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Chest Trauma: Clinical Profile and Therapeutic Aspects in a Rural Intensive Care Unit in Senegal

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Abstract **Original Research Article**

Objective: The aim of this study was to investigate the clinical profile and therapeutic aspects of chest trauma in the intensive care unit. ***Patients and Methods:*** We conducted a retrospective and descriptive study over a period from January 2023 to June 2025 (36 months). in the multipurpose intensive care unit of the Thierno Mouhamadou Mansour Barro Hospital in Mbour, Senegal. It focused on analyzing the records of patients admitted for isolated or other chest trauma. The parameters studied were epidemiological data and treatments administered and the progress of the patients. ***Results:*** During our study period, 78 patients presented with chest trauma, representing 3.5% of hospital admissions. The average age of patients was 32 years (range 13–52 years) with a sex ratio of 6.3. Road traffic accidents were the leading cause of trauma (88%). It was of traumas closed of the thorax in 72 case (92.3 %) and of traumas penetrating of thorax in 06 cases (7.6 %). The most frequently noted injuries were rib fractures (58%), pneumothorax (48%) and haemothorax (38.46%). In 28% of cases, chest trauma was associated with head and brain trauma. Fifty-four patients (70%) presented with life-threatening conditions. Chest drainage was performed in 30 patients (38.38), and 19% of patients received mechanical ventilation. The mortality rate was 29.48%. ***Conclusion:*** Chest trauma is serious, especially when associated with traumatic brain injury. The prognosis can be improved with good organization and adequate facilities for patient care.

Keywords: Chest trauma, resuscitation.

INTRODUCTION

Chest trauma is a common condition that can cause respiratory and/or haemodynamic distress. The main causes are road traffic accidents, which mainly affect young people [1]. Treatment requires a thorough initial assessment of the patient to establish a comprehensive injury assessment in order to apply the appropriate therapeutic measures. The main objective of this study was to determine the epidemiological profile, injury assessment and outcome of patients admitted to intensive care in rural areas for isolated or non-isolated chest trauma.

PATIENTS AND METHODS

We conducted a descriptive, retrospective study covering a 36-month period (January 2023–June 2025) in the general intensive care unit at Thierno Mouhamadou Mansour Barro Hospital in Mbour. The study involved analysing the records of patients admitted for isolated or non-isolated chest trauma. We collected epidemiological, clinical, therapeutic and evolutionary data from hospital records. All recorded data were entered into Excel (MicrosoftTM) and analysed using SPSS (Statistical Package for Social Sciences) version 1.

RESULTS

During this period, 78 patients were admitted to intensive care with chest trauma, representing 3.5% of hospitalisations. The average age of patients was 32 (range 13–52) with a sex ratio of 6.3. The main medical histories found were asthma (1 case), high blood pressure (2 cases) and diabetes (1 case). Road traffic accidents were the main cause of trauma (69 patients, or 88%). Other causes included falls from a height (5 cases), assault (2 cases) and unspecified causes (2 cases). All patients were transported without medical assistance, with the fire brigade providing transport in 20% of cases. Twenty-five patients (32% of cases) were treated at an initial healthcare facility. On admission to intensive care,

30% of patients were stable, while 70% were in critical condition. This included respiratory distress in 35 patients (44.80%), haemodynamic distress in 4 patients (5.12%) and neurological distress in 15 patients (19.23%). In 39% of cases, chest trauma was associated with head trauma. Table I shows the distribution of patients according to injuries associated with chest trauma. Standard chest X-rays were performed in 65 patients (83% of cases). A chest CT scan was performed in 43 patients (56%). The injuries identified by imaging were rib fractures (58% of cases), including a rib flap, fluid effusion (63% of cases), gas effusion (72% of cases), clavicle fracture (10% of cases) and pneumomediastinum (4%). Table 2 shows the distribution of patients according to the chest injuries found during chest trauma. In terms of intensive care treatment, 15 patients (19%) received mechanical ventilation and probabilistic antibiotic treatment was initiated in 60 patients (77% of cases). Chest drainage was performed in 30 patients (38.88% of cases), including 18 patients for haemothorax, 10 for pneumothorax and two for mixed effusion. Table 3 shows the distribution of patients according to the treatment applied in intensive care. Sixteen patients (20.51%) had complications during their stay in intensive care. Morbidity was dominated by infectious complications in eight patients (10.25%), haemodynamic complications in three patients (3.84%) and respiratory complications in five patients (6.41%). The average length of stay in intensive care was 12 days (range 1–35 days). Twenty-three patients died, representing a mortality rate of 29.48%. The causes of death identified in 15 patients were infectious pneumonia (4 cases), combined injury with severe traumatic brain injury (9 cases), and haemorrhagic shock (2 cases).

DISCUSSION

Over the period, we counted 78 patients admitted for chest trauma, with the incidence of this condition in intensive care, among all hospitalisations, being 3.5%. Niang in Senegal found a higher frequency of 6.3% [2]. The prevalence of chest trauma in intensive care was high in several African series [3,4]. Hospitalisation in intensive care for trauma patients may depend not only on the severity of the clinical picture, but also on the availability of care. Our intensive care unit was the only one in the area. It is therefore important to organise care and have adequate facilities in place. The average age of patients was 32 years with a sex ratio of 6.1, as found in most African series with an average age of around 30 years [1,4]. This is a condition that affects young males, who constitute the most active segment of our society and who also work in the transport sector, thus exposing them to road accidents. In our series, the main aetiological circumstance was identical to that found in developing countries : road accidents (88%). Rajaonera in Madagascar and Sani in Niger accounted for 46.86% and 65.9% of road traffic accidents respectively [1,5]. This predominance of road traffic accidents in our regions could be related to the use of high-speed means of transport, non-compliance with traffic regulations and the quality of roads. In our area, we have noticed an increase in the number of two-wheeled motorcycles, which are frequently used as a means of transport. We found that most life-threatening conditions were neurological and/or respiratory in origin. This can be explained by the fact that chest trauma is accompanied by pain and chest injuries that alter respiratory mechanics and manifest clinically as respiratory distress [6]. Twenty-two patients (28%) had a combination of chest trauma and craniocerebral trauma. This combination in the context of severe trauma made treatment much more difficult and increased costs. It was associated with high morbidity and mortality, as reported in the literature [3,5,7]. Other associated injuries, which may be abdominal, spinal or pelvic, were related to the violence and nature of the causal mechanisms. In our study, chest X-rays, the initial examination for chest trauma, were performed in 83% of cases. This allows the detection of gas or fluid effusion, rib fractures, etc. It helps to monitor injuries. Due to the combination of injuries and the nature of the causal mechanism, some patients underwent a chest CT scan from the outset, which is much more sensitive for detecting chest injuries. It is recommended that pleuropulmonary ultrasound be combined with FAST ultrasound to look for gas or fluid effusion and to assess the pericardium [8]. Fifteen patients (19%) underwent mechanical ventilation. In Rajaonera's series, it was used in 6.86% of cases [5]. The main indications were lack of clinical improvement after non-invasive ventilation, haemodynamic instability or impaired consciousness [9]. Experts recommend that the tidal volume be set between 6 and 8 mL/kg of ideal weight due to the non-homogeneous nature of the traumatised lung [8]. Chest drainage was performed in 30 patients (38.88% of cases). Niang and Sani found drainage rates of 46% and 65% of cases, respectively [2,4]. Drainage is indicated for any gas or fluid effusion with haemodynamic and/or respiratory repercussions. It is preferable to perform this via the axillary route at the 4th or 5th intercostal space on the mid-axillary line rather than via the anterior route [8]. In cases of chest trauma, pain management is an important part of treatment. Pain must be systematically assessed using conventional scales.The most commonly used analgesia protocol in our study was a combination of intravenous paracetamol and tramadol. Fifteen patients received titrated morphine. In the presence of severe pain, the use of titrated morphine is recommended with the aim of pain relief [10]. After effective titration, patient-controlled analgesia may be considered. Current recommendations give prominence to thoracic epidural anaesthesia for the quality of analgesia it provides, but also because it helps to improve respiratory problems [11]. In our study, the mortality rate was 29.48% of cases. This was much higher than that reported in the study by Niang (20.3%) conducted in the Senegalese capital and by Sani (12.2%) in Niamey [2,4]. This difference suggests that the availability of local healthcare services influences treatment strategies and

patient prognosis. The outcome for patients with chest trauma depends on the initial severity and, above all, on the combination of injuries. Mortality was linked to the severity of the associated injury. This was found in most series, and the association with neurological damage is a very poor prognostic factor [12,13].

Table 1: Distribution of patients according to injuries associated with chest trauma.

Associated lesions	Number(n)	Percentage (%)
Abdominal lesions	03	3.84
Limb fractures	08	10.25
Spinal injuries	01	1.28
TCE	22	28

TCE: Traumatic Brain Injuries

Table 2: Distribution of patients according to thoracic lesions.

Chest injuries	Number of employees (n)	Percentage (%)
Hemothorax	30	38.46
Pneumothorax	38	48.71
Pulmonary contusion	18	23.07
Diaphragmatic rupture	01	1.2
Pericardial effusion	01	1.2
Rib fracture	46	58

Table 3: Distribution of patients according to treatment and procedures performed:

Treatment and procedures	Number (n)	Percentage (%)
Mechanical ventilation	15	19.23
Vasopressor amines	4	5.12
Blood transfusion	11	14.10
Tranexamic acid	30	38.88
Chest drainage	30	38.88
Antibiotic therapy	60	77
Morphine titration	15	19.23
Paracetamol + Tramadol	78	100
Surgery	9	10

CONCLUSION

Chest trauma is common and is most often caused by road traffic accidents. It can be serious and requires adequate management to improve patient prognosis.

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