

Pattern of Limb Injuries and Their Management in the Emergency Department at a Tertiary Care Hospital

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ABSTRACT

Objective: To determine the pattern of limb injuries and their management in the emergency department of a tertiary care hospital.

Methodology: A cross-sectional observational study was conducted from January 2023 to June 2023 at the Department of General Surgery, Pakistan Institute of Medical Sciences, Islamabad. A total of 385 patients with limb injuries were enrolled using consecutive convenience sampling. Data on demographics, mechanism of injury, type and severity of injury, diagnostic modalities, and management strategies were collected using a structured proforma and analyzed using SPSS version 25.

Results: The mean age was 35 years (range 16–65 years), with male predominance (65%). Road traffic accidents (RTAs), particularly motorcycle-related incidents, were the leading cause (60%). Fractures were the most common injury type (40%). Conservative management was employed in 50% of cases, while surgical fixation was performed in 25%. X-rays were the most frequently used diagnostic modality (60%).

Conclusion: Motorcycle-related RTAs are the predominant cause of limb injuries in our setting, with fractures being the most common injury. While conservative management suffices for a substantial proportion of cases, surgical fixation remains essential for severe injuries. Enhanced road safety measures and strengthening of trauma care infrastructure are recommended.

Keywords: Limb injuries, Road traffic accidents, Conservative management, Surgical fixation, Trauma

Introduction

Limb injuries constitute a significant proportion of trauma presentations worldwide, particularly in low- and middle-income countries,¹ where road traffic accidents (RTAs) are a leading cause of morbidity and mortality.^{2,3} Globally, RTAs account for approximately 1.2 million deaths and over 50 million injuries annually.^{4,5} In Pakistan, the burden of trauma is substantial, yet trauma registries remain underdeveloped, and region-specific data on injury patterns and management are scarce.

Limb injuries may result from diverse etiologies, including RTAs, falls from height, domestic falls, assault, self-inflicted injuries, firearm injuries, occupational accidents, burns, and sports-related incidents.^{6,7} RTAs are a leading cause of morbidity and mortality in low- and middle-income countries, contributing to approximately 1.2 million deaths

and over 50 million injuries globally each year.⁸ Among these, motorcycle-related RTAs are disproportionately represented in developing countries due to factors such as inadequate road safety measures, lack of helmet use, and high population density of two-wheelers.⁹

The management of limb injuries ranges from conservative measures—such as rest, ice, compression, and elevation (RICE)—to surgical interventions including fracture fixation, debridement, vascular repair, and, in severe cases, amputation. Understanding local injury patterns and management approaches is essential for optimizing resource allocation, guiding clinical protocols, and informing preventive strategies.

Pakistan Institute of Medical Sciences (PIMS), Islamabad, is a major tertiary care referral center serving a large catchment population. This study was conducted to document the patterns of limb injuries and their management in the Department of General Surgery at PIMS and to provide baseline data to inform improvements in trauma care and preventive strategies.

Methodology

This cross-sectional observational study was conducted at the Department of General Surgery, Pakistan Institute of Medical Sciences (PIMS), Islamabad, over a period of six months from January 2023 to June 2023.

The sample size was calculated using the WHO formula for cross-sectional studies, assuming a 95% confidence level, 5% margin of error, and an anticipated proportion of limb injuries of 50%, yielding a sample size of 385 patients.¹ Consecutive convenience sampling was employed to recruit patients presenting with limb injuries during the study period. All male and female patients of any age presenting with limb injuries were included. Patients without limb injuries were excluded.

Data were collected using a structured proforma that captured information on demographics, mechanism of injury, anatomical location, type and severity of injury, diagnostic investigations (X-ray, CT scan, MRI, ultrasound/Doppler), and management strategies (conservative, plaster immobilization, suturing, surgical fixation). Severity was categorized as mild, moderate, or severe based on clinical assessment.

Ethical approval was obtained from the Institutional Review Board of PIMS, Islamabad. Written informed consent was obtained from all participants or their legal guardians before enrollment.

Data were entered and analyzed using SPSS version 25 (IBM Corp., Armonk, NY, USA). Descriptive statistics were computed, with frequencies and percentages reported for categorical variables. Means and ranges were used for continuous variables.

Results

A total of 385 patients with limb injuries were included in the study. The mean age was 35 years (range 16–65 years). Males constituted 250 patients (65%) and females 135 patients (35%). (Table I)

Table I: Demographic characteristics of the patients.

Category	Mean Age	Frequency	Ratio
Age Distribution			
16–25	21 years	120	0.31
26–45	35 years	160	0.41
46–65	55 years	105	0.27
Gender Distribution			
Male	65%	250	1.85
Female	35%	135	1.00
Mode of Injury			
Motorcycle	60%	231	0.60
Falls	20%	77	0.20
Assault	10%	38	0.10
Others	10%	38	0.10
Severity of Injury			
Mild	50%	193	0.50
Moderate	30%	115	0.30
Severe	20%	77	0.20

Road traffic accidents (RTAs) were the predominant cause, accounting for 231 patients (60%), with motorcycle-related accidents being the most common subtype. Falls accounted for 77 patients (20%), assault for 38 patients (10%), and other causes (including sports injuries, animal attacks, and burns) comprised 39 patients (10%).

Injuries were classified as mild in 193 patients (50%), moderate in 115 patients (30%), and severe in 77 patients (20%).

Fractures were the most frequently observed injury type, occurring in 154 patients (40%). Lacerations were seen in 77 patients (20%), abrasions in 58 patients (15%), sprains/strains in 38 patients (10%), tendon and vascular injuries in 38 patients (10%), and dislocations in 20 patients (5%).

X-rays were utilized in 231 patients (60%), CT scans in 77 patients (20%), MRI in 38 patients (10%), ultrasound/Doppler in 19 patients (5%), and 20 patients (5%) underwent no imaging. (Figure 1)

Conservative management (including RICE and observation) was employed in 193 patients (50%). Plaster immobilization was used in 58

patients (15%), suturing in 38 patients (10%), and surgical fixation (including debridement, vascular repair, and internal or external fixation) in 96 patients (25%). (Figure 2)

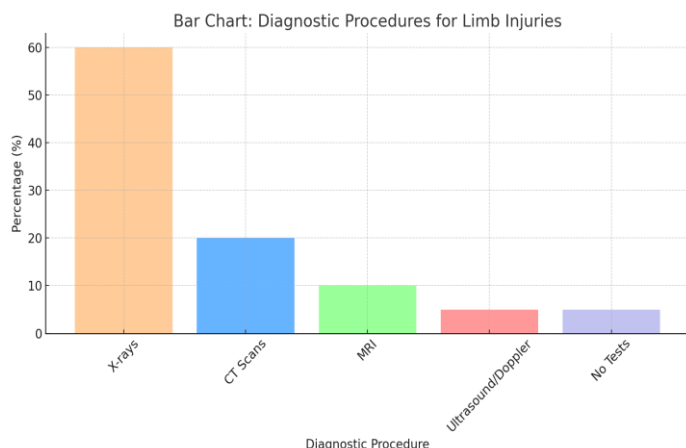


Figure 1. Diagnostic Procedures for Limb Injuries.

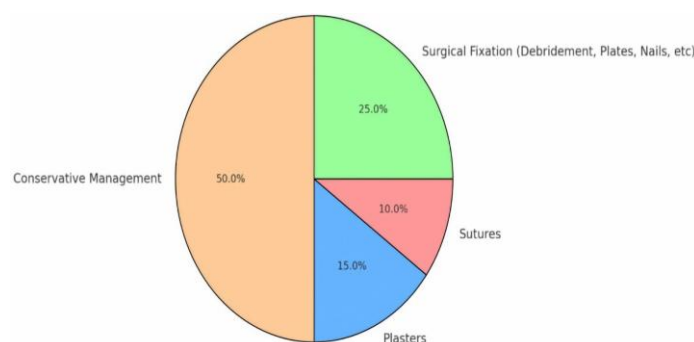


Figure 2. Management approaches.

Ambulance services were utilized by 231 patients (60%), while 96 patients (25%) were self-transported, and family or friends brought 58 patients (15%).

Discussion

This study provides a contemporary analysis of limb injury patterns and their management at a major tertiary care hospital in Pakistan. The findings demonstrate that road traffic accidents, particularly those involving motorcycles, are the predominant mechanism of limb injury, accounting for 60% of cases. This is consistent with regional and global literature highlighting the vulnerability of motorcyclists in low- and middle-income settings.⁹

Fractures were the most common injury type (40%), reflecting the significant force involved in RTAs and falls. This finding aligns with earlier studies from Pakistan and other developing

countries.^{6,7} The high proportion of fractures explains the frequent use of X-rays (60%) as the primary diagnostic modality and underscores the need for accessible radiological services in trauma care.

Notably, half of all patients (50%) were managed conservatively, suggesting that a substantial number of injuries were mild to moderate in severity.^{10,11} However, surgical fixation was required in 25% of cases, indicating that a considerable subset of patients needed advanced operative care.¹² This proportion is consistent with other tertiary care studies where fracture fixation and soft tissue repair form a core component of trauma management.¹³

The relatively low rate of ambulance utilization (60%) highlights potential gaps in pre-hospital emergency services in the region.^{14,15} Improving emergency medical services and public awareness regarding timely transport could potentially reduce morbidity associated with delayed care.¹⁶

The predominance of motorcycle-related injuries points to the need for targeted preventive measures.¹⁷ Enforcement of helmet laws, road safety education, and improved infrastructure for non-motorized transport are essential strategies that have proven effective in other settings.¹⁸

This study was conducted at a single tertiary care center over a six-month period, which may limit generalizability to other settings or primary care facilities. The use of consecutive convenience sampling may introduce selection bias. Additionally, long-term functional outcomes were not assessed, and the severity classification was based on clinical assessment rather than validated scoring systems.

Conclusion

Limb injuries at PIMS Islamabad are predominantly caused by motorcycle-related road traffic accidents, with fractures being the most common injury type. While conservative management suffices for half of the patients, surgical fixation remains a critical component of care for severe cases. These findings underscore the urgent need for targeted road safety

interventions, improved pre-hospital care, and continued strengthening of trauma services. Future research should focus on long-term functional

outcomes and the effectiveness of preventive strategies.

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