

Motorcycle accidents in tropical environments: injury mechanisms and anatomico-clinical aspects

Abstract

Background: To describe the mechanisms of injury and the anatomico-clinical aspects of trauma caused by motorized two-wheeled vehicles at the Bouaké University Hospital.

Methods: This was a retrospective descriptive study performed in the surgical emergency department of the Bouaké University Hospital. It lasted for a period of 08 months from February 1, 2015 to September 30, 2015. It concerned patients admitted to surgical emergencies for injuries that occurred during an accident involving a motorcycle. Neglected trauma due to accidents involving motorcycles, accident victims not involving motorcycles were not included in our study. The data collected were: age, sex, occupation, circumstances and mechanism of the accident, seat of the lesion and injury report.

Results: During this study period, 2,647 emergency room patients were registered with 615 injuries due to motorcycle accidents. The frequency of road accidents caused by motorized two-wheelers accounted for 23.23% of surgical emergency room admissions. The average age of the victims was 31.9 ± 16.7 years with extremes of 1 day and 95 years. There were 468 men (76.09%) and 147 women (23.91%), and the 21-30 age group was the most representative with (n=195, 31.70%) case. Students were the most affected (n=270, 43.91%) on traders (n=142, 23.09%). Motorcycle drivers (n=304, 49.44%) and motorcycle rear passengers (n=175, 28.45%) were the most affected. The most common types of accidents were motorcycle versus car (n=174, 28.29%), motorcycle versus pedestrian (n=154, 25.05%), and mishandled motorcycles (n=174; 143, 23.25%) of the cases. The majority of patients did not wear safety helmets (n=492, 80%). The lesions observed during our study sat preferentially at the limb level (n=344, 55.93%) and Skull n=115; 18.7%). Soft-tissue wounds (n=247, 40.15) predominated the cases, followed by fractures (n=145, 23.57%). There were eleven deaths (n=11, 1.79%).

Conclusion: Road accidents due to two-wheeled vehicles (motorcycles) are more and more frequent in Bouaké. Motorcycle-to-car accidents are common. Deaths were due to head trauma in the majority of cases. Compliance with the Highway Code and mandatory use of a safety helmet could reduce the number and severity of injuries.

Keywords: accident, injury, mechanism, public roads, motorcycles

Volume 2 Issue 1 - 2018

Kouassi Kouamé Jean Eric, M'bra Kouame Innocent, Yao Loukou Blaise, Sery Bada Justin Leopold Niaore, Krah Koffi Leopold, Michel Kodo

Department of Trauma and Orthopaedics, University of Alassane Ouattara, Côte d'Ivoire

Correspondence: Kouassi Kouame Jean Eric, Department of Trauma and Orthopaedics, Bouaké Teaching Hospital, University of Alassane Ouattara, Côte d'Ivoire, Tel +22507899242, Email medericko@yahoo.fr

Received: January 10, 2018 | **Published:** January 19, 2018

Introduction

Road accidents remain a serious public health problem at the global, regional and national levels. While action is being taken in many countries to improve road safety, much remains to be done if we want the number of deaths to stop increasing.¹ The African region still has one of the highest traffic fatality rates. More than 90% of road deaths occur in low- and middle-income countries, where only 48% of the world's population is found.² The advent of new, more powerful and financially accessible motorized two-wheelers is accentuating the problem in Africa. Road accidents involving motorcycles are part of the day-to-day operations of the University Hospital of Bouaké. The purpose of this study was to describe the lesional mechanisms and anatomy-clinical aspects of motorcycle accident injuries.

Methods

This was a descriptive, retrospective study performed in the surgical emergency departments of the Bouaké University Hospital. It lasted for a period of 08 months from February 1, 2015 to September

30, 2015. It concerned patients admitted to surgical emergencies for injuries that occurred during a motorcycle accident involving a motorcycle. Neglected trauma due to accidents involving motorcycles, accident victims not involving motorcycles, was not included in our study. The data collected were: age, sex, occupation, circumstances and mechanism of the accident, the seat of the lesion and the injury report.

Results

During this study period, 2,647 patients admitted to the emergency department were registered with 615 injuries due to accidents involving motorcycles. The frequency of road accidents caused by motorized two-wheelers accounted for 23.23% of surgical emergency room admissions. The average age of the victims was 31.9 ± 16.7 years with extremes of 1 day and 95 years. There were 468 males (76.09%) and 147 females (23.91%), and the 21-30 age group was the most representative with a strength of (n=195, 31.70%) (Figure 1). The circumstances of occurrence of motorcycle accidents are listed in Table 1. The type of user is listed in Table 2. The majority of patients

did not wear safety helmets (n=390, 79.75%). The lesions observed during our study sat preferentially at the limb level (Table 3). Injuries of upper extremity limbs in (n=211; 34.30%) cases and lower limb in (n=133; 21.63%). The soft-tissue wounds predominated with (n=247, 40.15%), followed by fractures (n=145, 23.57%), and muscle contusions (n=137, 22.27%) (Table 4) Eleven (1.79%) patients died in the emergency department. The causes were: severe head injury (n=7), severe contusion of the abdomen (n=2) and two polytrauma patients (n=2).

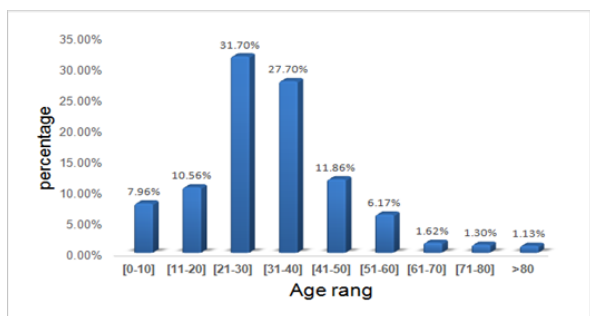


Figure 1 Distribution by age group.

Table 1 Distribution of Mechanisms by Patient

Type of accident	N	%
Motorcycle against Car	174	28,29
Motorcycle against Pedestrian	154	25,05
False maneuver	143	23,25
Motorcycle against Motorcycle	118	19,18
Accident Wheel spokes	11	1,78
Motorcycle against Bicycle	10	1,63
Motorcycle against animal	5	0,82
Total	615	100

Table 2 The distribution of the type of user according to the patients

Type of users	N	%
Motorcycle Driver	304	62,16
Motorcycle rear passenger	175	35,79
Cyclists	10	2,05
Total	489	100

Table 3 Distribution of lesions by seat of the lesion

Topography	N	%
Member	344	55,93
Crane	115	18,7
Maxillo-facial/ O.R.L	84	13,7
Basin	26	4,21
Abdomen	16	2,60
Spine	15	2,43
Thorax	15	2,43
Total	615	100

Table 4 Distribution by type of lesions

Lesions	N	%
Wound of soft parts	247	40,16
Fractures	145	23,57
Muscular contusion	137	22,27
Sprain	41	6,67
Dislocation	33	5,37
Durical	12	1,96
hematomas	615	100

Discussion

Motorcycle accidents are a public health problem.¹ They represent 23.23% of the cases in our study. These accidents are constantly increasing in our regions because of the proliferation of high-speed machines. The most common lesion mechanism in our study was motorcycle-to-car collision. This mechanism of injury is reported in the literature.³⁻⁵ There are several reasons for this: the lack of mastery of these multi-speed machines that require a driver's license; ignorance of the Highway Code, the lack of knowledge of safety measures including the non-overload and speed limitation, the virtual absence of road signs, the motorcycle is used for commercial purposes (motorcycle taxi) and the degradation of the way public.⁴⁻⁶ The young male population is the victims of most motorcycle accidents.⁵⁻⁷ This segment of the population is the most mobile and active.³ Lesions predominate in the limbs. This has been reported in the literature.^{8,9} This is due to the lack of cockpit that can protect motorcycle users.⁹

The fall of a motorized two-wheeled machine can cause a slip that causes wounds and burns by friction, and end with a shock against an obstacle (sidewalk, vehicle, and guardrail) that will cause secondary traumatic injuries. This explains the large number of mucocutaneous lesions in our patients who were not wearing protective clothing most often.⁹ In motorcycle accidents, the most common injuries are those of the soft parts followed by fractures.¹⁰ But the lesions of the trunk (chest and abdomen) and the head are the most serious. Indeed, in our study, all the deceased patients had lesions of these different parts of the body. In traumas of the thorax, the lesions are made by compression. They sit next to the point impact on the parietal level and directly underlying structures.¹¹ Kinetic energy at the time of injury is the main determinant of lesion severity.¹¹ Intra-abdominal organ damage is done by crushing or splitting. It is essentially perforation of the digestive tract, bursting of solid organs, mesenteric lacerations by direct hyper pressure or vascular lesions. The severity of the intra-abdominal lesions increases with the energy of the trauma.¹²

The projection of the patient on the ground can lead to cranio-encephalic traumas whose severity depends on the speed of projection of the casualty on the ground and wearing or not wearing a helmet. In our study, 20.25% of patients wore a helmet. Helmets are not commonly used in developing countries.⁶ Most of the deaths in our study are due to unprotected head trauma.¹³⁻¹⁵ Brain trauma can also occur as a result of sudden deceleration. Each mechanism causes different types of injuries ranging from concussion to lethal head trauma. Wearing a helmet must be mandatory for both the driver and the motorcycle passengers. Motorcycle accidents also cause high-level trauma energy and constitute situations at risk of pelvic fracture,¹⁶ as was the case in ours.

Conclusion

Road accidents due to two-wheeled vehicles (motorcycles) are more and more frequent in Bouaké. Motorcycle-to-car accidents are common. The young active population is the most concerned. The members were the most affected. Deaths were due to head trauma in the majority of cases. Compliance with the Highway Code and mandatory use of a safety helmet could reduce the number and severity of injuries.

Acknowledgements

None.

Conflict of interest

The author declares no conflict of interest.

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