Clinical and functional outcome of uncemented total hip replacement in patients with avascular necrosis of femoral head

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Abstract

Background: Avascular necrosis of femoral head is a common problem. New cases are now a days diagnosed early and treated early, because of Ayushman bharat yojna. It mostly affects the femoral head (hip joint). Its management can be conservative or invasive. [1-4]. Total hip arthroplasty is the treatment of choice for third and fourth stage avascular necrosis [5-8].

Material & Method: Fifty patients of Avascular necrosis of femoral head of stage III and IV are operated by uncemented total hip arthroplasty and their results were assessed by Harris hip score.

Results: The mean Harris hip score during preoperative stage was 33.27 and during postoperative stage was 91.60. Excellent results are seen in 44 patients, good results are seen in 6 patients, poor or very poor results are seen in none patients.

Conclusion: Current generation of uncemented implants provide satisfactory clinical and radiographic outcomes in intermediate duration of follow up in avn of hip.

Keywords: Avascular necrosis of femoral head, uncemented total hip arthroplasty

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Introduction

Incidence of AVN of femoral head is increasing, approximately 15,000 to 30,000 new cases occur annually in the USA. In India as there is no statistical data available, considering the population around 1.3 billion approximately 70000 to 90,000 patients get affected with AVN [1-2]. The disease occurrence is more in men than in women. Avascular necrosis is a disease where there is cellular death of bone components due to interruption of the blood supply. If avascular necrosis involves the bones of a joint, it often leads to destruction of the joint articular surface followed by secondary osteoarthritic changes in the hip [3-5]. Total hip arthroplasty is the only effective treatment of AVN of the femoral head when the disease process has reached Ficat and Arlet stages III and IV [6-8].

Cementless total hip arthroplasty remains a reasonable treatment option for advanced osteonecrosis of the femoral head. Avascular necrosis occurs due to impaired blood supply to the bone. It can be caused by fractures, dislocations, chronic steroid use, chronic alcohol use, coagulopathy, congenital source, and many other factors.

The purpose of this study is to assess the clinical functional outcomes of cementless total hip arthroplasty in patients with avascular necrosis of the hip. Aims and objectives of the study are, how early the patients recover from avascular necrosis of femoral head in arthritis stage following uncemented total hip arthroplasty and to study the clinical and functional outcome of uncemented total hip replacements in patients with avascular necrosis of femoral head.

Material and Method

This prospective study was conducted on patients who had arthritis of hip joints secondary to avascular necrosis of femoral head, during 3-year period from April 2018 to March 2021 in Department of Orthopaedics, R. D. Gardi Medical College, Ujjain. Inclusion criteria was patients of avascular necrosis of femoral head, patients in the age group of less than 60 years and patients willing to give informed consent. Exclusion criteria was patients of age more than 60 years, patients with systemic and local infections and patients who are not medically fit for surgery. Thorough preoperative assessment like history, clinical and radiological examination and routine investigations of the patient done. The patients were evaluated according to the modified Harris hip scoring system both preoperatively and postoperatively [9]. The scores taken into account were of pain, function, range of motion, and deformities.

Also, a mention of the limb length discrepancy and flexion contracture is made. The patients are reviewed with post op x-rays immediately after surgery at the end of 6, 12, 24 weeks after the surgery, then 12-month, 18 month and 2 years. Radiological assessment was done with radiogram of the pelvis with both hips with proximal half of shaft of femur AP view and lateral view was taken for all patients. The radiograph was evaluated for size of the acetabulum, bone stock of the acetabulum, any protrusion and periacetabular osteophyte formation, the structural integrity of the acetabulum, need for bone grafting and size of the femoral canal.

Table 1: Age distribution of patients studied

Age in years	No. of patients	%
21-30	5	10
31-40	26	52
41-50	13	26
51-60	6	12
Total	50	100

Table 2: Harris hip score, preop and post op

	Preop	Post op
Pain	10.13	42.13
Gait	10.53	30.33
Activity	5.17	11.40
Absence of deformity	4.00	4.00
ROM score	2.17	4.63
Total	33.27	91.60

Table 3: Post operative Harris hip Score

Rating	No. of patients	%
Excellent	44	80.0
Good	6	20.0
Poor	0	0
Very poor	0	0
Total	50	100

Table 4: comparison of HHS with other studies.

Study	Number of patients	Post op Mean HHS
Koteshwar et al [20]	30	92
Kakaria et al [21]	20	89
Karimi et al [22]	55	93
Sayed et al [27]	24	85
Our Study	50	91.6

Table 5: Complications

Complications	No. of patients	%
Nil	44	88
Foot drop	1	02
Dislocation	1	02
Superficial infection	2	04
Deep Infection	1	02
Periprosthetic Fracture femur	1	02
Total	50	100

Table 6: Comparison with other studies

Studies	Cemented/ Cementless THR	Follow up in years	Number of cases	Revision Rate %
Salvati et all [23]	Cemented	8	28	37
Kim et al [24]	Cementless	7.2	78	21.8
Piston et al [25]	Cementless	7.5	35	6
Lins et al [26]	Cementless	5	37	8.1
Our study	Cementless	3	50	0

Figure 1 - Preop xray, 35yr/f

Figure 2 – Bilateral THR done

The aim of the templating was to obtain the following results postoperatively an acetabular socket located in the anatomical position, center of

rotation of femoral head located in its normal anatomical position, restoration of limb length and restoration of abductor moment arm. Informed written consent is taken from the patients. All the patients were operated by Posterior (Southern or Moore's) Approach.

Figure 3- Follow up

Figure 4- Follow up

Discussion

This study has shown that, the mean age of patients in the study group was 32.30 years.

About 26 (52%) of the avascular necrosis patients in the study group belonged to 31-40 years age group. In contrary to these findings, a multivariate analysis identified young age at onset of avascular necrosis [10-12] The sex distribution of the study group has shown that, about 42 (84 %)of the patients were Males and 8 (16%) were females. Other studies like Tofferi JK, Gilliland W, also found the same results [12, 14]. The analysis of patients for the etiology of AVN showed that in 42 (84%) of the patient developed AVN of hip joint the cause was idiopathic, 5 (10%) of patients developed AVN secondary to corticosteroid use, and secondary to post trauma 3 (6%)patients developed AVN of the hip joint. In a study by Koo & Kim et al showed, 65% of AVN due to idiopathic cause and 10% to 30% cases due to corticosteroid therapy which is quite similar to this study [13]. In our study, most 22 (44.0%) of the patients of had left hip replacement, 18 (36%) had undergone right total hip replacement and 10 (20%) had undergone bilateral total hip replacement. These results were similar to the findings of Jacobs et al [14]. All of the patients 50 (100%) had uncemented type of arthroplasty. The new generation of uncemented prosthesis had demonstrated improvement in clinical and radiological outcomes compared with those associated with early designs of prosthesis inserted without cement [15]. Pain relief, Functional gait and activity and range of movement Score, all have improved post operatively. Excellent results are seen in 44 (88%) patients, good results are seen in 6 (12%) patients, poor or very poor results are seen in none patients. The mean Harris hip score during preoperative stage was 33.27 and during postoperative stage was 91.60. Almost similar results are seen in other studies [10-16]. In our study group, postoperative limb shortening was not seen in 38 (76%) of the study group. About 4 (8 %) and 3 (6%) patients of our study group had limb shortening of 1 cm and 1.5 cms respectively. Over lengthening of 1 cm is seen in 5 unilateral THR cases and a lengthened limb is more poorly tolerated. Konyves and Bannister noted that lengthened limbs were also associated with lower clinical hip scores[19]. Limb-length discrepancy can result from a poor preoperative patient evaluation as well as intraoperative technical errors with regard to the level of resection of the femoral neck, the prosthetic neck length, or the failure to restore offset. Most 44 (88%) of the patients in the study group had no complications. The common complication in the study group was superficial infection in 2 patients which is 4%. In a study by Meek RM, Garbuz DS [17], intraoperative fracture was observed in 4.3% of hips, sciatic nerve palsy was observed in 1.1%, 14% of the cases were revised because of aseptic loosening. In a study by Learmonth ID showed periprosthetic fracture in 8.6% cases[17,18]

Conclusion

Total hip arthroplasty is a well-documented surgical procedure for AVN hip. It relieves pain and functional disability of patients with arthritis of the hip, secondary to AVN and improving their quality of life. The outcome of the THR of hip joint is determined the design of component, the selection of the patients, and the operative technique. The results of the procedure needs long term studies for evaluating the complete effect. Current generation of uncemented implants provide satisfactory clinical and radiographic outcomes in intermediate duration of follow up. Even

though the procedure is not free of complications, the overall functional and clinical outcome had shown good to excellent result. In future, cases of AVN hip may increase because of execessive use of steroids in Covid 19 treatment.

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