

Observations on AVN Development in Patients of Fracture Neck of Femur Treated with Delayed Fixation

Naseemul Gani¹, Mushtaq Ahmad Ganai², Bilal Ahmad Baba³, Munir Farooq⁴

ABSTRACT

Introduction: Incidence of displaced fracture neck of femur is high and there is lack of consensus over the definitive treatment of such fractures as the incidence of complications especially avascular necrosis remains very high. Objective of the study was to evaluate the incidence of avascular necrosis and its pattern in displaced fracture neck of femur managed with osteosynthesis

Material and methods: This study was a prospective study conducted in Bone & Joint Hospital, Srinagar from 2003 to 2018 on patients with displaced fracture neck of femur. Close reduction was done on traction table using Whitman's Method and reduction was confirmed under C Arm and was labelled satisfactory using Lowell's S Method and fixation was done using 3 Cannulated Screws of 6.5mm.

Results: 118 patients {70 males and 48 females} with mean age 42.5 years {range 18 to 55 years} presented late in our hospital which resulted in a delay in fixation from 24 hrs to 7 days post trauma. Patients were followed till 2018 for a minimum period of 10 years.

Conclusion: Our study suggest same AVN rates as of other studies if fixation is done within a period of one week.

Keywords: Fracture Neck of Femur, Avascular Necrosis, Nonunion

INTRODUCTION

Hip Fracture is a major public health issue and major economic burden on health care worldwide. Femoral Neck Fractures constitute approximately half of all hip Fractures and 70 to 75% of these are displaced (Gardens III and IV).¹ In younger patient's fracture of hip do occur as a result of high energy trauma.² As a result of complex anatomy and precarious vascular supply fracture neck of femur constitute a challenge to health care provider especially in young high demand patients in which preservation of native head remains the priority. Although complications of internal fixation increase the risk of additional surgery but once union has been achieved the long term results of the procedure are excellent.

AVN of Femoral Head and Non Union are the two major complications in the treatment of displaced femoral neck fracture. AVN may develop in 30 to 35% of patients in this procedure.^{3,4,5} AVN may lead to collapse of femoral head and subsequent Osteoarthritis of hip joint. AVN may require additional surgery such as Osteotomy and Bone Grafting or Arthroplasty.

Non Union and fixation failure are early post-operative complications with a prevalence reported to range from 10

to 30%.^{6,7,8}

The purpose of this study was to evaluate the incidence of development of AVN and its pattern in displaced Femoral Neck Fractures treated with delayed fixation.

MATERIAL AND METHODS

This was a prospective study conducted in Bone and Joint Hospital from 2003 to 2018.

Inclusion Criteria

Displaced Fracture Neck of Femur.

Age range of 18 to 55 years.

Patients operated from 24 hours to 7 days post trauma.

Exclusion Criteria

Undisplaced fractures.

Age <18 and >55.

Patients operated in less then 24 hours and after 7 days post trauma.

Patients who required open reduction.

The patients were operated under spinal or General Anesthesia on the preference of Anesthetist and pre op antibiotics were given one hour before surgery. Close reduction was done on traction table using Whitman's Method⁹ and reduction was confirmed under C Arm and was labelled satisfactory using Lowell's S Method¹⁰ and fixation was done using 3 Cannulated Screws of 6.5mm. The screws were placed through a lateral approach in an inverted triangle configuration. The patients were followed with static Quadriceps Exercises and discharged after one day and advised Toe Touch weight bearing and physiotherapy as pain allowed. The patients were followed till 2018 and AVN was defined as those showing Ficat Arlet Stages III and IV.

RESULTS

Mean age of patients was 42.5 years (range of 18 to 55years). 70 were male (59.32%) and 48 females (40.67%). Mode of

¹Associate Professor, Department of Orthopaedics, B & J Hospital, GMC Srinagar, Kashmir, ²Registrar Department of Orthopaedics, B & J Hospital, GMC, Srinagar, Kashmir, ³Registrar, Department of Orthopaedics, B & J Hospital, GMC, Srinagar, ⁴Professor, Department of Orthopaedics, B & J Hospital, GMC, Srinagar.

Corresponding author: Dr. Naseemul Gani, Bone and Joint Hospital, GMC Srinagar, Kashmir, India 190005

How to cite this article: Naseemul Gani, Mushtaq Ahmad Ganai, Bilal Ahmad Baba, Munir Farooq. Observations on AVN development in patients of fracture neck of femur treated with delayed fixation. International Journal of Contemporary Medical Research 2019;6(2):B6-B7.

DOI: <http://dx.doi.org/10.21276/ijcmr.2019.6.2.42>

trauma included RTA in 65 patients (55.08%) and fall from height in 30 patients (25.42%) and trivial trauma in 23 patients (19.49%). Average time from injury to surgery was 4.5 days. All patients were displaced gardens stage III and IV. All patients under went close reduction and internal fixation with Cannulated Screws. Non Union was encountered in 32 patients (27.11%). AVN developed in 25 patients (21.18%). Of these 9 patients developed AVN within two years and 7 in 3rd year, 5 in 4th year and 4 developed delayed AVN .1 in 5th year, 2 in 6th year and 1 in 8th year. Thereafter no patient developed AVN. Out of these 12 were converted to Total Hip Replacement and rest are managing their symptoms with occasional analgesics.

DISCUSSION

Operative management of displaced intracapsular fractures has stimulated a debate for decades. Studies suggest that patients with age < 60 years with displaced fractures should be internally fixed and in age > 80 years are in favor of Arthroplasty.¹¹ Though there is variation in treatment in patients between 60 to 80 years versus Arthroplasty or Internal Fixation. Studies suggest that younger patients develop AVN more than Non Union and elder more Non Union than AVN.^{12,13,14}

There is strong evidence that the incidence of AVN is higher in displaced compared to undisplaced Intracapsular Hip Fractures.^{3,13,14,15} In our study AVN developed in 21% of patients. This is consistent with other studies such as Swiontkowski Etal¹⁶ with an incidence of AVN of 20%. Studies by Zetterberg Et al¹⁷ had AVN rate of 41%. Reason for such a high rate could be that among these patients with AVN 17 were alcohol abusers and in our study no patient was alcohol abuser. Brey¹⁸ was of the opinion that early rigid will lead to better outcome. Karaeminogullari O Etal¹⁹ had rate of AVN in those operated within 12 hours and those operated after 12 hours of 25% and 27% respectively. Though studies suggest that there is no discrepancy in AVN or Non Union in patients operated even after 48 hours. Our study suggest same AVN rates as of other studies and suggest no effect of timing of surgery if patient is operated within 7days. The pattern of AVN development is also consistent with other studies. Though these studies did not suggest the time of AVN. In our study 9 patients developed AVN within two years and 7 in 3rd year, 5 in 4th year, 1 in 5th year, 2 in 6th year and 1 in 8th year.

CONCLUSION

Our study suggests same rate of AVN in delayed fixation of fracture neck of femur as is seen in early fixation. Some patients may develop AVN even after 4 years post osteosynthesis.

REFERENCE

1. Garden RS. Low-angle fixation in fractures of the femoral neck. *Journal of Bone and Joint Surgery Br.* 1961; 43:647.
2. Swiontkowski MF. Intracapsular hip fractures. In: Browner BD, Jupiter JB, Levine AM, Trafton PG, editors. *Skeletal trauma. Fractures, dislocations,*

ligamentous injuries. Philadelphia: WB. Saunders. 1992; 2:1369-442.

3. Barnes R, Brown JT, Garden RS, Nicoll EA. Subcapital fractures of the femur. A prospective review. *J Bone Joint Surg Br.* 1976; 58:2-24.
4. Swiontkowski MF, Tepic S, Rahn BA, Cordey J, Perren SM. The effect of fracture on femoral head blood flow. Osteonecrosis and revascularization studied in miniature swine. *Acta Orthop Scand.* 1993; 64:196-202.
5. Tooke SM, Favero KJ. Femoral neck fractures in skeletally mature patients, fifty years old or less. *J Bone Joint Surg Am.* 1985; 67:1255-60.
6. Lowe JA Crist BD Bhandari M Ferguson TA. Optimal treatment of femoral neck fractures according to patient's physiologic age: an evidence-based review. *Orthop Clin North Am.* 2010;41:157-66.
7. Haidukewych GJ Rothwell WS Jacofsky DJ Torchia ME Berry DJ. Operative treatment of femoral neck fractures in patients between the ages of fifteen and fifty years. *J Bone Joint Surg Am.* 2004;86:1711-6.
8. Estrada LS Volgas DA Stannard JP Alonso JE. Fixation failure in femoral neck fractures. *Clin Orthop Relat Res.* 2002;399:110-8.
9. Whitman R: A new treatment for fractures of the femoral neck, *Med Rec* 65:441, 1904.
10. Lowell JD. Results and complications of femoral neck fractures. *clin orthop*, 1980;152:162-172.
11. Bhandari M, Devereaux PJ, Swiontkowski MF, et al. Internal fixation compared with arthroplasty for displaced fractures of the femoral neck. A meta-analysis. *J Bone Joint Surg [Am]* 2003;85:1673-81.
12. Mathews V Cabanela ME. Femoral neck nonunion treatment. *Clin Orthop Relat Res.* 2004;419:57-64.
13. Stroˆmqvist B, Hansson LI, Nilsson LT, Thorngren KG. Hook-pin fixation in femoral neck fractures. A two-year follow-up study of 300 cases. *Clin Orthop Relat Res* 1987;218:58-62.
14. Shih CH, Wang KC. Femoral neck fractures. 121 cases treated by Knowles pinning. *Clin Orthop Relat Res* 1991;271:
15. Nikolopoulos KE, Papadakis SA, Kateros KT, et al. Long-term outcome of patients with avascular necrosis, after internal fixation of femoral neck fractures. *Injury* 2003;34:525-8.
16. Swiontkowski MF, Winkquist RA, Hansen ST. Fractures of the femoral neck in patients between the ages of twelve and forty-nine years. *J Bone Joint Surg Am.* 1984; 66:837-46.
17. Zetterberg CH, Irstam L, Andersson GBJ. Femoral neck fractures in young adults. *Acta Orthop Scand.* 1982; 53:427-35.
18. Bray TJ. Femoral neck fracture fixation. *Clin Orthop.* 1997; 339:20-31.
19. Karaeminogullari O, Demirors H, Atabek M, Tuncay C, Tandogan R, Ozalay M. Avascular necrosis and nonunion after osteosynthesis of femoral neck fractures: effect of fracture displacement and time to surgery. *Adv Ther.* 2004; 21:335-342.

Source of Support: Nil; **Conflict of Interest:** None

Submitted: 19-01-2019; **Accepted:** 14-02-2019; **Published:** 25-02-2019