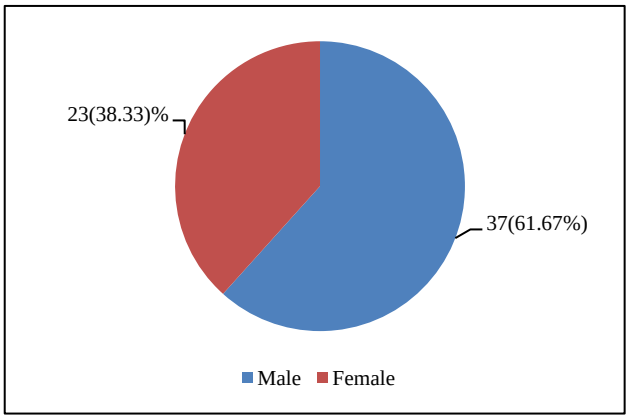

Figure 1: Gender distribution in the study.

There were 37 (61.67%) male and 23 (38.33%) females in the study (Figure 1). After giving the cemented and noncemented total hip replacement treatment to the patients of each group, we made a follow up for 3 months and 6 months. After the THR performed, patients face many problems such as loose of acetabular component, loose stem, instability, infection, pain, femoral fracture etc. After 3 months, 14 (46.67%) patients in group-A faced losing acetabular component, 11 (36.67%) patients faced losing stem, 21 (70%) patients faced instability, 16 (53.33%) patients faced infection, 20 (66.67%) patients faced pain, 6 (20%) patients faced femoral fracture. After 3 months, 16 (53.33%) patients in group-B faced losing acetabular component, 19 (63.33%) patients faced losing stem, 9 (30%) patients faced instability, 14 (46.67%) patients faced infection, 10 (33.33%) patients faced pain, 25 (83.33%) patients faced femoral fracture. After 6 months, 21 (70%) patients in group-A faced losing acetabular component, 14 (46.67%) patients faced losing stem, 19 (63.33%) patients faced instability, 11 (36.67%) patients faced infection, 4 (13.33%) patients faced pain, and 5 (16.67%) patients faced femoral fracture.

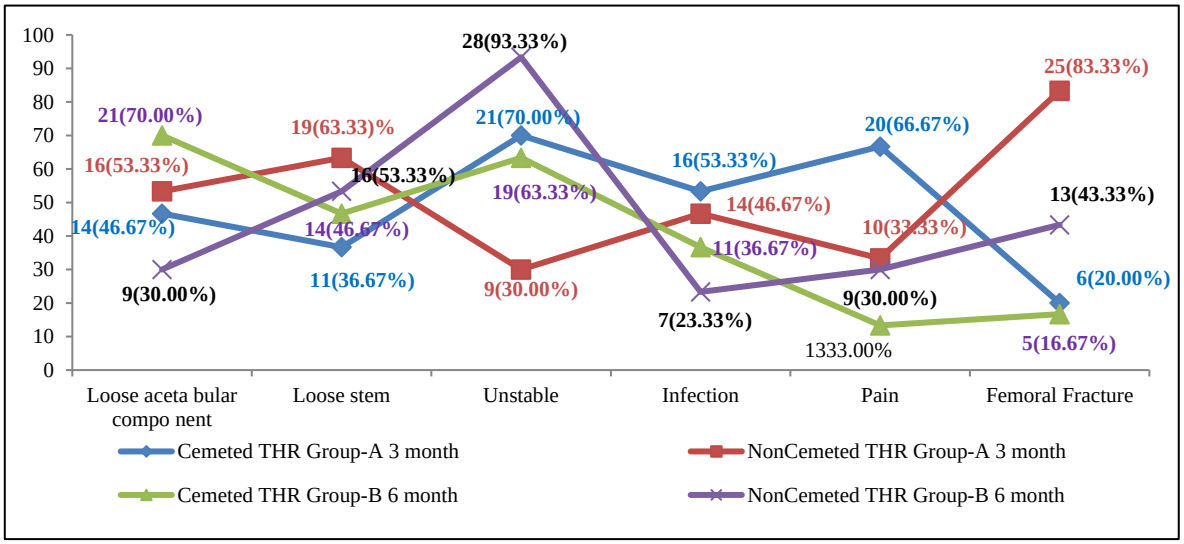

Figure 2: The rate and reasons for revision of two groups.

After 6 months, 9 (30%) patients in group-B faced losing acetabular component, 16 (53.33%) patients faced losing stem, 28 (93.33%) patients faced instability, 7 (23.33%) patients faced infection, 9 (30%) patients faced pain, and 13 (43.33%) patients faced femoral fracture. There was no significant difference between the results in both groups. Patients in cemented THR had better result in the 2nd revision in the 6th months as the revision rate was lower than the 3rd months except loose of acetabular component and loose of stem. On the other hand, patients in noncemented THR had better results in 6th month's revision except unstableness, which was much higher.

DISCUSSION

In bipeds, the hip has the great responsibility of transmitting the ground reaction against the body weight while at the same time presenting mobility. To mechanically accommodate this postural change, the head and neck of femur undergo angulation and rotation at the base. Any affection of the hip is of much concern to the patient since it affects locomotion from the very beginning.[19,20] There are many methods used for hip surgery. From them the most common treatment is total hip replacement (THR). THR can be given in several ways. In our study we compared cemented and noncemted THR. We collected 60 components and separated them in two groups by randomized selection. In group-A, 30 patients with cemented THR were included and in group-B, 30 patients with noncemented THR were included. Mäkelä et al in their recently published article, compared survival of cemented and uncemented hip replacement prosthesis in patients older than 55 years and came up with a conclusion that cemented implants have better survival.[21] They compared data from four nations. Hailer et al analysed Swedish Hip Arthroplasty Register and stated significant difference in 10-year survival of cemented and uncemented THR with cemented being better as uncemented implants had more revisions due to aseptic loosening of cup.[22] Studies have also proved better outcome of cemented THR in obese and osteoporotic patients and less intraoperative femur fracture rates. In a meta-analysis by Morshed et al there was no significant difference in survival of two type of implants.[23] Zimmerma et al published a study according to which, totally noncemented prosthesis was more costly, there were no statistically significant differences in clinical or functional outcomes between the noncemented and the cemented prostheses up to 12 months postsurgery.[24] In our observation, we found that, patients in both techniques faced complications after treatment. We found that in both technique the result in the 6th months follow-up was better than 3rd months. After 3 months, 14 (46.67%) patients in group-A faced losing acetabular component, 11 (36.67%) patients faced losing stem, 21 (70%) patients faced instability, 16 (53.33%) patients faced infection, 20 (66.67%) patients faced pain, 6 (20%) patients faced femoral fracture. After 3 months, 16 (53.33%) patients in group-B faced losing acetabular component, 19 (63.33%) patients faced losing stem, 9 (30%) patients faced instability, 14 (46.67%) patients faced infection, 10 (33.33%) patients faced pain, 25 (83.33%) patients faced femoral fracture. After 6 months, 21 (70%) patients in group-A faced losing acetabular component, 14 (46.67%) patients faced losing stem, 19 (63.33%) patients faced instability, 11 (36.67%) patients faced infection, 4 (13.33%) patients faced pain, 5 (16.67%) patients faced femoral fracture. After 6 months, 9 (30%) patients in group-B faced losing acetabular component, 16 (53.33%) patients faced losing stem, 28 (93.33%) patients faced instability, 7 (23.33%) patients faced infection, 9 (30%) patients faced pain, 13 (43.33%) patients faced femoral fracture. There is no significant difference between the results in two groups.

This study has some limitations. Our study wasn't a blinded study so patient bias was present along with observer bias in subjective recording and the small sample size, single center study, blinding was not done, short follow up period.

CONCLUSION

There is a trend to use noncemented THR in over 10 years as it is said to overcome the complications of cemented THR. In some point it is true but in our study, we saw that there is no significant difference between the results in the follow up of the two techniques. Though noncemented THR had better result in pain and infection occurrence after treatment, but the instability is higher comparing cemented THR. On the other hand, patients cemented THR also had many complications after treatment. Further study is needed with larger sample size and follow-up should be done for more time.

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