

ORIGINAL ARTICLE

Core decompression and Core decompression with non-vascularized fibular grafting in avascular necrosis of the hip

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ABSTRACT:

Background: The present study compared core decompression (CD) and CD with non-vascularized fibular grafting in the treatment of avascular necrosis of the hip. **Materials & Methods:** 82 cases of avascular necrosis of hip were divided into 2 groups of 41 each. Group I patients were treated with core decompression (CD) and group II with CD with fibular grafting. In both groups, etiology, Harris Hip Score and Visual analog score (VAS) was recorded pre-operatively and post operatively. **Results:** There was significant difference in mean HHS and VAS score in both groups ($P < 0.05$). Etiology was idiopathic seen in 23 and 19 in group I and II respectively, steroid induced in 13 and 14 respectively and alcohol induced in 5 and 9 respectively. The difference was non-significant ($P > 0.05$). **Conclusion:** Core decompression with non-vascularized fibular grafting found to be better in cases of avascular necrosis of the hip.

Key words: Avascular necrosis, hip, Core decompression.

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INTRODUCTION

Avascular necrosis (AVN) of the hip is a condition caused by interruption in the blood supply to the subchondral region of the head of the femur leading to death of the osteoblasts and osteocytes.¹ It can be posttraumatic, alcohol or steroid induced, and idiopathic variety. It usually affects the young population (third to fifth decade) and has been found to be responsible for 5%–12% of hip replacements.² Such a necrotic bone is not able to bear compressive stresses and if not treated, generally progress to collapse leading to loss of sphericity of the head and eventually secondary osteoarthritis.³

Avascular necrosis is characterized by osseous cell death due to vascular compromise. Avascular necrosis of bone results generally from corticosteroid use, trauma, SLE, pancreatitis, alcoholism, gout, radiation, sickle cell disease, infiltrative diseases and Caisson disease. The most commonly affected site is the femoral head and patient's usually present with hip and referred knee pain.⁴

The medical treatment includes nonsteroidal anti-inflammatory drugs, bisphosphonates, hyperbaric oxygen therapy, and extracorporeal shock wave therapy, but their role has been shown to be

ineffective.⁵ On the other hand, surgical options are femoral head preserving or hip salvaging procedures and hip replacement procedures.⁶

The present study compared core decompression (CD) and CD with non-vascularized fibular grafting in the treatment of avascular necrosis of the hip.

MATERIALS & METHODS

The present study was conducted in the department of orthopaedics. It comprised of 82 cases of avascular necrosis of hip of based on the clinical and radiological investigations of both genders. All enrolled patients were made aware of the study and their written consent was obtained. Ethical approval was obtained before starting the study.

Data such as name, age, gender etc. was recorded. Patients with stage 1 and 2 of Ficat and Arlet classification were included. Patients were divided into 2 groups of 41 each. Group I patients were treated with core decompression (CD) and group II with CD with fibular grafting. In both groups, etiology, Harris Hip Score and Visual analog score (VAS) was recorded pre-operatively and post operatively. Results were tabulated and assessed statistically. P value less than 0.05 was considered significantly.

RESULTS

Table I Distribution of patients

Groups	Group I	Group II
Method	Core decompression	Core decompression with fibular grafting
M:F	21:20	24:17

Table I shows that there were 21 males and 20 females in group I and 24 males and 17 females in group II.

Table II Assessment of parameters in group I

Parameters	Group I		P value
	Pre-operatively	Post-operatively	
HHS	48.7	76.2	0.015
VAS	6.4	1.1	0.021

Table II shows that in group I, mean HHS was 48.7 and 76.2 pre-operatively and post-operatively respectively. VAS score was 6.4 and 1.1 pre-operatively and post-operatively respectively. The difference was significant ($P < 0.05$).

Table III Assessment of parameters in group II

Parameters	Group II		P value
	Pre-operatively	Post-operatively	
HHS	62.3	71.4	0.04
VAS	8.4	1	0.001

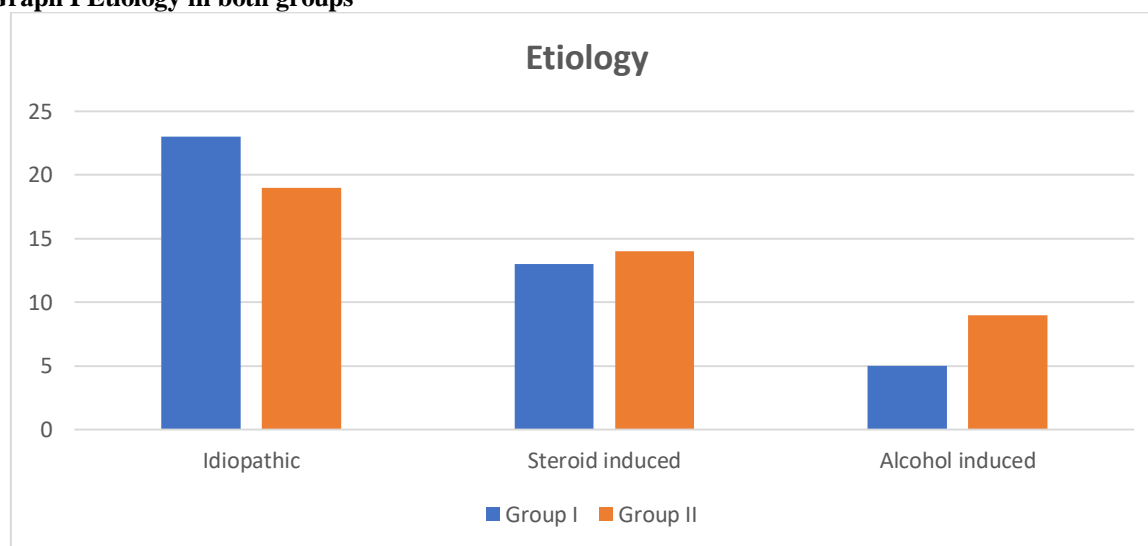
Table III shows that in group II, mean HHS was 62.3 and 71.4 pre-operatively and post-operatively respectively. VAS score was 8.4 and 1 pre-operatively and post-operatively respectively. The difference was significant ($P < 0.05$).

Table IV Etiology in both groups

Etiology	Group I	Group II	P value
Idiopathic	23	19	0.08
Steroid induced	13	14	0.91
Alcohol induced	5	9	0.05

Table IV, graph I shows that etiology found to be idiopathic seen in 23 and 19 in group I and II respectively, steroid induced in 13 and 14 respectively and alcohol induced in 5 and 9 respectively. The difference was non-significant ($P > 0.05$).

Graph I Etiology in both groups



DISCUSSION

Osteonecrosis or avascular necrosis (AVN) of the hip is a progressive disease mainly affecting adults in their third, fourth or fifth decade of life.⁷ Studies into the natural history of the disease suggest that femoral head collapse occurs within 2-3 years with associated degenerative changes and at that stage arthroplasty is the most reliable treatment option. Therefore, prevention of femoral head collapse is highly

desirable in this young patient group.⁸ In early stage disease, before femoral head collapse (Ficat and Arlet stage 1-3) core decompression of the femoral head is currently the most widely used procedure to try to relieve intraosseous pressure in the femoral head and restore blood supply.⁹ Greater understanding of the pathogenesis of osteonecrosis has led to research into non-surgical management of early stages of the disease, including pharmacological and biophysical

treatments. There may be a reduction in symptoms and evidence of prevention of disease progression following some non-surgical treatments.¹⁰ The present study compared core decompression (CD) and CD with non-vascularized fibular grafting in the treatment of avascular necrosis of the hip.

In present study, there were 21 males and 20 females in group I and 24 males and 17 females in group II. The mean HHS was 48.7 and 76.2 pre-operatively and post-operatively respectively. VAS score was 6.4 and 1.1 pre-operatively and post-operatively respectively. Lakshminarayana et al¹¹ evaluated the clinic-radiological outcomes of CD and non-vascularized fibular grafting in early stages of AVN femoral head. All patients in Stage 1 underwent CD (Group 1) and those in Stage 2 underwent CD and fibular grafting (Group 2). Preoperative Harris Hip Score (HHS), visual analog score (VAS), plain radiographs, and magnetic resonance imaging (MRI) were compared with serial postoperative HHS, VAS, plain radiographs, and MRI taken at different intervals. Average period of follow up was 53.5 months (44–63 months). Radiological progression was not seen in 55 hips out of 76 hips (72.3%), whereas 21 hips (27.6%) demonstrated signs of progression and collapse. Failure of surgery was defined as progression of the disease, which was 25% ($n = 9$) in Group 1 and 30% ($n = 12$) Group 2. Median values of HHS at the end of the follow up in Group 1 was 77 and in Group 2 was 71.5 compared to the preoperative HHS of 48 and 62 in Group 1 and 2, respectively. Median values of VAS at the end of the follow up in Stage 1 was 0 and in Stage 2 was 2 compared to the preoperative VAS of 6 and 8 in Group 1 and Group 2, respectively.

We observed that in group II, mean HHS was 62.3 and 71.4 pre-operatively and post-operatively respectively. VAS score was 8.4 and 1 pre-operatively and post-operatively respectively. The etiology found to be idiopathic seen in 23 and 19 in group I and II respectively, steroid induced in 13 and 14 respectively and alcohol induced in 5 and 9 respectively. Stulberg et al¹² did an RCT comparing the results of CD with conservative treatment, using HHS. CD was successful in 70% in Ficat Stage 1, 2, or 3 whereas the results of the cases managed conservatively was only 20% successful in Ficat Stage 1, 0% in Stage 2, and 10% in Stage 3 and concluded that CD is effective than conservative therapy.

The shortcoming of the study is small sample size.

CONCLUSION

Authors found that core decompression with non-vascularized fibular grafting is an effective method for the treatment of avascular necrosis of the hip.

REFERENCES

1. Fye MA, Huo MH, Zatorski LE, Keggi KJ. Total hip arthroplasty performed without cement in patients with femoral head osteonecrosis who are less than 50 years old. *J Arthroplasty* 1998; 13:876–881.
2. Callaghan JJ. Results of primary total hip arthroplasty in young patients. *J Bone Joint Surg Am* 1993; 75:1728.
3. Chandler HP, Reineck FT, Klixson RL, McCarthy JC. Total hip replacement in patients younger than 30 years old. *J Bone Joint Surg Am* 1981; 63:1426.
4. Devlin VJ, Einhorn TA, Gordon SL, et al. Total hip arthroplasty after renal transplantation: Long-term followup stuffy and assessment of metabolic bone status. *J Arthroplasty* 1988; 3:205.
5. Marker DR, Seyler TM, Ulrich SD, Srivastava S, Mont MA. Do modern techniques improve core decompression outcomes for hip osteonecrosis? *Clin Orthop Relat Res.* 2008;466:1093–103.
6. Mont MA, Jones LC, Sotereanos DG, Amstutz HC, Hungerford DS. Understanding and treating osteonecrosis of the femoral head. *Instr Course Lect.* 2000;49:169–85.
7. Nam KW, Kim YL, Yoo JJ, Koo KH, Yoon KS, Kim HJ, et al. Fate of untreated asymptomatic osteonecrosis of the femoral head. *J Bone Joint Surg Am.* 2008;90:477–84.
8. Lieberman JR, Berry DJ, Mont MA, Aaron RK, Callaghan JJ, Rajadhyaksha AD, et al. Osteonecrosis of the hip: Management in the 21st century. *Instr Course Lect.* 2003;52:337–55.
9. Mont MA, Jones LC, Hungerford DS. Nontraumatic osteonecrosis of the femoral head: Ten years later. *J Bone Joint Surg Am.* 2006;88:1117–32.
10. Babbhalkar S. Osteonecrosis: Early diagnosis, various treatment options and outcome in young adults. *Indian J Orthop.* 2006;40:138–46.
11. Lakshminarayana S, Dhammi IK, Jain AK, Bhayana H, Kumar S, Anshuman R. Outcomes of core decompression with or without nonvascularized fibular grafting in avascular necrosis of femoral head: short term followup study. *Indian journal of orthopaedics.* 2019 Jun;53:420-5.
12. Stulberg BN, Davis AW, Bauer TW, Levine M, Easley K. Osteonecrosis of the femoral head. A prospective randomized treatment protocol. *Clin Orthop Relat Res.* 1991;268:140–51