PROFILE OF SEPTIC SHOCK IN A TERTIARY HOSPITAL IN MAURITANIA

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ABSTRACT

Septic shock is a common medical emergency associated with high mortality. Our goal is to study its epidemiological, clinical, and therapeutic profile in the intensive care unit of the Centre Hospitalier de l'Amitié in Nouakchott. This is a retrospective study conducted in the intensive care unit of the Centre Hospitalier de l'Amitié (CHA) in Nouakchott from January 1, 2022, to December 31, 2023, covering 40 cases of septic shock. Among the 1,150 patients admitted to intensive care, 40 presented with septic shock, representing an incidence of 3.47%. The average age of patients was 56.4 years, ranging from 18 to 80 years. The majority were aged between 48 and 77, with two peaks at 58 and 77 years. A male predominance was observed (25 men to 15 women), with a sex ratio (M/F) of 1.66. The most common comorbidities were hypertension (50%) and diabetes (37.5%). The Glasgow Coma Scale score was 12 or lower in all patients. Mean blood pressure was below 60 mm Hg. Tachycardia was observed in 75% of patients, while bradycardia was seen in 25%. Urine output was preserved in 27 patients (67.5%), while oliguria-anuria was observed in 13 patients (32.5%). Septic shock is a medical emergency that can be life-threatening. Its management remains a challenge in sub-Saharan Africa.

Keyword: S*eptic shock; Sepsis; intensive care unit,*

INTRODUCTION

Septic shock corresponds to severe sepsis complicated by persistent hypotension, unresponsive to fluid resuscitation, and is the most common cause of death among ICU patients. Mortality remains high despite advancements in monitoring, surgery, and antibiotic therapy (1).

According to the World Health Organization, septic shock affects approximately 30 million people worldwide annually. It represents 62% of shock states encountered in ICUs. It is the leading cause of death in ICUs and one of the primary causes of in-hospital mortality (2). In the U.S., an analysis of an American database of 750 million hospitalizations over 22 years showed an incidence of 240.4 cases per 100,000 in 2000, compared to 82.7 per 100,000 in 1979—an annual increase of 8.7% with a mortality rate approaching 70% (3). The French study EPISEPSIS, conducted between 2009 and 2011 in 14 ICUs, reported an in-hospital mortality rate of 42% (4). In Morocco, a study conducted in the surgical ICU of CHU Hassan II in Fez estimated mortality at 76.5% (5). In Togo, a study conducted at CHU Sylvanus Olympio in Lomé found an incidence of 4.3% with an estimated mortality rate of 97.5% (6).

In Mauritania, we found no studies on septic shock, hence the interest of our study, which aims to:

To study the epidemiological, clinical, biological, and evolutionary profile of patients in septic shock admitted to the intensive care unit of the Centre Hospitalier de l'Amitié in Nouakchott.

MATRIALS AND METHODS

This retrospective study was conducted in the intensive care unit of the Centre Hospitalier de l'Amitié (CHA) in Nouakchott from January 1, 2022, to December 31, 2023, including 40 cases of septic shock.
Data were collected from patient records in the ICU. Collection, entry, and data analysis were performed using SPSS 20 software.

RESULTS

During the study period, among the 1,150 patients admitted to the ICU, 40 presented with septic shock, representing an incidence of 3.47%. The average age of patients was 56.4 years, ranging from 18 to 80. Most patients were aged between 48 and 77, with two peaks at 58 and 77 years. A male predominance was observed (25 men to 15 women), with a sex ratio (M/F) of 1.66. The most frequent comorbidities were hypertension (50%) and diabetes (37.5%). The Glasgow Coma Scale score was 12 or lower in all patients.
The mean blood pressure was below 60 mm Hg. Tachycardia was observed in 75% of patients, while bradycardia was observed in 25%. Urine output was preserved in 27 patients (67.5%), while oliguria-anuria was observed in 13 patients (32.5%).
Twenty-eight of our patients (70%) had hyperthermia, while 12 patients (30%) had hypothermia. The average respiratory rate was 24.8 breaths/min. Oxygen saturation at admission: 30 patients had SpO2 ≤90%, 7 patients between 90% and 94%, and 3 patients ≥94%.
All our patients experienced at least one organ failure. The average number of organ failures per patient was 2.9, ranging from 1 to 4. The most common failures were cardiac (100%), pulmonary (45%), and renal (32.5%).
All patients had a complete blood count (CBC), with results as follows: Twenty-six patients had anemia with hemoglobin (Hgb) ≤10; among them, 20 had severe anemia with Hgb ≤7. Leukocytosis ≥20,000 was observed in 25 patients (62.5%), 12,000–20,000 in 5 patients (12.5%), and leukopenia in 10 patients (25%). Thrombocytopenia was observed in 7 patients (17.5%) and thrombocytosis in 10 patients (25%).
All patients had elevated CRP levels; 18 patients had CRP levels between 80 and 150, 10 patients between 150 and 300, and 12 patients ≥300.
Only 5 patients were admitted with procalcitonin levels, all above 10 ng/ml. Elevated creatinine levels were found in 22 patients, and elevated urea in 25 patients. Blood glucose was ≥2 g/L in 31 patients (77.5%), of whom 15 were known diabetics.
The prothrombin rate was normal in half of our patients; 15 had rates between 50% and 70%, and 5 had rates below 50%. Hyponatremia was observed in 29 patients, with 22 having sodium levels <125. Two patients had mild hypernatremia, while the remaining patients had normal sodium levels.
For potassium levels, 26 patients had hypokalemia, 7 had moderate hyperkalemia, and 3 had severe hyperkalemia; only 4 patients had normal potassium levels. All blood cultures were negative. However, *Escherichia coli* was identified in all urine cultures.
Before admission, 21 patients had undergone abdominal-pelvic ultrasound. Additionally, 18 patients had chest X-rays, while 8 had abdominal CT scans, and 7 had abdominal-pelvic CT scans. The initial infectious foci responsible for septic shock were primarily located in the abdomen and lungs, accounting for over 50% of cases.
The distribution of patients by origin of septic shock shows a predominance of surgical pathologies (26 cases, or 65%) compared to medical pathologies (35%).
Regarding Antibiotic Therapy: Empirical antibiotic therapy was initiated in most cases (34 patients). Management included fluid resuscitation and the use of vasopressor agents. The most frequently prescribed antibiotics for our patients were penicillins, fluoroquinolones, aminoglycosides, carbapenems (Imipenem), and imidazoles.
Surgical treatment of the source of infection was performed in 17 patients (42.5%).
The average hospital stay for all patients was 6.62 days, ranging from 12 hours to 21 days. Favorable outcomes were observed in 12 patients, representing 30%.
We recorded 28 deaths, with an overall mortality rate of 70%. Death occurred in cases of refractory shock or multi-organ failure. Advanced age was a poor prognostic factor, as 21 of the 28 deceased patients were aged 60 or older. The average age of those who died was 60.93 years, compared to 45.83 years for survivors.

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DISCUSSION

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Septic shock accounts for 62% of shock states encountered in the ICU and is the leading cause of mortality in intensive care units as well as one of the primary causes of in-hospital mortality (2). It is defined as sepsis with persistent hypotension (SBP < 90 mm Hg or a decrease of 40 mm Hg from baseline in the absence of another cause of hypotension) despite adequate fluid resuscitation, accompanied by tissue perfusion abnormalities (lactic acidosis, oliguria, altered consciousness) [7].

Numerous hospital-based studies on severe sepsis, defined using the American College of Chest Physicians/Society of Critical Care Medicine consensus criteria, report variable incidence rates in hospitals and ICUs, ranging from 2% to 11% of all admissions [8]. This includes the rate of 3.47% found in our study. The risk of developing severe infection increases significantly after age 60 [9,10], although septic shock can occur at any age and is particularly common among the elderly. A study covering 10,694 patients over 40 years (from 1958 to 1997) published by the ACCP–SCCM Consensus Conference Committee in the USA reported an average age of 59 years [11], which is comparable to the age in our series. A sex ratio of 1.66 was observed.

In a French study conducted from 1993 to 2000 [12], a male predominance was observed, with a sex ratio of 1.7, comparable to our findings [13].

In our series, one or more underlying chronic diseases were observed in 36 patients (90%). The most common conditions were hypertension (50%), diabetes (37.5%), HIV (12.5%), COPD, and heart failure (10% each), and chronic kidney disease (7.5%). These comorbidities are aggravating factors in septic shock. In our study, cardiovascular failure was present in 100%, pulmonary in 45%, renal in 32.5%, neurological in 20%, hematologic in 15%, and hepatic in 10% of patients.

A study published by Christian B et al. in Paris found that multi-organ failure may accompany shock or occur after the initial circulatory insufficiency has stabilized [14]. Another French study by Annane D et al. noted that its prevalence is difficult to assess but is more common among elderly patients, those with prior health deterioration, and when treatment is delayed [15]. Its prognosis is bleak, as the occurrence of more than two organ failures for more than two days leads to a mortality rate of 95–97% [16].

A study published by Brun-Buisson C. reported that most patients who die from septic shock have multiple organ failures, with the kidneys, lungs, nervous system, digestive system, and hematologic system being affected first [17].

Bacterial infection is the most common cause of septic shock. Bacteremia is observed in 40–60% of septic shock patients. In 10–30% of cases, the causative organisms are never identified, partly due to prior antibiotic use. The responsible agents can include Gram-negative bacteria, Gram-positive cocci or their exotoxins, and other infectious agents, including fungi [18,19,20]. The initial management of severe infections currently follows the recommendations of the “Surviving Sepsis Campaign” international group [21].

In our series, this involved fluid resuscitation with crystalloids, the use of vasopressors (adrenaline, noradrenaline), triple antibiotic therapy, glycemic control, corticosteroids, and surgical treatment of the infection source. The average length of stay was 6.62 days, ranging from 12 hours to 21 days.

In a study published by RABI Z in Morocco [22], the average stay was 6 days, with a range of 24 hours to 14 days, comparable to our results.

In this study, 12 patients (30%) had a favourable outcome. In Morocco, ABDOUSSAMAD [23] found a favourable outcome in 32% of cases, consistent with our study results. Our mortality rate was 70%. In Morocco, ABDOUSSAMAD [23] found a mortality rate of 68%, which is comparable to our findings.

CONCLUSION

Septic shock is the most common type of shock and a medical emergency, representing the leading cause of mortality in ICUs. Its diagnosis is both clinical and biological. Despite advances in monitoring, diagnostic tools, and well-defined management protocols, mortality and costs remain high.

Its treatment remains a challenge in sub-Saharan Africa due to hygiene issues, limited technical facilities, and a shortage of qualified personnel.

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