Letter to the Editor
Assessing the quality of sepsis management in an African island

Dear Editor,

Sepsis is one of the major causes of death worldwide. In order to reduce mortality from sepsis, some international guidelines recommend the implementation of a bundle of care for sepsis [1]. In one study from the United States, Barbash et al. noted that compliance with "The Severe Sepsis and Septic Shock Management Bundle" (SEP-1) was only 48.9% on average in the years 2016 to 2017 [2]. Unfortunately, such data from low-income and in particular, from African countries, are sparse.

In one of the recent studies, patients who were admitted to the ICU and placed on antibiotics in Mauritius had two to three times higher mortality rate compared to patients in Belgium, despite adjustment for the severity of sepsis using the SOFA score [3]. Moreover, deaths from hospital-acquired infections occurred at an almost ten times higher rate in Mauritius compared to the United States (50% vs 5.8%) [4, 5]. Therefore, it was considered important to assess the compliance rate to the sepsis bundle in Mauritius so as to find the cause for such a high mortality rate.

From June to October 2018, 109 patients who were admitted to a 600-bed hospital in Mauritius, were evaluated. 24 patients had a rise in their baseline SOFA score by at least 2 and were considered to have sepsis. Further details regarding the adherence to the sepsis bundle can be found in table 1.

Adequate fluid resuscitation, n (%)*	1 (4.2%)	2 patients did not get any fluids. On average, 1.4L of fluids were administered in the first 24 hours. Doctors sometimes avoid giving fluids due to a lack of

		ventilators to intubate patients in case they develop fluid overload.
Blood culture before antibiotics, n (%)	3 (12.5%)	
Antibiotic in the first hour, n (%)†	3 (16%)	To avoid abuse in the casualty, antibiotics were generally only administered once the patient reached the ward. 37% of patients (7/19) received antibiotics within 3 hours.
Had serum lactate in first 24 hours, n (%)	0 (0%)	Venous lactate level was not being done in the lab routinely.
Mean time interval in minutes between entry to casualty and fluid resuscitation†, ‡	324	
Mean time interval in minutes between entry to casualty and antibiotic administration†	524	
Deaths from sepsis, n (%)	11 (46%)	

*Table 1: * – Defined as receiving > 2 liters in the first 3 hours and > 3 liters in the first 24 hours. † – calculated only for patients with community-acquired sepsis (5 patients developed hospital-acquired sepsis). ‡ – calculated only for patients who received fluids. This study did not assess how many patients were clinically re-evaluated within 6 hours of a diagnosis of sepsis.*

The mean age of the patients with sepsis was 58 years while 33% (8/24) were females. None of them received the entire sepsis bundle. The mortality rate was 78% (7/9) among those who developed septic shock in the first 24 hours, 27% (4/15) among those with sepsis but who did not require inotropes in the first 24 hours, and 9.3% (4/43) among those with uncomplicated infections but who did not worsen into sepsis during their admission.

17% (4/24) of patients received an inappropriate antibiotic initially – this can happen especially in the ICU since 68% of organisms isolated there were multi-drug resistant according to a study published in 2020 [3].

The mean turnaround time (measured from the point cultures were ordered by the doctor to when the results were in the patient's folder) was 5.6 days for blood cultures, 4.6 days for cultures of tracheal secretions, 5.8 days for cultures of pus swabs, and 4.0 days for urine cultures. It should be noted that positive gram stains of any cultures including blood cultures were not made available urgently to the treating team (i.e., on the same day the gram stain was carried out).

In order to achieve prompt source control within the recommended 6 hours to 12 hours, expeditious radiological imaging is mandatory – only 50% (12/24) of the septic patients had an imaging study and all of these 12 patients had their radiological test completed within 48 hours after the onset of sepsis. Amongst those who got an X-ray, CT scan or ultrasound, the mean time taken for the radiological study to be completed was 14 hours while the median time was 5 hours.

Even though several patients were on vancomycin and gentamicin, serum trough levels for dose adjustment were not available for any of these patients.

Moreover, vital signs were inconsistently taken in the emergency department – none of the septic patients had a respiratory rate recorded on arrival, and although 100% of patients had their blood pressures taken, 29% (7/24) did not have their heart rates written down, 17% (4/24) did not have their temperatures checked and 46% (11/24) did not have their oxygen saturations documented. Despite most of the vital signs being taken when the patients reached their wards, their respiratory rates were still noted to be missing. Similar findings have been reported in Australia, the United States, the Netherlands and the United Kingdom [6, 7].

This study was able to identify some of the probable causes of death from sepsis in Mauritius. In order to prevent such deaths from occurring, it is imperative that sepsis be identified early, and that the sepsis bundle be implemented as soon as possible.

After this study was completed, the laboratory started doing vancomycin and gentamicin trough levels (even though turnaround time is still lengthy), is now reporting positive gram stains on blood cultures within 24 hours to the treating team (for some patients) and the turnaround time may have improved slightly through the use of matrix-assisted laser desorption ionization time-of-flight mass spectrometry.

Further improvements should be encouraged e.g., more fluids should be administered during resuscitation, blood cultures should be taken before the start of antibiotics for all patients, antibiotics should be dispensed more rapidly, vital signs should be recorded rigorously, and serum lactate levels should be available for all septic patients.

CONSENT

It is not applicable.

ETHICAL APPROVAL

This study was approved by the Ethics Committee of the Ministry of Health and Wellness of Mauritius.

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