

Severe Trauma Admitted to Resuscitation Room at Mohammed VI University Hospital - Marrakesh: Epidemiological, Clinical and Prognostic Aspects

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Abstract: By analyzing 175 cases of severe trauma admitted to resuscitation room at MOHAMMED VI University Hospital in Marrakesh, between 1 June 2016 and 31 May 2017, this study aims to describe epidemiological characteristics, somatic injuries and to identify prognostic factors of mortality. The mean age of the patients was 35 ± 13.44 years (15 to 80 years). The male predominance was clear, with a sex ratio of 4. The majority were victims of road accidents (74.28%). Only 8.57% of patients had a post-traumatic admission delay of less than 1 hour. Somatic injuries were dominated by cranio-cerebral injuries in 85.71% of cases. 57, 14% of patients spent more than 24h in the ER (emergency room), the length of hospitalization was 5 ± 2 days. Mortality in our series was 27.42%. Prognosis was influenced significantly by multiple factors such as; age >45 years, non-medical transportation of patients, the state of hemorrhagic choc upon admission, Glasgow Coma scale <8, Injury Severity Score >20 and severe brain damage. Prognosis Improvement requires improvement of pre-hospital care and especially founding prevention protocols against road accidents, development of road structures, vehicle control, and to respect the rules of the road.

Keywords: severe trauma - road accidents - prognostic factors - prevention

INTRODUCTION

According to the WHO, road accidents cause around 1.24 million deaths worldwide and 20 to 50 million injuries, sometimes even disabilities [1]. Also, half of those killed on the roads are "vulnerable users"(pedestrians, cyclists and motorcyclists). In Morocco road accidents cause more than 4,000 deaths every year[2].

Serious traumatology is a very frequent emergency affecting primarily young and active population; the gravity evaluation is an important element of the initial management of polytrauma which decides the need of pre-hospital team and especially the orientation towards a structure able to take care of them. The purpose of our work was to describe the clinical, para-clinical, therapeutic and evolutionary profile, and to determine the mortality risk factors for polytrauma patients admitted in emergency department.

MATERIALS AND METHODS

This work is an analytical and transversal study, gathering prospective data. It lasted 12 months, from June 1, 2016 to May 31, 2017. This study was conducted in resuscitation room of the emergency department at MOHAMMED VI University Hospital in Marrakesh.

We included in the study all severe trauma patients over the age of 14 who were admitted to resuscitation room during the study period with at least one of the Vittel score criteria. The studied parameters

were epidemiological, clinical, therapeutic, evolutionary and prognostic aspects. This is how 175 patients were included in the study.

RESULTS

The most affected age group was 15 to 25 years and the average age of patients was 35 ± 13.44 years (15 to 80 years). The male predominance was clear, with a sex ratio of 4.83. Road accidents accounted for the main etiology (74.28%), with the majority of accidents occurring in urban areas (70.12%). 40% of the severe trauma patients were two-wheeler users (cyclists and motorcyclists) and the most common mechanism was "two-wheeler versus car" in 28% of cases. Only 8.57% of patients were admitted to hospital within less than 1 hour. More than half of the patients (66.56%) were admitted in the afternoon and evening. Most of the transport was carried out by non-medical ambulances and only 28 patients (16%) had medical transport. Clinically, upon admission, the distress found was: circulatory in 48% of cases, neurological (GCS <8) in 45% and respiratory in 44% of cases. Anisocoria was observed in 43 patients (24.57%) The cranio-encephalic and facial injuries

dominated the somatic ones in our series (85.71%) of which 37 cases of extradural hematoma (21.14%), 30 cases of subdural hematoma (17.14%) and 75 cases of cerebral edema (42.85%) were noted. Thoracic injuries were found in 31.42% of cases. Abdominal injuries were found in (28.57%) of the cases. In our series limbs trauma concerned 120 patients (68,57%). The mean injury severity score (ISS) was 31.2 with a

mortality of 27.42%. Thrombocytopenia less than 140000/mm³ was found in 89 patients (50.85%), including 10 patients (5.71%) with a rate of less than 50000/mm³. The prothrombin time (PT) level was <50% in 61 patients (34.85%). Anemia less than 10 g/dL was observed in 63 patients. Table I represents the average rates of different biological variables.

Table-I: average rates of different biological variables

Biological variable	Average rate	extremes
Hemoglobin	8,68 ± 2.49 g/dL	4-13.5 g/dL
White blood cells	10005.71 ± 4119.96/mm ³	4000 - 21000/mm ³
platelets	126214.28 ± 58072.14 /mm ³	10000 – 300000 /mm ³
Prothrombin	57.28 ± 21.99%	20 -100%
Urea	0,36 ± 0,15 g/L	0,6 - 5,8 g/L
creatinine	10.9 ± 4,06 mg/L	5 - 33 mg/L
natremia	136 ± 5 mmol/L	121 - 144 mmol/L

Therapeutically, all patients underwent conditioning with intravenous cannula placement and vascular filling with crystalloids mainly saline serum 9%, 20 patients received central venous catheterization immediately. 80 patients or 45.71% had to be ventilated artificially during the first 24 hours of hospitalization with a neuro-sedation essentially using the combination Hypnovel and Fentanyl in cranial trauma patients with a Glasgow scale <8.

Blood transfusion was required in 59 patients (33.71%). The use of vasoactive drugs was necessary in 55 patients (33.71%). IV Paracetamol was used in all patients combined with morphine or sometimes anti-inflammatory drugs. Systemic antibiotics were

used in 35 patients, (20% of cases) with Aspiration pneumonia upon admission, a cranio-encephalic wound, shock, and an open fracture or during urgent surgery. Amoxicillin-clavulanic acid combination was the most used antibiotic. 97 patients or 55.42% required urgent surgery.

The causes of death were mainly represented by deterioration in neurological status in (47.8%) cases, and circulatory failure in (26%) cases. The factors that significantly influenced the prognosis of the patients were age >45 years, non-medical transport, hemorrhagic shock, GCS <8, ISS >20, severe brain injury (Table II).

Table-II: Comparison of parameters in the search for mortality prognostic factors

Risk factor	Death cases (N = 48)	Living cases (N = 127)	P
Age > 45 years	43,13 ± 13,58	26,41 ± 16,88	0,002
Male	83%	82,67%	0,918
Admission delay > 1h	94,5%	96,80%	0,9
Non-medical transport	25%	12,59%	0,045
Respiratory distress	41,66%	39,37%	0,782
State of hemorrhagic shock	64,58%	41,73%	0,0069
GCS < 8 at admission	72,91%	34,64%	0,000001
ISS score > 20 (severe to critical)	100%	83%	0,001
Serious brain damage	95%	81%	0,02

DISCUSSION

Serious trauma is by far the leading cause of death among 15-44 year olds and is more prevalent in low- and middle-income countries [3,4]. We found in our series that the 15-44 age groups was the most affected (80% of cases). Our results are also consistent with those of KAUVAR DS *et al.*

In France, a predominance of the young population aged 18 to 29 was also found [5]. These results support the theory that the global labor force is

older than 15 years. A male predominance has been reported by all authors [3]. This is explained by the prevalence of risky activities in men [6], this predominance is confirmed in our study with 82.85% of male cases.

Road accidents are the main cause of serious trauma according to different authors [7]. In our series, road accidents accounted for 74.28% of serious injuries. 28 serious trauma patients had medical transport contributing significantly in the prognosis

improvement. This demonstrates the urgent need to improve pre-hospital care.

In France the mean admission time to the University Hospital varies from 1.9h to 6.5h [8], in our series 8.57% of patients were evacuated within less than one hour without any impact on mortality. 30 to 40% of the severe trauma patients die from hemorrhagic shock and its consequences, patients with a systolic blood pressure lower than 90mmHg when treated on the spot have a mortality of more than 50% [9]. 48% of patients in our series were admitted to our department in hemorrhagic shock, which significantly influencing the occurrence of mortality.

In the series of DABADIE PH. *et al.* 30% of patients with head trauma at admission died from direct consequences of brain injury [10], while in our series 85.71% of patients had head trauma, combined in 45.71% of cases with GCS <8. This could be explained by the severity of the traumas, since the majority was vulnerable people (pedestrians, motorcyclists not helmets for the most part).

In our series the average ISS is 31.2 with a mortality of 27.42%. Thoracic traumas are very often associated with other traumas [11]. In our series, we had 53 cases that are 31% of patients who had thoracic traumatism, abdominal injuries were found in 49 patients (28, 57%), the haemoperitoneum was the most frequently found type of injury.

CAMERON P. *et al* had observed limbs fractures in 70% of severe trauma patients [12], as also found in our study 68.57% of limb fractures and 17.71% of pelvic fractures.

According to MATHERS CD *et al.* [13], speed and precision of CT scans make them a complete diagnostic tool for polytrauma patients, without delaying therapeutic interventions. In our series, CT scan was required in more than 82% of cases and the indication was essentially head traumas.

It is essential, in the event of hemorrhagic shock, to maintain as much as possible a biological hemostasis by limiting the vascular filling to the necessary minimum to limit the dilution coagulopathy [14] and by having an aggressive transfusion strategy by an early and anticipated supply of platelets, red cells, fresh frozen plasma and fibrinogen. The early introduction of a vasopressor can quickly correct low blood pressure, it is only to help the ER doctor to quickly correct hypotension and allow an efficient and reasonable expansion [15]. Under these conditions, deaths may be due to the secondary worsening of traumatic injuries (head trauma) or hemorrhagic shock or to iatrogenic or infectious complications. In our study, 48 deaths were recorded, representing an overall mortality of 27.42%. The prognostic elements most

often selected according to the different authors are: age, hemodynamic instability, delay in management, ISS (injury severity score), Glasgow scale, hypothermia and combined injuries. In our study the factors that significantly influenced the prognosis of patients were the age > 45 years, the non-medical transport, the state of hemorrhagic shock, the GCS <8, the ISS >20 and severe brain injuries.

CONCLUSION

Improving the prognosis of severe trauma patients is based on urgent and effective care at the scene of the accident in order to reduce bad prognosis factors often identified, hence the need for a real pre-hospital medicine, and care in centers with all the technical platform necessary to cope with this difficult exercise (trauma center). Applying an effective prevention policy would inevitably and significantly reduce the financial burden of severe traumas.

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