



Preliminary radiological result after establishment of hospital-based trauma registry in level-1 trauma hospital in developing country setting, prospective cohort study

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ABSTRACT

Introduction: Injuries are the second most common cause of disability, the fifth most common cause of healthy years of life lost per 1000 people and unfortunately 90% of mortality takes place in low-to middle-income countries. Trauma registries guide policymakers and health care providers in decision making in terms of resource allocation as well as enhancing trauma care outcomes. Furthermore data from these registries inform policy makers to decrease the rate of death and disability occurring as a result of injuries. We present our experience in setting up an orthopedic trauma registry and the first short term follow-up of radiological outcomes.

Materials and methodology: Our study is a non-funded, non-commercial, prospective cohort study that was registered at Research Registry. The primary objectives of our study included assessing pattern of injuries in patients with upper and lower limb skeletal trauma presenting to our tertiary care academic university hospital and their respective outcomes. Data was collected by the musculoskeletal service line team members supervised by an experienced research associate and trauma consultants. The work has been reported in line with the STROCSS criteria.

Results: A total of 177 patients were included in this analysis, of whom 101 (57.1%) patients had lower limb fractures, 64(36.1%) patients had upper limb fractures and 12 (6.8%) patients had both upper and lower limbs involved. A total of 189 upper and lower limb fracture cases were recorded. 176 patients (93.1%) underwent surgeries and 13(6.9%) were managed nonoperatively. Roentgenographic outcomes were assessed using radiological criteria for each bone fractured.

Conclusion: Establishing a trauma registry assists in identification of the pattern of injuries presenting to the hospital which helps in priority setting, care management and planning. This continuous audit of outcomes in turn, plays a significant role in quality improvement.

1. Introduction

Presently, injury accounts for 10% of deaths and 15% of disability adjusted life years (DALYs), making it a major cause of morbidity and mortality globally [1]. According to a report from the World Health Organization (WHO) and World Bank, by 2020 injuries will account for 20% of all DALYs [2]. Injuries have a greater impact in low income countries and 90% of mortality takes place in low to middle-income countries (LMIC) [3]. A review of literature shows that injuries are the 2nd most common cause of disability, the 5th most common cause of healthy years of life lost per 1000 people and the 11th most common

cause of premature death in Pakistan [1]. However the data on injury severity, outcome, and process of trauma care in Pakistan is sparse, which is a major hurdle in recognizing the gaps in trauma care [4].

Trauma registries are databases that use specific inclusion criteria to document trauma [5]. The data provided by these trauma registries guide policymakers in government and health care providers to rationalize resource allocation as well as assessing multiple variables to improve patient outcomes. This plays a vital role in reducing harm and decreasing accidents, because the prevention policies work when the specific population is targeted at specific time and setting as informed by the data [6]. Moreover, successful implementation of trauma care

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systems which involves the use of trauma registries, has an essential role in substantially decreasing the rate of death and disability as a consequence of injuries [7]. A study conducted at our institution demonstrated that out of 18 trauma related deaths, 6 were preventable, 7 were potentially preventable, and 4 were non-preventable [8]. Furthermore, the clinical outcome data provided by trauma registries helps in establishment of protocols that ultimately improve the quality of care delivered to the trauma patients [7].

At our tertiary care academic hospital, an orthopedic trauma database of Upper and Lower Limb injury was established in 2015 to provide data regarding orthopedic injuries and their management. The aims of the study are to assess the pattern of injuries in upper and lower limbs and to evaluate their radiological and functional outcomes. Currently we present our experience in establishing this orthopedic trauma registry and the first short term follow-up of radiological outcomes in our patients.

2. Materials and methodology

This is a non-commercial study and it is registered at Research Registry with UIN 3466 and 3467 for lower limb fractures and upper limb fractures, respectively. The work has been reported in line with the STROCSS criteria [9].

The trauma registry was initiated after obtaining approval from Ethical Review Committee. Protocol was developed before study start-up and is available from corresponding author on request. Written informed consent was obtained from all patients as per Good Clinical Practice guidelines. In case of children or cognitively impaired participants, permission was obtained from parents or legally authorized representatives. The primary objectives of our study were to assess pattern of injuries in patients with upper and lower limb skeletal trauma presenting to our tertiary care academic university hospital and to evaluate their radiological outcomes.

Trauma injury patients were assessed by on duty orthopedic resident, admitted and operated upon by the surgical team consisting of orthopedic postgraduate trainee with minimum 3 years' experience and the trauma consultant. These patients were recruited from the hospital's emergency room as well as the in-patient and out-patient units of the hospital. All research processes were supervised by the trained research associate who has more than 4 years' research experience in patient recruitment and data management at orthopedic surgery department in close consultation with the trauma attendings. The following criteria were used for patient selection:

2.1. Inclusion criteria

- 1 All patients with upper limb (humerus, radius, ulna, hand bones including scaphoid, phalanges, metacarpal bones) fractures with or without additional trauma injuries
- 2 All patients with dislocations around shoulder, elbow, wrist, PIPJ and MPJ joints.
- 3 All patients with lower limb (pelvic, acetabulum, femur, tibia, fibula, ankle, metatarsal and phalanges) fractures with or without additional trauma injuries
- 4 Patients of all ages and genders.
- 5 Patients who signed written informed consent and were willing to participate in the study.

2.2. Exclusion criteria

- 1 Patients with pathological upper limb fractures secondary to tumour, metabolic bone disease, osteoporosis etc. without any trauma injury.
- 2 Patients with dislocations other than due to traumatic injury.

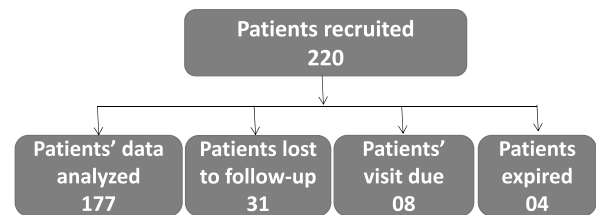


Fig. 1. Patient's participation status.

to follow-up.

The data was collected from patient's medical record by research associate using preset approved data collection form during hospital admission and at the follow-up visit outcomes were assessed at the clinic. Patients were followed at two weeks and scheduled for follow-up at six weeks, three-, six- and twelve-months after their initial visit. Patients were assessed by the operating surgeon who had minimum 5 years' experience as a consultant surgeon in our department. We assessed radiological outcomes for individual fractures using standardized scoring system [10–21].

For this study we describe the radiological outcomes of the patients at 3rd follow up visit which was scheduled at 3 months \pm 2 weeks following the surgery. We agree that radiological and clinical outcomes may differ. However, the clinical outcomes generally are inaccurate until full function is permitted by the treating surgeon, which depends on radiological union. Thus radiological union is a general prerequisite for good clinical/functional outcome. A longer follow-up is required for the latter, which is beyond the scope of the present paper. The forthcoming clinical and functional data will be reported as the long term follow-up in a separate report. We used SPSS version 22 to analyze the data.

3. Results

After excluding patients who were lost to follow-up, a total of 177 patients were included in this analysis (Fig. 1). Of these 101(57.1%) patients had lower limb fractures, 64(36.1%) patients had upper limb fractures and 12 (6.8%) patients had both upper and lower limbs involved. Thus a total of 113 lower limb and 76 upper limb fractures (189 upper and lower limb fractures) were managed. Out of the 76 upper limb fractures, 66 (86.8%) required surgery and 10 patients (13.2%) were managed nonoperatively. Among lower limb fractures, 110 (97.3%) patients were managed surgically and 3(2.7%) patients were managed non-operatively.

The sites of upper limb fractures included proximal humerus in 12 patients (15.8%), humerus shaft in 13 patients (17.1%), distal humerus in 13 patients (17.1%), radius ulna shaft in 19 patients (25%) and distal radius in 19 patients (25%). The age of patients ranged from 2 years to 83 years. The most common mechanism of injury was road traffic accidents (56.6%) followed by fall (36.8%), firearm injury (5.3%) and injury due to machinery (1.3%). The comorbidities of the patients included Diabetes Mellitus (19.7%), hypertension (22.3%), dyslipidemia (1.3%), arthritis (1.3%) and ischemic heart disease (1.3%). The GCS at presentation was 13–15 in 73 patients (96.1), 9–12 in 1 patient (1.3%) and 3–8 in 2 patients (2.6%) (Tables 1 and 2).

Out of the 113 lower limb fractures, proximal femur fractures were 47 (41.6%), femur shaft 13 (11.5%), distal femur 11 (9.7%), tibial plateau 16 (14.2%) and tibia shaft fractures in 26 patients (23%).

Among 47 proximal femur fractures, 23 (48.9%) had intertrochanteric fractures (IT), 13 (27.7%) had neck of femur (NOF) fracture, and 2 patients (5.4%) had femur head fracture. Remaining patients had more than one of these proximal femur fractures. The majority of patients were males being 87 (74%) compared to 30 (26%) females. The age of these patients ranged from 14 to 74 years. Overall road traffic accident was the most common cause of injury accounting

Fig. 1 shows the patients recruited in study and those who were lost

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