



## Original Research Article

### Functional and radiological outcomes of total hip replacement in non traumatic indications

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#### A B S T R A C T

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To analyse functional and radiological outcome of total hip arthroplasty done for non traumatic indications. 31 patients who had 38 cemented (or) uncemented hip prosthesis were followed retrospectively and prospectively for 5-13 yrs. A cemented prosthesis was used in men older than 60 yrs and women older than 55yrs and in younger patients in whom adequate initial fixation could not be obtained without cement. Uncemented implants were used in all other patients. We used the Harris hip score (Modified) for clinical and functional evaluation and plain x-ray pelvis with both hips and proximal femur - AP view and x-ray of the operated hip -lateral view for radiological evaluation. All the patients were followed up at Immediate Postop, 6wks, 3mths, 6mths, 1 year and annually thereafter. The mean HHS at latest follow up of both cemented and uncemented THR was 88 and 89 respectively. On analyzing the difference in pre op and latest HHS for various nontraumatic indications, our study showed that the results were better in patients with AVN followed by OA and RA. In our series of Uncemented THR's we have 95% excellent/good results while in case of cemented THR's we have 82% excellent/good results. The Harris hip score is a very useful scoring system in assessing total hip replacement done for non traumatic indications and showed high validity and reliability. The results in patients with avascular necrosis and osteoarthritis were significantly better than those with rheumatoid arthritis. Uncemented and cemented THR give equally good results in non traumatic indications.

#### Introduction

Hip replacement operation is one of the most successful operations in orthopaedic surgery. Hundreds of thousands of these operations are now carried out every year worldwide with excellent results. Hip replacement surgery becomes necessary

when the hip joint has been badly damaged from any cause and the resulting pain cannot be satisfactorily be controlled by non surgical means. The usual problems that can end up in the need for hip replacement include any of the many

types of arthritis, malformations of the hip since birth or abnormal development. Eventhough thousands of total hip replacements has been done, there are few literatures supporting mid-term and long-term follow-up of THR in non-traumatic indications. In this article, we are going to analyse the functional and radiological outcome of THR-mid term for non traumatic indications.

## **Materials and Methods**

Prospective and retrospective study of thirty one patients with thirty eight hip replacements done in Sri Ramachandra medical center .The study period was June 2010 to June 2013. The youngest patient was 23yrs and the oldest 75yrs with a Mean of 46 yrs. 24 patients underwent unilateral THR while 7 underwent bilateral THR. Of the 38 hips, 16 were cemented and 22 uncemented. We preferred the uncemented hip in males below 60yrs and females below 55yrs of age. However the cemented hip was used in patients for whom economy was a constraint. The follow up was from 5yrs to13 yrs with a Mean of 6yrs 6 month. The indications were rheumatoid arthritis (9), ankylosing spondylitis (2), avascular necrosis (14) and osteoarthritis (13). The Posterior Approach was used in 19 cases and the Lateral Approach in 19 cases. The Approach was selected randomly. Informed consent was obtained from patients after discussion of the advantages and risk of each approach.

The present study used the Harris hip score (Modified) for clinical and functional evaluation and plain x-ray pelvis with both hips and proximal femur - AP view and x-ray of the operated hip - lateral view for radiological evaluation. All the patients were followed up at Immediate Postop, 6wks, 3mths, 6mths, 1

year and annually thereafter. The Andrew Whaley and Daniel et al criteria<sup>2</sup> for uncemented cups and the De Lee and Charley criteria for cemented cups were used to assess cup loosening. The Gruen zones for cemented stems and the Engls criteria for uncemented stems were used to assess femoral stem loosening. Other radiological components that were taken into consideration were cup inclination, femoral stem position (Mont, M.A et al 1993), vertical subsidence of femoral component, vertical migration of acetabular component and heterotrophic ossification (Brooker et al 1973). The Brookers Classification was used to assess Heterotrophic Ossification

## **Results and Discussion**

In our series we had 89% excellent / good results and 11% fair / poor results (Table 1, 2). The mean pre and latest Harris hip score were 44 and 88 respectively. The mean Harris hip score in 1<sup>st</sup>, 3<sup>rd</sup> and 5<sup>th</sup> yrs were 86, 87 and 87 respectively. The mean pre and latest Harris hip score in osteoarthritis was 49 and 92, in rheumatoid arthritis it was 35 and 74, in avascular necrosis it was 46 and 90 and in ankylosing spondylosis it was 46 and 89 respectively.

In this series it had a Normal Cup inclination (30-45 degrees) in 21pts (55%), a Vertical cup inclination (> 45 degrees) in 15 pts (39%) and a Horizontal cup inclination (<30 degrees) in 2 pts (6%). We had a Central Femoral stem position in 26pts (69%), a Values position in 9pts (23%) and a Varus position in 3pts (8%). There was no incidence of Vertical femoral subsidence in our study. There was no incidence of migration of the acetabular component in our study. We had 1 case (2.6%) of acetabular loosening

and no cases of femoral loosening. The mean pre op and latest Harris hip score in our study were 44 and 88. This was comparable to the study by Wixson et al., (1992) whose mean pre and post op harris hip score was 44 and 93 respectively and Siwach et al., (2007) whose mean pre and post op harris hip score were 44 and 83.5. Mean pre op and latest Harris hip score in cemented hips was 40 and 85 which was comparable to that of Wixson et al 42 and 90 and cornel et al that had 36 and 88 respectively. Mean pre and post op Harris hip score in uncemented hips was 48 and 89 which was comparable to that of Wixson et al who had 47 and 95 and Callagan et al who had 42 and 92. Our mean 1st, 3rd, 5th yr harris hip scores of 86, 87 & 87 were comparable to that of C.Y.NG et al., (2007) and Goran et al (1998) who both had 88, 89 & 89 respectively. The greatest change occurred between pre op assessment and review at 6 months. The patients had the potential to improve further until 18 months further the scores plateaued. Our study of unilateral vs. bilateral thr was comparable (Table 3) with the study of Anders Wykman et al. The Harris hip score in bilateral hips is inferior to that of unilateral hips. Although patients with bilateral disease gain considerable pain relief and improvement after the first the, the optimal improvement is not seen until after the second replacement. On analyzing the difference in pre op and latest HHS for various indications, our study showed that there was a significant difference in patients with AVN followed by OA and RA. Our series of patient with OA have pre and latest HHS as 49 and 92. This is comparable to Ragab et al., (1999) whose series had 48 and 96. The HHS score in RA pts in our series was 35 and 74 which is comparable with Johnson et al's scores of 41 and 78.

In this series it had one patient (2.6%) for whom bilateral thr and tkr was done for rheumatoid arthritis. Her HHS score of 20 and 68 were comparable with the results of Kenneth et al., (1975) score of 25 and 75. The preferred method of arthroplasty in this case is to operate on the hips before the knees, and on the most diseased of each pair of joint. The relief of pain was the single factor that accounted for the increase in hip rating. In our series of Uncemented thr's we have 95% excellent/good results and 5% poor/fair results which can be compared with Wixson et al who has 89% excellent/good and 11% poor/fair results. In case of cemented thr's we had 82% and 18% results which can be compared with Wixson et al's 89% excellent/good and 11% poor/fair results respectively. In our series the poor results (4 hips) came in cases of rheumatoid arthritis. All the patients had involvement of other joints. 1 patient had bilateral thr and tkr done.

### **Radiological outcome**

In our study we had 1 case (2.6%) of acetabular cup loosening (aseptic loosening). The loosening occurred in the case of an uncemented acetabular component (fig 1). The patient was a case of rheumatoid arthritis operated through the posterior approach with a St.Nabor cup and Wagner stem. In our study, the hip showed radiographic evidence of loosening 8 years following the primary surgery. Since the patient did not have any symptoms of cup loosening, revision of the cup was not advised to the patient. 12 years following the primary surgery, the patient presented with symptomatic loosening of the acetabular component (St.Nabor Cup). Acetabular cup revision (fig 2) was done retaining the intact

**Table.1** Result in cemented

Result	No
Excellent	9(57%)
Good	4(25%)
Fair	0(0%)
Poor	3(18%)

**Table.2** Result in uncemented

Result	No
Excellent	13(59%)
Good	8(36%)
Fair	0(0%)
Poor	1(5%)

**Table.3** Unilateral vs. Bilateral

Particulars	Our		Anders et al	
	PRE	LATEST	PRE	LATEST
UNILATERAL	48	88	43	96
BILATERAL				
<b>AFTER ONE HIP</b>	40	65	41	73
<b>AFTER BOTH HIPS</b>	40	87	41	93



Loosening of cup(fig 1)



1yr 6 mon following revision(fig 2)



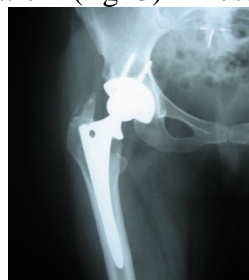
Subluxation (fig 3)



Post op reduction with trochantric osteotomy (fig 4)



1<sup>st</sup> yr follow up(fig 5)



6<sup>th</sup> yr follow up(fig 6)



1<sup>st</sup> yr follow up(fig 7)



6yr 6mon follow up(fig 8)

femoral component (Wagner stem). The mean interval between primary surgery and diagnosis of loosening was 7.8 years in the study by Engh C.A et al which is comparable with our study Zicat et al., 1995 ). The age of this patient at the time of primary total hip arthroplasty was 43 years. This corresponded to the results of Engh C.A who revealed a higher incidence of osteolysis and reoperation in younger patients. In the study by John C and W.H. Harris (1999), 4% of the acetabular components were revised. In our study 2.6%, i.e. 1 acetabular component was revised. The pattern of osteolysis in our case was localized and expansile. This pattern corresponded to the pattern of osteolysis in the study by B. Zicat and Engh C.A. However, long term follow-up is necessary in order to evaluate the potential mechanisms of failure of the acetabular component, including excessive polyethylene wear, dysfunction of the locking mechanism, dissociation of the liner and pelvic osteolysis

In our series we have 1 case of dislocation (2.6%).The dislocation occurred during the first month of the surgery at home and was treated with trochantric osteotomy and open reduction (fig 4). For this patient the cup was placed vertically and the posterior approach was used. Our study can be compared to that of M.A. Ali khan et al whose study shows 2.1% dislocation (Ali khan et al., 1981).The study of Wayne M.Goldstein et al shows an increased rate of dislocation following the posterior approach. His study shows a dislocation rate of 2.8% following posterior approach which is correlating with our study (5.2%). Charlotte B.Philips et al study shows a dislocation rate of 3.9%. The incidence of dislocation was highest during the immediate post operative period but remained elevated throughout the first

three post operative months. Heterotopic ossification usually first becomes visible on radiographs three to four weeks after surgery and matures by three to six months. The incidence ranges from 5% to 90% in various literatures. In our series we have 5 cases (13%) of class 2 heterotrophic ossification (fig 5, 6, 7, 8). This corresponded to the results of Micheal A. Mont et al (9.6%). All the cases were uncemented hips. 3 cases were through the lateral approach and 2 through the posterior approach. The particulate bone debris and the escape of femoral bone marrow elements, which are normally sealed off by bone cement in a cemented femoral component may be increased when an uncemented implant is used. In our study we had 7.8% heterotrophic ossification when the indication for surgery was osteonecrosis and 5.2% in osteoarthritis which can be comparable to the study of Michael A. Mont et al (jbjs vol 88A supplement 3, 2006) who had 9.6 % in both groups.

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