RESEARCH PAPER

Prognostic Value of ISTH Disseminated Intravascular Coagulation Score and Sepsis-Induced Coagulopathy Score in Patients with Sepsis: A Hospital-Based Observational Study

Dr. Preethi Yazhini Ravichandran[1], Dr. Madhavan Krishnaswamy[2]*
[1]Postgraduate, [2*]Professor
[1,2]Department of General Medicine, SRM MEDICAL COLLEGE HOSPITAL AND RESEARCH CENTRE KATTANKULATHUR

ABSTRACT
Background: Sepsis is a life-threatening condition characterized by dysregulated host response to infection and is frequently associated with coagulation abnormalities that may progress to disseminated intravascular coagulation (DIC). Early identification of sepsis-associated coagulopathy may provide important prognostic information and assist in risk stratification of critically ill patients. The International Society on Thrombosis and Haemostasis (ISTH) DIC score and the Sepsis-Induced Coagulopathy (SIC) score are commonly used tools for assessing coagulation abnormalities in sepsis; however, their comparative prognostic value remains an area of ongoing investigation. **Objective** To evaluate the prognostic significance of the ISTH DIC score and SIC score in patients with sepsis and to compare their predictive performance for mortality and organ dysfunction in an intensive care setting.
Methods A hospital-based observational study was conducted among 172 adult patients admitted with sepsis to the intensive care unit of a tertiary care teaching hospital. ISTH DIC and SIC scores were calculated using routine clinical and laboratory parameters at admission. Clinical outcomes including mortality, organ dysfunction, requirement for organ support, and length of hospital stay were recorded. Associations between coagulation scores and outcomes were assessed using chi-square tests. Receiver operating characteristic (ROC) curve analysis was performed to evaluate the predictive performance of the scoring systems for 28-day mortality.
Results The mean age of the study population was 53.7 ± 14.1 years, and 54.1% were female. Pneumonia was the most common source of sepsis (39.5%), followed by urinary tract infections (30.2%). The ICU mortality rate was 22.1%, while the 28-day mortality rate was 30.8%. Both ISTH DIC positivity ($p = 0.041$) and SIC score positivity ($p = 0.028$) were significantly associated with mortality. Higher coagulation scores were also associated with an increased incidence of organ dysfunction (ISTH $p = 0.032$; SIC $p = 0.021$). ROC analysis demonstrated acceptable predictive ability for both scoring systems, with the ISTH score showing better discriminatory performance (AUC = 0.795) compared with the SIC score (AUC = 0.729).
Conclusion Both the ISTH DIC score and the SIC score were significantly associated with mortality and organ dysfunction in patients with sepsis. While both scoring systems demonstrated acceptable predictive ability for 28-day mortality, the ISTH score showed slightly better prognostic discrimination. Routine assessment of coagulation abnormalities using these scoring systems may aid in early risk stratification and identification of high-risk septic patients in intensive care settings.
Keywords: Sepsis; Disseminated Intravascular Coagulation; Sepsis-Induced Coagulopathy; ISTH DIC Score; Prognosis; Intensive Care Unit.
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Introduction
Sepsis is a life-threatening organ dysfunction caused by a dysregulated host response to infection and remains a major cause of morbidity and mortality among critically ill patients worldwide [1]. Despite advances in intensive care management, sepsis continues to pose a significant clinical challenge due to its complex pathophysiology and high mortality rates, particularly in patients admitted to intensive care units (ICUs) [2]. Early identification of patients at increased risk of adverse outcomes is therefore essential for timely intervention and optimal clinical management.

Coagulation abnormalities are a well-recognized feature of sepsis and play an important role in disease progression. Sepsis is frequently associated with activation of the coagulation cascade, suppression of anticoagulant pathways, and impairment of fibrinolysis, ultimately leading to a prothrombotic state

[3]. In severe cases, this process may progress to disseminated intravascular coagulation (DIC), a systemic disorder characterized by widespread activation of coagulation, microvascular thrombosis, and consumption of coagulation factors [4]. The development of DIC in patients with sepsis has been associated with increased organ dysfunction and higher mortality [5]. Several scoring systems have been developed to identify and assess the severity of sepsis-related coagulopathy. The International Society on Thrombosis and Haemostasis (ISTH) disseminated intravascular coagulation score is one of the most widely used tools for the diagnosis of overt DIC and is based on routine laboratory parameters including platelet count, prothrombin time, fibrin-related markers, and fibrinogen levels [6]. However, overt DIC often represents a late stage of coagulation dysfunction in sepsis [7].

To facilitate earlier detection of coagulation abnormalities in septic patients, the Sepsis-Induced Coagulopathy (SIC) score was proposed by the ISTH Scientific and Standardization Committee [8]. The SIC score incorporates platelet count, prothrombin time, and components of the Sequential Organ Failure Assessment (SOFA) score to identify early sepsis-associated coagulopathy [8]. Early recognition of sepsis-induced coagulopathy may provide valuable prognostic information and help guide therapeutic decision-making. Previous studies have suggested that both ISTH and SIC scoring systems are associated with clinical outcomes in sepsis [9,10]. However, the comparative prognostic performance of these scores remains an area of ongoing investigation. In particular, there is limited data from developing countries regarding the utility of these scoring systems in predicting mortality and organ dysfunction among ICU patients with sepsis. Therefore, the present study was conducted to evaluate the prognostic utility of disseminated intravascular coagulation scoring systems in patients with sepsis admitted to the intensive care unit of a tertiary care teaching hospital. Specifically, the study aimed to assess the association of the ISTH DIC score and SIC score with clinical outcomes, including mortality and organ dysfunction, and to compare their predictive performance in patients with sepsis.

Methodology Study Design and Setting

This study was conducted as a hospital-based crosssectional observational study among patients admitted with sepsis in the Intensive Care Unit (ICU) of a tertiary care teaching hospital. The study aimed to evaluate the prognostic utility of disseminated intravascular coagulation (DIC) scoring systems in patients with sepsis and to compare the predictive performance of the International Society on Thrombosis and Haemostasis (ISTH) DIC score and the Sepsis-Induced Coagulopathy (SIC) score for clinical outcomes.

Study Population

Adult patients admitted to the ICU with a diagnosis of sepsis during the study period were screened for eligibility. A total of 172 patients meeting the inclusion criteria were enrolled in the study.

Inclusion Criteria

Adult patients (≥18 years) diagnosed with sepsis at the time of ICU admission. **Exclusion Criteria**

Patients were excluded if they had:
Pre-existing coagulation disorders
History of anticoagulant therapy prior to admission
Hematological malignancies or solid organ cancers
Trauma-related admissions
Obstetric complications such as abruptio placentae, amniotic fluid embolism, or retained dead fetus
Chronic liver disease
Chronic renal failure
Death within 24 hours of ICU admission.

Sample Size

The sample size was calculated based on a reported prevalence of disseminated intravascular coagulation in sepsis patients of 69%, with a 95% confidence interval and an allowable error of 7%, resulting in a required sample size of 172 patients.

Data Collection

After obtaining **written informed consent**, eligible patients were included in the study. Clinical and laboratory data were collected using a structured proforma.

The following baseline data were recorded:
Demographic variables: age and sex
Source of infection leading to sepsis
Clinical parameters and comorbidities Laboratory parameters relevant to coagulation and organ dysfunction.

Assessment of Coagulation Scores For each patient, the following scoring systems were calculated using clinical and laboratory parameters: International Society on Thrombosis and Haemostasis
(ISTH) Disseminated Intravascular Coagulation Score
Sepsis-Induced Coagulopathy (SIC) Score
These scores were calculated based on routine laboratory parameters including platelet count, coagulation parameters, and organ dysfunction indicators as per standard diagnostic criteria.

Outcome Measures

Patients were evaluated for the following clinical outcomes:
Mortality, including ICU mortality and 28-day mortality
Development of organ dysfunction
Requirement of organ support, including vasopressor therapy, mechanical ventilation, and renal replacement therapy Length of
hospital stay.

Statistical Analysis

Data were entered and analyzed using appropriate statistical software. Continuous variables were expressed as mean ± standard deviation, while categorical variables were presented as frequency and percentage. Associations between DIC scoring systems and clinical outcomes were assessed using chi-square tests for categorical variables. The predictive performance of the ISTH and SIC scores for mortality was evaluated using receiver operating characteristic (ROC) curve analysis, and the area under the curve (AUC) was calculated to determine the discriminatory ability of each scoring system. A p-value < 0.05 was considered statistically significant.

Ethical Considerations

The study was conducted after obtaining approval from the **Institutional Ethics Committee**. Written informed consent was obtained from all participants or their legally authorized representatives. Patient confidentiality was strictly maintained throughout the study, and all collected data were used solely for research purposes.

RESULTS

Baseline Demographic and Clinical Characteristics A total of 172 patients with sepsis admitted to the intensive care unit (ICU) were included in the analysis. The baseline demographic and clinical characteristics of the study population are summarized in Table 1. The mean age of the study population was 53.7 ± 14.1 years, and 93 patients (54.1%) were female. The mean ISTH score and SIC score were 3.87 ± 2.58 and 2.93 ± 2.02, respectively. Overall mortality was observed in 53 patients (30.8%), while organ dysfunction occurred in 65 patients (37.8%). The mean length of hospital stay was 10.07 ± 3.97 days.

Table 1. Baseline Demographic and Clinical Characteristics

Variable	Mean ± SD / n (%)
Age (years)	53.7 ± 14.1
Female sex	93 (54.1%)
ISTH score	3.87 ± 2.58
SIC score	2.93 ± 2.02
Overall mortality	53 (30.8%)
Organ dysfunction	65 (37.8%)
Length of stay (days)	10.07 ± 3.97

Source of Sepsis

The distribution of infection sources among the study population is presented in Table 2. Pneumonia was the most common source of sepsis, accounting for 39.5% of cases. Urinary tract infections were the second most common cause (30.2%), followed by abdominal infections (18.0%). Other sources, including skin and soft tissue infections, bloodstream infections, and unidentified sources, accounted for 12.3% of cases. **Table 2. Source of Sepsis**

Source of Infection	Frequency n (%)
Pneumonia	68 (39.5%)
Urinary tract infection (UTI)	52 (30.2%)
Abdominal infections	31 (18.0%)
Others (skin/soft tissue, bloodstream, unknown)	21 (12.3%)

Association Between ISTH DIC Score and Mortality

The association between ISTH DIC positivity (≥5) and mortality is presented in Table 3. A statistically significant association was observed between ISTH DIC positivity and mortality (p = 0.041). Among patients with ISTH scores <5, there were 75 survivors and 30 deaths. In contrast, patients with ISTH scores ≥5 demonstrated a higher proportion of deaths, suggesting that elevated ISTH scores are associated with an increased risk of mortality.

Table 3. Association Between ISTH DIC Positivity and Mortality

ISTH ≥5	Survivors n (%)	Deaths n (%)	p-value
No	75	30	
Yes	44	23	0.041

Association Between SIC Score and Mortality The relationship between **SIC score positivity (≥4)** and mortality is presented in **Table 4**. A statistically significant association was observed between **SIC score positivity and mortality (p = 0.028)**. **Table 4. Association Between SIC Score Positivity and Mortality**

SIC ≥4	Survivors n (%)	Deaths n (%)	p-value
No	70 (72.2%)	27 (27.8%)	
Yes	49 (65.3%)	26 (34.7%)	0.028

Association Between ISTH DIC and Organ Dysfunction

The relationship between ISTH DIC positivity and organ dysfunction is shown in Table 5. A statistically significant association was observed (p = 0.032). Among patients with ISTH scores <5, organ dysfunction occurred in 38 patients, whereas 27 patients with ISTH ≥5 developed organ dysfunction.

Table 5. Association Between ISTH DIC and Organ Dysfunction

ISTH ≥5	No Organ Dysfunction n (%)	Organ Dysfunction n (%)	pvalue
No	67 (63.8)	38 (36.2)	
Yes	40 (59.7)	27 (40.3)	0.032

Organ Dysfunction Profile

The distribution of organ dysfunction interventions among patients is summarized in Table 6. Vasopressor requirement was the most frequent intervention (28.5%), followed by mechanical ventilation (25.6%). Acute kidney injury requiring dialysis occurred in 11.0% of patients. Additionally, 19.2% of patients required two or more organ support modalities.

Table 6. Organ Support Requirements in Patients with Sepsis

Organ Dysfunction Parameter	n (%)
Vasopressor requirement	49 (28.5%)
Mechanical ventilation	44 (25.6%)
Acute kidney injury requiring dialysis	19 (11.0%)
≥2 organ support modalities	33 (19.2%)

Association Between SIC Score and Organ Dysfunction

The association between SIC score positivity (≥4) and organ dysfunction is shown in Table 7. A statistically significant relationship was observed (p = 0.021).

Table 7. Comparison of SIC Score and Organ Dysfunction

SIC ≥4	No Organ Dysfunction	Organ Dysfunction	p-value
No	66 (68.0%)	31 (32.0%)	
Yes	41 (54.7%)	34 (45.3%)	0.021

Mortality Outcomes

The mortality outcomes of the study population are presented in Table 8. The ICU mortality rate was 22.1%, while the 28-day mortality rate was 30.8%. These findings highlight the significant burden of mortality among patients with sepsis in the intensive care setting.

Table 8. Mortality Outcomes

Outcome	n (%)
ICU mortality	38 (22.1%)
28-day mortality	53 (30.8%)

Length of Hospital Stay and Mortality The association between length of hospital stay and mortality is presented in Table 9. Survivors had a slightly longer mean hospital stay (10.47 ± 3.76 days) compared with patients who died (9.16 ± 4.31 days). However, the difference was not statistically significant (p = 0.083).

Table 9. Length of Hospital Stay According to Mortality

Mortality	Mean LOS ± SD (days)	p-value
Survived	10.47 ± 3.76	0.083
Died	9.16 ± 4.31	

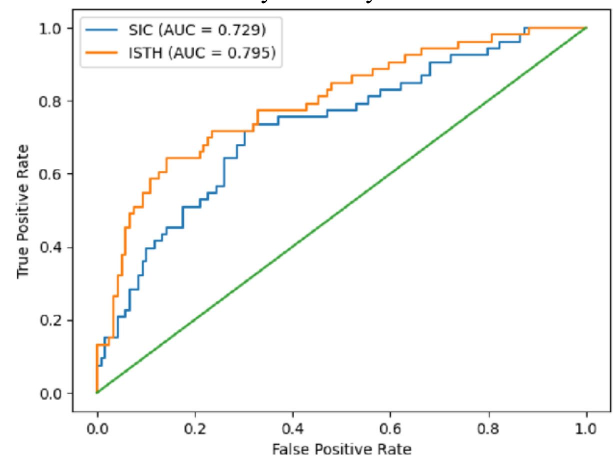
Predictive Performance of ISTH and SIC Scores

Receiver operating characteristic (ROC) analysis was performed to evaluate the predictive performance of the scoring systems for 28-day mortality. The ROC curve is presented in Figure 1, and the summary statistics are shown in Table 10. Both scoring systems demonstrated acceptable predictive ability for predicting 28-day mortality. The ISTH score showed better discriminatory performance (AUC = 0.795) compared with the SIC score (AUC = 0.729).

Table 10. ROC Analysis for Prediction of 28-Day Mortality

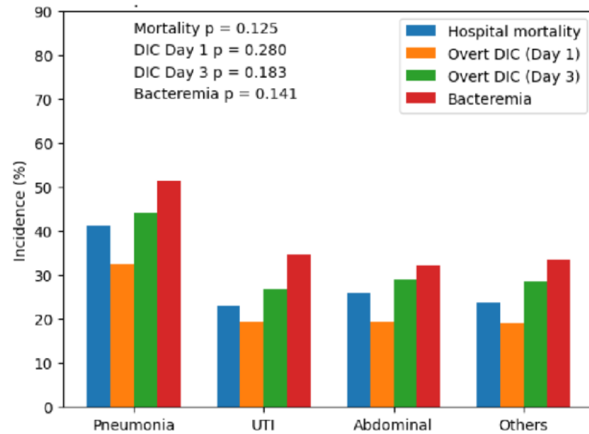
Score	AUC	pvalue	Reporting Odds Ratio
SIC Score	0.729	0.021	2.69
ISTH Score	0.795	0.009	3.88

Figure 1. Receiver operating characteristic (ROC) curves comparing the predictive performance of the ISTH score and SIC score for 28-day mortality.



Source of Infection and Clinical Outcomes

The relationship between the source of infection and major clinical outcomes is illustrated in Figure 2. Pneumonia demonstrated the highest incidence of mortality, overt disseminated intravascular coagulation, and bacteremia compared with other infection sources. However, the differences across infection categories were not statistically significant for mortality (p = 0.125), DIC on day 1 (p = 0.280), DIC on day 3 (p = 0.183), or bacteremia (p = 0.141). These findings suggest that although pneumonia was associated with higher complication rates, the source of infection alone did not significantly influence clinical outcomes in this cohort. **Figure 2.** Distribution of mortality, overt DIC (Day 1 and Day 3), and bacteremia across different sources of infection.



Discussion Baseline Characteristics of the Study Population

In the present study, the prognostic significance of the International Society on Thrombosis and Haemostasis (ISTH) disseminated intravascular coagulation score and the Sepsis-Induced Coagulopathy (SIC) score was evaluated in patients with sepsis admitted to the intensive care unit. The mean age of patients in the present study was 53.7 ± 14.1 years, and females constituted 54.1% of the study population. This age distribution is consistent with the well-recognized epidemiological pattern of sepsis, which occurs more frequently among middle-aged and elderly individuals, particularly those with underlying comorbid conditions and reduced physiological reserve. A previous study evaluating sepsis in critically ill populations have similarly reported higher incidence and severity of sepsis among older adults admitted to intensive care units [2]. The 28-day mortality rate observed in our study was 30.8%, which is comparable with mortality rates reported in several studies conducted among critically ill patients with sepsis. Previous studies have reported ICU mortality rates ranging between 25% and 40%, depending on disease severity, presence of multi-organ dysfunction, and the availability of advanced critical care facilities [11–13].

The mean ISTH score and SIC score observed in the present study were 3.87 ± 2.58 and 2.93 ± 2.02, respectively, indicating that a considerable proportion of patients exhibited evidence of sepsis-associated coagulation abnormalities. Sepsis is characterized by activation of the coagulation cascade, suppression of endogenous anticoagulant mechanisms, and impaired fibrinolysis, which together contribute to a prothrombotic state and may progress to disseminated intravascular coagulation [3,5]. Recognition of these coagulation abnormalities at an early stage is important, as sepsis-associated coagulopathy has been shown to correlate with disease severity, organ dysfunction, and mortality in critically ill patients [5,9].

Source of Infection

In the present study, pneumonia was identified as the most common source of sepsis (39.5%), followed by urinary tract infections (30.2%) and abdominal infections (18.0%). These findings are consistent with the epidemiological patterns reported in large observational studies of sepsis, where respiratory tract infections are frequently identified as the leading source of infection among critically ill patients admitted to intensive care units [2,11]. Previous studies have also reported pneumonia and urinary tract infections as major contributors to sepsis in ICU settings, highlighting the importance of early recognition and management of these infections to prevent progression to severe sepsis and septic shock [12,14]. Although pneumonia in the present study demonstrated higher rates of mortality and disseminated intravascular coagulation compared with other infection sources, the association between infection source and clinical outcomes was not statistically significant. This suggests that while certain infection sources may predispose patients to more severe disease, the overall prognosis in sepsis is determined by a complex interaction of factors including the host immune response, severity of organ dysfunction, and the development of sepsis-associated coagulopathy [1,3].

Association Between ISTH DIC Score and Mortality

The present study demonstrated a significant association between ISTH DIC positivity and mortality (p = 0.041). Patients with ISTH scores ≥5 exhibited a higher proportion of deaths compared with those with lower scores. These findings support the concept that overt disseminated intravascular coagulation represents an advanced stage of coagulation dysfunction associated with poor clinical outcomes in sepsis.

The ISTH DIC scoring system has been widely used for the diagnosis of overt DIC and has been shown in several studies to correlate with disease severity and mortality in patients with sepsis. Previous studies have reported that higher ISTH scores are associated with increased organ dysfunction and worse clinical outcomes in critically ill patients [4,5]. The findings of the present study are consistent with these observations and further reinforce the prognostic significance of the ISTH score in septic patients.

Association Between SIC Score and Mortality In addition to the ISTH score, the **SIC score was also significantly associated with mortality (p = 0.028)** in the present study. Patients with SIC scores ≥4 had a higher mortality rate compared with those with lower scores. The SIC score was specifically developed to identify early stages of sepsis-associated coagulopathy before the development of overt DIC.

The significant association observed in the present study supports the utility of the SIC score as an early prognostic indicator in patients with sepsis. Previous

studies have similarly demonstrated that the SIC score is associated with disease severity and mortality in septic patients and may help identify individuals at high risk for adverse clinical outcomes [10,15]. Early recognition of sepsis-induced coagulopathy may therefore allow closer monitoring and timely therapeutic interventions, potentially improving patient outcomes.

Association Between Coagulation Scores and Organ Dysfunction

Our findings also demonstrated a significant relationship between coagulation abnormalities and the development of organ dysfunction. Patients with ISTH scores ≥5 had a significantly higher incidence of organ dysfunction compared with those without overt DIC ($p = 0.032$). Similarly, SIC score positivity was associated with an increased occurrence of organ dysfunction ($p = 0.021$). These observations are consistent with the established pathophysiological mechanisms of sepsis-associated coagulopathy. During sepsis, activation of the coagulation cascade, suppression of natural anticoagulant pathways, and impairment of fibrinolysis contribute to the formation of microvascular thrombi, leading to impaired tissue perfusion and subsequent multi-organ dysfunction. Previous studies have demonstrated that sepsis-related coagulopathy is closely associated with the progression of organ dysfunction and poor clinical outcomes in critically ill patients [3,5,16].

Organ Support Requirements

In the present study, vasopressor support was required in 28.5% of patients, while mechanical ventilation was required in 25.6%, reflecting the severity of illness among ICU patients with sepsis. Additionally, acute kidney injury requiring dialysis occurred in 11.0% of patients, and 19.2% required support for two or more organ systems.

These findings highlight the substantial burden of organ dysfunction associated with sepsis, which frequently necessitates advanced organ support in intensive care settings. Previous observational studies of septic patients admitted to ICUs have similarly reported high rates of vasopressor requirement, mechanical ventilation, and renal replacement therapy due to the development of multi-organ failure [11,17]. Early identification of patients at high risk of organ dysfunction may therefore assist clinicians in optimizing monitoring and supportive care strategies in critically ill patients with sepsis.

Mortality and Length of Hospital Stay

In the present study, the ICU mortality rate was 22.1%, while the 28-day mortality rate was 30.8%. These findings are comparable with mortality rates reported in several observational studies of sepsis conducted in intensive care settings, where mortality commonly ranges between 20% and 40% depending on disease severity and the presence of organ dysfunction [2,11]. Although survivors in the present study had a slightly longer hospital stay compared with patients who died, the difference was not statistically significant. This observation may reflect the complex clinical course of sepsis, in which patients who survive often require prolonged intensive care, extended organ support, and gradual recovery following resolution of acute organ dysfunction. Previous studies have similarly reported prolonged hospital stays among survivors of severe sepsis and septic shock due to the need for ongoing supportive care and rehabilitation [18,19].

Predictive Performance of ISTH and SIC Scores

Receiver operating characteristic (ROC) analysis in the present study demonstrated that both scoring systems had acceptable predictive ability for 28-day mortality. The ISTH score demonstrated better discriminatory performance (AUC = 0.795) compared with the SIC score (AUC = 0.729).

These findings suggest that while both scoring systems are useful for risk stratification, the ISTH DIC score may provide slightly better prognostic discrimination in patients with sepsis. Previous studies have also reported that the ISTH DIC score correlates with disease severity and mortality in septic patients, reflecting the progression of coagulation abnormalities in advanced stages of sepsis-associated coagulopathy [4,5]. However, the SIC score remains clinically valuable, as it was specifically developed to identify early stages of sepsis-associated coagulopathy before the development of overt disseminated intravascular coagulation. Several studies have demonstrated that the SIC scoring system can serve as an early indicator of disease severity and adverse outcomes in patients with sepsis, allowing clinicians to identify high-risk patients at an earlier stage of the disease process [9,10].

Strengths and Limitations of the Study

The present study has several strengths. It evaluated the prognostic significance of two widely used coagulation scoring systems in a relatively large cohort of ICU patients with sepsis. Standardized clinical and laboratory parameters were used to calculate both ISTH and SIC scores, ensuring consistency in assessment. In addition, multiple clinically relevant outcomes including mortality, organ dysfunction, and organ support requirements were evaluated.

However, certain limitations should also be acknowledged. The study was conducted at a single tertiary care center, which may limit the generalizability of the findings. The observational study design also limits the ability to establish causal relationships between coagulation abnormalities and clinical outcomes. Furthermore, long-term outcomes beyond 28 days were not evaluated. Future multicenter studies with larger sample sizes and longer follow-up periods would provide further insight into the prognostic utility of these scoring systems.

Conclusion

In conclusion, both the ISTH disseminated intravascular coagulation score and the sepsis-induced coagulopathy score were significantly associated with mortality and organ dysfunction in patients with sepsis. Both scoring systems demonstrated acceptable predictive ability for 28-day mortality, with the ISTH score showing slightly better discriminatory performance. Routine assessment of coagulation abnormalities using these scoring systems may provide valuable prognostic information and assist in the early identification of high-risk patients with sepsis.

References

[1] Singer M, Deutschman CS, Seymour CW, et al. The Third International Consensus Definitions for Sepsis and Septic Shock (Sepsis-3). JAMA 2016;315:801–10. https://doi.org/10.1001/jama.2016.0287.
[2] Rudd KE, Johnson SC, Agesa KM, et al. Global, regional, and national sepsis incidence and mortality, 1990-2017: analysis for the Global Burden of Disease Study. Lancet 2020;395:200–11. https://doi.org/10.1016/S0140-6736(19)32989-7.
[3] Levi M, van der Poll T. Coagulation and sepsis. Thromb Res 2017;149:38–44. https://doi.org/10.1016/j.thromres.2016.11.007. [4] Levi M, Toh CH, Thachil J, et al. Guidelines for the diagnosis and management of disseminated intravascular coagulation. British Committee for Standards in Haematology. Br J Haematol 2009;145:24– 33. https://doi.org/10.1111/j.1365-2141.2009.07600.x. [5] Iba T, Levy JH, Warkentin TE, et al. Diagnosis and management of sepsis-induced coagulopathy and disseminated intravascular coagulation. J Thromb Haemost JTH 2019;17:1989–94. https://doi.org/10.1111/jth.14578.
[6] Taylor FB, Toh CH, Hoots WK, et al. Towards definition, clinical and laboratory criteria, and a scoring system for disseminated intravascular coagulation. Thromb Haemost 2001;86:1327–30.
[7] Levi M, van der Poll T. Inflammation and coagulation. Crit Care Med 2010;38:S26-34. https://doi.org/10.1097/CCM.0b013e3181c98d21.
[8] Iba T, Levy JH, Yamakawa K, et al. Proposal of a two-step process for the diagnosis of sepsis-induced disseminated intravascular coagulation. J Thromb Haemost JTH 2019;17:1265–8. https://doi.org/10.1111/jth.14482.
[9] Yamakawa K, Umemura Y, Murao S, et al. Optimal Timing and Early Intervention With Anticoagulant Therapy for Sepsis-Induced Disseminated Intravascular Coagulation. Clin Appl Thromb 2019;25:1076029619835055. https://doi.org/10.1177/1076029619835055.
[10] Iba T, Nisio MD, Levy JH, et al. New criteria for sepsis-induced coagulopathy (SIC) following the revised sepsis definition: a retrospective analysis of a nationwide survey. BMJ Open 2017;7:e017046. https://doi.org/10.1136/bmjopen-2017-017046. [11] Vincent J-L, Sakr Y, Sprung CL, et al. Sepsis in European intensive care units: results of the SOAP study. Crit Care Med 2006;34:344–53. https://doi.org/10.1097/01.ccm.0000194725.48928.3a.
[12] Fleischmann C, Scherag A, Adhikari NKJ, et al. Assessment of Global Incidence and Mortality of Hospital-treated Sepsis. Current Estimates and Limitations. Am J Respir Crit Care Med 2016;193:259–72. https://doi.org/10.1164/rccm.201504-0781OC.
[13] Rhee C, Dantes R, Epstein L, et al. Incidence and Trends of Sepsis in US Hospitals Using Clinical vs Claims Data, 2009-2014. JAMA 2017;318:1241–9. https://doi.org/10.1001/jama.2017.13836.
[14] Angus DC, Linde-Zwirble WT, Lidicker J, et al. Epidemiology of severe sepsis in the United States: analysis of incidence, outcome, and associated costs of care. Crit Care Med 2001;29:1303–10. https://doi.org/10.1097/00003246-200107000-00002.
[15] Hosseini SF, Behnam- Roudsari S, Alavinia G, et al. Diagnostic and prognostic value of Sepsis-Induced coagulopathy and International Society on Thrombosis and Hemostasis scoring systems in COVID-19associated disseminated intravascular coagulopathy. J Res Med Sci Off J Isfahan Univ Med Sci 2021;26:102. https://doi.org/10.4103/jrms.JRMS_1295_20.
[16] Gando S, Levi M, Toh CH. Disseminated intravascular coagulation 2016. https://doi.org/10.1038/nrdp.2016.37. [17] Angus DC, van der Poll T. Severe sepsis and septic shock. N Engl J Med 2013;369:840–51. https://doi.org/10.1056/NEJMra1208623.
[18] Prescott HC, Angus DC. Enhancing Recovery From Sepsis: A Review. JAMA 2018;319:62–75. https://doi.org/10.1001/jama.2017.17687.
[19] Iwashyna TJ, Ely EW, Smith DM, et al. Long-term cognitive impairment and functional disability among survivors of severe sepsis. JAMA 2010;304:1787–94. https://doi.org/10.1001/jama.2010.1553.