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Original Research Article.

Assessment of Outcome of Patients with Femoral Head Avascular Necrosis Undergoing Core Decompression

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ABSTRACT

Background: Osteonecrosis (ON) or necrosis of bone tissue, is a generic disorder that can happen when a disease pathology generates significant cell stress. Any etiology that promotes decreased blood supply locally, like trauma or fracture, can also cause osteonecrosis. When recommending an ideal therapeutic procedure for avascular necrosis of hip the goal of any treatment is to extend the life of normal hip joint while considering subject's age, profession and way of living. Core decompression is a least invasive operative procedure used for treating symptoms in precollapse stage.

Objective: To evaluate the outcomes of patients with AVN of the femoral head who underwent only core decompression.

Materials And Methods: Our study was retro-prospective carried out in department of Orthopaedics at our tertiary care centre. Study enrolled 30 patients as per inclusion criteria and they underwent core decompression. subjects were assessed at presentation and at follow-up of 3 weeks, 6 weeks, 3 months, 6 months and 1 year after surgery as per harris hip score (HHS).

Results: at presentation Mean HHS among patients during the preoperative period was 58.14 (±1.77). Postoperative follow-up at 3 weeks, 6 weeks, 3 months,6 months and 1 year, revealed Mean HHS of 62.29 (±2.36), 66.14 (±5.27), 68.28 (±6.47), 70.57 (±7.91) and 76.43 (±10.53) respectively, showing a significant improvement in the mean HHS was seen at different postoperative time intervals (p-value 0.001). The outcome of core decompression was excellent, good and fair in 43.33%, 13.33% and 16.67% patients respectively. While 26.67% patients showed poor outcome.

Conclusion: Core decompression when done in initial stages of AVN of head of femur, i.e. Stages 1 and 2, is a effective procedure for delaying disease advancement of disease, postponing femoral head collapse and eventual arthritis, and assisting in revascularising femoral head. THR is suggested in advanced stages.

Keywords: Outcome, Femoral Head, Avascular Necrosis, Core Decompression.

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INTRODUCTION

Avascular necrosis (AVN) of bone is frequently misused to refer to any type of bone disease with features of necrosis at microscopic level or that has been misinterpreted as having AVN radiological features.[1,2] Necrosis of bone tissue, or osteonecrosis (ON) is a generic disorder that can happen when a disease pathology generates significant cell stress. Any etiology that promotes decreased blood supply locally, like trauma or fracture, can also cause osteonecrosis. The clinical features and radiological findings are different from the ones reported in systemic AVN, despite histological bone necrosis. The most common risk factors for osteonecrosis of femoral head (ONFH) in the United States are corticosteroid therapy (35-40%), alcohol (20- 40%), and idiopathic ONFH (20-40%).[3-8] When recommending an ideal therapeutic procedure for avascular necrosis of hip with symptoms, due consideration should be given to present stage of disease, proportion of bone involved along with exact site, association of symptoms (present or not) and patients with chronic disease. The goal of any treatment is to extend the life of normal hip joint while taking into account age of the subject, his/her profession and way of living. Conservative methods, joint-preserving treatments and total hip joint reconstruction are the three main therapy choices for treating hip ON.[9,10]

Core decompression is a least invasive operative procedure used for treating symptomatic ON presenting in its initial stages (precollapse) (e.g., First two stages of Ficat-Arlet). Drilling holes in the femoral head lowers pressure while also forming new blood vessel channels to nourish the damaged areas. When this procedure is supplemented with bone grafting, it helps to grow new viable bone and also reinforces cartilaginous tissue at hip joint.[11,12] Hence, the current study was designed to evaluate the outcomes of patients with AVN of the femoral head who underwent core decompression.

MATERIALS AND METHODS

A retro-prospective observational research was carried out in department of Orthopaedics at Rajindra Hospital & Government Medical College, Patiala on 30 patients after getting approval from ethical committee of the institute (BFUHS/2K19p-TH/12025). Patients presenting in outpatient department or emergency of the hospital in the age group 18 years and above were included.

Inclusion Criteria

- Idiopathic Osteonecrosis (Stage 1 & Stage 2)
- Age 18 years and above
- X-ray/MRI suggestive of suspected osteonecrosis femoral head
- Patients giving consent for study

Exclusion Criteria

- Traumatic Osteonecrosis
- Idiopathic Osteonecrosis (Stage 3 & Stage 4)
- Any potential known risk factors
- Patients younger than 18 years
- Patients medically unfit for surgery

Sample of 27 subjects was sufficient for the study to be conducted at 95% confidence interval and α of 2.56. To make it round figure 30 subjects were enrolled in the study. The study's approach was explained in totality to all patients who met the inclusion criteria. Consent was acquired in writing. Patients enrolled were examined carefully after proper history taking. A preoperative X-ray (bilateral hip with pelvis in antero-posterior view and frog leg lateral view) and MRI was done along with routine investigations. On the basis of clinical presentation and radiological evaluation, patients were categorized in various stages as per FicatArlet classification. In patients of stage 2 as per FicatArlet classification, core decompression was done.

Outcome Measures

Patients were assessed at the time of presentation, and then regular follow-ups were done at 3 weeks, 6 weeks, 3 months, 6 months and 1 year after surgery. The assessment was done with the help of harris hip score (HHS) and the patients were graded according to their score.

Data Analysis

Data was entered in MS Excel spreadsheet and IBM Statistical Package for the Social Sciences Program (SPSS) was used to analyze the data. Categorical variables were represented in the form of frequencies, percentages and interval variables in the form of mean and standard deviations. The difference of interval variables at repeated time points across a group was explored using repeated measure analysis of variance and p value <0.05 was considered as statistically significant for the purpose of study.

RESULTS

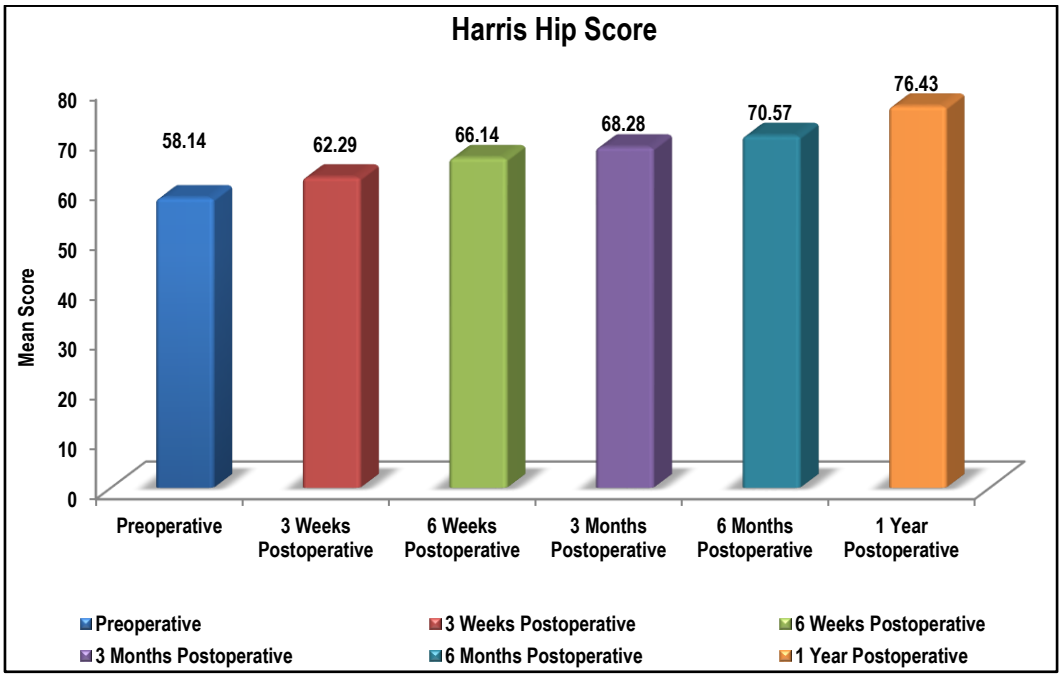
The present study was undertaken in the department of orthopaedics of Rajindra Hospital and Government Medical College, Patiala with the aim of assessing outcome of core decompression done in 30 idiopathic avascular necrosis of hip-stage 2. Average age of the subjects was 44.4 (±12.9) years. The male: female ratio was nearly 3:2. Majority of the patients (53.33%) had bilateral AVN, followed by left sided AVN (30%) and right sided AVN (16.67%). Mean HHS among patients during the preoperative period was 58.14 (±1.77). Postoperative follow-up at 3 weeks, 6 weeks, 3 months,6 months and 1 year, revealed Mean HHS of 62.29 (±2.36), 66.14 (±5.27), 68.28 (±6.47), 70.57 (±7.91) and 76.43 (±10.53) respectively, showing a significant improvement in the mean HHS was seen at different postoperative time intervals (p-value 0.001). The outcome of core decompression was excellent, good and fair in 43.33%, 13.33% and 16.67% patients respectively. While 26.67% patients showed poor outcome.

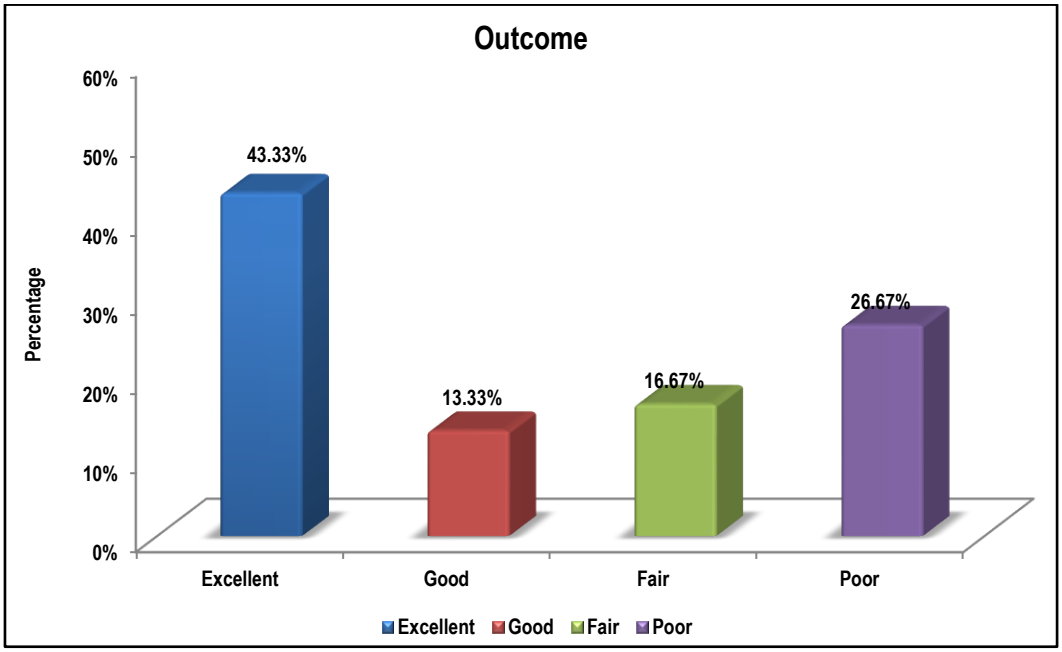
Table 1: Harris hip score at different intervals among patients undergoing core decompression

Harris hip score	Mean	SD	p value
Preoperative	58.14	1.77	0.001 (significant)
3 weeks postoperative	62.29	2.36	0.001 (significant)
6 weeks postoperative	66.14	5.27	0.001 (significant)
3 months postoperative	68.28	6.47	0.001 (significant)
6 months postoperative	70.57	7.91	0.001 (significant)
1 year postoperative	76.43	10.53	0.001 (significant)

Table 2: Outcome of patients undergoing core decompression

Outcome	Number of patients	Percentage
Excellent	13	43.33
Good	4	13.33
Fair	5	16.67
Poor	8	26.67
Total	30	100





DISCUSSION

When vascularity to the subchondral area of femoral head is hampered, then it leads of osteonecrosis, causing the osteoblasts and osteocytes to die. Necrotic bone is prone to compressive pressures and, if left untreated, will eventually collapse, resulting in loss of head sphericity and subsequent osteoarthritis.[13] Current study demonstrates the role of core decompression in early stages of osteonecrosis to alleviate the symptoms and prevent the collapse of the femoral head.

Mean age of the patients was 44.4 years. Our findings were consistent with those of earlier writers, who reported comparable age ranges in their separate research. Average age of the participants in Kammar et al stud was 42.2 years.[14] Mean HHS among patients undergoing core decompression during preoperative period, 3 weeks postoperatively, 6 weeks postoperatively, 3 months postoperatively, 6 months and 1 year postoperatively was 58.14, 62.29, 66.14, 68.28, 70.57 and 76.43 respectively, showing a significant improvement in the mean HHS was seen at different postoperative time intervals. Our findings were comparable those of prior studies. In the research done by Lakshminarayana S et al, HHS at the end of the follow-up was 77 compared to the preoperative HHS of 48.[13] Among the patients undergoing core decompression, excellent, good and fair results were seen in 43.33%, 13.33% and 16.67% of the patients respectively. 26.67% of the patients showed poor results. Marker et al (n = 52 patients) found similar results in which they have shown that the outcome of CD was excellent in 48 percent of cases, good in 13 percent, fair in 1 percent, and poor in 38 percent.[15] Stulberg et al (n = 55 hips) conducted an RCT and used HHS to evaluate the effects of CD against non-operative therapy. In Ficat Stage 1, 2, or 3, 70% of CDs were successful.[16] Mont et al (n = 1206 hips) reported a 71 percent success rate in Ficat Stage 1 and 2 compared to a 35 percent success rate with conservative treatment.[12]

Strength of our study was that it showed that core decompression is an effective approach to alleviate the symptoms of patients in early stage of osteonecrosis.

Limitation of our study was that it has small sample size, and it was single centre study. However further studies with large sample size and longer duration of follow up are recommended for better exploration of results.

CONCLUSION

Core decompression when done in initial stages of AVN of head of femur, i.e. Stages 1 and 2, is a effective procedure for delaying disease advancement of disease, postponing femoral head collapse and eventual arthritis, and assisting in revascularising femoral head. THR is suggested in advanced stages.

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