

Outcome of Operative fixation of Fracture Neck of Femur in Young Adults

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Abstract: 16 adults with neck of femur fracture, treated either with Titanium cancellous screw fixation or Titanium sliding hip screw were followed up for 2 years with clinical scoring and MRI. 93% fractures united. Their Harris Hip scores were near normal in 66% cases. MRI of five patients had avascular necrosis (Steinberg classification Stage II = 3, stage I = 2) 4 of these had high velocity injury. Three patients with AVN had poor results while two (stage 1) had fair results. Functional recovery and the patient's ability to do their daily activities did not correlate fully with post-operative MRI findings of AVN.

Keywords: Neck of Femur

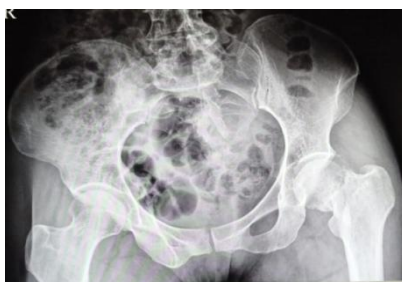
1. Introduction

Fracture neck of femur is a common type of fracture in the hip region. The treatment outcome is highly variable even after advances in surgical fixation. The functional outcome of such patients depends on peculiar blood supply of neck of femur, fracture pattern and adequacy of fracture reduction. Outcome of this fracture depends on the amount of initial displacement. Although the management of the neck of the femur involves multiple methods, all aim to restore the activities of daily living to the individual without high morbidity. However, the treatment of established femoral head necrosis complicating fracture neck of femur is approached as a therapeutic problem without an ideal solution.

2. Methodology

This study includes 16 young adults with fractured femoral necks presenting to the department of orthopaedics of Govt Thanjavur medical college hospital. (13 males + 3 females) which were taken up for internal fixation in our study. All were skeletally mature patients with closed fractures of neck of femur from a recent trauma. We excluded such fractures in skeletally immature patients or when the neck of femur is associated with fractures of the shaft or when the patient presented late after 15 days or they were open fractures.

Since most of our patients were victims of high energy vehicular accidents, they were treated as routine trauma patients with assessment of airway, breathing and circulation with screening of cervical spine, chest, abdomen and pelvic injuries. Patients were immobilized with skin traction of the affected side lower limb. Preoperatively for all patients Antero Posterior and lateral radiographic views were done.



Preoperative AP View of Pelvis



Preoperative lateral View of left Hip

Preoperative investigations were taken to assess the comorbidity and then they were taken up for surgery. They were anesthetised and placed on a fracture table. Before fixation of the fracture, using Lead better technique reduction attained. In all but one patient open reduction was done. Among 16 patients, 7 patients were fixed with dynamic sliding hip screw with anti-rotation screw and 9 patients with percutaneous cannulated titanium screw fixation.



Volume 10 Issue 12, December 2021

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Postoperative radiographs showing percutaneous cannulated titanium screw fixation.

Then patients were kept non-weight bearing mobilization for 12 weeks to allow union. Serial radiographic images at 3rd, 6th, 9th and 12th week were taken. Postoperative CT images were taken at 3rd and 6th month and MRI taken 6 months after surgery. Using Harris hip score (HHS) clinical outcome is evaluated and using Steinberg classification radiological outcome is analysed.

3. Results

One patient of the 16, having lost follow up, 15 patients were followed up and results were taken up for statistical analysis. There was male predominance with an average age distribution around 4th decade with no specific side specificity. Most of the fractures were trans-cervical of Garden type 4. Most of our patients presented within 5 hours of injury. Since some patients had co-morbid status to be optimized before taking up for surgery and our mean duration to surgery is 5 days. In our study the maximum follow up is 20 months and using Harris hip score (HHS) the clinical outcome was excellent to good in 33% of patients.



Squatting

Sitting Cross Leg

At 9 Months Follow Up

Of 15 patients, 10 patients were pain free in follow-up. However, in 25% of patients, avascular necrosis changes were noted. In follow-ups two patients had screw pull out and one patient had non-union and another patient had varus malunion.



MRI shows left proximal femur hypo-intense rim with altered marrow signal indicating stage IIAVN

4. Discussion

15 patients with fractured neck of femur were studied in our series. Their average age was 37 years – most of them were between 31-40 years (40%). 12 of 15 patients (80%) were males. More than fifty percent of our patients had fractures due to vehicular accidents (53%) and rests of the cases of fractures were due to fall from height or trivial fall. Depending on the anteroposterior radiographic view available the type of fractures is grouped into sub capital, transcervical and Basi cervical type. In our series, most patients had transcervical type of fracture (n=13). Among these patients Garden type 4 (53.3%) were the predominant types. With regard to time of presentation eight patients (53%) presented within five hours of injury. Depending on their co-morbid status 7 patients (46%) were operated within 3 days. When surgery was delayed due to a variety of reasons, the outcome of the fracture treatment was affected.

It is reported that the quality of reduction is the single most important factor within the surgeon's control influencing the rate of healing and development of complications in fracture neck of femur. Besides the quality of reduction, a biomechanical stability can reduce the failure rate. In this study types of fixations used were titanium-cancellous screw and titanium Dynamic Hip Screw with anti-rotation screw. These are the implants used in most such studies.

In our study with an average follow-up duration of 15 months, the average time of union was 4 months while other patients needed a longer time to unite. One of our cases did not unite. In this series out of 15 patients, 33% were pain free, with good mobility and able to even trim their nails with ease as described in HHS. Out of these 15 patients avascular necrosis was seen in 33%. (5 patients). Of these 3 patients had developed stage 2 AVN and two developed stage 1 AVN according to Steinberg classification. Other than avascular necrosis, screw pull-out non-union and varus malunion, no other complications like infections, iatrogenic subtrochanteric fractures were reported in our study. As neck of femur fractures were associated with development of avascular necrosis and non-union, we were able to achieve 13% excellent and 20% good results with regular fixation methods. In addition, we have 33% fair and 33% poor results in terms of functional outcome also. Most (93%) fractures united in this series with nearly 1/3rd or 33% having near normal Harris Hip score. By MRI findings five patients had avascular necrosis (AVN) (Steinberg classification Stage II = 3, Stage I = 2). Four of these had high velocity injuries. Routine capsulotomy was not done in our cases as there were certain studies who did not do it and some routinely advise capsulotomy.

Age of the patients or their, gender, time lag for surgery, an early weight-bearing, and types of surgical methods did not statistically cause avascular necrosis of femoral head – however Garden classification (displacement), reduction quality, and preoperative traction significantly influenced the development of avascular necrosis of femoral head. Even after a anatomical reduction and strong fixation – union can be uncertain-possibly from a failed fixation and AVN. however even after a fracture is united, still there AVN and delayed segmental collapse of femoral head can occur,

causing degenerative arthritis. A promise for the future is such devices could be combined with osteo-inductive materials to improve the results.

5. Conclusion

In this study functional recovery and patient's ability to do their daily activities by Harris hip score (HHS) did not correlate with degree of post-operative MRI findings of AVN. Possibly femoral head necrosis may be asymptomatic for a long time, even in patients in whom late segmental collapse already present. Hence close follow up is needed for planning further reconstructive procedures. In future to confirm the vascularity of the femoral head before surgery, all the fracture neck of femur cases can be subjected to pre-operative MRI. This will help if surgical methods have any role to play in the causation of AVN.

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