INTRODUCTION

Gunshot injuries are major problems worldwide and have a great impact on health budget and economy. Extremities are the most frequently involved sites in gunshot injuries, lower limbs being more involved as compared to upper limbs. Gunshots result in extensive comminution at the fracture site thus making treatment a difficult task. According to Gustilo and Anderson classification, gunshot fractures are type of open fractures and placed in gustilo type III. These fractures are usually managed surgically and stabilized either externally or with internal implants. Plating is associated with increased risk of infection and non-union, while external fixation is coupled with increased risk of malunion, non-union and pin tract infection. Treatment of femur diaphyseal fractures has been revolutionized after the introduction of intramedullary nailing. These have been associated with relatively lower risk of infection and non-union while better healing proportion as compared to other devices. Intramedullary nailing provides excellent stability against axial and rotational deformation of the fracture. It requires small surgical exposure thus decreasing the risk of infection, easy dressing and early rehabilitation.

Gunshot comminuted femur fractures have been treated with locked intramedullary nailing, however there is limited data available in local literature regarding healing of these fractures. The rationale of this study was to study the results of our patients managed with this technique.

METHODOLOGY

This study was conducted at Civil Hospital Karachi during July 2009 to December 2009. All the patients, 18 years and above presenting in emergency department with isolated gunshot femur fracture (Gustillo type IIIa) were included. Patients with Gustillo type IIIb and IIIc, diabetic patients and patients with multiple gunshot injuries were excluded. Patients were examined in the emergency department and assessed for entry and exit wounds. Patients were diagnosed with anteroposterior and lateral x-rays. All the patients were started on intravenous antibiotics for 5 days after tetanus prophylaxis. Wounds were irrigated in the emergency room and debridement was done in operation theatre within 8 hours of presentation.
Patients were operated for intramedullary nailing on the next available trauma list by senior consultant. Patients were mobilized on the next day and discharged after 2-3 days. Stitches were removed after 2 weeks and then followed on monthly basis with x-rays. Final was assessed in the clinic at six months. The data was analyzed by using SPSS (version 13; SPSS Incorporated, Chicago, Illinois, USA). Frequencies and percentages were used to summarize categorical variables like gender distribution, postoperative follow-up (i.e. callus formation – present/absent) and final outcome (i.e. healing – yes/no). Moreover, male to female ratio was also determined. Mean±standard deviation (SD) were computed for numerical variables like age distribution. Stratification with regards to age, gender, postoperative follow-up and final outcome was done to control the effect modifiers. Any inferential test of significance was not applicable for this descriptive type case series.

RESULTS
Between July 2009 to December 2009, 43 patients sustaining isolated gunshot femur fracture were included in this study. Mean (+ SD) age was 36.05 (+12.53) years (Range 18 to 60 years). Thirty-five (81.4%) patients in this study were male whereas eight (18.6%) were female. Male to female ratio was 4.3: 1.

Callus was observed radiographically in 39(90.7%) patients at the end of six months of follow-up. However, in 4(9.3%) patients, callus was not demonstrated on radiography. Hence, healing was achieved in 90.7% of cases after intramedullary locking nail usage in gunshot comminuted fracture shaft of femur.

DISCUSSION
In our study callus formation was observed in 39 patients at the end of six months. Hence, healing rate was observed in 90.7% of cases after usage of locked intramedullary nail in gunshot comminuted fracture shaft of femur.

Gunshot comminuted fractures of femur shaft are high energy open fracture by definition. They are generally considered to affect young patients as previously mentioned by Moran et al in their case series. In this study, majority of the afflicted patients were between 18 to 30 years of age group with mean age being 36.05 years. Umeret al noticed average age of 36 years in their case series, which is comparable to results of this study. The sex ratio distribution in this study was also in keeping with other reports and further emphasizes the greater vulnerability of males to trauma. Males in our population play major holding financial matters of family and for that they have to remain outside of their homes most of the time, predisposing to trauma. In this study, 81.4% of male sustained gunshot comminuted fracture of femur shaft.

Intramedullary nails are weight sharing implants which permit immediate weight bearing after static locking even in unstable fractures. They have the advantage of providing greater fatigue strength, better stability in all planes specially if locking screws are used and providing reamed bone at the fracture site. Therefore, locked intramedullary nail fixation has become the standard of treatment for comminuted femur shaft fracture with reported union rates between 88-97%.

Fogarty and Yeates retrospectively evaluated 45 patients with 46 femoral shaft fractures treated with interlocking intramedullary nail. The type of fractures included 4 compound and 13 comminuted. The union rate was 98% with this technique in their series.

Ali and associates prospectively evaluated a role of intramedullary interlocking nail in 68 patients sustaining femoral fractures as a consequence of high velocity gunshot injuries. They observed overall satisfactory outcome in 88.33% (61.76% excellent and 26.47% good) of cases. Non-union was noticed in 4(5.88%) patients. Hence, they concluded that intramedullary locked nail is best option for the
management of femoral shaft fractures due to high velocity gunshot injuries. Grosse and colleagues managed 115 open femur shaft fractures by meticulous wound care followed by intramedullary nailing. Healing was noticed in all patients. Therefore, recommended early intramedullary nailing in open femur shaft fractures.

Tuzuner and co-workers reported 100% union rates in 42 patients having open femoral shaft fractures. Similarly, Yilmaz et al also experienced high union rates with intramedullary interlocking nail in type II and IIIA open fracture of femur shaft.

There were certain limitations to our study including small sample size.

CONCLUSIONS
In summary, intramedullary interlocking nail is safe and effective technique for management of gunshot comminuted fractures of femoral shaft, as it is associated with excellent healing rates. This facilitates the early return to physical activity of patient.

REFERENCES


PREVIOUS RELATED STUDIES