MANAGEMENT OF IPSILATERAL FRACTURE OF NECK AND SHAFT OF FEMUR WITH RECONSTRUCTION NAIL

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ABSTRACT: Ipsilateral femoral neck and shaft is primarily found in younger individuals, usually in their third or fourth decades. Patients are usually involved in high-energy trauma. The overall incidence of associated neck and shaft fracture ranges from 2.5% to 9%. The majority of these injuries are the result of motor vehicle accidents or falls from a height. Ipsilateral femoral neck fractures are usually nondisplaced and, therefore, difficult to diagnose. Study of twenty five cases of ipsilateral neck and shaft fractures managed by reconstruction nail is presented. Pelvic film with hips in 20 degrees of internal rotation is recommended to avoid missing the diagnosis at the initial workup of the patient. We had no patient with delayed diagnosis of neck fracture. All patients were operated as early as the general condition of the patient permitted. Delay in treatment was mainly due to associated major non orthopaedic injuries. There were 22 males and 3 female patients. Mean age in males was 40.14+/- 10.98 yrs and females was 40.33+/- 7.64yrs age. All the patients were followed up for six months till the union of both the fractures. There were two cases of non-union of the femoral neck fracture, one case of avascular necrosis of head and four patients had varus malunion at neck. There were three cases of non-union and ten cases of delayed union of femoral shaft fracture. Femoral shaft fracture determined the total union period. Shaft complications were managed with or without secondary procedures as compared to femoral neck complications, which usually required more extensive procedures. It is concluded that Reconstruction nailing is a good treatment option in patients with undisplaced fracture of neck but it should not be preferred in displaced femoral neck fractures because of difficulties in reducing the fracture and its maintenance during nail insertion.

Simultaneous ipsilateral femoral neck and shaft fractures are a rare injury pattern and constitutes for approximately 2.5-9% of femoral shaft fractures (Wolinsky PR, Johnson KD, Clin Orthop Relat Res. 1995 Sep; (318):81-90; Watson JT, Moed BR Clin Orthop Relat Res. 2002 Jun; (399):78-86). These injuries are a result of high energy trauma (Wolinsky PR, Johnson KD Clin Orthop Relat Res. 1995 Sep; (318):81-90.). Victims are usually young and frequently have multiple associated injuries (Wolinsky PR, Johnson KD Clin Orthop Relat Res. 1995 Sep; (318):81-90; Watson JT, Moed BR Clin Orthop Relat Res. 2002 Jun; (399):78-86.). Various surgical treatment options exist for the treatment of this injury pattern like cannulated screws for fracture neck and plate for the shaft fracture, antegrade intramedullary nail for fracture of shaft and cannulated screws for fracture of neck inserted with miss-a-nail technique (Alho A Acta Orthop Scand. 1996 Feb; 67(1):19-28.), dynamic hip screw for fracture of neck with a long side plate spanning the fracture of shaft if it is in the proximal 3rd of femur or a separate plate for more distal fractures (Wolinsky PR, Johnson KD Clin Orthop Relat Res. 1995 Sep; (318):81-90.), cannulated screws for fracture neck and retrograde intramedullary for fracture of shaft (Oh CW, Oh JK, Park BC, Jeon IH, Kyung HS, Kim SY, Park IH, Sohn

OJ, Min WKArchOrthop Trauma Surg. 2006 Sep; 126(7):448-53.) .This study reports the outcome of 25 patients of ipsilateral femoral neck and shaft fractures using reconstruction nailing.

MATERIALS AND METHODS: Twenty five patients with ipsilateral neck and shaft fractures were treated with reconstruction nailing. All the cases were followed for a minimum of 6 months or until the healing of fractures. Mean age in males was 40.14+/- 10.98 yrs and females were 40.33+/- 7.64yrs. Fifteen patients had injuries to other parts viz chest, abdomen, facial and head. In fifteen patients fracture shaft of femur was in middle 3rd, four had it in mid-distal 3rd region. Fifteen patients had Winquist type iii and iv fractures. Three patients had Gustilo and Anderson grade ii and one had grade I open fracture of shaft. Eleven patients had Garden type ii and six had type iii fractures. All patients were managed initially in emergency department. Non orthopaedic injuries were managed by General Surgeons and Neuro Surgeons. Fractures in patients with associated injuries who could not be operated immediately were initially stabilized by skeletal traction. All patients received prophylactic i/v antibiotics pre-operatively, which continued post operatively for varying length according to whether the fractures were closed or open. Patients were operated in supine position on the fracture table under image intensifier. Reduction of fracture neck and shaft was achieved by varying amount of traction and external manipulation of the limb. A temporary stabilization of fracture neck with two guide wires was done prior to the fixation of shaft fractures. Physiotherapy was started from 2nd post-operative day. Toe touch walking was allowed on 5th post-operative day. Patients were discharged after suture removal and followed up in OPD at monthly intervals for six months or till the fractures united. Follow ups included clinical and radiological evaluations. Progressive weight bearing was allowed after the appearance of radiological signs of union. Union was defined as presence of consolidation on radiographs. Results were defined according to Friedman and Wyman system (Friedman RJ, Wyman ET (1986) ipsilateral hip and femoral shaft fractures. Clin Orthop Relat Res 208:188–194) and were categorized into good, fair and poor. Good result required no limitation of daily activities, no pain and <20 degrees of loss of hip and knee motion. Fair result indicated mild limitation of activities, mild to moderate pain, 20-50 degrees of loss of motion at hip and knee. Poor result was when moderate to severe limitation of activities and >50 degrees of loss of motion at hip and knee.

RESULTS: Nineteen patients had no delay in surgery. They were operated within 24 hours. Remaining six patients had variable delay between one to sixteen days depending upon the severity of non orthopaedic injuries. Mean time of operation was 3+/-0.67hrs. We faced technical difficulties in ten patients in locating the entry portal and in thirteen patients in the reduction of fractures. Iatrogenic comminution was present in four patients. We had distraction in four patients at fracture neck and two patients at fracture shaft of femur. One patient had superficial entry site infection which subsided with debridement. One patient had post-operative respiratory distress, he recovered uneventfully. Delayed union of fracture shaft occurred in ten patients. Non union of fracture was encountered at shaft in three patients and at neck in two patients. Mal union occurred at shaft in three patients, one had posterior angulation of fourteen degrees, and two had valgus of ten degrees. Four patients had varus at neck. One patient had avascular necrosis of head and a significant 11 had heterotopic ossification at normal entry point. There were 62 percent patients with good, thirty percent patients with fair and eight percent patients with poor results.

Radiograph of pelvis with both hips showing fracture neck of femur

We followed a strict protocol for radiograph of pelvis with both hip joints; therefore we did not miss any fracture neck of femur.

Varus malunion of # neck and non union of # SOF managed with bone grafting.

Valgus malunion of fracture shaft femur in progress.

DISCUSSION: Ipsilateral fracture of neck and shaft of femur occurs in young victims of high energy trauma. Eighty eight percent had road traffic accident, Alho A in his meta- analysis of 659 cases (ActaOrthopScand 1996 Feb; 67(1)) reported RTA in 78% of patients. Mean age of males was 40.14, females were 40.33 and eighty percent were males. Alho A reported a mean age of 34 years and 78% were males. We observed no missed fracture neck of femur as we observed a strict protocol for a radiograph of pelvis with both hips in all major trauma cases. Mark f Swiontkowski in his series of 15 cases (1971-81) reported an incidence of 19%, Bennett et al reported an incidence of 31%, Chi Wu reported an incidence of seven out of 42 patients. Sixty percent of the patients had associated non orthopaedic injuries. Operations were performed within one to sixteen days following the trauma. Delay was mainly due to non orthopaedic injuries. One patient (4%) had avascular necrosis of head, Ahlo observed AVN in 3% of patients in his meta analysis of 659 patients. We stabilized the femoral neck fracture first which prevented further displacement of fracture while trying to reduce fracture of the shaft. Non union of the fracture of neck occurred in 8% of the patients due to inadequate reduction of the neck fracture, one patient was managed with Meyer bone graft and the fracture united, the other patient was lost to follow-up. Examining the two large series, that of Bennett et al and Wu and Shih, it seems as if stable anatomic fixation is key for union and delay in treatment seems to have little effect on this complication and our observation is in agreement with them. Four patients had varus malunion of neck fracture Twelve percent (12%) of patients had non union of shaft fracture for which bone grafting was required, one patient had exchange nail. Swiontkowski and carry and chapman found a femoral shaft non union rate of 14%. Malunion at fracture of shaft was present in three patients. We observed an average shortening of 1cm, Ostermann PA et al in his series reported average shortening of 1.3cm.

Russell taylor reconstruction nail is advantageous in terms of closed antegrade nailing with minimal incision, and reduced blood loss and biological fixation of both fractures with a single implant. We found reconstruction nailing to be technically demanding. It is difficult to achieve

reductions in displaced femoral neck fractures in such complex injuries with reconstruction nailing, and varus nonunion or malunion can occur, as observed in five patients in the present series. The stability of neck fixation may be insufficient.

CONCLUSION: The choice of treatment method should be dictated primarily by the type of femoral neck fracture. Reconstruction nailing should not be preferred in displaced femoral neck fractures because of difficulties in reducing the fracture and its maintenance during nail insertion. Careful patient selection, precise surgical technique and close post-operative follow up is the key to success in treating these groups of patients.

REFERENCES:

1. Oh CW, Oh JK, Park BC, Jeon IH, Kyung HS, Kim SY, Park IH, Sohn OJ, Min WK ArchOrthop Trauma Surg. 2006 Sep; 126(7):448-53.
2. Kao HK, Wu CC, Lee PC, Su CY, Fan KF, Tseng I: Ipsilateral femoral neck and shaft fractures treated with Russell-Taylor reconstruction intramedullary nails. Chang Gung Med J.2006; 29(1):79-85.
3. Wu CC: Ununited ipsilateral femoral neck and shaft fractures: treatment of 16 patients. Arch Orthop Trauma Surg.2004; 124(3):173-178.
4. Watson JT, Moed BR: Ipsilateral femoral neck and shaft fractures: complications and their treatment. Clin Orthop.2002; 399:78-86.
5. Whittle AP, Wood GWII: Fractures of lower extremity. In: Canale ST (ed) Campbell's operative orthopaedics. Mosby, St. Louis, MO. 2003; 2725-2872.
6. Starr AJ, Bucholz RW: Fractures of the shaft of the femur. In: Bucholz RW, Heckman JD (eds) Rockwood and Green's fractures in adults. Lippincott Williams & Wilkins, Philadelphia, PA.2001; 1683-1730.
7. Randelli P, Landi S, Fanton F, Hoover GK, Morandi M: Treatment of ipsilateral femoral neck and shaft fractures with the Russell-Taylor reconstructive nail. Orthopedics.1999; 22(7):673-676.
8. M.SankaranKutty: The management of combined fracture of neck and shaft of ipsilateral femur Orthopaedic update. 1999; 9:99-102.
9. Kelvin D Plancher, Jon D. Donshik: Femoral neck and ipsilateral neck and shaft fractures in young adult. Orthopaedic clinics of North America; 1997; 3:450-58.
10. Praveen K. Rao, A Balakrishnan, Ganesh Nayak, S. Venkat: Management of ipsilateral fractures of hip and femoral shaft. Journal of orthopaedics 1997; 31: 123-26.
11. AlhoA: Concurrent ipsilateral fractures of the hip and femoral shaft: a meta-analysis of 659 cases. ActaOrthop Scand.1996; 67:19-28.
12. Wolinsky PR, Johnson KD: Ipsilateral femoral neck and shaft fractures. ClinOrthop. 1995; 318: 81-90.
13. Swiontkowski MF: Current concepts review: Intracapsular fractures of hip. J Bone and Joint Surg. 1994; 76(A): 129-33.
14. Ramser JR Jr., Mihalko WM, Carr JB Beaudoin AJ, Krause WR: A comparison of femoral neck fixation with the reconstruction nail versus. ClinOrthop. 1993; 290:189-96.

15. Bennett B, Alberto f, Hugo L: Simultaneous ipsilateral trochanteric and femoral shaft fracture. *ActaOrthop Scand*. 1985; 56:36-39.
16. Bray JP, Templeman DC: Fractures of femoral neck. Chapman MW (ed): *Operative Orthopaedics*, ED2. Philadelphia, JB Lippincot. 1993; 583-594.
17. Wu CC, Shih CH: Ipsilateral femoral neck and shaft fractures. *ActaOrthop Scand*. 1991; 62:346-51.
18. Esjaer S, Schmidt SA, Sojbjerg JO, Moller Larsen F: Alternatives in the treatment of ipsilateral fractures of the hip and femur. *Orthopedics* 1989; 12(3): 397-400.
19. Swiontkowski MF: Ipsilateral femoral shaft and hip fractures. *OrthopClin North Am*. 1987; 18: 73-84.
20. Friedman RJ, Wyman ET (1986). Ipsilateral hip and femoral shaft fractures. *Clin Orthop Relat Res* 208:188-194.
21. Antonio B, Alberto F, Hugo L: Simultaneous ipsilateral trochanteric and femoral shaft fracture. *ActaOrthop Scand*. 1985; 56: 36-39.
22. Ischolz RW, Rathjen K: Concomitant ipsilateral fractures of hip and femur treated with interlocking nails. *Orthopaedics* 1985; 8(11): 1402-6.
23. Zettas JP, Zettas P: Ipsilateral fractures of femoral neck and shaft. *ClinOrthop*. 198; 160: 63-73.
24. Chapman MW: The use of immediate internal fixation in open fractures. *Orthop. Clin. North Am*. 1980; 11:579.
25. Casey MJ, Chapman MW: Ipsilateral concomitant fractures of the hip and femoral shaft. *J Bone J surg*. 1979; 61: 503-9.
26. Hansen ST, Winkquist RA: Closed intramedullary nailing of fracture of the femoral shaft. Part II. Technical considerations. In: *The American Academy of Orthopaedic Surgeons: Instructional course lectures*. 1978; vol 27.CV Mosby, St. Louis, MO.
27. Bernstein SM: Fractures of the femoral shaft and associated ipsilateral fractures of the hip. *OrthopClin North Am*. 1974; 5:799-819.
28. Kimbrough EE: Concomitant unilateral hip and femoral shaft fractures- A too frequently unrecognized syndrome. A report of five cases. *J Bone Joint Surg*. 1961; 43A: 44A.
29. Ritchey SJ, Schonholtz GJ, Thompson MS: The dashboard femur fracture: Pathomechanics, treatment and prevention. *J Bone Joint Surg* 40(A): 1958; 1347-58.
30. Delaney WM, Street DM: Fracture of femoral shaft with fracture of neck of same femur. Treatment with medullary nail for shaft and Knowles pins for neck. *J IntColl Surg*. 1953; 19:303.

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