

## ASSESSING THE OUTCOMES FOLLOWING TREATMENT OF AVASCULAR NECROSIS OF FEMORAL HEAD TREATED IN INDIAN SETUP

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### ABSTRACT

**Background:** Owing to the hampered blood supply, cellular death of bone components results in avascular necrosis of the femoral head.

**Aims:** The present study was conducted to assess the outcomes following treatment of avascular necrosis of femoral head treated with Total Hip Replacement.

**Materials and methods:** 54 subjects with advanced avascular necrosis of femoral head treated with Total Hip Replacement were included in the study. Each hip was postoperatively assessed using the Harris hip scoring system where scores less than 70 were considered poor, 70-79 as fair, 80-89 as good, and 90-100 as excellent scores.

**Results:** In 87.03% (n=47) subjects Harris Hip scoring was excellent, in 7.40% (n=4) subjects, the scoring was good, in 5.55% (n=3) subjects Harris hip scoring was fair, whereas, in 3.70% (n=2) subjects, Harris Hip scoring criteria was poor. The postoperative complications were also assessed in the study subjects following total hip arthroplasty, and the results are shown in Table 3. It was seen that delayed wound healing was seen in 5.55% (n=3) study subjects, posterior dislocation was seen in 3.70% (n=2) study subjects, and limb length discrepancy was also seen in 3.70% (n=2) study subjects

**Conclusion:** The present study concludes that subjects having advanced necrosis of femoral head managed with total hip replacement showed acceptable clinical and functional outcomes with a small incidence of delayed wound healing, posterior dislocation, and limb length discrepancy.

**Keywords:** Avascular Necrosis, Femoral Head, Femoral head necrosis, Total Hip Replacement.

### INTRODUCTION

Owing to the hampered blood supply, cellular death of bone components results in avascular necrosis of the femoral head. This is followed by bone structure collapse, joint function loss, pain, bone destruction, and collapse. Avascular necrosis of the femoral head can be attributed to various etiologic factors with associated one or more risk factors. However, nearly two-thirds of avascular necrosis of the femoral head are associated with corticosteroid intake and alcohol abuse, whereas, majority of the cases have idiopathic etiology.<sup>1</sup>

After the diagnosis of avascular necrosis of the femoral head is confirmed, treatment depends on various factors including previous treatment, occupation, avascular necrosis stage, and/or the age of the subject treated. In the early stages, valgus osteotomy with bone grafting and

core decompression can be done, whereas, in advanced stages of avascular necrosis of the femoral head, total hip arthroplasty of the femoral head can be considered.<sup>2</sup>

The total incidence of nearly 20 thousand to 30 thousand of avascular necrosis of the femoral head is reported every year in new subjects starting usually with osteonecrosis. Also, total hip arthroplasty (THP) accounts for nearly 10% of all the total hip arthroplasties performed in the United States.<sup>3</sup>

Impairment in the blood supply leads to death of osteocytes and marrow which later leads to alteration of the bony structures followed by necrotic segment collapse and degenerative alteration of associated joint. Avascular necrosis of the femoral head can remain unnoticed leading to regularly increasing pain in the hip joint which finally proceeds to function loss. Spontaneous regression of the disease is rare where untreated subjects usually progress to the total hip arthroplasty with a collapse rate of nearly 85% in symptomatic and 67% in asymptomatic subjects with avascular necrosis of the femoral head.<sup>4</sup> The present study was conducted to assess the outcomes following treatment of avascular necrosis of femoral head treated with Total Hip Replacement.

## **MATERIALS AND METHODS**

The present study was conducted to assess the outcomes following treatment of avascular necrosis of femoral head treated with Total Hip Replacement. The study was conducted at Department of Orthopaedics. The study population was comprised of the subjects who underwent total tip arthroplasty for avascular necrosis of the femoral head. The study included 54 subjects from both genders with advanced avascular necrosis of the femoral head.

The inclusion criteria for the study were subjects having Ficat and Arlet stage III and IV of avascular necrosis of femoral head, degenerative arthritis of femur, subjects managed with total hip arthroplasty, and subjects who were willing to participate in the study. Before planning the total hip arthroplasty, conservative management strategies included walking with a cane, activity restriction, anti-inflammatory medicine, and weight reduction was advised to all the subjects. After the final inclusion of the study subjects, detailed history recording and pre-operative assessment was done. The posterolateral approach was used in all the subjects where the limb was kept in 30° abduction postoperative and after 48 hours, the drain was removed.

Clinically, following, surgery, all subjects were assessed for any reported complication. 6<sup>th</sup> day postoperatively, subjects were allowed movement with a walker followed by two and then one axillary crutch. On 14<sup>th</sup> day postoperative, sutures were removed. On the 14<sup>th</sup> day itself, exercises to improve range of motion were started. After 6 weeks, when full rehabilitation was achieved, subjects were discharged, also, at that time subjects were able to walk with a stick in the opposite hand. Each hip was postoperatively and pre-operatively assessed using Harris hip scoring system<sup>5</sup> where scores less than 70 were considered poor, 70-79 as fair, 80-89 as good, and 90-100 as excellent scores.

The collected data were subjected to the statistical evaluation using SPSS software version 21 (Chicago, IL, USA) and one-way ANOVA and t-test for results formulation. The data were expressed in percentage and number, and mean and standard deviation. The level of significance was kept at  $p < 0.05$ .

## RESULTS

The present study was conducted to assess the outcomes following treatment of avascular necrosis of femoral head treated with Total Hip Replacement. The study included 54 subjects from both genders with advanced avascular necrosis of the femoral head. The demographic characteristics of the study subjects are listed in Table 1. It was seen that the mean age of the study subjects was  $32.4 \pm 3.68$  years with 20.37% (n=11) subjects from age of 21-30 years, 40.74% (n=22) subjects from 31-40 years, 22.22% (n=12) subjects from 41-50 years, and 16.6% (n=9) subjects above 50 years of age. There were 37.03% (n=20) females and 62.96% (n=34) males in the present study (Table 1).

On assessing the Harris Hip score postoperatively in the 54 study subjects following total hip arthroplasty, it was seen that in 87.03% (n=47) subjects Harris Hip scoring was excellent, in 7.40% (n=4) subjects, the scoring was good, in 5.55% (n=3) subjects Harris hip scoring was fair, whereas, in 3.70% (n=2) subjects, Harris Hip scoring criteria was poor as depicted in Table 2.

The postoperative complications were also assessed in the study subjects following total hip arthroplasty, and the results are shown in Table 3. It was seen that delayed wound healing was seen in 5.55% (n=3) study subjects, posterior dislocation was seen in 3.70% (n=2) study subjects, and limb length discrepancy was also seen in 3.70% (n=2) study subjects (Table 3).

## DISCUSSION

The present study was conducted to assess the outcomes following treatment of avascular necrosis of femoral head treated with Total Hip Replacement. The study included 54 subjects from both genders with advanced avascular necrosis of the femoral head. It was seen that the mean age of the study subjects was  $32.4 \pm 3.68$  years with 20.37% (n=11) subjects from age of 21-30 years, 40.74% (n=22) subjects from 31-40 years, 22.22% (n=12) subjects from 41-50 years, and 16.6% (n=9) subjects above 50 years of age. There were 37.03% (n=20) females and 62.96% (n=34) males in the present study. These results were consistent with the findings of Kim YH et al<sup>6</sup> in 2011 and Maus U et al<sup>7</sup> in 2015 where total hip arthroplasty was done in subjects with comparable demographics.

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## CONCLUSION

Within its limitations, the present study concludes that subjects having advanced necrosis of femoral head managed with total hip replacement showed acceptable clinical and functional outcomes with a small incidence of delayed wound healing, posterior dislocation, and limb length discrepancy. However, the present study had a few limitations including a small sample size, shorter monitoring period, and geographical area biases. Hence, more longitudinal studies with a larger sample size and longer monitoring period will help reach a definitive conclusion.

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**TABLES**

S. No	Characteristics	Percentage (%)	Number (n)
1.	<b>Gender</b>		
a)	Females	37.03	20

b)	Males	62.96	34
<b>2.</b>	<b>Age Range (years)</b>		
a)	21-30	20.37	11
b)	31-40	40.74	22
c)	41-50	22.22	12
d)	Above 50	16.6	9
<b>3.</b>	<b>Mean Age (mean± S. D)</b>	32.4±3.68	

**Table 1: Demographic characteristics of the study subjects**

S. No	Harris Hip scores (postoperative)	Percentage (%)	Number (n)
1.	Excellent	87.03	47
2.	Good	7.40	4
3.	Fair	5.55	3
4.	Poor	3.70	2

**Table 2: Harris Hip scores assessment postoperatively in the study subjects**

S. No	Complications	Percentage (%)	Number (n)
1.	Delayed Wound Healing	5.55	3
2.	Posterior dislocation	3.70	2
3.	Limb length discrepancy	3.70	2

**Table 3: Postoperative complications following total hip arthroplasty in the study subjects**