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ORIGINAL ARTICLE
ORİJİNAL ARAŞTIRMA

Long-Term Prognostic Evaluation of Patients Presenting to the Emergency Department with a Pre-Diagnosis of Sepsis

Acil Servise Sepsis Ön Tanısı İle Başvuran Hastaların Uzun Dönem Prognostik Değerlendirilmesi

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ABSTRACT

Aim: The aim of this study was to evaluate the 90-day post-discharge mortality and rehospitalization rates of patients hospitalized in the emergency department with a preliminary diagnosis of sepsis.

Material and Method: Among the patients who applied to our hospital's emergency department between January 1, 2020 and January 1, 2022 with fever, chills, shivering, confusion, nausea and vomiting, patients over the age of 18 who met the criteria for sepsis-3 and were hospitalized or referred to the intensive care unit were included in the study. Age, gender, acute physiological and chronic health evaluation scores of the cases meeting these diagnostic criteria were recorded.

Results: 176 patients were admitted to the Emergency Department with the diagnosis of sepsis 58.44% (n=137) of the patients were male and 41.56% (n=39) were female. 15.78% (n=28) of 176 patients died in the emergency department, 32.44% (n=57) died after ICU admission, and 26.44% (n=47) were discharged.

Conclusion: This study shows that all patients need professional care within 90 days of intensive care discharge. It may be recommended to establish a separate unit in the hospital on this subject.

Keywords: Sepsis, emergency service, prognosis, post discharge care

ÖZ

Amaç: Bu çalışmanın amacı, sepsis ön tanısı ile acil servise yatırılan hastaların taburculuk sonrası 90 günlük mortalite ve yeniden yatış oranlarını değerlendirmektir.

Gereç ve Yöntem: Hastanemiz acil servisine 1 Ocak 2020-1 Ocak 2022 tarihleri arasında ateş, titreme, titreme, konfüzyon, bulantı ve kusma şikayetleri ile başvuran hastalardan sepsis kriterlerini karşılayan 18 yaş üstü hastalar; 3 hastaneye yatırılan veya yoğun bakıma sevk edilenler çalışmaya dahil edildi. Bu tanı ölçütlerini karşılayan olguların yaş, cinsiyet, akut fizyolojik ve kronik sağlık değerlendirme puanları kaydedildi.

Bulgular: Acil Servise sepsis tanısı ile başvuran 176 hasta %58,44 (n=137) erkek, %41,56 (n=39) kadındı. 176 hastanın %15,78'i (n=28) acil serviste, %32,44'ü (n=57) yoğun bakım ünitesine kabul edildikten sonra öldü ve %26,44'ü (n=47) taburcu edildi.

Sonuç: Bu çalışma, tüm hastaların yoğun bakımdan taburcu olduktan sonraki 90 gün içinde profesyonel bakıma ihtiyacı olduğunu göstermektedir. Bu konuda hastanede ayrı bir birim kurulması önerilebilir.

Anahtar Kelimeler: Sepsis, acil servis, prognoz, taburculuk sonrası bakım

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INTRODUCTION

Sepsis is a chain of reactions of the body against the infection that prevents the functioning of more than one organ, which develops due to the infection, can go as far as shock (1-3).

Shock is circulatory failure that causes an imbalance between tissue oxygen demand and oxygen transported to the tissue. Whatever the cause, this situation, which develops as a result of hypoperfusion, results in cellular dysfunction (4).

The causes of shock in patients who apply to the emergency department and have shock symptoms at the time of admission or during follow-up should be quickly identified and treatment should be initiated for the cause (5,6).

Most patients who survive sepsis have neuromuscular weakness, persistent neurocognitive deficits, symptoms of depression, and poor quality of life. (7-11). With the developments in health and the increase in hospital modernization, sepsis have become a disease that can be diagnosed quickly and can be cured with early interventions. Of the surviving cases; The rates of admission to health institutions and re-hospitalizations are high due to reasons such as newly developed sepsis-related organ failure, relapse or newly developed infections, planned controls, together with existing comorbidities (12).

Although studies on sepsis is increasing in our country, there is not enough information about post-survival. In our study, we aimed to evaluate the 90-day mortality and rehospitalization rates after discharge of patients hospitalized in the emergency department with a preliminary diagnosis of sepsis.

MATERIAL AND METHOD

This study was approved by the University/local human research ethics committee (Date: 16.06.2022, Decision no: 0349). All procedures were performed adhered to the ethical rules and principles of the Helsinki Declaration.

Our study was carried out retrospectively and observationally in a single center in a tertiary university hospital. For the study, patients who were diagnosed with sepsis in the emergency department of our hospital between January 1, 2020 and January 1, 2022 and meeting the study criteria were included.

Among the patients who applied to our hospital's emergency department between January 1, 2020 and January 1, 2022 with fever, chills, shivering, confusion, nausea, and vomiting, patients over the age of 18 who met the criteria for sepsis-3 and were hospitalized or referred to the intensive care unit were included in the study (13). Cases under the age of 18, pregnant, hospitalization diagnosis other than sepsis were not included in the study.

Age, gender, Acute Physiology And Chronic Health Evaluation Score II (APACHE II), estimated mortality rate, Glasgow Coma Score (GCS), SOFA score, serum lactate level, and C-reactive protein (CRP) values were recorded. By examining the patient registration documents, the number of days of intensive care hospitalization, whether mechanical ventilator (MV) support was available, the number of MV days if MV was needed, the type of ICU discharge (exit, discharge, transfer to another clinic, transfer to the palliative care unit) were recorded.

Sepsis-related organ failures of the survivors were examined. For patients discharged from the hospital; Using the hospital patient registration and information system (Probel), re-admissions to the hospital due to sepsis-related conditions within 90 days after ICU discharge were checked, the reasons for coming back to the hospital, re-admissions to the ICU, if any, and the number of days of hospitalization were recorded. Patients who were not registered in the patient registry and information system after discharge from ICU were called by phone and their health status (living/deceased) at 30 and 90 days after discharge, their application to health institutions and their re-admissions to ICU were questioned. The data were recorded in the SPSS (Statistical Package for the Social Sciences Inc.) program and statistical analyzes were made.

RESULTS

Between 01 January 2020 and 01 January 2022, 176 patients were admitted to the Emergency Department with the diagnosis of sepsis. 57.95% (n=102) of the patients were male and 42.05% (n=74) were female.

When the prognoses of the patients who entered the shock state were examined, 15.78% (n=28) of 176 patients died in the emergency department, 32.44% (n=57) died after ICU admission, and 26.44% (n=47) were discharged. Outcome information was not available for 25.33% (n=44) due to referral.

The pathologies that cause shock in the sepsis patients included in the study are shown in the table. Accordingly, pneumonia was the most common underlying cause in shock patients with a rate of 36.36% (n=64). When we examined the other underlying causes of shock, 17.04% (n=30) had urinary tract infection (UTI), 9.09% (n=16) gastroenteritis, 8.52% (n=15) soft tissue infection, 7.95%. (n=14) oral intake disorder, 3.97% (n=7) trauma, 1.70% (n=3) anaphylaxis, 1.13% (n=2) gastrointestinal system bleeding, and 14.20% (n=25) appear to be other causes (**Table 1**).

Table 1. Etiological comparison of sepsis status		
Disease Causing Sepsis	**%**	**n (number of patients)**
Pneumonia	36.36	64
Urinary tract infection	17.04	30
Oral intake disorder	7.95	14
Trauma	3.97	7
GI bleeding	1.13	2
Gastroenteritis	9.09	16
Soft tissue infection	8.52	15
Anaphylaxis	1.70	3
Other	14.20	25

The data of 132 patients who were not referred but whose outcome information could be accessed were analyzed. According to these data, the survival rate was 35.41% (n=47), and 64.58% (n=85) of the cases died. The age of surviving patients was 66.4±13.4, while those who died were 71±10.6 years. A significant correlation was found between advanced age and mortality (p=0.021). Although the GCS score was 10.9±4.3 in surviving patients and 7.1±5.1 in patients with ex, GCS was found to be correlated with survival (p=0.018). The APACHE II score was found to be 21.7±6.9 in survivors and 34.1±9.2 in those who died, and it was associated with mortality (p=0.026). The SOFA score, lactate and CRP values calculated at the time of hospitalization of the patients were found to be statistically significantly higher in patients with ex (p<0.001) (**Table 2**).

Table 2. Effect of some parameters on mortality			
	Survivor (n=47)	**Exitus (n=85)**	**p**
Age	66.4±13.4	71±10.6	0.021
GCS	10.9±4.3	7.1±5.1	0.018
SOFA	5.9±2.7	10.7±3.3	<0.001
APACHE II	21.7±6.9	34.1±9.2	0.026
Lactate	3.3±2.1	8.4±5.2	<0.001
CRP	113±46.7	221±61.9	<0.001

When the antecedents of all patients are evaluated; It was observed that 89.1% of the cases had at least 1 chronic disease. DM was detected in 39.1%, CHF in 15.7%, COPD in 22.8%, CAD in 19%, CRF in 13.9%, HT in 30.4%, and CVO in 21.5%. In the evaluation of the patients who were admitted to the hospital again after discharge, DM is the most common with 41% and HT is the second with 24% in terms of comorbidity, followed by CHF in the third place. When we look at the re-admission rates of the patients, general condition disorder and oral intake disorder are the most common reasons for admission (33% CRF).

If we look at the 90-day re-admissions of the discharged patients to the emergency department, 27 (58%) of 47 patients had re-admissions. While 16 (34%) of these applications were hospitalized again, 9 (19%) were admitted to the intensive care unit. Among the discharged patients, 2 (5%) of the patients who applied to the emergency department again died (**Table 3**).

Table 3. Prognosis of patients re-admitted to the emergency department within 90 days of discharge		
90-day analysis of discharged patients	**%**	**n (number of patients)**
Number of patients discharged	100	47
Re-admission to the emergency department	58	27
Hospitalization from Emergency again	34	16
Intensive care hospitalization from Emergency	19	9
Exitus (From those who applied to the emergency department)	5	2

Mortality rates are similar to diagnoses in the etiology of sepsis. However, considering the discharges, there are etiologically similar diagnoses and they do not have numerical superiority over each other.

DISCUSSION

Timely management of sepsis reduces morbidity and mortality, as well as lowers healthcare costs (14-16). With the 2-year analysis of our hospital's Emergency Service Sepsis record, we aim to determine where and how we can improve our sepsis-fighting operations. Sepsis; It is a health problem that is difficult to recognize, diagnose and treat. Timely and rapid diagnosis is essential for successful treatment. In order to minimize mortality in sepsis, it is necessary to apply prompt, appropriate and intensive treatment. Delays in diagnosis are often seen due to different clinical findings and clinical courses.

As seen in this study, sepsis is primarily a disease of the elderly population; however, we could not obtain data from pediatric emergency services. The reason is the lack of availability of branches related to pediatric emergency care in our hospital. According to our data, there is no age or gender-related severity in sepsis according to the population studied (p= 0.021)

During the time period of this study, 36.44% of the patients with sepsis who applied to the emergency department could be explained by Pneumonia. Comparing the etiology of septic patients admitted to the hospital's emergency department with sepsis in line with the literature, it was observed that it was one of the most common septic conditions secondary to pneumonia, the second most common secondary to urinary tract infection. Pneumosepsis and urosepsis are the conditions that we encounter most frequently in the advanced age group according to Madkour et al. (17)'s research.

In a study by Baykara N,et al. (18), the presence of infection was detected in 57.7% (n=863) of 1499 patients included in the study, and 6.9% (n=104) of these patients were evaluated as sepsis according to the sepsis diagnostic criteria. The mortality rate has been reported as 75.9%. Mortality rate in sepsis diagnosis and sepsis in

this study is similar to Turkish data (18). In the study of Baykara et al., high mortality rates; Age, APACHE 2 score, diagnosis of ICU admission, SOFA score were found to be correlated. SOFA score, Lactate level and CRP are correlated with mortality correlated with literatüre (19). The mortality rates in our study may also be associated with the advanced age (71±10.6) of the cases.

According to Prescott HC et al.'s research (19); They apply to health institutions again with physical problems, cognitive disorders, recurrent infections or sepsis, sepsis-related chronic organ failures after discharge. Despite the improved health awareness and the ease of access to health, the rate of re-admissions to the hospital within 90 days after discharge was found to be 58%. Prescott HCet al. 's (20) another research found that, 42.7% of the surviving cases applied to health institutions again in the first 90 days after discharge. The most common reason for admission was determined as recurrent infections (urinary system, skin or soft tissue infections and pneumonia). We can interpret this as the fact that home care services are still not at an adequate level. Of the re-admissions, 34% were re-admitted to the service, and 19% re-admitted to the intensive care unit.

In the analysis of the effect of patient characteristics on mortality, 64.58% of the patients whose data could be accessed completely died. Fleischmann C et al. In his study on sepsis patients, the in-hospital mortality rate was reported as 24.3%, which is not consistent with our findings. We think that this is due to the exclusion of patients whose data could not be fully evaluated (21). The age of the surviving patients was 66.4±13.4, while the age of the deceased was 71±10.6. A significant correlation was found between advanced age and mortality (p=0.021). This may be explained by the tendency for older patients to have more comorbidities and less physiological reserves. Our result is compatible with the literatüre (22). The APACHE II score was found to be 21.7±6.9 in survivors and 34.1±9.2 in ex patients, which was associated with mortality. Our result is compatible with the literatüre (23). In this study, the SOFA score, lactate and CRP values of the patients were found to be statistically significantly higher in patients with ex. Balcan et al. found that increased APACHE-II score, increased SOFA score and increased CRP were associated with mortality in their study. The results are consistent with our study (24).

Limitations

It was done with a limited number of cases in a single center. The fact that the ICD-10 diagnosis codes of sepsis cases were entered differently in the data system of our hospital caused the patients to be excluded from the study.

CONCLUSION

This study shows that all patients need professional care within 90 days of intensive care discharge. It may be recommended to establish a separate unit in the hospital on this subject. Future studies and pilot applications will determine the need on the subject.

ETHICAL DECLARATIONS

Ethics Committee Approval: This study was approved by the University/local human research ethics committee (Date: 16.06.2022, Decision no: 0349).

Informed Consent: Because the study was designed retrospectively, no written informed consent form was obtained from patients.

Referee Evaluation Process: Externally peer-reviewed.

Conflict of Interest Statement: The authors have no conflicts of interest to declare.

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REFERENCES

1. Lagu T, Rothberg MB, Shieh MS, Pekow PS, Steingrub JS, Lindenauer PK. Hospitalizations, costs, and outcomes of severe sepsis in the United States 2003 to 2007. Crit Care Med 2012;40:754–61.
2. Dombrovskiy VY, Martin AA, Sunderram J, Paz HL. Facing the challenge: decreasing case fatality rates in severe sepsis despite increasing hospitalizations. Crit Care Med 2005;33:2555–62.
3. Dombrovskiy VY, Martin AA, Sunderram J, Paz HL. Rapid increase in hospitalization and mortality rates for severe sepsis in the United States: a trend analysis from 1993 to 2003. Crit Care Med 2007;35:1244–50.
4. Hu JR, Yo CH, Lee HY, et al. Risk-standardized sepsis mortality map of the United States. Digit Health 2022; 20; 8.
5. Madkour AM, ELMaraghy AA, Elsayed MM. Prevalence and outcome of sepsis in respiratory intensive care unit. Egypt J Bronchol 2022; 16: 29.
6. Taghavi S, Nassar AK, Askari R. Hypovolemic Shock. 2022 Jul 12. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2022 Jan–. PMID: 30020669.
7. Brück E, Schandl A, Bottai M, Sackey P. The impact of sepsis, delirium, and psychological distress on self-rated cognitive function in ICU survivors—a prospective cohort study. J Intensive Care 2018;6:2.
8. Davydow DS, Hough CL, Langa KM, Iwashyna TJ. Symptoms of depression in survivors of severe sepsis: a prospective cohort study of older Americans. Am J Geriatr Psych 2013;21:887–97.
9. Iwashyna TJ, Ely EW, Smith DM, Langa KM. Long-term cognitive impairment and functional disability among survivors of severe sepsis. JAMA 2010;304:1787–94.
10. Winters BD, Eberlein M, Leung J, Needham DM, Pronovost PJ, Sevransky JE. Long-term mortality and quality of life in sepsis: a systematic review. Crit Care Med 2010;38:1276–83.
11. Yende S, Austin S, Rhodes A, et al. Long-term quality of life among survivors of severe sepsis: analyses of two international trials. Crit Care Med 2016;44:1461–7.
12. Singer M, Deutschman CS, Seymour CW, et al.The Third International Consensus Definitionsfor Sepsis and Septic Shock (Sepsis-3). JAMA 2016; 315: 801-10.

13. Jones TK, Fuchs BD, Small DS, et al. Post-acute care use and hospital readmission after sepsis. Ann Am Thorac Soc 2015;12:904-13.
14. Amland RC, Lyons JJ, Greene TL, Haley J. A two-stage clinical decision support system for early recognition and stratification of patients with sepsis: an observational cohort study. JRSM Open 2015; 6, 1-10.
15. Amland RC, Haley JM, Lyons J. A multidisciplinary sepsis program enabled by a two-stage clinical decision support system: factors that ınfluence patient outcomes. Am J Med Quality 2015; 31, 501-8.
16. Jones SL, Ashton CM, Kiehne L, et al. Reductions in Sepsis Mortality and Costs After Design and Implementation of a Nurse-Based Early Recognition and Response Program. Jt Comm J Qual Patient Saf 2015; 41: 483-91.
17. Madkour AM, ELMaraghy AA, Elsayed MM. Prevalence and outcome of sepsis in respiratory intensive care unit. Egypt J Bronchol 2022; 16: 29.
18. Baykara N, Akalın H, Arslantaş MK, et al. Epidemiology of sepsis in intensive care units in Turkey: a multicenter, point-prevalence study. Crit Care 2018;22:93.
19. Prescott HC, Derek C. Enhancing recovery from sepsis: a review. JAMA 2018;319:62-75.
20. Prescott HC, Langa KM, Iwashyna TJ. Readmission diagnoses after hospitalization for severe sepsis and other acute medical conditions. JAMA 2015;313:1055-7.
21. Fleischmann C, Thomas-Rueddel DO, Hartmann M, Hartog CS, Welte T, Heublein S, Dennler U, Reinhart K. Hospital Incidence and Mortality Rates of Sepsis. Dtsch Arztebl Int. 2016 Mar 11;113(10):159-66.
22. Reaven MS, Rozario NL, McCarter MSJ, Heffner AC. Incidence and risk factors associated with early death in patients with emergency department septic shock. Acute Crit Care. 2022 May;37(2):193-201.
23. Martin-Loeches I, Guia MC, Vallecoccia MS, Suarez D, Ibarz M, Irazabal M, Ferrer R, Artigas A. Risk factors for mortality in elderly and very elderly critically ill patients with sepsis: a prospective, observational, multicenter cohort study. Ann Intensive Care. 2019 Feb 4;9(1):26.
24. Balcan B, Olgun Ş, Torlak F, Sağmen SB, Eryüksel E, Karakurt S. Determination of Factors Affecting Mortality of Patients with Sepsis in a Tertiary Intensive Care Unit. Turk Thorac J. 2015 Jul;16(3):128-132.