

A Comparison of Cemented with Hybrid Total Hip Arthroplasty in Terms of Functional outcome

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ABSTRACT

OBJECTIVE: To compare the functional outcome of cemented total hip with hybrid total hip arthroplasty in terms of mean change in pain score.

STUDY DESIGN: A Randomized controlled study.

PLACE AND DURATION: At Benazir Bhutto Hospital, Rawalpindi, Pakistan for a duration of 06 months from 2nd March 2015 to 1st August 2015.

METHODOLOGY: Study patients who had osteoarthritis hip (primary and secondary) under-going arthroplasty were divided into groups, A and B. Group A underwent hybrid total hip while cemented total hip for group B patients. Post-operative pain scoring was done in each group with visual analog pain scale (VAS) at 4, 8 and 12 weeks interval to find the improvement after arthroplasty in terms of pain relief and a comparison was done between two groups.

RESULTS: Group A (62.67 ± 10.48) patients had a significantly lower mean pain score than group B (68.33 ± 7.92) at 8th ($p=0.022$) and 12th week ($p=0.005$) follow-up.

CONCLUSION: Functional outcome of hybrid total hip is better as compared to cemented total hip in terms of mean change in pain score.

KEY WORDS: Osteoarthritis, Hybrid hip, Hip arthroplasty, Visual analog pain scale (VAS), Functional outcome.

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INTRODUCTION

One of the most lucrative surgery of the modern age is total hip replacement.¹ Osteoarthritis of hip affects more than 10% of people older than 60 years.² Osteoarthritis (OA) of the hip commonly presents with pain and disability in elderly patients.³ Hip joint is a ball and socket joint of synovial variety. A complex of acetabulum, proximal femur and vasculature that accommodates these growing bones constitutes normal hip joint.⁴

Surgical modification of a joint aimed at relieving pain and restoring function is termed arthroplasty. Replacement of both

acetabulum and the head and neck of femur is done in total hip replacement (THR).⁵ Most beneficial procedure for patients suffering from progressive degenerative disease of the hip is THR.⁶ Approximately 168,000 primary and 30,000 revision THR are performed in the US on yearly basis. Degree of pain relief and improved function achieved with this procedure is followed by a generally high patient's satisfaction.⁷ Cemented acetabular fixation appears to be less tenacious than the combination of a cemented stem and an un-cemented acetabulum known as 'hybrid hip' which has become more popular.⁸ As there is no study done in our population regarding comparison of hybrid and cemented total hip, so this study was carried out to assess and compare the functional outcome after total hip arthroplasty using cemented and hybrid hip in terms of pain relief using visual analog pain scale (VAS).

METHODOLOGY

This study was done for a period of 06 months from 2nd March 2015 to 1st August 2015 in the Department of Orthopaedics, Benazir Bhutto Hospital, Rawalpindi. It was a randomized control trial with non-probability consecutive sampling technique. Inclusion criteria were patients of all age groups and of either sex, patients with Osteoarthritis hip (primary & secondary) under-going arthroplasty. Exclusion criteria were failed total hip arthroplasty, Septic arthritis, Neuropathic joints, Neurological defects around hip (paralyzed abductors) and

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congenital defects. Study was started after approval from the ethical committee of hospital. Those patients who gave informed written consent were included in the study.

Risks and benefits were discussed. Patients were admitted in orthopaedic ward. Patients were allocated into groups A and B based on table of random numbers. Each group was allotted its name. Hybrid Total Hip Group A and Cemented Total Hip designated as Group B. Hybrid total hip replacement consisted of a cemented polyethylene cup with a cementless femoral stem while cemented total hip involved the use fast-drying bone cement to help affix it to the bone. Implants were purchased by the patients who were able to afford it, while for non-affording patients it was arranged from Bait-ul-maal or a non-profit organization (NGO). A comprehensive history of the patients including pain in the hip, reduced range of motion at hip joint, limb shortening and limp was taken. A detailed physical examination was carried out for flexion contractures, discrepancy in length of the limbs, range of motion and deformities. Gait was also analyzed and routine baseline investigations were done. To confirm the diagnosis antero-posterior and lateral view radiographs of hip were taken. Post operative pain scoring was done in each group with visual analog pain scale (VAS) at 4, 8 and 12 weeks interval to find the improvement after arthroplasty in terms of pain relief and comparison was done between the two groups.

VAS has a minimum score of 0 and a maximum of 100. 0 means zero pain intensity while 100 for very high pain intensity. X-rays were also repeated at 4th, 8th and 12th week. All of the patients in the study were subjected to elective surgery and Harding's (lateral) approach was employed. All operations were done by a consultant Orthopaedic surgeon.

Data Analysis: All the data collected was analyzed using SPSS 23. To calculate mean and standard deviation of age and pain score in both groups post operatively at 4, 8 and 12 weeks comparative statistics were applied. For the comparison of pain score at 4, 8 and 12 weeks postoperatively in the two groups, Independent samples T-test was employed. P value ≤ 0.05 was considered to be significant.

RESULTS

Sixty patients with osteoarthritis hip who were to undergo arthroplasty were randomly allocated into two groups. Hybrid Total Hip in Group A and Cemented Total Hip were designated as Group B. The subjects had an average age of 65.05 ± 11.78 years. Median age of the patients was observed to be significantly high in group B compared to group A [71(IQR=11) vs. 55(IQR=13); p=0.0005].

Out of 60 patients, 28(46.7%) were male and 32(53.3%) were female (Table-I)

Significant difference was not observed between the groups based on gender (p=0.301). Regarding hip side, 25(41.7%) were with left sided hip involvement and 35(58.3%) with right hip (Table-I).

Mean pain score was not significant between groups at 4 weeks while mean pain score was significantly low in group A than B at 8th week (62.67 ± 10.48 vs. 68.33 ± 7.92 ; p=0.022) and 12th week follow-up (46.67 ± 11.24 vs. 62.67 ± 10.48 ; p=0.005) as presented in Figure-1.

Mean pain score assessed at 12th week follow up was significantly lower in group A patients as compared to B in both males (p=0.004) and females (p=0.005) (Figure-2).

TABLE-I: DISTRIBUTION OF GENDER AND HIP INVOLVEMENT. (N=60)

| | | Group | | Total (n=60) |
|-----------------|--------|-------|----|--------------|
| | | A | B | |
| Gender | Male | 16 | 12 | 28 (46.67%) |
| | Female | 14 | 18 | 32 (53.33%) |
| Hip involvement | Right | 22 | 13 | 35 (58.33%) |
| | Left | 08 | 17 | 25 (41.67%) |

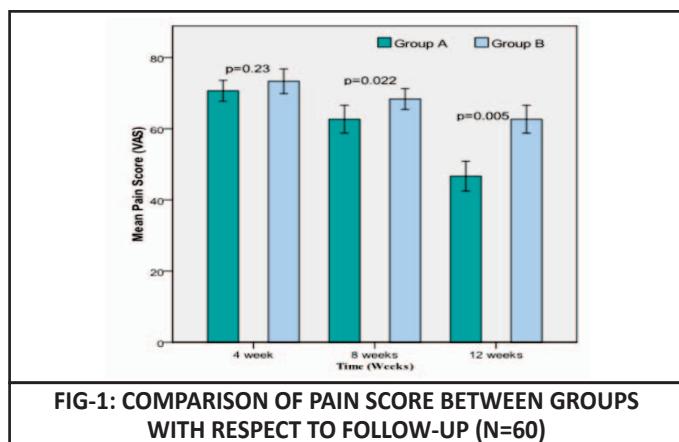


FIG-1: COMPARISON OF PAIN SCORE BETWEEN GROUPS WITH RESPECT TO FOLLOW-UP (N=60)

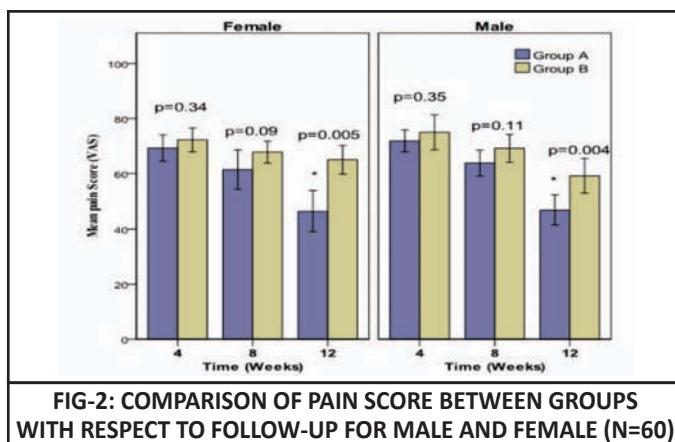


FIG-2: COMPARISON OF PAIN SCORE BETWEEN GROUPS WITH RESPECT TO FOLLOW-UP FOR MALE AND FEMALE (N=60)

DISCUSSION

Total hip prosthetics primarily used are either cemented or cement less. As the name implies, cement glues the prosthesis to the bone in cemented type whereas direct fixation of implant to the bone through osteo-integration comprises the cement less implant. Hybrid hip replacement consists of a combination of both cemented and cement less prosthetic elements.¹¹ The loosening of cemented prosthetics and migration of the components was their principal disadvantage.¹²⁻¹³ Karim et al proved that titanium implants were favorable for total hip replacement due to their property of osteo-integration without cement. Follow-up period of this study was relatively short therefore long term results cannot be predicted.¹⁴⁻¹⁶ Studies have shown that cemented femoral component is superior to uncemented technique for short term.¹⁷

We selected sixty patients for our study who had a mean age of 65.05 ± 11.78 years. Toossi et al carried out a similar study and the age of patients ranged from 45 to 87 years with a mean age of 65 years.¹⁸ With the increase in life expectancy over the past years, the older population with THR requirement is expected to rise as they have a greater functional desire.¹⁹ In our study, 28(46.7%) subjects were males and 32(53.3%) were females. It was in concordance with a study by Phedy et al.²⁰ Female predominance in patients undergoing total hip arthroplasty was also observed by Chammout et al.²¹ Females are at a greater risk of developing osteoarthritis which is also more severe as compared to male population. This incidence increases after menopause.²²

Mean pain score was not significant between groups at 4 weeks while mean pain score was significantly low in cemented hip arthroplasty group than non-cemented at 8th and 12th week. However, our findings were based on short term outcomes. In another study carried out by Wyatt et al, non-disabling pain was observed in 24% patients at a follow up after one year in whom non-cemented femoral component was used.¹⁹ The pain declined afterwards. Indo Asian literature lacks long term follow up studies which is required to establish the benefit of this technique over long term as the results generally seen in the published literature will vary from the indo Asian results due to their greater tolerance to pain and therefore less visits to hospitals for surgeries and follow-up.²³ It was seen that patients without inflammation had long term improvement after the total hip arthroplasty as compared to those with inflammation.²³ According to the study done by Troelsen et al in which record of New Zealand Arthroplasty registry data was analyzed and it showed that hybrid total hip had better functional outcome and low pain scores in young individuals especially males.²⁴ Our study showed similar results. Hooper et al reviewed the revision rate for total hip replacements. It was found that the revision depended not only on the type of implant but also on the age of the patient. Most common cause for the revision surgery was dislocation and fully cemented THRs had a lower rate for revision as compared to uncemented fixation.²⁵

CONCLUSION

The functional outcome of hybrid total hip is much better when compared to cemented total hip in terms of mean change in pain score.

Contribution of author's:

Mustafa MS: Conceived Idea, Designed Methodology. Data Interpretation, Statistical Analysis, Manuscript final reading and approval
 Khan J: Literature Search, Data Collection.
 Ahmed R: Manuscript Writing, Literature Search.
 Ahmad T: Data Collection.

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