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Short term outcome of total hip replacement by modified Hardinge's approach

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Abstract
Research on the patient outcomes after total hip replacement by Modified Hardinge's in the Indian scenario will help Surgeons offer the most suitable treatment for Indian patients. The current study was undertaken to assess the functional outcome of Total hip replacement in terms of Harris Hip Score to measure clinical outcome at 6 weeks and 3 months postoperatively (Pain Relief, Gait, Activities & Degree of Motion). 20 patients with 20 diseased hips of varied pathology, aged between 26 and 72 years were operated with Total hip replacement by Hardinge's Approach. Functional evaluation at 3 months showed excellent results in 13 hips, good in 6 hips and fair in 1 hip. No poor results were noted. Radiological evaluation at the latest follow-up of all cases didn't show any signs of aseptic loosening or stem failure. This study proved that Total Hip Replacement by Modified Hardinge's using uncemented and cemented procedures in varied hip pathologies gives an almost equivalent functional outcome and excellent to good results were achieved in 95% of patients postoperatively irrespective of the hip disease according to Harris hip score at 3 months.

Keywords: Uncemented, cemented, replacement, Harris hip score

Introduction
Total hip replacement means a surgical procedure in which both the components forming the hip joint i.e. the head of the femur as well as the acetabulum are replaced with artificial components. For the acetabulum, a cup made of high density polyethylene is used, and for the head a specially designed prosthesis made of metal alloy (cobalt-chromium) is used. Both components are fixed in place with or without bone cement. Choice must be made between cemented and uncemented joint replacement. In general, cemented arthroplasty is used in elderly people with expected life of 10-15 years and uncemented in younger people. A study has demonstrated good functional outcome of THR in old people after having displaced femoral neck fractures [1]. Another study has demonstrated excellent long-term survival of an uncemented press-fit stem and screw cup in young patients [2]. Research on the patient outcomes after total hip replacement by Hardinge Approach in the Indian scenario will help Surgeons in deciding the most suitable treatment for Indian patients.

Methodology
Ethical committee permission was obtained for the study .It is a Prospective study of 20 adult patients with primary or secondary Osteoarthritis of hip, or fracture neck of femur, who attended Department of Orthopaedics, Dr. D.Y. Patil Hospital and Research Institute, Kolhapur from May 2015 to July 2017, and were treated with Total Hip Replacement. Case selection was done according to the criteria of history, clinical examination and radiological (X-ray) examination. Pre operative Templating of X-ray for femoral and acetabular component was done. Patients medically unfit for major surgery, or with clinically detectable focus of active infection- such as genitourinary, pulmonary, or skin were excluded. The patients were followed up at 6 weeks, 3 months, 6 months, 1 year and at yearly intervals. Pre-operative and post operative evaluation during follow up was recorded on the basis of Harris hip score.

Operative Technique
Ceftriaxone + Sulbactum 1.5 gm was given prior to the induction of anaesthesia, urinary catheter was introduced in all patients just prior to surgery.

Patient was given lateral position with a sterile surgical drape folded in a saddle bag manner to allow the leg to hang over the edge of the table in a flexed and externally rotated position. Joint was exposed by Modified Hardinge Approach .Acetabulum was cleared of all tissues and reamed with basket reamers achieving appropriate combined version (45^0 of abduction and 15^0 of anteversion). Using the cup introducer the trial cup of 1-2 mm smaller size to the final reamer was introduced and assessed for its position and cortical bone contact. After thorough acetabular preparation cemented cup was then loaded on cup introducer and alignment guide and fixed achieving correct combined version. In Uncemented Acetabular cup fixation, cup sizes used were one size higher than the last reamer used. Femoral canal was assessed at the pyriformis fossa with a box osteotome. Canal was rasped till a tight fit was achieved. Rough idea was gained with the help of pre-operative templating. Trial reduction was then done with a trial head to check for stability, range of movement and muscular tension. Intra-medullary plug was then introduced into the canal to block the canal. Canal was then irrigated thoroughly and cement was introduced in a retrograde fashion. Selected stem fitted with a centralizer was then introduced maintaining the necessary anteversion. Firm pressure was maintained until bone cement hardened. Selected head size was then placed over the neck of the stem and impacted with an impactor. Reduction was done and stability of the reduction checked. Wound was then closed in layers over negative suction drain. Abduction pillow was given between the legs. In Uncemented femoral stem fixation, canal preparation was done with a broach to the expected size achieved by templating and maintaining the anteversion.

Method of statistical analysis

Appropriate statistical analysis was performed using ANOVA test and 2 independent sample t-test. Additional exploratory (parametric as well as non-parametric) analysis of the data was performed as deemed essential by using appropriate statistical tests. In all the above test the "p" value of less than 0.05 was accepted as indicating statistical significance Pre-op X-ray of Case of AVN.

Fig 1: INTRA-OP C–ARM image

Fig 2: Post op X-ray

Fig 3: Active Abduction

Fig 4: Active Flexion

Fig 5.

Results

20 patients with 20 diseased hips were treated with Total hip replacement between May 2015 to July 2017, at Dr. D. Y. Patil Hospital, D Y Patil Medical College, Kolhapur. Patients aged more than 18 years were included in the study with the average age being 51.95 years. Maximum number of patients, 16 in number, were in age group of above 40 years of age and 14 patients (70%) were males. Right side was affected in 12 patients (60%), left side was affected in 8 patients (40%). Fracture neck of the femur was the commonest indication for the surgery, the number being 10 (50%). Main other indication of the surgery was secondary osteoarthritis post avascular necrosis of the femoral head in 7 patients (35%) and Rheumatoid Arthritis in 1 patient (5%). There was 1 patient who had primary osteoarthritis and 1 patient who had failed hemiarthroplasty leading to repeated Bipolar dislocation.

The mean total pre-operative score was 32.5. The maximum score being 67 and the minimum being 16. Post operatively

the total mean Harris Hip Score at 6 weeks follow up was 81.67, with 76 being the minimum and 89 being the maximum. At 3 months follow up the total mean HHS increased to 90.2. 3 of our study patients died between 7 to 9 months after surgery, 2 of them were operated for NOF fracture and 1 was operated for primary OA. On their last follow up they had excellent functional outcome.

The treatment of diseased and destroyed hips with chronic pain with cemented or uncemented total hip replacement by Hardinge's is reproducible and gives stable, mobile and painless hip joint to the patient. By using ANOVA test p-value > 0.05 therefore is no statistical significance between functional outcomes by HHS with respect to diagnosis at 3 months follow up. This procedure should be considered in young as well as elderly patients, who are suffering from chronic and incapacitating pain in the hip joints as shown in this study, it provides excellent results in patients below 40 years of age; and good to excellent results in patients above 40 years age.

(By using 2 independent sample t-test p-value < 0.05 therefore there is significant difference between mean Harris hip score (HHS) with respect to age (years).

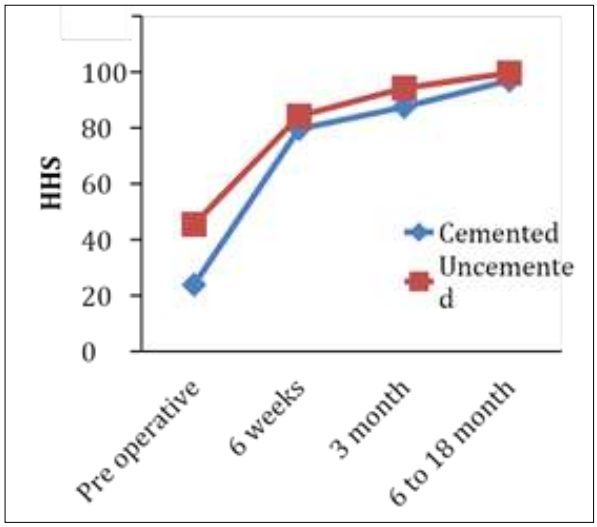

Fig 6: Mean Harris Hip Score (HHS) With Respect to Procedure

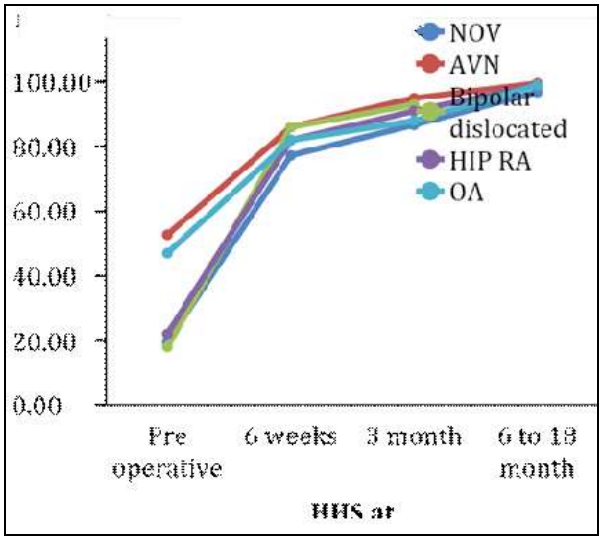

Fig 7: Mean Harris Hip Score Respect Diagnosis

Discussion

Total hip replacement is a permanent method of gaining range of motion and relieving pain in the hip due to various hip conditions. This study was done in view of the existing controversies and lack of consensus on the short term outcome of total hip replacement by Modified Hardinge Approach. The principal aim of the study was to assess the functional outcome of Total Hip Replacement. The strength of the present study is that all varied hip pathologies were primary arthroplasties, all were done using a uniform technique by Modified Hardinge's (Direct Lateral) approach by same surgeon and no patient was lost for final 3 months short term follow -up. The limitation of the study is that the sample size was less and the follow-up duration is not very long so as to demonstrate the long term complications of this procedure.

Table 1: Comparison of our study with other study

Studies	Mean Functional Outcome by Harris Hip Score
Siwach *et al*.	83.5
Kapil Mani *et al*.	85
Bourne *et al*.	90
Ryan KTakenaga *et al*.	80
Wixson R. *et al*.	92
Our Study	90.2

Comparison of Results

Taheriazam A *et al*. did a study on Functional Outcomes and Complications of Cementless One-Stage Bilateral Total Hip Arthroplasty through Hardinge approach in Osteoarthritis Patients. The mean preoperative MHHS score was 41.64±5.42 in patients. MHHS score improved to 89.26±4.68 in the last followup (P=0.0001). Their results recommended the use of cementless one-stage BTHA through Hardinge approach [3]. The results of our study were comparable with the above study, our Study group of 20 hips operated by direct lateral approach had a mean harris hip score of 81.67 at 6 weeks and 90.2 at 3 months.

Takenaga *et al*. did a study on Cementless Total Hip Arthroplasty in patients fifty years of age or younger to evaluate the results of cementless THA for a minimum of 10 years follow up. The average age at the time of surgery by Posterior approach was 40.1 years. Three femoral stems were revised for periprosthetic fracture. Two patients underwent reoperation for recurrent dislocation. The average Harris hip score was 45 points preoperatively and 80 points at the time of the final follow-up [4]. In our study by Hardinge Approach 8 patients underwent cementless THA, their mean pre-operative HHS was 45.5, which improved post operatively to a mean score of 94.25 at 3 months follow up. There was no dislocation reported till date; and there wasn't any periprosthetic fracture, the limitation being the short term follow-up.

Barber TC *et al*. did a study on early outcome of total hip arthroplasty using the direct lateral vs the posterior surgical approach. The average Harris hip score at 1 year was 90 for Group 1 (posterior approach) and Group 2 (lateral approach). The authors concluded that the clinical and radiographic outcome for THA using the posterior and the lateral approaches to the hip yield similar clinical results [5]. Our results were comparable with the above study, our Study group of 20 hips operated by Direct lateral approach had a MHHS of 90.2 at 3 months and 95.1 score at 6 to 18 months follow up. Our study group had an excellent to good results.

In our study group 12 hips underwent cemented THR. Cemented total hip replacement has some limitations like the long term complications associated with the cementing

technique mainly aseptic loosening and difficult revision surgeries In our study, the cemented THR group at 3 months follow -up had a mean HHS of 87.5 indicating good results comparable with other studies.

Abboud JA *et al*. did a retrospective study on Outcomes of total hip arthroplasty for patients with displaced femoral neck fractures and osteoarthritis by Modified lateral approach. The mean Harris hip score for the 25 patients treated with a THA for a femoral neck fracture was 81 points; the mean hip score for the 27 patients treated with a THA for osteoarthritis was 87 points. No statistically significant differences between these groups were observed. This study suggests that the outcomes for THA in this consecutive series of patients treated for displaced femoral neck fractures and osteoarthritis are comparable [6]. Our results of the study were comparable with the above study, at 3 months the neck of femur fracture group (10 patients) had a MHHS of 86.7 and Osteoarthritis group had a MHHS of 94.13. No statistically significant differences between these groups were observed at 3 months follow up (p value =0.053).

In our study we found that there was no statistical significance between the indication of surgery and final outcome at 3 months follow up, but there was minimal significance seen at 6 weeks and 6- 18 months follow up which could be because of the small sample size.

Conclusion

Total Hip Arthroplasty by Modified Hardinge gives an excellent to good short-term functional outcome in varied hip pathology after careful selection of cases.

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