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Clinical and radiological outcome following core decompression for pre-collapse stages of Osteonecrosis of Head of Femur: A retrospective report

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Abstract
Introduction: Osteonecrosis is a progressive disease of hip joint affecting adults in 2nd to 5th decades of life leading eventually to osteoarthritis. Core decompression is one of the modalities of treating pre-collapse stage of Osteonecrosis which entails repair of the necrotic site by coring followed by filling the cored area with a bone graft, which is optional
Methodology: 21 patients (34 Hips) in the pre-collapse stage were included regardless of cause of disease and were followed up for a minimum period of 6 months following core decompression. Clinical evaluation was done using HARRIS HIP SCORE and radiological evaluation was done to assess the status of the disease
Results: Mean age of presentation was 36.5 years. 18 patients (85.7%) had bilateral involvement and 3(14.3%) had unilateral involvement. 21 patients (34 hips) underwent core decompression. In addition to core decompression, 17 hips (50%) were supported by fibular grafting. 2 hips (5.8%) by bone marrow injection, 2 hips (5.8%) by iliac crest grafting and 1 hip (2.9%) with synthetic bone substitute.
At 6 months according to HARRIS HIP SCORE, 7 were graded as excellent, 20 as good, 6 as fair and 1 as poor. Radiologically, 13 Femoral heads showed reduction in sclerosis, 20 Femoral heads showed no reduction in sclerosis but without any progression of disease, 1 patient however showed progression to osteoarthritis and eventually underwent THR.
Conclusion: Core decompression with or without bone grafting for early stages of Osteonecrosis limits the disease progression, achieves fair to good clinical and radiological outcome, enables the patient to return to their activities of daily living and prevents or delays the need for hip reconstructive surgeries.

Keywords: avascular necrosis, core decompression, fibular grafting

Introduction
Avascular necrosis is a progressive disease of the hip joint affecting adults especially active male adults between the 2nd and 5th decades of life, leading eventually to secondary osteoarthritis. The exact worldwide incidence is not known and there is a 50% chance of bilateral presentation [1]. The aetiology and pathogenesis are still unclear, but a lot of risk factors have been identified through the years. Trauma, embolisation, smoking, corticosteroids, alcohol abuse, haemoglobinopathy, hyperbaric exposure, auto-immune disease, anti-tumour chemotherapy, Gaucher's disease and Caisson disease are some of the risk factors that could act individually or synergistically to produce death of bone cells [2].

Early presentation can be asymptomatic; when the disease becomes symptomatic the most common manifestation is deep pain in the groin referred to the buttock or knee. Physical examination may be normal until the Femoral Head collapses. The diagnosis of AVN is based on plain anteroposterior and frog-leg radiographs and MRI which are used for classification and staging, i.e. Ficat, Steinberg and Association Research Circulation Osseous.

If left untreated, AVN can lead to FH collapse and hip joint destruction. The treatment options vary from core decompression only, core decompression with bone grafting either autologous or synthetic, core decompression with fibular grafting, core decompression with Bone morphogenetic proteins etc [3, 4, 5].

The poor results following conventional core decompression may be due to loss of support of the weakened subchondral bone leading to a further collapse of the femur head. To overcome the limitations of this surgery, some authors have advocated multiple drilling, whereas others have advocated fibular strut grafting following decompression [6]. Multiple small diameter drilling does not produce weakness of the subchondral bone, whereas fibular strut grafting supports the subchondral bone, thereby preventing further collapse.

This study was done to assess the clinical and radiological outcome following core decompression for pre-collapse stages of Osteonecrosis of Head of Femur

Aim
This study aims to assess the clinical and radiological outcome following core decompression for pre=collapse stages of Osteonecrosis of head of Femur.

Methodology
This is a retrospective study on patients operated in our Institution between October 2015 to March 2018 for core decompression of the Femoral head affected by Osteonecrosis in the pre-collapse stages. Only patients of stage I and IIA were included in the study. X-rays and MRI of the patients at presentation and X-rays 6 months after core decompression were assessed to evaluate the radiological outcome [7]. Clinical outcome was assessed using the HARRIS HIP SCORE. Only patients who had a

minimum of 6 months follow up were included in the study. After the surgery, patient's information was recorded in a specific checklist - final assessment of motion range, return to work, and severity of pain in thigh was performed. The duration of hospitalization and rate of infection were also recorded.

Results

21 patients (34 hips) in the pre-collapse stage were included in this study which was operated in our Institution between October 2015 and March 2018. 8(38%) patients were female while 13(61.9%) were male (Table 1).

Average age at presentation was 36.5 years. Furthermore 2 patients were below 21 years, 6 were in the age group 21-30 years, 7 were in the age group 31-40 years, 3 were in the age group 41-50 years, 2 were in the age group 51-60 years and 1 in the age group 61-70 years (fig 3).

In 12(35.2%) hips, only core decompression was done while in 17(50%) hips core decompression and fibular grafting was done, Core decompression and bone marrow injection was done in 2(5.8%) hips, core decompression and iliac crest bone grafting was done in 2(5.8%)hips and core decompression and synthetic bone substitute placement was done in 1(2.9%) hip.

HARRIS HIP SCORE was used to assess the clinical outcome of core decompression in these patients. As per this score at the end of 6 months, 7 were graded as excellent, 20 as good, 6 as fair, 1 as poor (Table 3).

Radiologically, 13 Femoral heads showed reduction in sclerosis, 20 Femoral heads showed no reduction in sclerosis but without progression of disease, 1 patient however showed progression to osteoarthritis that eventually underwent THR.

The average duration of hospitalization was 5.5 days. In most of the patients there was improvement in the range of motion few months after the surgery. The average period of return to work after surgery was 3 months. There were no post op infections observed in this study. Overall most of the patients showed significant reduction of pain, improvement in range of motion and improvement in the quality of life.

Tables

Table 1: Patients of AVN of Femoral head

Male	**13 (61.9%)**
Female	8 (38%)

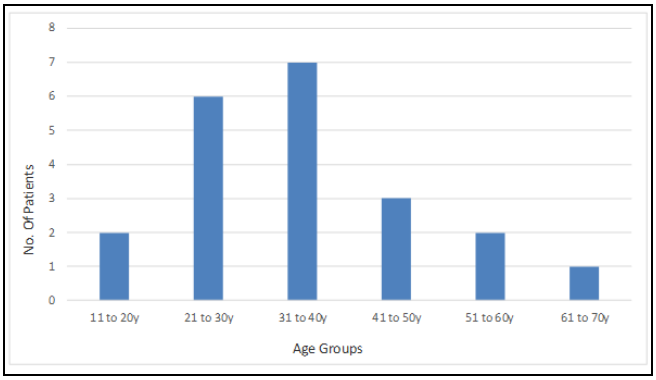

Fig 2: Age group of patients

Table 3: HARRIS HIP SCORE 6 months after surgery

Excellent	**7**
Good	20
Fair	6
poor	1

Fig 1: X-ray Pelvis of Patient 1

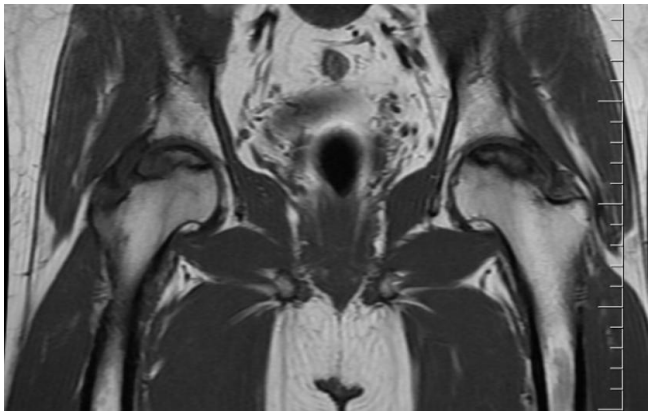

Fig 2: MRI Pelvis of Patient 1

Fig 3: X-ray Pelvis of Patient 1, six months after surgery

Discussion

Core decompression is an effective method of treatment of Avascular necrosis of the Femoral head. The results of the procedure improve significantly when it is combined with bone grafting especially fibular bone graft which acts like a

strut against collapse of the avascular segment. Vascularised fibula grafting give better results but is technically more demanding. Newer techniques of using Bone Morphogentic Protein and Stem cells have also shown better results but we need more long term studies on the same [8].

Limitations of our study were that we did not do a comparative study on the different modalities of treatment nor did we limit the cases of AVN of the femoral head caused by one particular aetiology like steroid intake etc.

Broadly from the study it was clear that core decompression plays an important role in the treatment of AVN and Fibular grafting helps in preventing the collapse of the avascular segment. This was clear from the improvement in the HARRIS HIP SCORE and the improvement seen in the X-ray films 6 months after the surgery [9, 10]. Thus, this procedure significantly reduces the pain, improves the range of motion and improves the quality of life of the patient.

Conclusion

Core decompression and fibular grafting plays an important role in the treatment of Avascular Necrosis of the Femoral Head. More long-term trials need to be done on newer techniques like use of BMP, stem cell etc to prove their clinical efficacy.

References

1. Hsu H, Nallamothu SV. Hip Osteonecrosis. StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing, 2019, 30.
2. Shah KN, Racine J, Jones LC, Aaron RK. Pathophysiology and risk factors for Osteonecrosis. Curr Rev Musculoskelet Med. 2015; 8(3):2019.
3. Pilge H, Bittersohl B, Schneppendahl J, Hesper T, Zilkens C. Bone Marrow Aspirate Concentrate in Combination With Intravenous Iloprost Increases Bone Healing in Patients With Avascular Necrosis of the Femoral Head: A Matched Pair Analysis.Orthop Rev (Pavia). 2017; 8(4):6902.
4. Nakul Talathi S, Atul Kamath F. Autologous stem cell implantation with core decompression for avascular necrosis of the femoral head. J Clin Orthop Trauma. 2018; 9(4):349-352.
5. Calori GM, Mazza E, Colombo A, Mazzola S, Colombo M. Core decompression and biotechnologies in the treatment of avascular necrosis of the femoral head. EFORT Open Rev. 2017; 2(2):41-50.
6. Mohanty SP, Singh KA, Kundangar R, Shankar V. Management of non-traumatic avascular necrosis of the femoral head-a comparative analysis of the outcome of multiple small diameter drilling and core decompression with fibular grafting. Musculoskelet Surg. 2017; 101(1):59-66.
7. Nori M, Marupaka SK, Alluri S, Md N, Irfan KA. MRI Evaluation of Post Core Decompression Changes in Avascular Necrosis of Hip. J Clin Diagn Res. 2015; 9(12):TC04-8.
8. Nandeesh NH, Janardhan K, Subramanian V, Ashtekar AB. Treatment of AVN Using Autologous BM Stem Cells and Activated Platelet-Derived Growth Factor Concentrates. J Stem Cells. 2016; 11(3):135-148.
9. Classen T, Warwas S, Jäger M, Landgraeber S. Two-year follow-up after advanced core decompression. J Tissue Eng Regen Med. 2017; 11(4):1308-1314.
10. Etemadifar M, Kooskzari M, Khalilollah N, Ali MK, Mahsa B. The results of core decompression treatment in patients with avascular necrosis of femoral headin patients at Isfahan City educational hospitals in 2010-2011. Adv Biomed Res. 2014; 25(3):93.