

Management Of Motorcycle Limb Trauma In A Teaching Hospital In South-Western Nigeria

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ABSTRACT

Background: To evaluate the management of limb injuries sustained from motorcycle accidents.

Method: Consecutive 115 patients managed for limb injuries secondary to motorcycle trauma over a one-year period were prospectively studied.

Results: There were 115 patients out of which seventy-six (66.1%) sustained injuries to the lower limbs, 25 (21.7% to the upper limbs, while 14 (12.2 %) injured both the upper and the lower limbs together. Seventy-nine (68.7%) patients had fractures of which 24 (30.4%) were open. There was no organized pre-hospital care, a high referral rate and long injury-treatment intervals. Treatment was by closed manipulation and splintage with casts (57.6%), tractions (30.4%), and external fixation (5.4%); 18 patients had elective ORIF. The complication rate for cases was 71.3% while 4 (3.5%) patients died.

Conclusion: Management of motorcycle injuries is still difficult in developing countries. Attention needs to be paid to provision of organized trauma care to improve outcomes.

Key Words: Motorcycle, Limb, Trauma, Developing Country

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INTRODUCTION

Globally, the motorcycle is increasing in popularity as a means of transport especially among the young and low income groups.¹

The incidence of fractures to the limbs in motorcycle crashes is higher than in many other forms of crashes, and many studies have shown that limbs are more likely to be injured than any other region of the body.² The treatments of such injuries are usually difficult, protracted, and expensive and they have a high morbidity rate.^{3,4}

This study was designed to assess the types of injuries sustained in motorcycle accidents, their management

and outcome in the Obafemi Awolowo University Teaching Hospitals Complex., Ile-Ife, Nigeria.

PATIENTS AND METHOD

The study was hospital-based and the study population consisted of all victims of motorcycle accidents of all age groups and both sexes that presented at Obafemi Awolowo University Teaching Hospitals Complex (OAUTHC), Ile-Ife between June 1, 1998 and May 31, 1999. Study population also included all referred cases that had not developed complications secondary to treatment offered at the referral hospital.

Patients that presented in the hospital were studied prospectively over a one year period. Patient's bio-data, injury data and treatment and outcome data were all recorded according to a pro forma that was created to that effect.

Open fractures were classified according to the Gustillo and Andersons criteria.⁵ Grade I and II fractures were managed in the accident and emergency unit with copious irrigation using saline solution under sedation and analgesia with diazepam and pentazocine. The wounds were initially left open and at 72 hours the wounds were either closed or left open for dressing depending on the presence of signs of infection. The fractures were reduced and immobilized in POP. Grade III fractures were taken to the theater for wound debridement and fracture immobilization. When the theater was not immediately available, then they were given the grade I and II treatment; patients were then subsequently taken to the theater when it becomes available. All patients were given prophylactic antibiotics and tetanus immunoprophylaxis.

The patients were followed up for two years to highlighting their morbidity and mortality. The eventual outcome of the patients were reviewed and recorded as any one of six possible outcomes: satisfactory; unsatisfactory; discharge against medical advice (DAMA); lost to follow up; referred and dead.⁶ Clinical, operative and post-mortem findings were used in

ascertaining the final and correct diagnosis. Analysis was made using SPSS data analysis software.

RESULT

One hundred and fifteen patients with motorcycle injuries were seen within the study period. Twenty-five (21.7%) of these sustained injuries to the upper limbs, 76 (66.1%) to the lower limbs while the remaining 14 (12.2%) injured both upper and lower limbs together.

Table 1: Distribution of injuries according to the various types of tissues affected.

Type of tissue injured	Number	Percentage
Skin	88	33.0
Bones	79	29.6
Joints	34	12.7
Muscle-tendon unit	23	8.6
Nerves	2	0.7
Other parts of the body	41	15.4
Total	267	100.0

Table 1I: Distribution of limb fractures according to the part of the limb involved and the individual bone fractured

Bone fractured	Number	Percent
Tibia	32	27.1
Femur	25	21.2
Fibula	25	21.2
Ulna	7	5.9
Pelvis	7	5.9
Humerus	6	5.1
Radius	6	5.1
Clavicle	4	3.4
Patella	2	1.7
Phalanges	2	1.7
Scapular	1	0.8
Metatarsal	1	0.8
Total	118	100.0

All 25 patients with fibula fracture also fractured the Tibia. 5 patients with forearm fractures fractured both bones while 1 and 2 fractured the radius and ulna alone respectively.

Tissue injured and associated injuries:

Two hundred and sixty-seven injuries were sustained by the patients. The distribution is as shown in Table 1; no patient sustained major arterial injury. Forty-one (35.6%) patients had injuries involving other parts of the body including the head (32, 12.1%) which was the most commonly injured region (78% of all associated injuries).

The cervical spine was injured in 3 (2.6%) patients, the chest region in 2 (1.7%) patients while one patient (0.9%) each had associated injuries involving the abdomen, rectum, urinary tract and the back.

Skin: The skin was the most commonly injured tissue. One hundred and eighty one skin injuries were seen in the 88 patients who had skin injuries. There were 60 (33.1%) lacerations, 48 (26.5%) bruises, 44 (24.3%) abrasions, 18(9.9%) avulsions, and 11 (6.1%) puncture wounds.

Fractures: Seventy-nine patients (68.7%) had fractures. Forty-six (58.2%) were single bone fractures while 33 (41.8%) were multiple fractures made up of 2 bones in 29 (36.7%) patients, 3 bones in 3 (3.8%) patients and one (1, 3%) patient with fracture of five bones.

However, 25 (31.6%) of patients with fractures, injured both the tibia and fibula together while 5(6.3%) injured the radius and ulna together. The distributions of fractures in the bones are shown in Table II. While most of the fractures of the leg involved both the tibia and fibula together, all the single bone leg fractures recorded involved the tibia; none of the patients sustained fibula fracture alone.

Fracture patterns: Fifty-two (65.5%) patients had closed fractures, 24 (30.4%) open and the remaining 3 (3.8%) patients with multiple fractures sustained both types of fractures to different bones. Eight (29.7%) of the 27 open fractures were Gustillo-Anderson type 2, types 3A and 3B were seen in 7 (25.9%) patients each, type 1 was seen in 4 (14.8%) patients while one (3.7%) patient had type 3C. Twenty-one (77.8%) of the patients with open fractures involved the tibia and fibula, five (18.5%) the femur while the remaining one (3.7%) involved the hand.

Joint injuries: Thirty-four patients (29.5%) sustained 50 different injuries to the joints; the knee (13, 38.3%) was most frequently involved joint. Others are the ankle and the hip (4, 11.8% each), the wrist and elbow (3, 8.8%) each, the acromio-clavicular and sacroiliac joints (2, 5.9%) each and the symphysis pubis, shoulder, upper radio-ulna joint seen in one (2.9%) each. Eighteen (52.9%) patients had single joint injury, 15 (44.2%) had two while the remaining one (2.9%) had injuries to three joints for a total of 51 injuries and an average of 1.7 joint injuries per patient. The most common injury was intra-articular fractures (16, 32%),

followed by ligament injuries (14, 28%), dislocations (13, 26%), and subluxations (7, 14%). Two patients had open dislocation; they were of types 3A and 3B and both involved the wrist joints.

Treatment: The breakdown of the treatment given to the patients is shown on table III. Only 3 (2.6%) had pre-hospital treatment consisting of wound coverage with torn cloth and wound irrigation with water.

Skin: Eighty-five patients (96.6%) with wounds were without reliable history of tetanus immunization and were subsequently immunized. Only three patients, (3.4%) all of them children, gave a reliable history of immunization. Prophylactic antibiotics were administered to 79 (89.8%) patients with wounds.

In the accident and emergency room, wound irrigation was done in 28 (31.8%) patients with abrasions and , while 30 (34.1%) had primary closure of their wounds. Thirty (34.1%) patients had wound debridement in the theater; 8 (26.7%) and 5 (16.7%) of these subsequently had secondary closure and skin grafting respectively while the remaining 17 (56.6%) healed spontaneously.

Table III: Overview of all forms of patient treatment including drugs .

Procedure	Number	Percentage
Splinting	86	24.5
Surgery	61	17.4
Antibiotics	79	22.5
Wound dressing	78	22.2
Manipulation under anaesthesia	47	13.4
Total	351	100.0

Table IV: Distribution of the various complications the patient had.

Complications	Number	Percentage	
		% of patients N=115	% of injuries N=255
Joint stiffness	60	52.2	23.7
Muscle weakness	47	40.7	18.2
Limb oedema	31	27.0	12.0
Muscle atrophy	25	21.7	9.7
Wound infection	15	13.0	5.8
Delayed union	14	12.2	5.7
Deformity	13	11.3	5.2
Shortening	11	9.6	4.3
Mal-union	8	7.0	3.1
Nerve palsy	5	4.4	2.1
Hypertrophic scar	5	4.4	2.1
Non-union	4	3.5	1.5
Osteomyelitis	4	3.5	1.5
Tendon lesion	4	3.5	1.5
Plaster sore	3	2.6	1.2
Reaction to skin traction	2	1.7	0.8
Wound breakdown	2	1.7	0.8
Pin tract infection	1	0.87	0.4
Re-fracture	1	0.87	0.4
Total	255	221.7	100.0

Fractures and dislocations:

Reduction of fractures was achieved by either manipulation under anaesthesia in 61 (77.2%) or open reduction in 18 (22.8%) patients.

Twelve patients with grade 1 and 2 open fractures and 5 of the patients with grade 3A and 3 grade 3B open fractures had wound lavage in the Accident and Emergency Unit. All other grade 3 fractures had wound debridement in the theater. The mean time to surgery was 15 hours (Range was 2-37 hours)

Immobilization was achieved by application of casts in 53 (57.6%), tractions in 28 (30.4%), external fixation in 5 (5.4%) and figureofeight bandages in 6 (6.5%) patients; some patients had more than one type of splints applied. The mean duration of immobilization was 53.5 days. (Range was 7 to 257 days).

Eighteen patients had ORIF with plates and screws or Kunscher's nails; the mean time to surgery was 7 weeks

(range was 2 to 22 weeks). Two patients had patellectomies while one patient needed an above knee amputation as a result of gangrene.

Sixty-seven (71.3%) of the patients developed complications as shown on Table IV. The tibia and the fibula bones had the highest rates of complications (28 of 32 patients) followed by radius and ulna (5 of 8 patients).

OUTCOME

Of the 115 patients, only 94 (81.7%) completed the study. Seventy two (76.6%) of these patients had satisfactory outcomes of treatment while 22 (23.4%) patients' treatment outcome were unsatisfactory. While thirteen (11.3%) of the remainders took a discharge against medical advice (DAMA), 9 (7.8%) were lost-to-follow up, 4 (3.5%) died and 3 (2.6%) were referred to other hospitals for further treatment.

DISCUSSION

The increasing popularity of motorcycle use as a means of transport has led to an increased incidence of motorcycle trauma. However there has not been a corresponding improvement in the management of crash victims. This study shows some of the problems that medical teams face when managing motorcycle trauma in resource poor countries. The physical forces involved in motorcycle trauma are high.^{2, 4} It has been estimated that a 60 kg motorcyclist travelling at 50km/hr colliding head on with a 60kg automobile also travelling at 50 km/hr is subjected to about 12^{1/2} times the force to which a skier brought to a sudden halt from a 50 km/hr is subjected;² therefore, the injuries are usually severe and their treatment difficult. Only three patients were given pre-hospital treatment and none was standard, this lack of organized pre-hospital care resulted in some unique characteristics: a high referral rate because laypersons will usually take crash victims to the nearest hospital not withstanding the available resources in the hospital. Before referral, 25

patients were initially taken to private hospitals where appropriate treatments were not given and there were also delays in instituting the correct management of patients; 2 of the patients who died were in this group.

In this study, the lower limbs were injured three times more commonly than the upper limbs; this agrees with some previous reports.^{2, 7, 8} Again, like in most of the reported series, the tibia is more commonly fractured bone than any other one in the body.^{2, 9} These high incidences may be because many of the fractures were from collisions with motor vehicles with the patient sustaining direct bumper injuries to the legs. This may also explain the high incidence of open fractures in motorcycle trauma.^{4, 10} Fifteen of the 27 open fractures were Grade 111A and above. These categories of fractures occur usually as a result of high-energy trauma. Findlay coined the term "motorcycle tibia to describe such "very severe" open fractures of the tibia with high non-union rate seen as result of motorcycle trauma.⁴ The treatment of motorcycle injuries can be difficult and may require a multidisciplinary approach if these patients are to recover uneventfully.^{2, 10} Most hospitals in developing countries do not have the manpower or material resources required to treat these patients¹¹, hence treatment are often delayed because materials needed have to be procured from outside the hospital environment or even the town by patients relatives. In this study, the high (71.3%) complication rate seen in the patients, the high rate of absconding from treatment and referral recorded are all indicative of the poor state of trauma care in the country.

In conclusion, motorcycle limb injuries most commonly involved the lower limb. They have a high morbidity rate. Efforts should be made towards preventing the occurrence of such injuries.

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