

A STUDY OF SURGICAL MANAGEMENT OF AVASCULAR NECROSIS OF FEMORAL HEAD

S.K. Venkatesh Gupta^{1*}, G. Suman Babu², B. Praveen Kumar³

¹Professor & HOD, ²Assistant Professor, ³Post Graduate, Dept of Orthopedics, Mamata General Hospital, Khammam, Telangana, India.

Article Info

Received 12/03/2016

Revised 16/03/2016

Accepted 28/03/2016

Keywords :-

Osteonecrosis, ANFH, inadequate blood supply, Bone marrow cells causing death of osteocytes

ABSTRACT

Osteonecrosis or avascular necrosis of the femoral head (ANFH) is a progressive, multifactorial, and disabling disease that can result in significant clinical morbidity and affect patients of any age, including young and active patients. The pathogenesis and etiology of nontraumatic ANFH has not been elucidated completely, but could be mainly due to an inadequate blood supply, causing death of osteocytes and bone marrow cells. In our study 60 cases of Avascular Necrosis of Femoral head were treated with various modalities of surgeries depending upon the stage of presentation and age of the patient at Mamata General Hospital, Mamata Medical College, Khammam, during the period October 2011 to October 2015. Average time interval between admission and surgery was 3 days. 66.6% (40 cases) had excellent results, 28.4% (17 cases) had good result and 5% (3 cases) had fair result. Out of 60 cases followed up, 3 cases had superficial infection, one patient had sciatic nerve palsy and 2 patients had intra-operative greater trochanteric split fracture.

INTRODUCTION

Avascular necrosis (AVN), also known as osteonecrosis, aseptic necrosis and ischemic bone necrosis, is a relatively common disease characterized by death of cellular elements of bone or marrow as a result of temporary or permanent loss of blood supply. The ischemia causes the death and eventual collapse of the bone tissue, with its overlying joint surface [1].

Pietrograndi described the first case of femoral head AVN after steroid use in 1957 [2]. Early presentation of avascular necrosis of femur head may be painless; however the ultimate presentation is painful limitation of hip motion [3]. Later leads to joint destruction, requiring surgical treatment. It is essential that AVN of the femoral head is diagnosed early because delaying this disease by

joint preserving measures have a much better prognosis and because the results of joint replacement are poorer in young individuals. Careful clinical history is important to find any of the risk factors. The Harris hip score is one of the most common clinical scales used for assessing the hip status. Male : Female ratio is 8:1 . In Central India, sickle cell disease is the most common associated condition with osteonecrosis followed by alcohol abuse and corticosteroid use [4]. Ficat described a four stage (I through IV) classification system, which is based on standard radiographs [5].

In Stage I the radiographs are normal. In Stage II the contour of the femoral head is normal but the radiographs show evidence of bone remodeling including cystic and sclerotic areas. Stage III involves flattening of the femoral head. In Stage IV, there is joint space narrowing with secondary degenerative changes in the acetabulum. Steinberg *et al* [6] expanded the Ficat system by dividing Stage III lesions into femoral heads with and without collapse or hips with acetabular involvement.

Corresponding Author

S.K Venkatesh Gupta

Email: - veege_47@yahoo.co.in



MATERIALS AND METHODS

Fourty eight cases of Steinberg stage I –VI of avascular necrosis of femoral head in adults were treated by various modalities of surgeries during the period from october 2011 to October 2015 in MGH hospital, MMC Khammam.

- There were 40 males and 20 females with age group ranging from 20 - 55 years.
- 35 patients presented with disease of right hip, and 19 of left hip and 6 of B/L hips.
- Out of 60 cases in our study, 8 cases are stage I , 12 cases are stage II, 15 cases are stage III disease, 15 cases are stage IV and 10 cases are stage V.
- In 25 cases idiopathic, post-traumatic in 15 cases, alcoholism is seen in 15 cases, steroid usage in 5 cases.
- The time interval between injury and reporting time has ranged from a minimum of 3 months to 1 year.

Table 1. Stage of the Disease

Stage	No. of cases	%
I	08	12
II	12	21
III	15	25
IV	15	25
V	10	17

Graph 1. Stage of the Disease

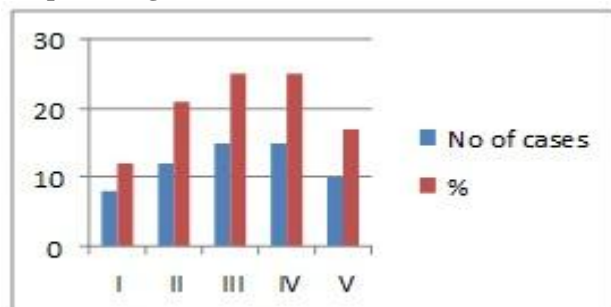


Table 2. Stage of Disease & Surgery

Stage of disease	Surgery
i	Core decompression
ii	Core decompression & fibular graft
iii	Osteotomy
iv	Hemi-replacement arthroplasty
v	Total hip replacement

SURGICAL TREATMENT

1. Core Decompression

Under sub-arachnoid block, with the patient supine on a fracture / normal table, hip approached through a 2 to 3 cm mid lateral longitudinal incision centered over the sub trochanteric region using image intensifier as a guide. It is very important to keep the leg internally rotated 15 degrees, so that the entry point into the lateral

metaphysis is not too anterior.

Under sub-arachnoid block, with the patient supine on a fracture / normal table, hip approached through a 2 to 3 cm mid lateral longitudinal incision centered over the sub trochanteric region using image intensifier as a guide. It is very important to keep the leg internally rotated 15 degrees, so that the entry point into the lateral metaphysis is not too anterior.

Then the lateral femoral cortex opened with a cannulated drill, to a diameter of 10 mm. An 8 mm Michele trephine inserted over the guide wire and manually advanced to within approximately 5 mm of the articular surface. The necrotic segment can be identified because of the sclerotic bone encountered and the resistance to advancement of the trephine. The trephine slowly advanced, in stages, into the lesion, removing bone from the trephine with an obturator as soon as significant resistance is met and further progression of the trephine ceases. On occasion, it is difficult or impossible to remove the entire necrotic specimen from the proximal portion of the femoral head using the trephine. In such cases, the last few millimeters of bone removed with either a cannulated or a solid drill.



Reaming



PRE-OP

IMMEDIATE POST OP

2. Non-Vascularised Fibular Graft:

The ideal area for harvesting of a fibular graft is the middle third of the fibular shaft because the contour of the bone is similar to the contour of the cannulated reamer.

The patient is supine on a fracture table, a longitudinal incision is made just posterior to the crest of fibula. In the middle third, flexor hallucis longus is detached from its insertion on the posterior aspect of fibula and removed subperiosteally from distal to proximal to avoid injury to muscles. The graft prepared with a

rounded proximal end and tapered distally to be press-fit through the lateral femur up into the head. Or it can be split into two, mallet through the core with canal portion along the wall. The appropriate placement of the graft confirmed by fluoroscopic imaging with its rounded proximal end within the lesion just underneath the subchondral bone.



FIBULA PREPARED



Pre op xray

immediate post op

3. Hemi-Arthroplasty

After placing the patient in lateral recumbent position with, a 10 to 15 cm curved incision one inch posterior to posterior edge of greater trochanter (GT), begin 7 cm above and posterior to GT curve posterior to the GT and continue down shaft of femur. Internally rotate the hip to place the short external rotators on stretch, place stay suture in piriformis and obturator internus tendon (short external rotators) then attach piriformis and obturator internus close to femoral insertion, reflect backwards to protect sciatic nerve. Capsule is incised with longitudinal or T-shaped incision followed by hip is dislocated with internal rotation. Depending upon the acetabular involvement prosthesis (AMP, Bipolar and Total hip prosthesis) is used.

RESULTS

Results are assessed by comparing the pre operative and post operative Harris hip score. The results are evaluated as.

Table 3. Final Results According to Harris Hip Score

Result	No. of cases	%
Excellent	40	66.6
Good	17	28.4
Fair	03	5.0

Graph 2. Final Results According to Harris Hip Score

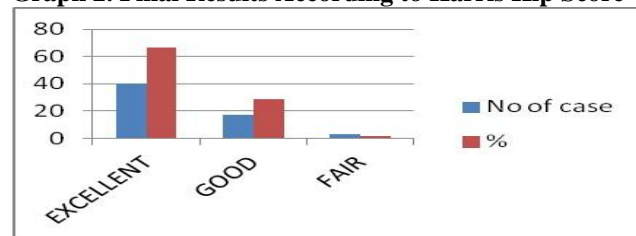


Table 4. Post-Operative Complications

complication	no. of patients	%
1.superficial infection	03	05.0
2.sciatic nerve palsy	01	01.6
3.greater trochanteric split fracture	02	03.4

DISCUSSION

In our study 48 patients of Avascular Necrosis of Femoral head of different age groups were selected. The mean age is 31 years. The sex ratio is 2:1 (M : F)

Steinberg et al 2001 study, reviewed the results of a prospective study of 406 hips in 285 patients treated by one surgeon with core decompression and bone grafting. Indications for core decompression and fibular grafting in our study are steinberg stage I, II, III Avascular Necrosis of Femoral head. In Steinberg et al 2001 study, all stages are operated by core decompression and fibular graft. In our study patients are followed up for 5 to 12 months. Steinberg et al 2001 study, patients were followed up for 2 to 14 years.

In our study the outcome was determined by the change in the Harris hip score, quantitative radiographic measurements. In Steinberg et al 2001 study, the outcome was determined by the change in the Harris hip score, quantitative radiographic measurements, and need for total hip replacement.

In our study patients were not compared to control. In Steinberg et al 2001 study, these hips were compared with 55 hips in 39 patients treated non-operatively and with historic controls.

In our study 3 complications occurred. In Steinberg study, five complications occurred after 406 procedures including two fractures that resulted from falls during the first postoperative month.

In our study hip replacement was done in, 15 of 60 hips (25%) with Stage IV and 10 of 60 hips (12%) with Stage V. In Steinberg et al 2001 study, 36% of hips (113 hips in 90 patients) required hip replacement at a mean of 29 months: 18 of 65 hips (28%) with Stage I disease; 45 of 133 hips (34%) with Stage II disease; three of 13 hips (23%) with Stage III disease; and 45 of 92 hips (49%) with Stage IV disease. Before femoral head collapse (Stages I and II combined) hip replacement was performed in 10 of 77 hips (14%) with small lesions, 33 of 68 hips with moderate lesions. Buckley et al. described the results after



core decompression combined with tibial autografts and fibular autografts or allografts. They reported successful clinical outcomes in 18 of 20 hips (90%) that had precollapse disease, stage I or II.

In a comprehensive review of the literature published in 1996, Mont, Carbone and Fairbank [7] reviewed 42 separate reports involving 2,025 hips and concluded that, compared to nonoperative or symptomatic management, surgical management with or without a bone graft was a safe and effective procedure for the treatment of avascular necrosis.

Steinberg [8] et al (2001) stated that patients who underwent surgery by various modalities and bone grafting have good functional hips. In patients treated before femoral head collapse, the outcome is significantly better than in patients who received symptomatic treatment.

CONCLUSION

Considering the number of cases treated and the good results obtained with surgical management of Avascular Necrosis of Femoral head, it is justifiable that Avascular Necrosis should be operated by various modalities of surgeries depending upon the stage of presentation and age of the patient.

Surgery is a method with lot of advantages;

REFERENCES

1. Schoenstadt A. (2008). Avascular Necrosis, available at [http, // bones.emedtv.com/avascularnecrosis/avascular-necrosis.html](http://bones.emedtv.com/avascularnecrosis/avascular-necrosis.html), last updated/reviewed, November 05, 2008.
2. Aiello MR. (2008). Avascular Necrosis of the Femoral Head, available at [http, / /emedicine.medscape.com/article/ 386808](http://emedicine.medscape.com/article/386808), updated, Aug 1, 2008.
3. Mont MA, Jones LC, Hungerford DS. (2006). Non-traumatic osteonecrosis of the femoral head, Ten years later- current concepts review. *J Bone Joint Surg Am*, 88, 1107–29.
4. Ficat RP. (1985). Idiopathic bone necrosis of the femoral head, Early diagnosis and treatment. *J Bone Joint Surg Br*, 67, 3.
5. Steinberg ME, Hayken GD, Steinberg DR. (1995). A quantitative system for staging avascularnecrosis. *J Bone Joint Surg Br*, 77, 34–41.
6. Mont MA, Carbone JJ, Fairbank AC. (1996). Core decompression vs. non-operative management for avascular necrosis of the femoral head. *Clin Orthop Relat Res*, 324, 169–78.
7. Steinberg ME. (2001). Diagnostic imaging and role of stage and lesion size in determining outcome in osteonecrosis of the femoral head. *Tech Orthop*, 16, 6–15.

1. Core decompression is relatively simple, requires no special equipment or expertise; It is a short procedure with little blood loss. Protected weight bearing is required for only six to twelve weeks; it can be done bilaterally under the same anesthetic when indicated.

2. Valgus osteotomy was done in one case for stage III Avascular Necrosis of Femoral head. The result was good with improved Harris Hip Score.

3. Arthroplasty is indicated in later stages of Avascular Necrosis of Femoral head where retention of head is not useful, maximum pain relief is possible and early post operative ambulation can be initiated.

Hence the functional results are very good, if the patients follow the post operative instructions carefully. The procedures are well tested and results are good in all series and avoid of complication.

Surgery is well recommended for all stages of Avascular Necrosis of Femoral head. In conclusion, surgery is the best treatment option to relieve pain and with near normal hip function, complications are few and avoidable.

ACKNOWLEDGEMENT: None

CONFLICT OF INTEREST:

The authors declare that they have no conflict of interest.

