ORIGINAL ARTICLE

Frequency of Causes and Location of Open Fractures

ABDUR RAHMAN QURESHI[1], JUGDESH KUMAR[2], AFTAB ALAM KHANZADA[3], *SYED MUHAMMAD AWAIS*[4]

ABSTRACT

Open fractures are high-energy injuries that require a principle-based approach, starting with detailed evaluation of patient status and injury severity. In the presence of extensive soft tissue damage, local or free muscle flaps should be transferred to achieve coverage. Stable fracture fixation should be achieved with a method suitable for the bone and soft tissue characteristics. Early bone grafting is indicated for bone defects unstable fractures treated with external fixation, and delayed union. Management of the infected open fracture is based on radical débridement, skeletal stabilization, microbial-specific antibiotics, soft-tissue coverage, and reconstruction of bone defects. The objective of the study was common causes and location of open fractures. The study was carried out from September 1995 to 1998 in the Department of Orthopaedics, Mayo Hospital, Lahore. Five hundred patients who have sustained open fractures of upper and lower limbs received within 24 hours after the injury of all ages and both sexes were included. Patients with endocrine disorders and cavities injuries were excluded from the study. The wounds were selected for primary and delayed primary closure on suction drain. The contamination organism was detected by culture swab from the wound prior to debridement and lavage. All these open fractures were followed upto 4 weeks. There were three major causes were noted. Eighty cases of humerus open fracture were caused road traffic accidents 8 by agriculture injury and 2 by fall and fire arms. In case of radius and ulna, 80 cases were of road traffic accident, 8 cases of agriculture and 14 cases of fall and fire arm injury. In 108 femur open fracture, 80 were of road side accidents, 8 were of agriculture and 20 were of fall and fire arms. In 200 open fracture of tibia/fibula, 10 cases were of road side accident, 11 of agriculture and 89 were of fall and fire arms injury. It is concluded that causes of open fracture were road traffic accidents and location of long bones showed tibia or lower extremity were mostly injured.

Key words: Open fractures, soft tissue coverage

INTRODUCTION

Trauma is a major problem for a surgeon sitting in an accident department of any hospital all over the world. It is the leading cause of death in 1-45 years old age group, 12% of all hospital beds are occupied by trauma patients.[1] Infection still represents one of the major complications in the treatment of open fractures though results have improved during the last century. Break down of the tissue barrier between the fracture zone and the environment leaves the underlying bone prone to direct contact with contaminating agents, mirrored in positive wound cultures up to 60–70%[2-4]. Open fractures are known orthopaedic emergencies associated with risk of infection and healing problems. They also present as part of the spectrum in multiple injured patients in a third of cases. The cases of open fractures are common in our environment because of motor vehicle and motorbike accidents, falls from height and sometimes gun-shot wounds. They do carry significant morbidity and subsequent disability, if not managed appropriately. The initial management of Open fractures usually affects the ultimate outcome. A closer look at principles of evaluation and management of open fractures is necessary if they are to be managed appropriately[5]. Open fractures are complex injuries of bone and soft tissue. They refer to osseous disruption in which a break in the skin and underlying soft tissue communicates directly with the fracture and its hematoma. They are orthopedic emergencies due to risk of infection secondary to contamination and compromised soft tissues and sometimes vascular supply and associated healing problems. Any wound occurring on the same limb should be suspected as result of open fracture until proven otherwise. The principles of management of open fracture are initial evaluation and exclusion of life threatening injuries, prevention of infection, healing of fracture and restoration of function to injured extremity[6].

The treatment of open fractures can be challenging. Open fractures are often the result of

[1]Departments of Orthopaedics, PGMI/Govt Lady Reading Hospital Peshawar, [2]Associate Professor of Orthopaedics, Ghulam Muhammad Mahar Medical College Sukkur, [3]Orthopaedic Surgeon District Hospital Paretabad Hyderabad, [4]King Edward Medical University/Mayo Hospital, Lahore.

Correspondence to Dr. Abdur Rahman Qureshi, Senior Registrar, E mail: hwabannu@yahoo.com

high energy mechanisms. Additionally, contamination of the fracture site as well as devitalization of the soft tissue envelope greatly increase the risk of infection, nonunion and wound complications when compared to closed fractures. In the presence of extensive soft tissue damage, local or free muscle flaps should be transferred to achieve coverage[10,11]. Antibiotic prophylaxis should be initiated as soon after the injury as possible as the timing of the antibiotic prophylaxis has been shown to be important for prevention of infection[12].

PATIENTS AND METHODS

Five hundred patients who have sustained open fractures with integument of upper and lower limbs received within 24 hours after the injury were selected. This study was carried out from September 1995 to 1998 in the Department of Orthopaedics, Mayo Hospital, Lahore. Patients of all ages and both sexes were included with open fractures of long bones (humerus, radius ulna, femur, tibia and fibula). All patients with endocrine disorders and cavities injuries were excluded from the study. The amount of debridement and the method of immobilization were determined by the operating orthopaedic team. The patients were IV line and acute trauma was managed accordingly with tetanus prophylaxis. The wounds were selected for primary and delayed primary closure on suction drain. Suction drains were removed after 24-48 hours. The contamination organism was detected by culture swab from the wound prior to debridement and lavage. All these open fractures were followed upto 4 weeks.

RESULTS

In 500 cases of open fractures reported in present study, 405(81%) were males and 95 (19%) were females. There were three major causes were noted. Eighty cases (16%) of humerus open fracture were caused road traffic accidents 8 (1.6%) by agriculture injury and 2(0.4%) by fall and fire arms. In case of radius and ulna, 80 cases (16%) were of road traffic accident, 8 cases (1.6%) of agriculture and 14 cases (2.8%) of fall and fire arm injury. In 108 femur open fracture, 80(16%) were of road side accidents, 8(1.6%) were of agriculture and 20(11%) were of fall and fire arms. In 200 open fracture of tibia/fibula, 100 cases (20%) were of road side accident, 11(2.2%) of agriculture and 89(17.8%) were of fall and fire arms injury (Table 1).

Table 1: Aetiology and location of open fracture (n=500)

Aetiology/Bones	Road traffic accident		Agriculture injuries		Fall & Fire arms injuries	
	No.	%age	No.	%age	No.	%age
Humerus	80	16.0	8	1.6	2	0.4
Radius ulna	80	16.0	8	1.6	14	2.8
Femur	80	16.0	8	1.6	50	10.0
Tibia fibula	100	20.0	11	2.2	89	17.8
Total	340	68.0	35	7.0	125	25.0

DISCUSSION

Initial treatment of an open fracture often effect the ultimate outcome of the injury.[13] Surgical decision and postoperative clinical management plan will determine the optimal function and residual disability of the involved extremity.[14] The innovation of immediate closure after meticulous debridement of open fracture was designed to restore the normal environmental state of the deeper cells, the innate defense mechanism was considered to be of great therapeutic value than the action of bactericidal agent[15]. Road traffic accident was the major cause of open fracture, 340(68%) cases were victims of road traffic accidents followed by another major causes gun shot injuries and fall 125 cases (25%). Matewski et al[16] and Dellinger et al[17] studied 81 and 230 cases respectively and noted 64 and 152 victims of road traffic accidents with open fractures at different sites.

In the present study, most common site affected was tibia, 200 cases were recorded, 108 cases of femur the next common fracture. Humerus was having only 90 cases of open fracture. Patzakis et al[18] noted 115 cases among open fractures of tibia in 234 fractures. Dellinger et al[17] also studied 240 open fractures of tibia in 399 cases. Tissues with its own vascularity, independent of the state of the wound, resist necrosis, has a higher oxygen level, and imports host defence mechanism.[15] Stabilization of open fracture is as important as debridement.[19] It preserves the integration of the remaining soft tissues, facilities care of wound also preserve fracture alignment[20].

CONCLUSION

It is concluded that causes of open fracture in our society were road traffic accidents, agricultural and falls and gun shots. Road traffic accidents are major causes. The location of open fracture in long bones showed tibia or bones of lower extremity were mostly injured.

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