Comparison of Fixation Techniques in Young Patients with Fracture Neck of Femur: Multiple Hip Screws with Fibular Graft or Multiple Hip Screws Alone.

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ABSTRACT

Background: Fracture neck of femur occurs infrequently in young patients compared to geriatric age groups. The occurrence in the younger age group is associated with high-energy trauma and more complications. The study was conducted to compare the results of two fixation techniques in management of fracture neck of femur in young age group patients. **Methods:** A total of 60 patients included in this prospective randomized trial were divided into two groups. Group I includes patients managed by multiple hip screws with fibular graft and group II includes patients managed by multiple hip screws alone. Assessment of fixation was done on basis of Harris Hip score at 6 week and 3 monthly intervals. **Results: A**ccording to Garden's classification, a total of 40 (66.67%) cases were of type III, out of which 24 patients were in group I and 16 were in group II. The rest 20 (33.33%) patients were of type IV with 6 cases in-group I and 14 cases in group II. In our study, functional outcome was calculated according to Harris hip score. In Group I we got 21 patients (70%) with excellent result, 7 patients (23.33%) with good result and 2 patients were failure cases. In Group II 17 patients (56.67%) got excellent outcome, 9 patients (30%) good outcome and 4 were failure cases.**Conclusion:** The study showed that there was no significant difference in any of the procedures and either of the technique could be employed depending on user experience and skills.

Keywords: Neck of femur, fibular graft, cancellous screw, Harris Hip Score.

INTRODUCTION

Hip fractures are devastating injuries that most often affect the elderly and have a tremendous impact on both the health care system and society in general. Of these fracture neck femur is one of the common fracture. The incidence of the fracture also is increasing among young patients who sustain high-energy trauma. It has been the most controversial fracture among the orthopedic surgeons. Starting from its classification to its treatment there are different opinions and views with varying outcome. Femoral neck fractures in all age groups are difficult to manage due to higher rate of complications.

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Fracture neck of femur in a young adult have a relatively higher incidence of complications like non union[1], avascular Necrosis (AVN) of femoral head[2], loss of fixation, screw cut-out and delayed secondary osteoarthritis[3]. In India, any injury around the hip in rural area tends to be managed by local bone setters using local massage and manipulation. These massages and manipulation of injury around hip area have a relatively less adverse effect on intertrochanteric fracture, but adversely affects the outcome of the intra-capsular fracture of femur. These manipulations often lead to loss of neck stock, and smoothening of fracture margin, decrease in size of proximal fragment and osteonecrosis.[4] Replacement surgeries in these cases are a difficult choice as these patients are generally of low social, economical status and also in these patients it is difficult to restrict squatting for lifelong due to social-cultural habits.[5-7] Fresh fracture of femoral neck in young adults are generally managed by osteosynthesis using cancellous screws alone, Cannulated Cancellous Screw (CCS) with fibular graft, DHS with de-rotation screw in basal neck fractures. Now a day also preferences are given to head sparing surgeries and osteosynthesis.

MATERIALS AND METHODS

After taking informed consent for surgery 60 cases were enrolled in this prospective study. They were divided into two groups randomly. The group I includes cases that underwent cancellous screw fixation with fibular graft and group II includes cases that underwent cancellous screw fixation alone. Cases aged between 20-55 years of age, having trans-cervical, basal or subcapitate type of fracture neck of femur and duration of injury less than three weeks were included in our study. Duration of injury more than three weeks, age less than 20 or more than 55 years, infection around surgical site, previous history of any surgery

around affected joint, polytrauma cases, evidence of complications such as septic arthritis or AVN were excluded from our study. The fractures were reduced by standard technique of closed methods. The reduction was confirmed with the help of C-arm image intensifier with anteroposterior and lateral views, based on the Garden's alignment index. An angle of 160°–180° in both views was considered satisfactory reduction. In cases of group I the standard lateral approach was used and after securing a reduction with screws, a channel for fibula graft (autologous) was prepared in central or superior part of head and neck. In-group II cases after closed reduction, internal fixation were done either percutaneously or through a small incision laterally with Cannulated cancellous screws. Post operatively boot and bar cast was applied in all the cases for six weeks. They were allowed quadriceps exercise and after six week knee range of motion exercises started upto eight weeks and later on the hip abductor strengthening exercises in the supine position. Partial or full weight bearing was allowed only based on radiological evidence of union. Initial follow up were done at six weeks interval till the bony union and 3 monthly thereafter. Hip pain, range of hip motion, walking capacity, evidence of bone union, presence of avascular necrosis, graft incorporation, and position of the screws/graft was evaluated. Functional outcomes were evaluated using the Harris hip score.

RESULTS

Total 60 cases were participated in our study out of which 30 belong to group 1 and 30 to group 2.
In group I there were 20 males (66.67%) and 10 females (33.33%). In Group II there were 24 males (80%) and 6 were females (20%) [Table 1].

Table 1: Distribution of male and female in two group.

Group	Male	Female	Total
I	20(66.67%)	10(33.33%)	30
II	24(80%)	6(20%)	30

10 cases (16.67%) were belong to 20 – 30 years age group, 15 cases (25%) belong to 31 – 40 years age group and 35 cases (58.33%) to 41 – 55 years age group [Table 2].

Table 2: Distribution of male and female in two group

Age Group (Years)	No. Of Cases	Percentage (%)
20 – 30	10	16.67
31 – 40	15	25
41 – 55	35	58.33
Total	60	100

In our study, according to Garden's classification, 40 (66.67%) cases were of type III, out of which 24 cases were in group I and 16 were in group II. 20 (33.33%) cases were of type IV, 6 in group I and 14 in group II [Table 3].

Table 3: Showing no of cases according to Garden'sClassification

Garden's Classification	Type III	Type IV
Group I	24	6
Group II	16	14
Total	40	20

In our study, functional outcome was calculated according to Harris hip score. In Group I we got 21 cases (70%) with excellent result, 7 cases (23.33%) with good result and 2 cases were failure cases. In Group II 17 cases (56.67%) got excellent outcome, 9 cases (30%) good outcome and 4 were failure cases [Table 4].

Table 4: Showing result according to Harris Hip Score

Harris Hip Score	Group I (No. of cases)	Group II (No. of cases)
Excellent	21	17
Good	7	9
Fair	-	-
Poor	-	-
Failure	2	4

The meantime of partial weight bearing in Group I was 12 weeks and 14 weeks in Group II. The mean time of union was 17 weeks in Group I (Figure 1] and 18 weeks in Group II [Figure 2].Full weight bearing was allowed after 20 weeks (after confirming radiological union) in both groups because most of cases were from rural area and not well educated.

Figure1: Post-operative X-ray of Fibular graft with screws fixation

Table 2: Post-operative X-ray of Cancellous screws fixation

DISCUSSION

The fracture neck femur is not very uncommon in developing country like India. Fracture neck femur tends to neglect more than intertrochanteric fracture because of factors like less severity of injury and lack of gross deformity. Most local bone setter tends to manage these fractures as soft tissue injuries and give a massage and manipulations. Numerous methods were advised in literature for the management of fracture neck of femur in young adults. Various methods were used for preservation of head in fracture femur in young adults, such as Multiple cannulated cancellous screw[8], fibula graft with screw[9,10], vascularised fibular graft[11-13], vascularised iliac bone graft[14,15], muscle pedicle graft[16,17] various osteotomy around hip[18-20] and the combination of these procedures.[21] However, we compared the results of fibula graft with hip screws and hip screws alone.

In our study, 10 cases (16.67%) belonged to 20 – 30 years age group, 15 cases (25%) belong to 31 – 40 years age group and 35 cases (58.33%) to 41 – 55 years age group. Goyal *et al*. observed in their study union in 15 cases with 24 months follow up with fibular grafting and MHS.[22] The result of our study is comparable with this study. We got 21 cases with excellent result and 7 cases with good result in Group I and 17 cases with excellent result and 9 cases with good result in Group II. The meantime of partial weight bearing in Group I was 12 weeks and 14 weeks in Group II. The mean time of union was 17 weeks in Group I and 18 weeks in Group II. Full weight bearing was allowed after 20 weeks (after confirming radiological union) in both groups because most of the cases were from rural area and not well educated. In our study, according to Garden's classification, 40 (66.67%) cases were of type III, out of which 24 cases were in group I and 16 were in group II. 20 (33.33%) cases were of type IV, 6 in group I and 14 in group II. Nagi *et al* reported a series of 26 cases (10 fresh and l6 old) treated by open reduction and one cancellous screw with free fibular graft followed by single hip spica to all his cases.[23,24] Kumar *et al* reported 40 cases of femoral neck fracture treated with multiple cannulated screws in younger cases with union in 31 cases.[25] These results are also comparable with us. The nonunion rates were 6.67% (02) in group I and 16.67% (04) in group II. In both group cases of nonunion were associated with implant failure. In group I 1 case and in group II 3 cases were developed avascular necrosis of femur head. These failures were mainly due to noncompliance, and premature weight bearing. With respect to morbidity associated with the Fibular graft donor site in our study 8 cases developed incisional pain. Nassr *et al* reported in his study of 163 patients with 53% had Incisional pain, lasted longer than 3 months, 1.2% developed superficial peroneal neuroma, 3% developed tibial stress fractures and 1.2% developed ankle instability.[26] Procedure with fibula graft will increase donor site morbidity, operative time and intra-operative blood loss. Functional outcome in two different procedures evaluated by Harris hip score showed no statistically significant difference ($p>0.05$).

CONCLUSION

We concluded in our study that the results of both the procedure is comparable and it is difficult to say which one is better over another procedure. So we can conclude that it all depends on surgeon choice and his expertise and also on cases education level which procedure to opt.

REFERENCES

1. Banks HH. Nonunion in fractures of the femoral neck. OrthopClin North Am. 1974;5:865–85.
2. Calandruccio RA, Anderson WE 3rd. Post-fracture avascular necrosis of the femoral head: correlation of experimental and clinical studies. ClinOrthopRelat Res. 1980;152:49–84.
3. Dedrick DK, Mackenzie JR, Burney RE. Complications of femoral neck fracture in young adults. J Trauma. 1986;26:932–7.
4. Sandhu HS, Sandhu PS, Kapoor A. Neglected fractured neck of the femur: a predictive classification and treatment by osteosynthesis. ClinOrthopRelat Res. 2005;431:14–20.
5. Cartlidge IJ. Primary total hip replacement for displaced subcapital femoral fractures. Injury. 1981;13:249–53.
6. Coates RL, Armour P. Treatment of subcapital femoral fractures by primary total hip replacement. Injury. 1979;11:132–5.
7. Gregory RJ, Wood DJ, Stevens J. Treatment of displaced subcapital femoral fractures with total hip replacement. Injury. 1992;23:168–70.
8. Haidukewych GJ, Rothwell WS, Jacofsky DJ, Torchia ME, Berry DJ. Operative treatment of femoral neck fractures in cases between the ages of fifteen and fifty years. J Bone Joint Surg Am. 2004;86:1711–6.
9. Azam MQ, Iraqi A, Sherwani M, Sabir AB, Abbas M, Asif N. Free fibular strut graft in neglected femoral neck fractures in adult. Indian J Orthop. 2009; 43(1):62–66
10. Elgafy H, Ebraheim NA, Bach HG. Revision internal fixation and nonvascular fibular graft for femoral neck nonunion. J Trauma. 2011; 70:169–173
11. Jun X, Chang-Qing Z, Kai-Gang Z, Hong-Shuai L, JiaGen S. Modified free vascularized fibular grafting for the treatment of femoral neck nonunion. J Orthop Trauma. 2010; 24:230–235
12. LeCroy CM, Rizzo M, Gunneson EE, Urbaniak JR. Free vascularized fibular bone grafting in the management of femoral neck nonunion in cases younger than fifty years. J Orthop Trauma. 2002;16:464–72.
13. Nagi ON, Dhillon MS, Goni VG (1998) Open reduction, internal fixation and fibular autografting for neglected fracture of the femoral neck. J Bone Joint Surg Br 80:798–804
14. Chang MC, Lo WH, Chen TH. Vascularised iliac bone graft for displaced femoral neck fracture in young adults. Orthopedics. 1999; 22:493–498

15. Hou SM, Hang YS, Liu TK. Ununited femoral neck fractures by open reduction and vascularized iliac bone graft. ClinOrthopRelat Res. 1993;294:176–80.
16. Baksi DP. Internal fixation of ununited femoral neck fracture combined with muscle pedicle grafting. J Bone Joint Surg [Br]. 1986; 68:239–245 365
17. Meyers MH, Harvey JP Jr, Moore TM. Treatment of displaced subcapital and transcervical fractures of the femoral neck by muscle-pedicle-bone graft and internal fixation. A preliminary report on one hundred and fifty cases. J Bone Joint Surg Am. 1973;55:257– 74.
18. Anglen JO. Intertrochanteric osteotomy for failed internal fixation of femoral neck fracture. ClinOrthopRelat Res. 1997;341:175–82.
19. Ballmer FT, Ballmer PM, Baumgaertel F, Ganz R, Mast JW (1990) Pauwels osteotomy for nonunions of the femoral neck. OrthopClin North Am 21:759–767
20. Kalra M, Anand S. Valgus intertrochanteric osteotomy for neglected femoral neck fractures in young adults. IntOrthop. 2001;25:363–6.
21. Beris AE, Payatakes AH, Kostopoulos VK, Korompilias AV, Mavrodontidis AN, Vekris MD, et al. Non-union of femoral neck fractures with osteonecrosis of the femoral head: treatment with combined free vascularized fibular grafting and subtrochanteric valgus osteotomy. OrthopClin North Am. 2004;35:335–43.
22. Goyal R.K., Chandra H., Pruthi K.K., Nirvikalp Fibular grafting with cannulated hip screw fixation in late femoral neck fracture in young adults. Indian J Orthop. 2006;40:94–96.
23. Nagi O.N., Dhillon M.S., Goni V.G. Open reduction, internal fixation and fibular autografting for neglected fracture of the femoral neck. J Bone Joint Surg Br. 1998;80:798–804
24. Nagi O.N., Dhillon M.S., Gill S.S. Fibular osteosynthesis for delayed type II and type III femoral neck fractures in children. J Orthop Trauma. 1992;6:306–313
25. Kumar S., Bagchi D. Fractures of the neck of the femur-treated with multiple cannulated screws in younger cases – a study of 40 cases. IJOS. 2009;18.
26. Nassr A, Khan MH, Ali MH. Donor-site complications of autogenous non vascularized fibula strut graft harvest for anterior cervical corpectomy and fusion surgery: experience with 163 consecutive cases. Spine J. 2009;9:893–898.

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