



EVALUATING SEVERITY AND MANAGEMENT OF ROAD TRAFFIC INJURIES

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ABSTRACT

A road traffic accident (RTA) is an event on a public road involving at least one moving vehicle, leading to injury or death. Bengaluru recorded over 2,000 accidents from January to May 2024 according to Bengaluru Traffic Police data, highlighting the urgent need for targeted interventions to reduce RTAs and improve public health. The Primary Objectives of the study were to assess the severity of injuries in RTA and check utilization services for traumatic injuries at the emergency department. The Secondary Objective was to understand the community acceptance of investigations prescribed by the physician. A 6 months prospective observational study was conducted at a tertiary care hospital after obtaining ethical approval and informed consent, all the relevant data such as patient's demographics, injury specifics, clinical management details, injury severity and surgical requirements were collected. Descriptive statistics was utilized for analysis. During our study period, a total of 40 patients who met inclusion criteria were included, majority of which were males between the age group of 19-30 years. The majority of accidents occurred between 6 AM and 12 PM with most common accidents including skid and fall with moderate severity of injuries. Pharmacological treatment was provided with paracetamol being the most common analgesic and amoxicillin with clavulanic acid and ceftriaxone were common antibiotics. Out of 40 patients, 22 underwent surgery-10 for minor procedures and 12 for major surgery. 40 patients were recruited, among which it was observed that majority were males, and the common age group was between 19-30 years. The most common type of accident was skid and fall. Treatment included analgesics, and antibiotics predominately amoxicillin and clavulanic acid or ceftriaxone. Surgical interventions were necessary for 22 patients.

KEYWORDS : RTI (Road Traffic Injuries), 4W (4 Wheeler) , 2W (2 Wheeler), ISS (Injury Severity Scale)

INTRODUCTION

Road Traffic Injuries (RTIs) are a growing social, economic, and health concern globally. With increasing road networks, motorization, and urbanization, the incidence of RTIs has risen significantly¹. Worldwide, around 2 million people die and 50 million are injured annually due to RTIs, with numbers expected to rise by 65% in the next 20 years. In India, the situation is alarming—Bengaluru alone recorded over 2,000 accidents by May 2024². According to the Global Burden of Disease Study (2016), RTIs rank 8th among leading causes of death, accounting for 2.46% of global mortality. Most accidents in rural areas occur on national highways or rural roads³. Injury patterns vary but often include head, spinal, pelvic, and internal organ injuries. Head injuries are common among motorcyclists and cyclists, with helmets reducing fatalities by one-third. Spinal injuries may cause paralysis, while pelvic fractures—more frequent in males—require fixation. Urethral injuries often accompany pelvic trauma and need careful diagnosis and management. Internal organ injuries, such as liver lacerations or internal bleeding, may require surgical intervention. Post-trauma complications like venous thromboembolism and vascular injuries can be life-threatening if untreated⁵. Causes and risk factors are multifactorial. Human error contributes most, with overspeeding, alcohol use, and negligence as major triggers. Speed accounts for one-third of RTIs, and alcohol impairs judgment, increasing crash risk even at low levels. Non-compliance with seat belts and helmets, distracted driving, driver fatigue, and poor visibility further worsen the situation. Vulnerable populations such as children, elderly pedestrians, and people with comorbidities face higher

risks. Additionally, poor road design, inadequate signage, and bad weather contribute significantly to accidents. After stabilization, a secondary assessment includes a detailed head-to-toe exam, history, and diagnostic tests (X-ray, CT, eFAST). It identifies missed injuries like blunt or penetrating trauma while maintaining spine precautions and prioritizing urgent interventions. Management of RTAs involves prompt and systematic medical response. Well-equipped Emergency Medical Services (EMS) are vital for on-site stabilization and hospital transfer⁷. Treatment includes tetanus prophylaxis, pain control, blood transfusion, and fracture management. Severe trauma cases are handled following Advanced Trauma Life Support (ATLS) guidelines: maintaining airway, breathing, circulation, neurological assessment, and exposure for hidden injuries⁸. Controlled resuscitation prevents complications like Acute Traumatic Coagulopathy (ATC). Pharmacological management includes analgesics (Paracetamol, Tramadol) and antibiotics (Ceftriaxone, Amoxicillin-Clavulanic Acid⁹). Prevention strategies require strict enforcement of traffic laws, medical fitness checks before licensing, better road infrastructure, and public education on first aid and safe driving. Promoting helmet and seat belt use, strengthening EMS and police coordination, and conducting awareness programs can greatly reduce accidents¹⁰.

METHODOLOGY

This hospital-based prospective observational study was conducted at a tertiary care hospital, over a period of six months. The study included both male and female patients of all age groups with a definite history of road traffic accidents

(RTA). Patients who refused to participate or did not provide informed consent were excluded. Data were obtained from multiple sources, including patient case sheets, direct communication with patients or their attenders, and interactions with doctors, residents, and nurses. Research students visited the emergency department regularly and followed up with patients until discharge. Eligible patients were recruited after obtaining informed consent. Relevant data such as demographic details, type of RTA, time of accident, injury severity (assessed using the Injury Severity Scale), and management patterns were collected and documented. The collected data were pooled and analyzed using descriptive statistics. Ethical approval for the study was obtained from the IEC of the hospital.

RESULT

Out of the 40 patients included in the study, the majority (27.5%) were in the 19–30 years age group, followed by 22.5% in the 31–40 years group.

Table 01: Distribution Of Patients Based On Age

SL. NO	AGE (YEARS)	NO. OF PATIENTS	PERCENTAGE
1	0 - 18	3	7.5%
2	19 - 30	11	27.5%
3	31 - 40	9	22.5%
4	41 - 50	6	15%
5	51 - 60	7	17.5%
6	>60	4	10%
	TOTAL	40	100%

Patients aged 51–60 years accounted for 17.5%, while those aged 41–50 years comprised 15%. The age groups 0–18 years and above 60 years contributed 7.5% and 10% of the total cases, respectively. This indicates that young adults, particularly those between 19 and 40 years of age, were the most commonly affected group in road traffic accidents.

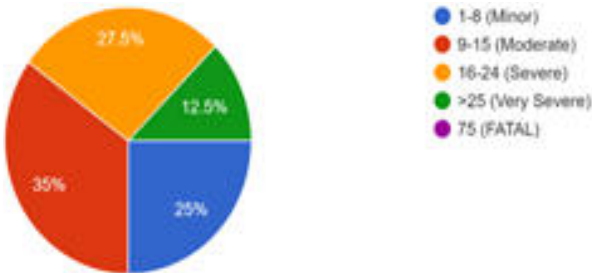


Figure 02: Distribution Of Patients Based On Injury Severity Scale

Based on the Injury Severity Scale (ISS) analysis of 40 patients, 25% of cases were classified as minor (ISS 1–8), 35% as moderate (ISS 9–15), 27.5% as severe (ISS 16–24), and 12.5% as very severe (ISS >25). No fatal injuries (ISS 75) were reported. This indicates that the majority of road traffic accident victims sustained moderate to severe injuries.

Table 03: Distribution Of Patients Based On Type Of Surgery:

SL. NO	TYPE OF SURGERY	NO.OF PATIENTS	PERCENTAGE
1	MINOR	10	45.45%
2	MAJOR	12	54.54%
3	TOTAL	22	100%

Out of the 22 patients who underwent surgical intervention, 54.54% required major surgery, while 45.45% underwent minor surgical procedures. This indicates that a slightly higher proportion of road traffic accident patients required major surgical management.

Table 04: Summary Of Pharmacological Management Of

Road Traffic Injury Patients:

Drug Class	Common Drugs Used	No. of Patients (n=40)	Percentage (%)	Purpose / Remarks
Analgesics	Paracetamol, Paracetamol + Tramadol, Paracetamol + Diclofenac, Aceclofenac, Etoricoxib, Serratiopeptidase	40	100%	Pain relief and inflammation control
Antibiotics	Amoxicillin-Clavulanic Acid, Ceftriaxone, Cefoperazone-Sulbactam, Piperacillin-Tazobactam, Amikacin, Cefepime, Meropenem	40	100%	Prevention and treatment of wound and systemic infections
Anticoagulants	Clopidogrel + Aspirin, Enoxaparin, Heparin, Ticagrelor	10	25%	Prevention of thromboembolic complications
Multivitamins	B-Complex with Vitamin C, Lactobacillus with Thiamine	8	20%	Nutritional support and enhancement of recovery
Proton Pump Inhibitors (PPIs)	Pantoprazole, Omeprazole	28	70%	Prevention of gastric irritation and stress ulcers
Antiemetics	Ondansetron, Domperidone	22	55%	Management of nausea and vomiting
Antiepileptics	Phenytoin, Levetiracetam	6	15%	Control of seizures in head injury patients
Antihypertensives	Amlodipine, Telmisartan	5	12.5%	Blood pressure control in hypertensive patients
Antidiabetic Drugs	Metformin, Insulin	4	10%	Glycemic control in diabetic patients

Analgesics were the most frequently prescribed drugs, with paracetamol being the predominant agent used either alone or in combination with other agents such as tramadol and diclofenac for effective pain control. Adjuvant analgesics like aceclofenac, etoricoxib, serratiopeptidase, and trypsin-chymotrypsin were also utilized to manage inflammation and tissue pain. Antibiotics were administered to all patients to prevent or treat infections, with amoxicillin–clavulanic acid and ceftriaxone being the most commonly prescribed, followed by other broad-spectrum antibiotics such as cefoperazone–sulbactam, piperacillin–tazobactam, amikacin, cefepime, and meropenidazole, ensuring wide antimicrobial coverage. Anticoagulant therapy was provided to 25% of the patients to prevent thromboembolic complications, primarily involving the combination of clopidogrel with aspirin, along with agents such as enoxaparin, heparin, and ticagrelor. Supportive medications, including multivitamins, were prescribed to enhance recovery and overall nutritional status. Proton pump inhibitors were used to prevent gastric irritation due to analgesic and stress-related causes, while antiemetics were given to manage nausea and vomiting. Additionally, antiepileptics were prescribed for patients with head injuries, antihypertensives for those with hypertension, and antidiabetic drugs for diabetic individuals.

DISCUSSION

A prospective observational study titled “Evaluating the Severity and Management Pattern of Road Traffic Injuries” was conducted at the Emergency Department of the hospital over six months, including 40 patients (28 males, 70%; 12 females, 30%). The majority were aged 19–30 years (27.5%), followed by 31–40 years (22.5%), with similar findings to Basri Lenjani et al⁷. The most common cause of accidents were skid and fall (32.5%), followed by two-wheeler vs. two-wheeler collision (22.5%) The results were found to be similar to the study by Neeraj Sharma et al.³ Most incidents occurred between 6 AM and 12 PM (30%) which was similar to the study done by Satabdi Mitra.⁴ Regarding severity, 14 patients (35%) had moderate injuries, 11 (27.5%) severe, 10 (25%) minor, and 5 (12.5%) very severe. Comorbidities were present in 9 patients (22.5%), which includes hypertension, diabetes, hypothyroidism, and vertigo, while 27 (67.5%) had none. Diagnostic investigations included CT scans (face, brain, thorax, abdomen, pelvis), MRI, X-rays, ECG, urine analysis, and 2D echo, aligning with findings by Michael Kostiuk et al⁵. In terms of management, all patients received analgesics, with paracetamol (27%) being most common, followed by combinations with tramadol (25%) and diclofenac (20%). Antibiotics were prescribed to all, predominantly amoxicillin–clavulanic acid (17.5%) and ceftriaxone (10.3%), these findings were consistent with those reported in the study

conducted by Alexandre S. Korsaga et al.⁹. Anticoagulants were given to 10 patients, mainly clopidogrel + aspirin (40%), while antiepileptics (levetiracetam) were prescribed to 4 patients, antihypertensives to 10, and multivitamins to 8. Other commonly used drugs included pantoprazole (92.5%) and ondansetron (32.5%). Post-treatment, 36 patients (90%) were shifted to the ward, 3 (7.5%) discharged against medical advice, and 1 (2.5%) admitted to ICU. Surgical interventions were performed on 22 patients (55%), with 12 major (mainly OR+IF for fractures) and 10 minor (including K-wire fixation, wound debridement, and traction) procedures.

CONCLUSION

Over six months, 40 patients were recruited from a tertiary hospital's Emergency Department, mostly males aged 19–30 years. Skid-and-fall incidents were the leading cause, with most injuries of moderate severity and occurring during daytime. Diagnostic imaging (CT, X-ray, MRI) was used to assess injuries. Treatment included analgesics—mainly paracetamol—and antibiotics such as amoxicillin–clavulanic acid or ceftriaxone, along with surgical procedures in 22 patients. Overall, young adults were most prone to road traffic accidents, and all patients received timely care with zero mortality.

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