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Research Article

The Outcome of Patients with Sepsis at Tarakan Hospital Central Jakarta in 2018

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ABSTRACT

Background: Sepsis is a common, life-threatening organ dysfunction caused by a dysregulated host response to infection. In 2017, estimated cases for sepsis reached 48.9 million worldwide, with 11 million deaths. Adequate antibiotic therapy is crucial for the treatment of sepsis. **Purposes:** The objective of this study is to find factors related to sepsis patient outcomes. **Methods:** We conducted a 1-year retrospective descriptive study with the inclusion criteria of all adult sepsis patients in Tarakan District Hospital in 2018. We compiled 39 samples that fit the inclusion criteria. **Results:** The distribution gender of this study were 51.2% female and 48.8% male patients; with most patients in the age of <65 years old (53.8%), <7 days in the length of stay (72%), and the most common source of infection was gastrointestinal (33.3%) followed by lungs (28.2%). **Conclusion**: We found a mortality rate of 59%, with the most common source of infection leading to death was the lungs (81.2%) and treated with single ceftriaxone antibiotic therapy (78.3%). Another factor associated with mortality is inadequate single antibiotic therapy.

Keywords: mortality, outcome, sepsis

INTRODUCTION

Infection is one of the health issues that is still gaining much attention to this day. Examples of infections that can become an emergency are sepsis and septic shock. Sepsis is a life-threatening organ dysfunction due to the dysregulation of the host's response towards an infection. Whereas septic shock is a continuation of sepsis with metabolic/cellular and circulatory dysfunction associated with an increased risk of mortality (1–3). Sepsis can occur in 10 of 1000 patients treated, and 30% of them can lead to MODS (Multiple Organ Dysfunction Syndrome), with mortality occurring in 20% of sepsis patients and 60-80% of patients with septic shock (2).

Clinical manifestations in sepsis patients include fever, decreasing consciousness, hypotension, reduced urine volume, and thrombocytopenia. If not treated promptly, sepsis can cause respiratory and renal disorders, hypotension, and coagulation disorders, leading to severe clinical phases, namely septic shock and MODS (2,4). The most recent sepsis screening assessment was based on the qSOFA (quick Sequential Organ

Failure Assessment) and SOFA criteria, in which a score of ≥ 2 would indicate a suspected sepsis or organ dysfunction (3,5,6).

In 2017, incidence of sepsis was estimated to reach up to 48,9 million worldwide, with 11 million reported deaths due to sepsis. The cases were varied from country to country, and the most affected regions were Sub-Saharan Africa, Oceania, South Asia, East Asia, and Southeast Asia (7). A 2009 study conducted in 16 Asian countries (one of them was Indonesia) found 10.9% cases of sepsis and septic shock treated in the ICU (Intensive Care Unit) with a mortality of 44.5%. A study at ICU in RSCM, conducted for one month in 2012, found that there were 23 cases of sepsis and septic shock from ICU, with a mortality rate of 47.8% (8).

The incidence of sepsis increases with age, causing a sharp incidence in people older than 80 years, and is associated with extremely high mortality rates. A study from Loeches et al. found that patients with age ≥ 80 had higher hospital mortality than patients between 65 and 79 years. Otherwise, a study by Chen et al. found no difference in mortality rate between age ≥ 65 and < 65 years (9,10) Although sepsis incidence is higher in men than women, but it is still controversial whether there are differences between gender in mortality caused by sepsis (11).

However, early and adequate antimicrobial therapy was found to be the basis of anti-infectious therapy for sepsis patients. The Surviving Sepsis Campaign (SSC) guidelines provided several recommendations on antimicrobial therapy for sepsis. Firstly, the intravenous (IV) antimicrobial is promptly administered 1 hour after diagnosing sepsis and septic shock. Other offers include that broad-spectrum antimicrobial empirical therapy must be administered as soon as possible to have all bacteria that might cause the infection. Broad-spectrum is also required because inappropriate antimicrobial therapy can lead to a significant increase in mortality. In general, a broad-spectrum carbapenem (i.e., imipenem/cilastatin, meropenem, or doripenem), or a combination of penicillin and β-lactamase inhibitors (piperacillin/tazobactam or ticarcillin/clavulanate), can be used. Third-generation cephalosporins or higher can also be considered. Patients with a very high risk of death, such as septic shock, must receive multidrug therapy to broaden the antimicrobial spectrum (12–14). So with the study by Micek et al. showed empirical antibiotic combination against Gram-negative bacteria in sepsis patients associated with appropriate initial therapy compared to single therapy (15). A review from Asner et al. showed two-third of 35 studies with a total of 154,330 patients reported an early administration of empirical antibiotics related to sepsis patient outcome (16). The objective of this is to know factors related to the outcome with sepsis. So this result of the study might help clinicians to improve their sepsis patient's outcomes.

METHODS

This research was a retrospective descriptive study. The data was obtained from the patient's medical record at Tarakan District Hospital, Central Jakarta, in 2018, with the inclusion criteria of patients aged ≥ 18 years, in patients diagnosed with sepsis, and were treated empirical therapy, and the data was completed. This study used total sampling. The data were collected from the medical record with sepsis diagnosis. The total was 117 patients, but most of them did not meet the inclusion

criteria. Only 39 patients can be analyzed. The recorded data included age, sex, diagnosis, type of antibiotic, and hospitalization period. This research was approved by the UKRIDA Faculty of Medicine and Health Sciences Ethics Committee with the number 729/SLKE-IM/UKKW/FKIK/KE/ II/2019).

RESULT

From the total of 117 medical records of adult patients diagnosed with sepsis, it was found that as many as 39 patient data fit the inclusion criteria. From the characteristics of sepsis patients, it was found that the most common sources of infection were gastrointestinal (33.3%), lungs (28.2%), skin (10.3%), urinary tract, and CNS (2.5%), while 23% of cases had unknown source infection.

Table 1. Characteristic of Sepsis Patients in Tarakan District Hospital, Central Jakarta in 2018

Characteristic	Total	Mortality	
		N	%
Gender			
Male	19	12	57.9
Female	20	11	60
Age (Years)			
18 – 64	26	14	53.8
≥ 65	13	9	69.2
Diagnosis			
Sepsis	33	18	54.5
Septic Shock	6	5	83.3
Hospitalization Period			
< 7 days	25	18	72.0
≥ 7 days	14	5	35.8
Source of Infection			
Lungs	11	9	81.8
Gastrointestinal	13	6	46.1
Urinary Tract	1	0	0
Skin	4	2	50
CNS	1	1	100
Unknown	9	5	55.6

As displayed in Table 2, it was found that ceftriaxone, classified as cephalosporin antibiotics, was one of the most commonly used antibiotics for empirical therapy, used for as many as 27 patients, with 23 single uses and four combinations. A single administration of ceftriaxone yielded the highest mortality rate of 78%.

Table 2. Distribution of Antibiotics Usage towards Sepsis Patients' Outcomes at Tarakan District Hospital in 2018

Antibiotics	Total	Mortality	
		N	%
Single Administration			
Ceftriaxone	23	18	78.3
Cefoperazone	1	0	0
Ampicillin Sulbactam	3	1	33.3
Meropenem	7	3	42.9
Combination Administration			
Ceftriaxone + Levofloxacin	2	1	50
Ceftriaxone + Metronidazole	2	0	0
Ampicillin-Sulbactam + Metronidazole	1	0	0

DISCUSSION

As mentioned in the result, female patients' mortality rate was higher than male patients (60% and 57.9%). This result is similar to other studies done by Pietropaoli et al. and Katu. et al. (11,17), whereas the study conducted by Nasir et al. yet al. had different results, which was that mortality in male patients was higher than in female patients (46% vs 27%)(18). The results yielded from this research did not appear to have significant differences between mortality in male patients and female patients (p=0.268). Mortality in patients aged <65 years was 53.8% while mortality in patients aged ≥65 years was 69.2% (p=0.848). This obtained result is similar to the study conducted by Loeches et al., which said that as patients age, their mortality risk also increases (10). This can be caused by the immune function decreasing as patients age; therefore, it tends to increase vulnerability towards small and severe infections that could cause

mortality on elderly inpatients is the underlying condition of susceptibility, malnutrition, and decreasing cognitive functions, as well as comorbid diseases such as diabetes mellitus, hypertension, and others (19). Meanwhile, a study from Chen et al. yielded different results, where patients' age did not affect mortality; the study found that mortality in patients aged ≥65 years was 50.4%, while mortality in patients aged <65 years was 55.1% (9).

The characteristics of sepsis patients in this study show that the most common infection sources in sepsis patients were gastrointestinal (33.3%) and lungs (28.2%). This result is similar to the study conducted by Abe et al., where the most common sources of infection in sepsis patients were lungs and gastrointestinal, reaching up to 31.0% and 26.3% (20). A study by Viale et al. also yielded results that were not much different, where the most common source of infection was lungs (43%), and 22% of cases had an unknown source of infection (21). The study from Chou et al. obtained slightly different results, where the most common source of infection was the urinary tract (36.7%), followed by lungs (27.7%) (22). According to the 2015 study by Katu et al. in Indonesia, lungs were the most common source of infection (52.7%) in sepsis patients (17).

From Table 2, it can be concluded that the single administration of ceftriaxone antibiotic had a higher risk of mortality than combination administration. According to the sepsis patient treatment guidelines issued by the Decree of the Indonesian Minister of Health 2017, the appropriate antibiotics for empirical therapy are broad-spectrum antibiotics, namely Carbapenem group, 4th generation Cephalosporin group, piperacillin-tazobactam. These antibiotics can be used both in single and combination administration (8).

CONCLUSION

The factor that affects patient mortalities is the single administration of ceftriaxone antibiotics. From the data on the distribution of infections, the fatal source of infection is the lungs. Although infection in the central nerve system seems to be fatal, this is still inconclusive due to small sample data, where we only obtained one sample of data for this category.

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CONFLICT OF INTEREST

All authors declare no conflicts of interest in this paper.

REFERENCES

1. Simpson SQ. New Sepsis Criteria, A Change We Should Not Make. Chest. 2016;149(5):1117–8.
2. Polat G, Ugan RA, Cadirci E, Halici Z. Sepsis and Septic Shock : Current Treatment Strategies and New Approaches Sepsis ve Septik Şok : Mevcut Tedavi Stratejileri ve Yeni Yaklaşımlar. Eurasian J Med. 2017 ;53–8.
3. Gul F, Arslantas MK, Cinel I, Kumar A. Changing Definitions of Sepsis. Turk J Anaesthesiol Reanim. 2017 ;129–38.
4. Gotts JE, Matthay MA. Sepsis : pathophysiology and clinical management. Bmj. 2016;1–20.
5. Gyawali B, Ramakrishna K, Dha moon AS. Sepsis : The evolution in definition , pathophysiology , and

management. SAGE Open Med. 2019;
6. Irvan I, Febyan F, Suparto S. Sepsis dan Tata Laksana Berdasar Guideline Terbaru. J Anestesiol Indones. 2018;X:62–73.
7. Rudd KE, Johnson SC, Agesa KM, Shackelford KA, Tsoi D, Kievlan DR, et al. Global , regional , and national sepsis incidence and mortality , 1990 – 2017 : analysis for the Global Burden of Disease Study. Lancet. 2020;395(10219):200–11.
8. Keputusan Menteri Kesehatan Republik Indonesia Nomor HK.01. 07/Menkes/342/2017 Tentang Pedoman Nasional Pelayanan Kedokteran Tata Laksana Sepsis. 2017. p. 1–82.
9. Chen C, Cheng K, Chan K, Yu W. Age May Not In fl uence the Outcome of Patients with Severe Sepsis in Intensive Care Units q. Int J Gerontol. 2014;8(1):22–6.
10. Loeches M, Intensive A, Loeches IM, Guia MC, Vallecoccia MS, Suarez D, et al. Risk factors for mortality in elderly and very elderly critically ill patients with sepsis : a prospective, observational, multi center cohort study. Ann Intensive Care. 2019;
11. Pietropaoli AP, Glance LG, Oakes D, Fisher SG. Gender Differences in Mortality in Patients With Severe Sepsis or Septic Shock. Gend Med. 2010;7(5):422–37.
12. Rhodes A, Evans LE, Alhazzani W, Levy MM, Antonelli M, Ferrer R, et al. Surviving Sepsis Campaign : International Guidelines for Management of Sepsis and Septic Shock : 2016. Vol. 43, Intensive Care Medicine. Springer Berlin Heidelberg; 2017. 304–377 p.
13. Evans T. Diagnosis and Management of Sepsis. Clin Med (Northfield Il). 2018;18:146–9.
14. Angus DC, Poll T Van Der. Severe Sepsis and Septic Shock. N Engl J Med. 2013;
15. Micek ST, Welch EC, Khan J, Pervez M, Doherty JA, Reichley RM, et al. Empiric combination antibiotic therapy is associated with improved outcome against sepsis due to gram-negative bacteria: A retrospective analysis. Antimicrob Agents Chemother. 2010;54(5): 1742–8.
16. Asner SA, Desgranges F, Schrijver IT, Calandra T. Impact of the timeliness of antibiotic therapy on the outcome of patients with sepsis and septic shock. J Infect. 2021;82(5):125–34.
17. Katu S, Suwarto S, Pohan HT, Abdullah M. Faktor-Faktor yang Mempengaruhi Keberhasilan Terapi Antibiotik Empirik pada Pasien Sepsis Berat dan Syok Sepsis di Bangsal Rawat Inap Penyakit Dalam Rumah Sakit Cipto Mangunkusumo. J Penyakit Dalam Indones. 2015;2(2):96–106.
18. Nasir N, Jamil B, Siddiqui S, Talat N, Khan FA, Husain R. Mortality in Sepsis and its relationship with Gender. Pakistan J Med Sci. 2015 ;31(5):1201–6.
19. Rowe TA, Mckoy JM. Sepsis in Older Adults. Infect Dis Clin NA. 2017;31(4):731–42.
20. Abe T, Ogura H, Kushimoto S, Shiraishi A, Sugiyama T. Variations in infection sites and mortality rates among patients in intensive care units with severe sepsis and septic shock in. J intensive care. 2019;1–9.

21. Viale P, Tedeschi S, Scudeller L, Attard L, Badia L, Bartoletti M, et al. Infectious Diseases Team for the Early Management of Severe Sepsis and Septic Shock in the Emergency. Clin Infect Dis. 2017;65(Id):1253–9.

22. Chou EH, Mann S, Hsu T, Hsu W, Liu CC, Bhakta T, et al. Incidence , trends , and outcomes of infection sites among hospitalizations of sepsis : A nationwide study. PLoS One. 2020;1–13.