

## Polytrauma in War Time in A Clinical Case at the Mali Hospital in Bamako (Mali)

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### Abstract

### Case Report

According to Trillat and Patel, multiple traumas are a serious wounded person with at least two injuries. We bring here the case of a 22-year-old man, a military victim of chest trauma by firearm with entry orifice, the subclavicular region left and exit port, the axillary region facing the 4th, 5th and 6th left intercostal spaces, the wound on the anterior side of the arm with entry port, the middle 1/3 of the arm and exit port on 1/3 middle of the anterior aspect of the forearm. Initially taken over by the Barkhane force (a force made up of French soldiers deployed in the Sahel). The chest CT scan showed pneumothorax, pulmonary contusion and multiple rib fractures. Admitted to the operating room, he underwent chest drainage followed by wound trimming under general anesthesia plus orotracheal intubation. Five days later, he was referred to the Hospital of Mali for further treatment. The evolution was favorable from a clinical and para clinical point of view. Chest injuries are directly responsible for more than 25% of deaths. It is the 2nd cause of mortality in polytrauma victims. Knowledge of ballistic concepts is of capital assistance to the surgeon and the anesthetist.

**Keywords:** Polytrauma, War, Pneumothorax, sepsis, Thoracic drainage.

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## INTRODUCTION

Chest injuries are directly responsible for over 25% of deaths, the second leading cause of death in polytrauma victims after head trauma [1]. In addition, chest trauma is only very rarely isolated since, in more than 80% of cases, it is associated with other lesions that are potentially life-threatening [2]. This frequent association is essential to consider because chest lesions, which are often less apparent than others, are likely to be obscured and quickly lead to the formation of a vicious circle. Thus, the presence of thoracic trauma is involved in 25 to 50% of secondary deaths in Polytrauma victims [3, 4].

## OBSERVATION

Mr. AS 22 years old military by profession, was the victim of gunshot wounds on January 27, 2018 in Sombi (in the circle of Niafounké - Mali) resulting in him a thoracic trauma with entry orifice (OE) subclavicular left and exit orifice (OS) on the axillary line facing the 4th, 5th and 6th left intercostal spaces associated with a wound on the anterior aspect of the arm with OE in the middle 1/3 of the arm and OS in the middle 1/3 of the anterior aspect of the forearm.

Initially rescued by the Barkhane medical team, upon pickup, the diagnosis of pneumothorax was raised. Mr. A.S benefited from the placement of a chest tube followed by the dressing of the wound on the upper left limb. A CT scan performed after confirmed the diagnosis of pneumothorax and objectified also the presence of pulmonary contusion of the left upper and lower lobes and rib fractures. However, the thoracic tube installed was not pleural, Mr. A.S was immediately admitted to the operating room; taken under general anesthesia plus orotracheal intubation, they removed the old drain, placed a new pleural drain and trimmed the wounds of the left upper limb (debridement and closure of the orifices in a single plane after careful hemostasis and abundant washing with physiological serum only and dressing) and transfer to the hospital unit.

In the immediate postoperative period, the assessments carried out objectified a mixed acidosis (respiratory and metabolic) with a pH at 7.18, a PaCO<sub>2</sub> at 60.6mmHg and bicarbonates at 18 mmol / l, lactatemia at 2.59mmol / l, anemia normochromic normocytic at 9.4g / dL hyperleukocytosis at 13400 / mm<sup>3</sup> predominantly neutrophilic, thrombocytopenia at 85000 / mm<sup>3</sup> and prothrombin time at 58%

The therapy consisted of: a vascular filling with 1500 ml of Ringer Lactate and 1000 ml of isotonic saline serum, the transfusion of a bag of isogroup isorhesus blood (concentrate of group O positive red blood cells), and 3 lyophilized plasmas, analgesia based on morphine (30mg / 12h) and Ketamine (10mg) combined with Paracetamol 1g / 6h, and Tramadol 50mg / 6h, an antibioprohylaxis based on Augmentin 2g / 8h, prevention of thromboembolic disease based on enoxaparin 4000IU subcutaneously 12 hours after the operation, injection of tetanus serum and tetanus vaccination.

Two days later, the patient complained of rib pain, the onset of a productive cough associated with fever, the onset of hypotension and respiratory deterioration characterized by bradypnea and oxygen desaturation. The hypothesis of a sepsis starting from the lungs was raised. The assessments carried out revealed anemia at 6.9g / dl, hyperkalaemia (7mmol with electrical manifestations on the electrocardiogram: sharp T wave); rhabdomyolysis (Creatine Phospho Kinase greater than 5000IU / L) and serum creatinine at 240µmol / l.

The therapy consisted of filling with 1000 ml of Ringer Lactate over 1 hour under echocardiographic control then 2500 ml Ringer Lactate over 24 hours, the transfusion of two pouches of group O positive red blood cell concentrate, the administration of 30% glucose serum associated with 20IU of rapid insulin and 1g of calcium gluconate for the management of hyperkalaemia, Non-Invasive Ventilation (NIV) sessions, antibiotic therapy based on Tazocillin 4g / 6h and Gentamycin 8mg / kg once started, the analgesia based on Morphine, Paracetamol and Tramadol is maintained.

On the 3rd day, a follow-up CT scan demonstrated right basal pneumonia, worsening of the lesion on the left lung and the persistence of a pneumothorax blade. In addition, there is also significant colectasis on this same scanner. The procedure consisted of keeping the chest tube in place (50ml of serohaematic fluid per 24 hours), the administration of 0.5mg of Neostigmine and Movicol 1 sachet every 8 hours.

On the 5th day, the X-ray examination showed a chest tube in place, improvement of the lung lesions and pneumonia. They made a decrease of the oxygen flow (eupneic patient under 2 liters / minute of oxygen) which prompted the same day his referral to the Mali hospital in Bamako for the continuity of care.

On admission to the intensive care unit, the examination found a calm patient with a clear conscience (a Glasgow score of 15/15) in efficient spontaneous ventilation, 100% peripheral oxygen saturation under oxygen at a flow rate of 2 Liters /

minute, normadilated pupils reactive to light, no sensitivomotor deficit. On cardiopulmonary examination, the sounds of the heart are audible, regular and without added noise with a heart rate of 82 beats per minute, the thorax is harmonious symmetrical with good thoracic amplification, vesicular murmurs are reduced in the 2 pulmonary bases with crackling rales in the left hemithorax and a respiratory rate of 18 cycles / minute. We note the presence of a chest tube connected to a collection device (pleurevac) containing 1950ml of serohaematic fluid. The rest of the exam is unremarkable.

Our action to take consisted of: cardiorespiratory monitoring, oxygen therapy, gentle aspiration of the chest tube at 20cmH<sub>2</sub>O, a hydro-electrolyte supply with serum enriched with ions on the basis of 30 ml / 24 hours, analgesia based on the Paracetamol 1g / 6h, and Tramadol 100mg / 8h, probabilistic antibiotic therapy with Ceftriaxone 1g / 8h, prevention of stress ulcers, and corticosteroid therapy with Solu-medrol 120mg / day. After obtaining hemodynamic stability, apyrexia and normalization of the biological assessments, a CT scan of the thorax with injection of contrast product performed showed satisfactory images on the 5th day of his admission. On day 8, the chest tube was removed. After 13 days in the intensive care unit and with a favorable outcome, he was referred to the thoracic surgery department for further treatment.

## DISCUSSION

Ballistic trauma requires surgery more often and faster than blunt trauma. The role of the anesthetist-resuscitator is essential since he intervenes at all stages of the management of these injured people: initial resuscitation and primary transport, monitoring of diagnostic procedures, intraoperative anesthesia and resuscitation and postoperative follow-up.

Usually the conditions for taking care of these wounded are different depending on whether it is in time of war or in time of peace. Wartime is characterized by often prolonged evacuation times, by a restricted technical environment, in particular with regard to diagnostic means, by standardized surgical procedures limited to survival procedures and by a complete and definitive treatment which intervene only after a secondary evacuation. In our case; care was taken early, given the technical and logistical resources available by the BARKANE forces medical team.

Our patient presented with multiple trauma combining thoracic trauma and trauma to the left upper limb. Knowing the type of weapon, the type of ammunition, the impact distance, the wearing of a bulletproof vest allows us to estimate the potential injury power [5]. However, it should be remembered that the severity of the injury will depend above all on

the organ affected more than on the type of injuring projectile.

Lesion topography has been well studied in wartime [6]. Limb injuries are predominant (65% of cases, 95% for personnel wearing helmets and flak jackets) [7]. Head, neck and trunk lesions are observed in 10 to 20% of cases. These lesions have a considerable mortality, 80% for cephalic lesions, 70% for thoracic lesions. The cause of death is either central nervous system damage or hemorrhage [7].

Limb injuries are the most frequent in war surgery [7, 8] and in these circumstances represent more than 60% of ballistic injuries. Our patient presented with a sepsis at the pulmonary starting point, the prevention of the infection in the ballistic trauma is a capital element in their management. Indeed, if their early mortality has considerably decreased thanks to an optimization of the initial care (resuscitation, surgery), the infection is currently the first cause of secondary mortality [7, 8].

Bacterial contamination can be primary or concomitant with the injury. It then involves the germs of the telluric (clostridia, bacillus) and aqueous (*Pseudomonas*) environment associated with the resident clothing and cutaneous-mucous flora of the injured person (staphylococcus, streptococcus). Prevention of primary infection is based on early, enlarged debridement surgery with excision of devitalized and necrotic tissue. Combined antibiotic therapy is intended to prevent microbial overgrowth which is logarithmic and which begins as early as the sixth hour following the trauma. The most widely used antibiotic therapy currently in wartime remains the classic combination of penicillin G-metronidazole [8].

## CONCLUSION

Ballistic trauma has now left the reserved domain of war surgery. The availability in peacetime of modern diagnostic means has made it possible to change the management strategy for these lesions. However, for the most serious lesions in the most severely injured, extreme emergency surgery combined with intensive resuscitation remains the only possible tactic. Knowledge of the basics of ballistics helps the surgeon and the anesthetist to assess the potential severity of a lesion.

## REFERENCE

1. Sauaia A, Moore F, Moore E, Brennan R, Read R. Epidemiology of trauma deaths: a reassessment. *J Trauma*. 1995;38:185-93.
2. Karmy-Jones R, Jurkovich G. Blunt Chest Trauma. *Current Problems in Surgery*. 2004; 41:223-330
3. Ciesla D, Moore E, Johnson J, Burch J, Cothren C, Sauaia A. The role of the lung in post injury multiple organe failure. *Surgery*. 2005;138:749-58
4. Adnet F, Lapandry C, Lapostolle F. Thorax trauma. *Practitioner Review*. 2003;53:967-74
5. Roberts GK, Bullian ME. Protective ability of the standard US Military Personnel Armor System Ground Troops (PASGT) fragmentation vest against common small arms projectiles. *Mil Med*. 1993;158:560-3.
6. Bellamy RF. The medical effects of conventional weapons. *World J Surg*. 1992; 16:888-2.
7. Crey ME. Analysis of wounds incurred by US Army Seventh Corps Personnel treated in Corps hospital during Operation Desert Storm, February 20 to March 10, 1991. *J Trauma*. 1996;40:165-9
8. Korzinek K. War injuries of the extremities. *Unfallchirurg*, 1993; 96:242-7.