ORIGINAL ARTICLE

Ipsilateral Femoral Neck and Shaft Fracture

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ABSTRACT

Background: Fracture of the ipsilateral femoral neck and shaft are not uncommon, but challenging combination of injuries encountered by Orthopedic Surgeons.

Objective: Objective of this study was to evaluate the devastating complication of femoral head i.e. avascular necrosis and non union of femoral head and to determine outcome of DHS and cancellous screw fixation for its management.

Patients and Methods: This prospective study was conducted in the Department of Orthopedic Surgery Sheikh Zayed Medical College/Hospital from 2008 to 2011. Diaphysial fracture of femur with neck fractures in 24 patients between 16 to 40 years were included in this study. Priority was given to neck fractures which was stabilized as early as patient's general condition permitted with DHS and Screws and shaft Fracture was fixed with DCP and screws with or without bone grafting. The entire patients were mobilized after surgery on crutches except for patients having other associated injury within one week. Patients were fallowed until 02 years.

Results: Union of fracture neck was achieved in 100% of patients treated with DHS and side plate and 78% treated with cannulated screws. Delayed union is 20% and non union 10% of patients treated with cannulated screw. Overall results of union of fracture neck of femur was graded as good union, achieved between 16-28 weeks (83.33%), fair union achieved between 29-46 weeks (8.33%), Poor, Union achieved between 46 weeks (8.33%).

Conclusion: The findings of present study in concomitant fractures suggest that DHS with side plate is a good device for management of fracture of neck of femur in concomitant injury as no major complication was detected with this method.

Key Words: Dynamic hip screw and side plate fixation in concomitant, femur and shaft fractures in adults.

INTRODUCTION

Isolated fractures of neck of femur and femoral shaft are common and orthopedic surgeons have considerable experience in the treatment of these fractures and their complications. However, ipsilateral femoral neck and shaft fracture is an uncommon, complex, and challenging problem encountered by orthopedic Surgeons. This was first reported in 1953[1]. In 2008, Agarwal et al. stressed the rarity of this concomitant injury[2]. These fractures may occur in up to 9% of all femoral shaft fractures[3]. Approximately 250 cases were reported in the literature up till 1953[4]. The incidence of this injury is increasing. This increase may be the result of better reporting, better recognition of the injury pattern and better resuscitation efforts[5].

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These fractures are the result of high energy trauma, such as motor vehicle accidents (MVA) and fall from heights. The fracture occurs when hip is axially loaded while leg is abducted[6]. The definitive repair of this injury pattern can be a difficult problem due to mechanism of injury as well as location of the fractures[7].

A number of issues increase the difficulty and complexity of managing a combined femoral neck-shaft injury as compared with addressing either fracture alone. The optimal timing of fixation, sequence of fracture fixation, and implant selection must be considered. It is clear, however, that excellent reduction of both fractures is the goal of treatment of this injury pattern[8]. The ideal fixation strategy for high energy ipsilateral neck of femur and shaft remains controversial. In general the mechanism of repair has been mainly determined by surgeon performance[9]. Many implant options exist to manage the combined neck-shaft injury.

The most common methods to treat these fractures are.

1. Reconstruction nail for both fractures.

2. Anti-grade interlocking nail for shaft of femur and dynamic hip screw for fracture neck of femur.
3. Dynamic compression plate fixation for fracture of shaft of femur and dynamic hip screw for fracture neck of femur.
4. Dynamic compression plate fixation for fracture of femur shaft and cannulated screws for fracture neck of femur.
5. Retrograde interlocking nail for fracture of femur shaft and cannulated screws for neck of femur.

Varying degrees of success rate has been reported about femoral neck and shaft nonunion as high as 25% and 10% respectively. None of the studies to date have conclusively demonstrated superiority about any particular devices pattern on long term clinical outcomes[10].

In this institution, ipsilateral femoral neck and shaft fractures were treated as orthopedic emergencies. The first step was to obtain anatomic reduction and rigid fixation of the femoral neck fracture. This was done with either cannulated screws or dynamic hip screw and side plate for neck fractures. The shaft fractures was then reduced and stabilized with dynamic compression plate with or without bone grafting.

PATIENTS AND METHODS

A prospective study was conducted in orthopedic department of Sheikh Zayed Medical College/Hospital from November 2008 to December 2011. All the traumatic ipsilateral femoral neck and shaft fracture in young adults between 16 to 45 years were included in the study. All the patients with open shaft fractures, open knee fractures, pathological fractures, systemic injuries and systemic disease were excluded from the study. Detailed history was taken. There was high index of suspicion in patients presented after motor vehicle accidents, motorcycle accidents and fall from height.

The deformity associated with fracture shaft of femur is usually obvious, it is shortening and external rotation. The fracture neck of femur may present as fullness or tenderness in the groin or tenderness over the greater trochanteric area. Antero-posterior X – Rays of pelvis along-with antero –posterior and lateral X – rays of shaft of femur including both hip and knee joints were advised. In high suspicious cases CT scan, Bone Scan and MRI were advised as needed. Abdominal ultrasound was advised in suspected abdominal injuries. Blood complete examination, serum electrolytes, blood glucose random, blood urea nitrogen, Serum Creatinine and arterial blood gases were advised as needed and assessment done accordingly.

According to treatment protocol of this study, priority was given to the femoral neck fractures. It is essential that anatomical reduction and rigid fixation of the femoral neck take precedence over definitive fixation of the femoral shaft fractures. All the neck fractures irrespective of displacement will be treated according to time scale division. Neck fractures operated within 72 hours will be fixed with cannulated screws and those operated after 72 hours will be fixed with dynamic hip screw. Reduction of the femoral neck fracture was done by positioning the patient on fracture table under image intensifier or by indirect techniques. In this instance limited open reduction and manual manipulation to assist the indirect techniques were required for adequate fracture alignment. Only after anatomical reduction achievement, the rigid fixation of the femoral neck with cannulated screws (6.5mm) or dynamic hip screw and four holes side plate was done. Later on the shaft was fixed with broad dynamic compression plate (4.5mm) with or without bone grafting in the standard fashion.Delayed union and nonunion was defined in a standard way.

Post operatively broad - spectrum antibiotics were given for 48 hours. Analgesics were given as needed. Physiotherapy was used to avoid Knee stiffness after surgery. The patients were allowed to walk non weight bearing with crutches till a trace of callus started to appear at both fracture sites. The patients were permitted to gradually bear weight on the affected limb with crutches. The crutches were discarded once there was good callous visible at femoral neck and shaft fractures. The patients were visited for clinical and radiological assessment every 03 months during the 1st and 2nd years and every six months during the 3rd year of study. Data regarding age, sex mechanism of injury, duration of injury, time of operation, duration of operation and complications were recorded and analyzed by SPSS version 14.

RESULTS

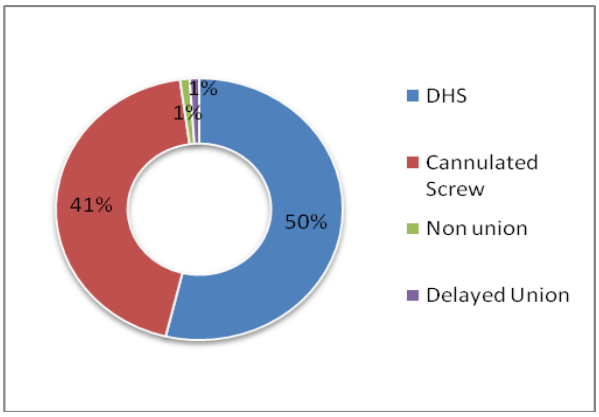
There were 24 patients. All the patients were operated within one week. Average duration of operation was 02:30 hours. There were 19 (79%) males and 5 (21%) females (Table-I). The 19 (79%) patients have automobile related injuries

and 5 (21%) patients have fractures due to fall from height (Table-II). Delayed union of neck of femur was noted in 1 (4%) of patients and non union of neck of femur in 1 (4%) patients treated with cannulated screws (Table – III) .

Delayed union in shaft of femur was detected in four (16.66%) patients and nonunion in 02(8.33%) patients (Table -III). Plate failure of diaphysis was seen in one patient. One patient developed deep infection and two patients superficial infection that settled down after thorough debridement and antibiotics. Union of fracture neck was achieved in 12 (50%) patients Fracture Neck of Femur (Table - I)

treated with DHS and side plate and 10 (41%) patients treated with cannulated screws. True leg length discrepancy was detected in 02 (8.33%) patients. We developed our own criteria for union fracture neck of femur. Overall results of union of fracture neck of femur were graded as good - union achieved between 16-28 weeks (83.33%), fair - union achieved between 29-46 weeks (8.33%), Poor - union achieved after 46 weeks (8.33%). Overall results of fracture shaft of femur. Good 75%, Fair 16.66% and poor 8.33% respectively.

Fracture Shaft of Femur (Table -II)



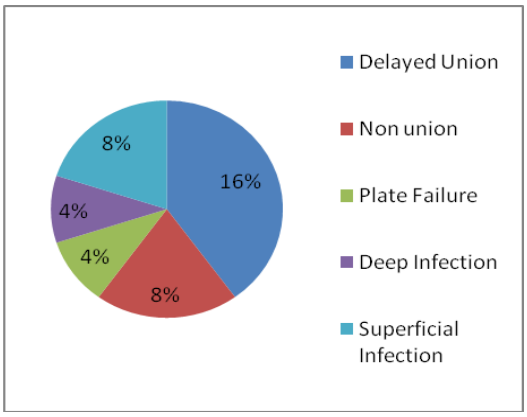


Table: I: Sex wise distribution of patients.

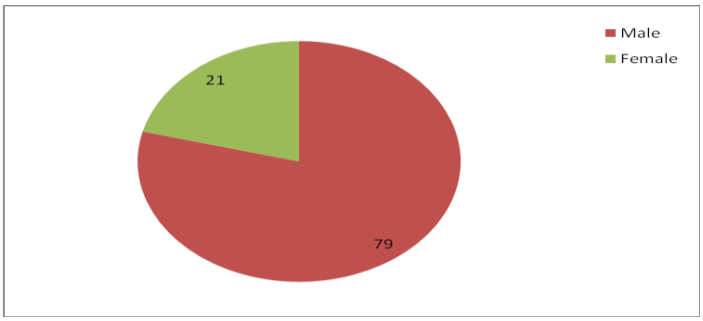


Table II: Mechanism of Injury

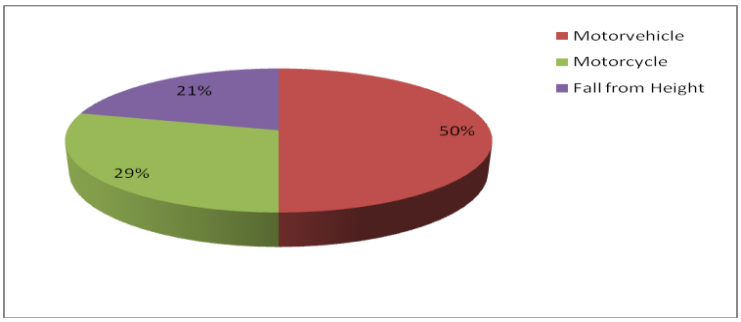


Table III: Complications and Surgical Treatment

Complications	Percentage	Surgical Treatment
Delayed Union at shaft of femur	16.66	Cancellous bone grafting
Plate failure at fracture shaft of femur	4.16	Revised with DCP plate & Primary cancellous bone grafting
Non union at Shaft of Femur	8.33	Cancellous bone grafting
Infection Superficial	8.33	Antibiotics
Deep Infection	4.16	Debridement and Antibiotics
Delayed union at fracture neck of femur	4.16	Conservative Treatment
Non-union at fracture neck of femur	4.16	Valgifying osteotomy and fixation with DHS along with tensor fascia latae flap
True leg length discrepancy 2-3cm	8.33	Shoe elevation (conservative)

DISCUSSION

Ipsilateral femoral neck and shaft fractures are uncommon but potentially devastating injuries. These concomitant fractures are challenges to orthopedic surgeons[11]. These fractures are primarily found in younger individuals, usually in their third or fourth decades, resulting from high energy trauma, caused by motor-vehicle accidents or fall from height[12]. Fracture neck of femur escapes recognition at initial presentation in 10 – 19%[13] of cases and could be as high as 20-30%. To avoid this diagnostic pitfall; we advice the following: awareness of this combination of injuries especially in road traffic accident and in poly trauma. During radiographic evaluation, always advise x –rays of the joint above and the joint below the fractures as recommended by Burkle de la Camp & Rostock[14].

When clinical examination reveals fullness and/or tenderness in the groin of the injured side or tenderness over the greater trochanter, fracture of the neck of femur should be suspected until proved otherwise. Though there is confusion regarding which fracture should be managed first, there appears to be a general consensus regarding the seriousness of the complications involving femoral neck fracture so in this study femoral neck fractures were stabilized first in all patients. There is still no consensus on the optimal treatment method for these complex fractures. In a meta-analysis of the reports published in the literature, the locked intermedullary nails or reconstruction nails yielded results that were superior to those for combinations of plates. The plate series was associated with more frequent infections and nonunion, while the nail fixations were complicated by rotatory malalignments and shortenings[15].

The choice of implant was influenced by the surgeon's preference. Kao has 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[16]. Retrograde femoral nailing with multiple screws has been reported to result in unions with 5^0 to 7^0 of varus angulation and avascular necrosis of the femoral head[17]. Also there is difficulty in removing the nail, as the entry point for the nail is the knee joint[18]. Singh et al., stated that the choice of the treatment method should be dictated primarily by the type of femoral neck fracture and the surgeons familiarity with the treatment method chosen[19].

Technically, it is much easier to fix such fractures with a plate plus screws or DHS (than an intramedullry nail with screws or a reconstruction nail). It achieves a union rate of 77 to 93% in the femoral shaft and 93 to 100% in the femoral neck, with 77 to 93% of patients achieving good outcomes[20]. Compared to other techniques, fixation using a DHS and a DCP for ipsilateral femoral neck and shaft fractures is a reliable means of achieving bone union with few complications. We recommend stabilization with cancellous screws for un-displaced fractures neck of femur and DHS to fix the displaced fractures neck of femur, with a broad dynamic compression plate and cancellous bone graft to fix the femoral shaft fractures in order to achieve adequate fixation of both fractures, aiming for early union without loss of function.

CONCLUSION

It is concluded that no single treatment or combination of treatment can be considered

standard or preferable in all cases[21]. The basic importance lies in early diagnosing, lessening the chance of missing these injuries. Proper evaluation and managing these poly trauma patients and early anatomically reducing and stabilizing theses complex fractures by a reasonable method of fixation, as soon as the patient is received in the Orthopedic unit.

We have found that early fixation of the femoral neck fracture with DHS and side plate or cannulated screws fallowed by DCP plating of the femoral shaft fractures with or without bone grafting, is a excellent method of treatment with low complication rate.

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