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EPIDEMIOLOGY, CLINICAL MANAGEMENT AND THERAPEUTIC STRATEGIES OF SEVERE TRAUMA: EXPERIENCE OF THE RESHOP ROOM OF THE MOULAY YOUSSEF REGIONAL HOSPITAL CENTER OF RABAT WITH REGARDING A CASE.

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ABSTRACT

Severe trauma or polytrauma is a frequent life-threatening emergency, primarily affecting young people. A polytrauma patient is defined as someone with two or more injuries, at least one of which is life-threatening in the short term, or whose mechanism or severity suggests the presence of such injuries. Severe trauma is a significant cause of mortality in the Maghreb. Indeed, the incidence of road traffic accidents is very high, particularly serious accidents resulting in a large number of victims and/or severe injuries. While commendable efforts have been made in prevention, much remains to be done in this area, but also, and especially, in the management of victims after an accident.

KEYWORDS :

Polytrauma, regulated transport, damage control, emergencies, Moulay Youssef Regional Hospital Center of RABAT

MAIN ARTICLE

INTRODUCTION:

Trauma remains a major cause of death, particularly among adolescents and young adults. The need for a comprehensive and rapid assessment of injuries allows for the prioritization of care, but it always presents a challenge, cannot be improvised, and requires a trained, multidisciplinary team. Up to 30% of deaths could be avoided in severely injured patients through improved management. The early post-traumatic phase—the pre-hospital and initial hospital periods—is therefore crucial, as it marks the patient's entry into an organized care pathway. The management of severely injured patients, including imaging techniques and surgical and interventional therapies, has progressed significantly in recent years (1).

For a patient to benefit from this service, it is essential that the pre-hospital organization, which includes referral, be predetermined so as to quickly transfer the patient to the appropriate referral center capable of treating them. This transfer must take place under the best possible conditions; that is, a transfer to a local center should be considered in cases of life-threatening distress that do not respond to pre-hospital resuscitation efforts. Thus, a true healthcare network must be established. According to the French National Authority for Health (HAS) (2), a healthcare network is a specific, administratively formalized entity that is an organized form of collective action, ensuring continuity of care and coordination according to pre-established and standardized procedures. A healthcare network brings together various stakeholders to address a healthcare need within a defined geographical area. These stakeholders, who volunteer their time, jointly define objectives. These objectives concern the quality of care, resource optimization, prevention, and training.

Evaluation indicators are also planned. These are usually based on the maintenance of care records, tracing the patient's journey through the network. A network is therefore based on four dimensions (3):

– the medical project that links the professionals;

– the coordination of care through interaction among professionals;

– training and information for professionals (learning network practice, acceptance of procedures, feedback on network results);

– evaluation (evaluation of network practice, quality of care and economic evaluation of the network).

We report a case of a high-speed road traffic accident revealing a serious trauma in the Emergency Department of the Moulay Youssef Regional Hospital Center in Rabat.

Our study aims to evaluate the importance of regulated medical transport, pre-hospital care followed by the hospital phase with a multidisciplinary team (Emergency Physician, Paramedical Team, Radiology Technician, Radiologist, Intensivist, Traumatologist, Visceral Surgeon, Vascular Surgeon and the blood bank).

CLINICAL OBSERVATION:

This is a 53-year-old patient, with no particular notable history, a helmeted motorcyclist waiter who was hit by a high-speed car with a report of ejection approximately 10 meters, initial loss of consciousness and loss of urine, admitted for treatment to the Emergency Life Support Service in the Resuscitation Room of the Moulay Youssef Regional Hospital Center in RABAT.

Upon Admission:

Patient injured in a road traffic accident on March 31, 2026, with serious trauma at H1 of admission, with the following points of impact:

- On the skull: frontal wound, bilateral eyelid bruising
- Fractures of: right upper limb (middle third of the humerus), of both lower limbs (in the left lower limb we had a fracture of the: upper third of the femur and middle third of the tibia, in the right lower limb, fractures of the patella and lower third of the tibia).

Patient transported unregulated by the civil protection ambulance.

The clinical examination reveals a patient:

In general terms:in poor general condition with multiple open fractures, pale conjunctiva.

From a hemodynamic standpoint: Tachycardic with HR: 122 bpm and hypotension, BP: 87/44 (58) mmHg, signs of peripheral hypoperfusion such as cold extremities.

From a respiratory standpoint: Tachypnea with RR: 28 bpm and SpO2 desaturation: 88% AA, signs of respiratory distress (jugular vein distension, abdominal breathing), sweating, no crackles on pleuropulmonary auscultation

From a neurological perspective: Agitated with GCS 8/15 (OY: 4, RV: 2, RM: 2), disoriented, pupils pinpointed, functional impairment of 3 out of 4 limbs, no signs of seizures. Blood glucose 1.08 g/l.

Given the diagnosis of the severity of the ATLS blood loss pattern (enormous blood loss, tachycardia, hypotension, polypnea and agitation) justifying his admission to the resuscitation room with conditioning, multimodal monitoring, central venous access due to an impossible peripheral venous access, blood sampling for medical assessment and grouping with a request for packed red blood cells (PRBCs), filling with crystalloids due to uncontrolled active bleeding plus the Damage Control Resuscitation ++++ procedures (which consist of debriding the wounds for hemostasis in all cases on day 0) and oxygen therapy followed by orotracheal intubation with respect to the head-neck-thorax axis (spine).

The evolution was marked by cardiorespiratory arrest despite adequate Cardiopulmonary Resuscitation measures following an uncontrolled post-traumatic hemorrhagic shock refractory to filling with suspicion of injury to the left femoral vein due to active bleeding.

DISCUSSIONS:

In our context, the transport of our patient was provided by the Civil Protection which is responsible for the pickup and bringing him to the hospital and not for pre-hospital care and there is no information network between this service and the Emergency Reception Service for arrangements to be made and there is also no team trained for this care which can be associated with the seriousness of our victim which could lead to Cardiorespiratory Arrest due to post-traumatic hemorrhagic shock.

All these dimensions require the implementation of an information system.

Several scores and indices have been developed to assist clinicians in assessing the initial condition and/or determining the course and prognosis of trauma patients. These scores are very useful, particularly for the accurate categorization of patients. Their value for patient inclusion in epidemiological or clinical research studies is undeniable. However, their rational application to the various objectives of these scores in the emergency department is not straightforward. The most widely used scores in trauma care are the Injury Severity Score (ISS) (4, 5), which is an anatomical score, and the Revised Trauma Score (RTS) (6), based on the assessment of physiological variables and specifically designed for the pre-hospital evaluation of severely injured patients.

In practice, the use of simple and easily remembered clinical elements by emergency physicians is more helpful in this situation where all delays must be shortened.

The patient's age is an important prognostic factor. Taylor et al. showed that subjects over 65 years of age have a mortality odds ratio of 1.9 (7). The patient's medical history is also important to determine. Heart disease, respiratory failure, or a history of neoplasia leads to increased mortality in trauma patients (8).

The circumstances of the accident help determine the elements indicating violent kinetic energy, which is itself correlated with the severity of the injuries. An estimated speed of over 60 km/h, the death of another passenger in the same vehicle, a victim being thrown or crushed, significant vehicle damage, and the absence of a seatbelt are all factors that should lead to the victim being considered as having a serious injury until proven otherwise. The initial clinical assessment of injuries provides an approximation of the severity. The presence of penetrating trauma to the head, neck, or trunk, a flail chest, a severe burn, a pelvic fracture, a limb amputation, or the absence of a distal pulse places the patient in a high-risk category. Riou et al. demonstrated the value of measuring simple variables such as the Glasgow Coma Scale score, systolic blood pressure, and partial oxygen saturation in determining the severity of injuries. Extreme severity is defined by a Glasgow Coma Scale score of 3 (mortality close to 70%), systolic blood pressure < 65 mmHg (mortality > 60%) and SaO2 < 80% or undetectable (mortality close to 75%) (9).

Secondly, the means implemented to stabilize the patient such as the need for artificial ventilation, filling with more than 1,000 cc of colloids and the use of catecholamines allow us to refine this assessment (10).

Target blood pressures in hemodynamically unstable patients secondary to active bleeding have been revised downwards following primarily experimental (11) and also human (12, 13, 14) studies that showed increased mortality in groups where aggressive resuscitation was performed. It is thus unanimously accepted that before performing a hemostasis procedure, systolic blood pressure (SBP) should not exceed 90 mmHg unless there are associated head injuries, in which case SBP should be maintained around 120 mmHg (15).

It is generally recommended to begin volume expansion with crystalloids and colloids, then transfuse packed red blood cells, and only prescribe fresh frozen plasma (FFP) later to compensate for hemodilution of coagulation factors or to treat established hemostasis disorders (12, 16). These recommendations have recently been challenged by the latest work

conducted by American military physicians on wounded soldiers from the Iraq War (17, 18, 19, 20, 21).

All of these studies demonstrate the value of early FFP administration in managing coagulopathy in severely injured patients requiring massive transfusion. This early administration, with a 1:1 FFP/packed red blood cell ratio, reduces the need for packed red blood cells and, most importantly, decreases mortality. The benefit of recombinant activated factor VII (rFVIIa) as an adjunct treatment for bleeding has been the subject of recent European recommendations (15, 22). Given that this product is relatively expensive and not always available in our facilities, it seems more appropriate in our context to reconsider the role of FFP, especially since screening and preparation techniques have significantly reduced the risk of viral transmission. This risk was the basis for questioning the use of FFP as a volume expander.

Management of neurological distress involves improving the patient's hemodynamic and respiratory status. The indications for intubation and mechanical ventilation should be broad in these patients. If a Glasgow Coma Scale (GCS) score < 7 necessitates airway management even in the absence of respiratory distress, it is often preferable to consider mechanical ventilation in the face of a rapidly deteriorating neurological condition. Prevention of systemic brain injury (SBEI) will improve the prognosis for these patients and should begin as early as possible (15).

Furthermore, it is essential to systematically stabilize the cervical spine immediately upon arrival. A CT scan of the cervical spine should be performed routinely in all severely injured patients, particularly those with altered consciousness (23). The cervical collar will only be removed after confirmation of the absence of cervical spinal injuries, and very often, for these severely injured patients, this decision will not be made in the emergency department.

In the United States, the impact of healthcare networks has led to the implementation of a healthcare organization in severe trauma based on the concept of hierarchical Trauma Centers, ranked according to their technical capabilities and their activity within a healthcare network (Trauma System). This organization has significantly reduced post-traumatic mortality (24).

The establishment of a formalized and organized system around the SAMU/SMUR could help to reduce post-traumatic mortality in France (25).

Medical triage is the first link in the healthcare chain. The triage physician tries to identify, from the moment the call arrives, not only the severity of the accident but also the clinical signs of severity for the victim(s). The dispatcher assists in medical triage by identifying the caller, the scene, and the patient, emphasizing the precise location of the accident. They immediately assess the priority level of the initial call (high priorities include: cardiac arrest, comatose patient, high-speed collision, hit-and-run child, unresponsive hit-and-run adult, and unresponsive motorcyclist). They also seek to determine the number of victims and the expertise of any witnesses (for potential advice while awaiting medical triage). In the case of a high priority level (as described previously), they dispatch the Mobile Emergency and Resuscitation Service (SMUR) according to a standard local procedure and then request priority triage of the call (26).

Medical dispatch focuses on sending the most appropriate emergency resources to the scene, in terms of both numbers and expertise. It also provides advice to bystanders, particularly to prevent further accidents and guide initial care (cardiopulmonary resuscitation maneuvers and assisting those present in placing a patient in the recovery position). In all cases, the medical dispatcher encourages bystanders to cover the injured to limit heat loss. This advice allows them to wait for the arrival of the first professional first responders and then the mobile intensive care unit (SMUR). The criteria for dispatching the SMUR are based on the assessment of severity, which can be schematically categorized by answering five questions:

1. Is there evidence of a violent kinetic effect in the accident?

2. Are there any obvious clinical signs of severity?

3. Are there any serious anatomical lesions?

4. Did the treatment of the injured person require the use of resuscitation therapy?

5. Finally, is one of the following anamnestic elements found?

The dispatch of a SMUR team is guided by the accident criteria of Vittel 2002 (27).

This topic has been the subject of numerous publications. Regarding early mortality, some studies show the benefit on early mortality of severe trauma (ST) patients (25, 28).

Indeed, pre-hospital medical intervention allows for the optimization of resuscitation effectiveness from the initial pick-up phase. For example, in cases of circulatory arrest,

medical intervention significantly increases the success rate of intubation and therefore survival (29).

Even though these intermediate criteria appear favorable to pre-hospital medical intervention, there are currently no studies that allow us to draw conclusions about longer-term mortality. In France, data from the FIRST study show that, for patients who arrived alive at one of the university hospital intensive care units participating in this study, pre-hospital medical intervention provides a significant survival benefit at day 30 (25).

Whether in Europe, where pre-hospital medical care exists, or in the United States, where pre-hospital care is provided by paramedics, treatment in a trauma center reduces patient mortality. This reduction is even greater the more severe the patient's condition (24, 30, 31).

Road traffic accidents remain the leading cause of blunt trauma. Current data from the literature do not allow for an objective correlation between a patient's hemorrhagic risk and the injury mechanism. Pelvic injuries are most often caused by road traffic accidents and falls from a great height (32, 33). While pelvic trauma represents only 2 to 3% of skeletal injuries, its prevalence reaches 25% in cases of multiple trauma (32).

The composition of the hospital reception team plays a crucial role: having a medical-surgical team present on-site improves the prognosis. Similarly, the presence of a complete and trained team significantly reduces resuscitation time and the delay between admission and the start of surgery. The availability of a comprehensive trauma team, encompassing all specialties (emergency physician, surgeon, anesthesiologist/intensivist, radiologist, and paramedical staff), immediately available and dedicated to this activity, has a significant positive impact on mortality. The quality of the medical organization from the moment of admission should also be considered in the initial triage decision for severely injured patients (34, 35, 36).

The concept of "damage control" has revolutionized traditional surgical techniques. These techniques, well known to military surgeons who were often criticized for them, fell into disuse after World War II and the Vietnam War. The results of recent research have led to a renewed interest in this concept (37, 38, 39).

CONCLUSION:

The management of polytrauma is essentially pre-hospital followed by a hospital phase with a well-adapted technical platform, in order to reduce the mortality rate.

Since the total coverage of the respective national territories by functional SAMUs has not yet been achieved, we continue to receive in the emergency reception services (SAU) seriously injured people who have not been conditioned beforehand in pre-hospital care.

A rapid assessment to identify signs of life-threatening distress is absolutely essential upon arrival of the severely injured patient and will determine the immediate course of treatment. Subsequently, a more comprehensive and dynamic assessment will allow for a more precise estimation of the severity of the injury.

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