

Polytrauma Observed at the Surgical Emergency Unit of Joseph Ravoahangy Andrianavalona (JRA) Teaching Hospital, Antananarivo, Madagascar: Clinical and Evolutionary Aspects

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Abstract

Introduction: A polytraumatized person is a wounded person, who has at least two lesions, which one or their combination is life threatening. Polytrauma mainly affects the young and active population. It constitutes the first cause of death. Our objectives is to describe the clinical profile, therapeutic and evolutionary patients polytraumas seen in the surgical emergency department of JRA Teaching Hospital and to identify the factors associated with the mortality of patients.

Methods: This is a retrospective and descriptive study of the polytrauma patients, aged 15 years or more, admitted to the surgical emergency department over a period of 07 months from June to December 2017.

Results: 87 patients were retained. The average age of the patients was 33.12 +/- 10 years with male predominance (77.01%). The majority of patients had no specific antecedents (88.50%). The trauma was mainly due to a public road accident (57.47%). Common transport was the main means of transport (58.62%). The average duration of the transport was 6.43 +/- 2 Hours. At admission, the majority of patients had an average arterial pressure (PAM) lower at 80 mmHg. Consciousness disorders with a Glasgow score of less than 8 were observed in 47 patients or 54.02%. A desaturation was noted in 76 patients or 87.35%. Cranial traumas associated with limb trauma were the most lesional association observed (70, 11%). The ISS Score (Injury Severity Scale) median was 32 [17-75]. Medical treatment was realized for all patients. Four patients or 4.59% had thoracic drainage. An exploratory laparotomy was indicated in 5 patients or 5.74%. Neurosurgical emergencies were transferred directly to the surgical surgery. The mortality rate was 44.83%. Hemorrhagic shock was the leading cause of death (21.83%). The factors associated with patient mortality were the female gender ($p = 0, 01$), the high ISS score (0,001) and patients in a state of shock requiring a vasopressor ($p < 0,005$).

Conclusion: Polytrauma is common pathology in our service, encumbered of high morbidity- mortality.

Keywords: Polytraumatized; Clinical; Evolution; Surgical Emergencies; Antananarivo

Introduction

A polytraumatized person is a wounded person, who has at least two lesions, which one or their combination is life threatening. Polytrauma mainly affects the young and active population. It constitutes the first cause of death [1, 2]. Polytrauma is a major public health problem. Each year, more than five million deaths occur in the aftermath of severe trauma around the world and this figure should be increased to more than eight million in 2020. Severe trauma is the fourth leading cause of death of all ages and the first cause of death of patients under 40 years [3, 4]. Our objectives are to describe the profile Clinical, therapeutic and evolutionary of polytraumatized patients and to determine the mortality factors.

Methods

This is a retrospective and descriptive study of the polytrauma patients, aged 15 years or more, admitted to the surgical emergency department over a period of 07 months from June to December 2017. We are included in the study, all polytraumatized patients admitted to our service, aged 15 years or older.

We excluded from the study all patients whose records were incomplete. Data analysis was made with Epi-Info 7 versus 1.1.14 software from the Center for Disease and Prevention (USA). The Chi-2 or Fisher test was used for the comparison of qualitative variables and the T-test of Student for the comparison of averages. Any P-value < 0.05 was considered statistically significant.

Results

We selected 87 patients. The average age of our patients was 33.12 +/- 10 years with predominance of the male gender (77.01%). The majority of patients had no particular history (88.50%). The trauma was mainly due to a public road accident (57.47%) followed by the domestic accident (26.44%), the civil liability accident (10.34%) and the accident at work (5.75%). Table 1 represents the distribution of patients according to the mechanism of the trauma.

Characteristics	Effective (n = 87)	Percentage (%)
Average age (years)	33,12 +/- 10	
Gender		
Female	20	22,99
Male	67	77,01
Mechanism		
Public Road Accident	50	57,47
Domestic Accident	23	26,44
Civil Liability Accident	09	10,34
Work Accident	05	5,75

Table 1: Distribution patients according to the trauma mechanism.

Common transport was the main means of transport (58.62%). More than half of the patients had arrived at the hospital for at least two hours after the accident. The average duration of the transport was 6.43 +/- 2 Hours. At admission, the majority of patients had an average arterial pressure (PAM) lower to 80 mmHg. Conscience troubles with a score of Glasgow inferior to 8 were observed in 47 patients or 54.02%. A desaturation was noted at 76 patients or 87.35%. The cranial trauma associated with limb trauma was the most observed Lesional association (70.11%). The ISS Score (Injury Severity Scale) median was 32 [17-75]. The majority of patients had an ISS score of less than 40 (71.26%).

Table 2 recalls the distribution of patients according to the observed lesional association.

For exams paraclinical the complete blood count (CBC) was prescribed in 100% of Case. The Brain scan (47,12%), Chest X-Ray (19,54%) and members (14,94%) were the main exams radiological effect in our study. Table 3 shows the distribution of patients according to the paraclinical tests performed. Fourteen patients or 16.09% had anemia Severe (Hemoglobin < 7g/dl). On the most observed lesions (Brain injury), extra-dural hematoma was the main lesion Observed 50.57%) followed by the hematoma Subdural (17.24%) and Cerebral contusions (14.94%).

Concerning the treatment, all patients received painkillers. Sixty five Lamar be 74.71% were sedated, in tubes and ventilated. Eighteen patients or 20.68% received a blood transfusion and a vasopressor. The osmotherapy was reported in 12.64% of cases. Four patients or 4.59% had benefited of thoracic drainage. An exploratory laparotomy was indicated in 5 patients or 5.74%. Table 4 represents the distribution of patients according to the therapeutic aspect.

Characteristics	Effective (n = 87)	Percentage (%)
ISS score		
Median ISS	32 [17-75]	
ISS <40	62	71,26
ISS ≥ 40	25	28,74
Lesional Association		
Skull/limbs	61	70,11
Chest/ Limbs	6	6,9
Abdomen/Limbs	5	5,75
Skull/Chest/limbs	4	4,6
Skull/Chest	3	3,45
Abdomen/skull/limbs	3	3,45
Abdomen / Chest	2	2,3
Abdomen/Skull	1	1,15

Table 2: Distribution of patients according to the lesional association observed.

Exams	Effective (n = 87)	Percentage (%)
Brain scan	41	47,12
Chest X-Ray	17	19,54
X-rays of members	13	14,94
Abdominal ultrasound	06	6,89
X-ray of pelvis	05	5,74

Table 3: Distribution of patients according to paraclinical exams realized.

Treatment	Workforce (n = 87)	Percentage (%)
Painkillers	87	100
Sedation + Endotracheal intubation + Ventilation	65	74,71
Blood transfusion	18	20,68
Vasopressor	18	20,68
Osmotherapy	11	12,64
Exploratory laparotomy	5	5,74
Thoracic drainage	4	4,59

Table 4: Distribution patients according to the therapeutic aspect.

For severe brain injury, 32 patients or 36.78% had died in our service. Thirty three patients or 37.93% were transferred directly to the surgical unit of the neurosurgery to evacuate the hematoma.

The mortality rate was 44.83%. Hemorrhagic shock was the leading cause of death (21.83%). Then come serious multiple organ failure (12,64%) and cerebral engagement (9.19%). Factors associated with patient mortality were female (P = 0.01), high ISS score (0.001), and patients In a state of shock requiring an administration of Vasopressors (P < 0.005). Table 5 recalls mortality factors.

Factors	Non-deceased Patients	Deceased Patients	Total	P value
Gender	7	13	20	0,03
Score ISS ≥40	7	18	25	0,001
Shock State + Vasopressors	1	17	18	P < 0,005

Table 5: Patient mortality factors.

Discussion

In our study, the average age of the polytraumas was to 33, 12+/- 10 years with male predominance (77.01%). Polytrauma is considered to be pathology of the young subject between 20 and 30 years. This frequency is explained by the demographic curve of the ages and by the activity of the young subjects which increases the risk of polytrauma [5-7]. In our study, this is justified by the young age of our population. In industrial countries where the population is older, the polytrauma is increasingly common in the elderly [8-10]. This male predominance reinforces the data from studies in the countries African [11, 12] and in the countries developed as the United States, Australia, Germany [13] and France [14]. Studies carried out in China, Colombia, in Ghana, Kenya, Mexico, Mozambique, Republic of Korea, in Thailand, Viet Nam and Zambia also showed a male predominance [15].

Public road accidents constituted the main cause of trauma in our study. This result reaches the data of the literature. According to the studies FIRST (French Intensive care Recorded in Severe Trauma) on 2012 [16] and in 2013 [17], 61% of injuries were caused by public road accidents. Our duration average of the patients to the hospital was 6.43 +/- 2 hours. An American study reported a delay of transportation less than one hour [18]. In France, this period ranges from 1.9 to 6.5 hours [16]. It is noted that the time taken to support in developed countries is much shorter than in our study, this could be explained by the lack of management Pre-Hospital and that in the majority of cases, the transport of the wounded is ensured by the common transport.

The cranial trauma associated with limb trauma was the most lesional association observed (70.11%) in our study. This result joins the study of Madane and his teams. In his study, in 37, 5% cases, this was a head trauma associated with the trauma of the members [19]. Sow. et al. [20] in Bamako revealed that 60% of traffic accidents are accompanied of head trauma. The Sima study in Libreville showed that the head injuries account for 45.5% of traumatized [21]. According to Vichard., et al. [22], 50% of the polytraumas possessed a cranial lesion.

The brain scan (47, 12%), Chest X-ray (19, 54%) and members (14, 94%) were the main exams radiological effect in our study. The initial assessment of imaging is to determine whether an urgent intervention (thoracic drainage, laparotomy or thoracotomy of hemostasis, embolism during a trauma of pelvis) is necessary. This assessment is also intended to verify the actions carried out in pre-hospital in difficult conditions (selective intubation, verification of a thoracic drainage). Three essential exams must be obtained quickly: the Chest X-Ray, the X-ray of pelvis and the FAST (Focus Assessment with Sonography in Trauma) Ultrasound [23]. By extension, it is also possible to propose currently the pleural-pulmonary ultrasound [24] and the transcranial Doppler [25]. In the case of a head trauma with a clinical sign of cerebral engagement, the practice of cerebral tomodensitometry without injection of contrast product is indisputable to eliminate a extradural hematoma that may require immediate surgical action [26]. For the patients with stable hemodynamic or stabilized after resuscitation, the HAS (high authority of health) recommends a body scan with and without injection of contrast product [27].

Our mortality rate hospital (44,83%) was high. Deaths of serious traumatized people occur in 50% of cases at the accident site and 30% within 12 hours of admission; they are often the result of a hemorrhagic shock or neurological lesions [27]. This high mortality rate could be explained by the lack of pre-hospital care of our patients and the delay of arrival to the hospital.

The factors associated with the mortality of patients were the female gender ($P = 0.01$), the High ISS score (0.001) and the patients in a state of shock requiring an administration of vasopressors ($p < 0,005$). Hypotension (systolic blood pressure < 90 mmHg) is deleterious in presence of head trauma [29] and reports of the interest prognostic of maintaining of an average arterial pressure greater than 85 mmHg in the context of central nervous system lesion [30]. Apart from these situations, there is no clearly defined threshold value of the hemodynamic parameters that depend on the conditions physiological underlying, in particular the age [31]. "Over-correction" hemodynamic disorders do not improve the prognosis of traumatized serious [31]. The links between mortality and systolic blood pressure (not), oxygen saturation (SpO₂) or the Score of Glasgow have already been shown [32]. The likelihood of survival of traumatized patient's decreases as the systolic blood pressure decreases: 90% if it is greater than 90 mmHg, 74% if the systolic blood pressure is less than 65 mmHg. Similarly, if the SpO₂ is less than 80%, the mortality rate is 76%, while it is 27% if the SpO₂ is between 80 and 90%, and is less than 5% if the SpO₂ is greater than 90%. However, SpO₂ is actually less important than the hemodynamic variables or the Glasgow score to evaluate the severity of a traumatized [33].

For the score of gravity; the ISS score is the most used in international literature to assess the severity of injuries according to their lesions [34]. More the ISS score is higher, more the vital prognosis is committed [35].

Conclusion

Polytrauma is common pathology in our service with a high mortality rate. It mainly affects the young subject's male. Public road accidents are the main mechanism of the trauma. The cranial trauma associated with limb trauma is the most lesional association observed. According the study, the factors associated with patient's mortality were gender, high ISS score, and shock patients requiring vasopressors administration. Pre-hospital time is paramount in the management of the polytrauma. It ensures the conditioning and transport of patients. A system to ensure this pre-hospital care should be installed in Madagascar to reduce the mortality rate of polytrauma.

Conflicts of Interest

There is no conflict of interest

Authors' Contribution

All the authors contributed to this study.

Thanks

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