RESEARCH PAPER

Sequential Organ Failure Assessment (SOFA) Score in Lung Cancer Patients Presenting to the Emergency Department

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ABSTRACT

Background: Lung cancer patients in the emergency department frequently experience organ dysfunction and poor clinical outcomes. Although the Sequential Organ Failure Assessment (SOFA) score is used to assess organ dysfunction, its prognostic value among these patients remains insufficiently investigated. This study evaluated SOFA and clinical outcomes in oncologic emergencies.

Methods: Prospective observational cohort study conducted at the Emergency Departments of Dr. Wahidin Sudirohusodo Hospital and Labuang Baji Hospital, Makassar, Indonesia, between January and March 2026. A total of 100 consecutive adult patients with confirmed lung cancer presenting with oncologic emergencies were enrolled. SOFA scores were calculated at emergency department admission using six organ system parameters. Associations between SOFA scores, organ dysfunction, and clinical outcomes were analyzed using logistic regression.

Results: Most patients had SOFA scores of 0–3 (62%), followed by 4–6 (32%) and 7–9 (6%). Overall in-hospital mortality was 65%. Increasing SOFA scores were significantly associated with higher mortality ($p<0.001$). Patients with SOFA scores of 4–6 had a markedly increased risk of death (OR=37.64, $p<0.001$), while all patients with SOFA scores of 7–9 died during hospitalization. Respiratory dysfunction demonstrated the strongest association with mortality (OR=76.00), followed by hepatic dysfunction (OR=5.09), renal dysfunction (OR=5.39), and neurological impairment ($p=0.007$). No significant associations were observed between SOFA score and demographic characteristics, tumor stage, comorbidities, or anticancer treatment.

Conclusions: Higher SOFA scores were strongly associated with adverse clinical outcomes in lung cancer patients presenting to the emergency department. The SOFA score is a practical and effective tool for early prognostic assessment and risk stratification in this population.

Keywords: SOFA score; lung cancer; emergency department; organ dysfunction; mortality.

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INTRODUCTION

Lung cancer remains the leading cause of cancer-related mortality worldwide, causing 1.8 million deaths annually [1]. Patients with lung cancer often develop complications, including multiple organ dysfunction syndrome (MODS), which increases mortality [2]. Therefore, assessment of organ dysfunction is essential in managing advanced lung cancer [3,4]. Early assessment guides treatment and predicts outcomes in critically ill patients. The Sequential Organ Failure Assessment (SOFA) score is a tool for evaluating organ dysfunction. Developed for sepsis, it has been validated for prognostic assessment in critically ill populations, including patients with malignancy [5]. The SOFA score evaluates six organ systems: respiratory, coagulation, liver, cardiovascular, renal, and neurological, using the Glasgow Coma Scale [6,7].

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Patients with advanced lung cancer are particularly susceptible to organ dysfunction because of progressive tumor burden, metastatic disease, cancer-related inflammation, treatment-related toxicities, and infectious complications. These conditions may culminate in MODS and markedly worsen prognosis [8]. Consequently, an objective scoring system such as the SOFA score may provide valuable prognostic information by identifying patients at increased risk of mortality and severe clinical deterioration.

Previous studies have demonstrated that the SOFA score is an effective predictor of mortality among critically ill patients with cancer regardless of malignancy type [9]. In patients with advanced cancer presenting to the emergency department, Lee et al. (2012) reported that higher SOFA scores were significantly associated with shorter survival and poorer short-term outcomes [10]. Similarly, Chou et al. (2012) demonstrated that elevated SOFA scores predicted hospital mortality among patients with advanced lung cancer admitted to the intensive care unit because of sepsis-related acute respiratory failure [11]. More recently, Tseng H et al. (2022) found that each one-point increase in the SOFA score significantly increased mortality risk among patients with newly diagnosed advanced lung cancer requiring mechanical ventilation [12].

Despite accumulating evidence supporting the prognostic value of the SOFA score in critically ill oncology patients, studies specifically evaluating its role among lung cancer patients presenting to the emergency department remain limited [13]. Most published studies have included heterogeneous cancer populations or intensive care unit cohorts, leaving uncertainty regarding the usefulness of SOFA as an early prognostic tool for emergency department patients with lung cancer [10,12]. Therefore, further investigation is warranted to clarify the prognostic performance of the SOFA score in this specific clinical setting. Accordingly, the present study aimed to evaluate the association between SOFA scores and clinical outcomes among lung cancer patients admitted to the Emergency Department of Dr. Wahidin Sudirohusodo Hospital and Labuang Baji Hospital, Makassar. The findings are expected to provide evidence supporting the use of the SOFA score as a practical prognostic tool for early risk stratification and clinical decision-making in emergency care.

MATERIALS AND METHODS

Study Design and Setting

This was a hospital-based prospective observational cohort study conducted at the Emergency Departments of Dr. Wahidin Sudirohusodo Hospital and Labuang Baji Hospital, Makassar, Indonesia. Consecutive eligible patients with lung cancer presenting with oncologic emergencies were enrolled at emergency department admission. Baseline SOFA scores were recorded, and participants were prospectively followed throughout hospitalization until discharge or in-hospital death. Data collection was performed between January and March 2026 using primary data obtained from patients diagnosed with lung cancer who fulfilled the study eligibility criteria.

Participants

The study population consisted of adult patients presenting to the emergency department with a confirmed diagnosis of lung cancer. Participants were recruited using a consecutive sampling approach. All eligible patients presenting during the predefined study period (January to March 2026) who fulfilled the inclusion and exclusion criteria were consecutively enrolled until completion of the study period. Because the study aimed to include all eligible consecutive patients during the recruitment period, no formal *a priori* sample size calculation was performed. Patients were eligible if they were aged ≥18 years and experienced an oncologic emergency requiring hospitalization during the study period. Patients with non-malignant pulmonary diseases that could independently affect organ function or those with other primary malignancies were excluded.

Variables and Data Collection

The primary clinical outcome was in-hospital mortality occurring during hospitalization. Potential confounding variables included age, cancer treatment received (chemotherapy, radiotherapy, immunotherapy, and long-term corticosteroid therapy), and comorbidities such as congestive heart failure, chronic kidney disease, diabetes mellitus, and immunodeficiency disorders. Potential confounding variables included age, cancer treatment received (chemotherapy, radiotherapy, immunotherapy, and long-term corticosteroid therapy), and comorbidities such as congestive heart failure, chronic kidney disease, diabetes mellitus, and immunodeficiency disorders.

At the point of admission to the emergency department, clinical and laboratory information was gathered in a forward-looking manner. Each patient who participated was monitored continuously during their hospital stay until they were either discharged or passed away, in order to assess the study outcomes. Standardized forms were employed to collect clinical and laboratory data prospectively. Information regarding demographics, medical background, cancer therapies, laboratory results, and clinical outcomes was acquired through patient interviews and confirmed with hospital medical records.

SOFA Score Assessment

The SOFA score was calculated at the time of emergency department admission according to the original SOFA scoring system. Six organ systems were evaluated, including respiratory (PaO_2/FiO_2 ratio), coagulation (platelet count), hepatic (serum bilirubin), cardiovascular status (blood pressure and vasopressor requirement), renal function (serum creatinine concentration or urine output), and neurological status assessed using the Glasgow Coma Scale (GCS). Higher SOFA scores indicated greater degrees of organ dysfunction.

Outcome Measures

The primary outcome was in-hospital mortality, defined as death occurring during the index hospitalization. Patients

were followed from emergency department admission until hospital discharge or death.

Statistical Analysis

Statistical analyses were performed using IBM SPSS Statistics version 25.0 (IBM Corp., Armonk, NY, USA). Continuous variables were assessed for normality using the Shapiro–Wilk test and are presented as mean ± standard deviation (SD) or median with interquartile range (IQR), as appropriate. Categorical variables are presented as frequencies and percentages.

Comparisons between groups were performed using the independent-samples t-test or one-way analysis of variance (ANOVA) for normally distributed continuous variables, whereas non-parametric tests were applied when distributional assumptions were not satisfied. Associations between continuous variables were evaluated using Pearson's correlation coefficient or Spearman's rank correlation, as appropriate. To evaluate the association between SOFA score and in-hospital mortality, univariable logistic regression analysis was performed to estimate crude odds ratios (ORs) with 95% confidence intervals (CIs). No multivariable adjustment was performed because the objective of the study was to evaluate the unadjusted association between baseline SOFA score and in-hospital mortality.

Ethical Considerations

The study protocol was approved by the Health Research Ethics Committee of the Faculty of Medicine, Universitas Hasanuddin, under approval number 1072/UN4.6.4.5.31/PP36/2025 (Protocol No. UH25111043), dated 7 December 2025. The study was conducted at Dr. Wahidin Sudirohusodo Hospital and Labuang Baji Hospital, Makassar. Ethical approval was granted through an Expedited Review process and remained valid from 7 December 2025 to 7 December 2026. Written informed consent was obtained from all participants or their legally authorized representatives prior to enrollment. The study was conducted in accordance with the ethical principles of the Declaration of Helsinki, and all participant information was treated confidentially and used solely for research purposes.

RESULTS

Baseline Characteristics of the Study Population

A total of 100 patients with lung cancer and oncologic emergencies at the emergency departments of Dr. Wahidin Sudirohusodo Hospital and Labuang Baji Hospital were included after fulfilling predefined inclusion and exclusion criteria. Baseline characteristics are presented in Table 1. The mean age was 57.05 years; most participants were older than 60 years (39%), followed by those aged 46–59 years (36%) and ≤45 years (25%). Males accounted for 65% and females 35%. Regarding tumor histology, adenocarcinoma was the most common subtype (59%), followed by squamous cell carcinoma (27%) and adenosquamous carcinoma (14%). Most patients had advanced disease: stage IVA 58%, stage IVB 34%, and stage III 8%.

Malignant pleural effusion was the most frequent oncologic emergency causing admission (44%), followed by superior vena cava syndrome (27%) and decreased consciousness from brain metastases (16%). Cancer-related pain occurred in 4% of patients; other emergencies were less frequent. 59% had at least one comorbidity and 41% had none. Tuberculosis was most common (22%), followed by hypertension (15%), diabetes mellitus (11%), cardiovascular disease (9%), and chronic kidney disease (2%). By hospitalization end, 65% had died and 35% survived to discharge; characteristics are summarized in Table 1.

SOFA Score Profile

The distribution of SOFA score components is presented in Table 2. For respiratory component, the PaO_2/FiO_2 ratio showed most patients had values <200 mmHg (44%), followed by >400 mmHg (34%), <300 mmHg (12%), <400 mmHg (6%), and <100 mmHg (4%). For coagulation, most had platelet counts >150×10³/µL (94%); 3% had counts <150×10³/µL and 3% <20×10³/µL, with none between 20×10³/µL and 100×10³/µL. For hepatic component, serum bilirubin was <1.2 mg/dL in 76% of patients; 18%, 5%, and 1% had concentrations of 1.2–1.9 mg/dL, 2.0–5.9 mg/dL, and 6.0–11.9 mg/dL.

For the cardiovascular component, 99% of patients maintained mean arterial pressure (MAP) ≥70 mmHg without vasopressor support; only one patient (1%) required low-dose norepinephrine, and none required dopamine or dobutamine. Neurologically, most patients had a Glasgow Coma Scale (GCS) score of 15 (82%), followed by 13–14 (6%), 10–12 (3%), 6–9 (8%), and <6 (1%). Renal function was preserved, with serum creatinine <1.2 mg/dL in 82% of patients; 1.2–1.9 mg/dL and 2.0–3.4 mg/dL occurred in 16% and 2%, respectively. Overall, total SOFA scores were 0–3 in 62%, 4–6 in 32%, and 7–9 in 6%; none were ≥10. Table 2 summarizes score distribution and their individual organ components.

Association Between SOFA Score and Clinical Outcomes

The association between SOFA score categories and clinical outcomes is presented in Table 3. Among patients with a SOFA score of 0–3, 28 (28%) died during hospitalization and 34 (34%) survived; this was the reference group for estimating the odds ratio (OR). In patients with a SOFA score of 4–6, 31 (31%) died and one patient (1%) survived; compared with the reference group, patients had a higher risk of in-hospital mortality (OR = 37.64, $p < 0.001$). All patients with SOFA scores of 7–9 died, with no survivors; thus, the odds ratio could not be estimated because of complete separation. Increasing SOFA scores were associated with significantly higher in-hospital mortality ($p < 0.001$).

Association Between Individual SOFA Components and Clinical Outcomes

The associations between SOFA score components and hospitalization outcomes are summarized in Table 4. Respiratory, hepatic, central nervous system, and renal dysfunction were significantly associated with in-hospital

mortality, whereas coagulation and cardiovascular components were not. Respiratory dysfunction showed strongest association ($p<0.001$); deceased patients had impaired oxygenation, with PaO_2/FiO_2 <200 in 42%, whereas survivors were in the normal category (PaO_2/FiO_2 >400). Logistic regression showed that patients with PaO_2/FiO_2 <300 had 76-fold higher odds of in-hospital mortality than those with PaO_2/FiO_2 ≥300 (OR=76.00; 95% CI: 18.84–306.59). Coagulation abnormalities were not significantly associated with mortality ($p=0.797$); thrombocytopenia (<150,000/μL) had OR 2.83 (95% CI: 0.32–25.22), but the CI included null, indicating no association.

Liver dysfunction was associated with outcomes ($p=0.037$). Patients with serum bilirubin ≥1.2 mg/dL had higher likelihood of death than those with lower levels (OR=5.09; 95% CI: 1.40–18.50). Neurological status assessed by GCS differed between survivors and non-survivors ($p=0.007$). Survivors had GCS score of 15; reduced GCS scores occurred only in those who died. Renal dysfunction by serum creatinine was associated with mortality ($p=0.046$). Patients with serum creatinine ≥1.2 mg/dL had 5.39-fold higher odds of in-hospital mortality (OR=5.39; 95% CI: 1.16–24.93). Respiratory dysfunction was strongest, followed by renal and hepatic dysfunction; coagulation and cardiovascular components were not associated with clinical outcomes.

Association Between SOFA Score and Disease Severity

The associations between SOFA score categories and clinical characteristics are summarized in Table 5. No significant associations were observed between SOFA score and demographic characteristics, including age ($p=0.322$), sex ($p=0.990$), or tumor histology ($p=0.956$). Likewise, tumor stage ($p=0.780$), type of oncologic emergency ($p=0.650$), presence of comorbidities ($p=0.895$), specific comorbid conditions ($p=0.367$), length of hospital stay ($p=0.091$), and receipt of anticancer therapy ($p=0.151$) were not significantly associated with SOFA score.

Although not statistically significant, patients with higher SOFA scores were more frequently observed among those with advanced-stage disease, oncologic emergencies involving impaired consciousness, the presence of comorbidities, shorter hospital stays, and those who did not receive anticancer therapy. Across all SOFA categories, adenocarcinoma was the predominant histological subtype, stage IV disease accounted for the majority of cases, and malignant pleural effusion was the most common oncologic emergency.

DISCUSSION

The present study showed that lung cancer patients presenting to the emergency department were predominantly older males with adenocarcinoma and advanced-stage disease, consistent with previous studies. Chen et al. (2019) reported that patients aged >60 years have aggressive disease and poorer survival, while Huang et al. (2020) and data from the Norwegian Cancer Registry showed higher prevalence in males [14,15]. Likewise, the predominance of adenocarcinoma and stage IV disease agrees with reports from the World Health Organization, the National Cancer Institute, and the Journal of Thoracic Oncology, indicating that adenocarcinoma remains the most common subtype and that most patients are diagnosed at an advanced stage because early disease lacks specific symptoms. Malignant pleural effusion was the most frequent oncologic emergency, followed by superior vena cava syndrome and decreased consciousness due to brain metastases, consistent with Siddiqui et al. (2023) [16]. Tuberculosis was the most common comorbidity, supporting evidence that chronic pulmonary tuberculosis increases lung cancer risk through inflammation, fibrosis, oxidative DNA damage, and immune dysregulation.The observed in-hospital mortality of 65% reflects the advanced condition and is comparable with reports of poor short-term survival among critically ill patients with advanced lung cancer.

Respiratory dysfunction represented the predominant organ impairment, whereas coagulation, hepatic, cardiovascular, neurological, and renal components were preserved in patients. This is plausible because lung cancer compromises pulmonary gas exchange through airway obstruction, tumor infiltration, atelectasis, malignant pleural effusion, pneumonia, and acute respiratory distress syndrome. Respiratory dysfunction is expected to be the dominant determinant of mortality in patients with advanced lung cancer because the lungs are both the primary site of malignancy and the organ most directly affected by tumor progression. Airway obstruction, diffuse parenchymal infiltration, malignant pleural effusion, pulmonary infection, and cancer-related inflammation collectively impair oxygen delivery, leading to tissue hypoxia and subsequent dysfunction of other organ systems. Consequently, respiratory failure often represents the initial event that precipitates multiple organ dysfunction syndrome and death in this patient population. These findings align with Tseng et al. (2020), who reported that respiratory failure is the principal organ dysfunction contributing to mortality in advanced lung cancer and showed a correlation between increasing SOFA scores and poor survival [12]. A finding was the association between increasing SOFA scores and in-hospital mortality. Patients with SOFA scores of 4–6 had greater mortality risk than those with scores of 0–3, whereas all patients with SOFA scores of 7–9 died during hospitalization. These findings support Kolay et al. (2025), Sirley et al. (2022), and Lee et al. (2012), supporting SOFA for mortality prediction and early risk stratification in advanced cancer patients [10,17,18].

Among SOFA components, respiratory dysfunction showed the strongest mortality association, followed by renal and hepatic dysfunction. Patients with a PaO_2/FiO_2 ratio <300 had greater odds of death than those with preserved oxygenation, indicating hypoxemia is a major determinant of hospital mortality. These findings align with Luong et al. (2025), Ozpinar et al. (2023), and Huang

et al. (2022), who identified impaired oxygenation as an independent mortality predictor in critically ill lung cancer patients [15,19,20]. Although respiratory dysfunction demonstrated the strongest association with in-hospital mortality, the corresponding odds ratio was accompanied by a wide confidence interval, reflecting the limited number of patients in some exposure categories. Therefore, the magnitude of the observed association should be interpreted with caution, although the direction of the association remained consistent with previous studies. Elevated bilirubin and serum creatinine were significantly associated with mortality, reflecting the contribution of hepatic and renal dysfunction to multiple organ failure. These findings are consistent with the updated SOFA framework developed by Ranzani et al. (2025), which reaffirmed serum bilirubin and creatinine as core indicators of hepatic and renal dysfunction associated with ICU mortality, as well as recent evidence by Kolay et al. (2025) and Kashyap et al. (2021), demonstrating that renal dysfunction remains one of the strongest independent predictors of mortality among critically ill oncology patients [18,21,22]. Neurological impairment, reflected by reduced GCS scores, was also associated with poor outcomes, consistent with findings reported by Park et al. (2021) and Al-Dorzi et al. (2024), who demonstrated that greater neurological dysfunction and higher severity of critical illness were associated with increased mortality among critically ill patients with lung cancer [23,24]. Conversely, coagulation and cardiovascular components were not significantly associated with mortality. This may be explained by the few patients with thrombocytopenia or hemodynamic instability, limiting statistical power to detect meaningful differences.

No significant associations were observed between SOFA score categories and age, sex, histological subtype, tumor stage, oncologic emergency, comorbidity, hospital stay, or anticancer therapy. Although patients with higher SOFA scores received anticancer therapy less frequently, treatment decisions in advanced lung cancer are multifactorial, influenced by organ dysfunction, performance status, tumor stage, molecular profile, comorbidities, and treatment goals. Consequently, SOFA should be an adjunctive prognostic tool rather than the sole determinant of therapeutic decision-making. Overall, the present findings support the clinical utility of the SOFA score as a simple and readily available instrument for prognostic assessment in lung cancer patients presenting with oncologic emergencies. Nevertheless, the observed associations should be interpreted with caution because several important prognostic variables that were not assessed in the present study may also contribute to mortality risk in patients with advanced lung cancer. Early identification of patients with high SOFA scores may facilitate prompt escalation of care, closer monitoring, timely intensive care referral, and individualized treatment planning to improve clinical outcomes.

LIMITATIONS

This study has several limitations. First, because this was a prospective observational cohort study, the findings demonstrate associations rather than causal relationships between SOFA score and in-hospital mortality. Second, although all eligible consecutive patients were enrolled during the predefined study period, the overall sample size remained relatively small, particularly in the highest SOFA score category (7–9). This resulted in sparse data, wide confidence intervals for several odds ratio estimates, and complete separation, precluding reliable estimation of odds ratios using conventional logistic regression. Future studies with larger cohorts should consider penalized regression methods, such as Firth or exact logistic regression, to obtain more robust effect estimates. Third, only univariable logistic regression was performed; therefore, the reported associations were not adjusted for potential confounding variables. In addition, several important prognostic factors, including Eastern Cooperative Oncology Group (ECOG) performance status, smoking history, metastatic burden, serum albumin, C-reactive protein (CRP), sepsis status, and the need for mechanical ventilation, were not routinely collected and may have contributed to residual confounding. Fourth, SOFA scores were assessed only once at emergency department admission, preventing evaluation of dynamic changes in organ dysfunction during hospitalization. Finally, participants were recruited exclusively from two tertiary referral hospitals, where patients generally had advanced-stage disease and greater clinical severity. Consequently, selection bias may have limited the generalizability of the findings, and external validation in independent multicenter cohorts is required before broad clinical application.

CONCLUSIONS

The SOFA score was significantly associated with clinical outcomes in patients with lung cancer presenting with oncologic emergencies, with higher SOFA scores corresponding to a substantially increased risk of in-hospital mortality. Although SOFA scores were not significantly associated with disease severity indicators, including tumor stage, oncologic emergencies, comorbidities, or anticancer treatment, respiratory, hepatic, neurological, and renal dysfunction were identified as the major organ components associated with poor clinical outcomes. These findings support the use of the SOFA score as a practical prognostic tool for early risk stratification and clinical decision-making in patients with lung cancer requiring emergency care.

DECLARATIONS

Consent for Publication

Not applicable.

Availability of Data and Materials

The datasets generated and/or analyzed during the current study are available from the corresponding author upon reasonable request.

Competing Interests

The authors declare that they have no competing interests.

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This research received no external funding.

Authors' Contributions
RR conceived and designed the study, collected and analyzed the data, and drafted the manuscript. JM, BN, HI, ID, and NAT contributed to the study design, data interpretation, critical revision of the manuscript, and supervision of the research. All authors read and approved the final manuscript.

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TABLES & FIGURE

Table 1. Baseline Characteristics of the Study Population

Characteristic	Frequency (%), n = 100
Age	
≤45 years	25 (25%)
46–59 years	36 (36%)
≥60 years	39 (39%)
Sex	
Male	65 (65%)
Female	35 (35%)
Tumor Histology	
Adenocarcinoma	59 (59%)
Squamous cell carcinoma	27 (27%)
Adenosquamous carcinoma	14 (14%)
Tumor Stage	
Stage III	8 (8%)
Stage IVA	58 (58%)
Stage IVB	34 (34%)
Oncologic Emergency	
Cancer-related pain	4 (4%)
Malignant pleural effusion	44 (44%)
Superior vena cava syndrome	27 (27%)
Decreased level of consciousness	16 (16%)

Comorbidities	
No comorbidity	41 (41%)
At least one comorbidity	59 (59%)
Tuberculosis	22 (22%)
Cardiovascular disease	9 (9%)
Chronic kidney disease	2 (2%)
Hypertension	15 (15%)
Diabetes mellitus	11 (11%)
Hospital Outcome	
Died	65 (65%)
Survived	35 (35%)

Table 2. Distribution of Study Participants According to SOFA Score Components

SOFA Score Component	**Frequency (%), n = 100**
Respiratory System (PaO_2/FiO_2)	
≥400 kPa	34 (34%)
<400 kPa	6 (6%)
<300 kPa	12 (12%)
<200 kPa	44 (44%)
<100 kPa	4 (4%)
Coagulation (Platelet Count)	
>150 × 10^3/µL	94 (94%)
<150 × 10^3/µL	3 (3%)
<100 × 10^3/µL	0 (0%)
<50 × 10^3/µL	0 (0%)
<20 × 10^3/µL	3 (3%)
Liver Function (Serum Bilirubin)	
<1.2 mg/dL	76 (76%)
1.2–1.9 mg/dL	18 (18%)
2.0–5.9 mg/dL	5 (5%)
6.0–11.9 mg/dL	1 (1%)
Cardiovascular System (Mean Arterial Pressure, MAP)	
MAP ≥70 mmHg	9 (99%)
MAP <70 mmHg	0 (0%)
Dopamine <5 µg/kg/min or dobutamine (any dose)	0 (0%)
Norepinephrine <0.1 µg/kg/min	1 (1%)
Central Nervous System (Glasgow Coma Scale)	
15	82 (82%)
13–14	6 (6%)
10–12	3 (3%)
6–9	8 (8%)
<6	1 (1%)
Renal Function (Serum Creatinine)	
<1.2 mg/dL	82 (82%)
1.2–1.9 mg/dL	16 (16%)
2.0–3.4 mg/dL	2 (2%)
Total SOFA Score	
0–3	62 (62%)
4–6	32 (32%)
7–9	6 (6%)
≥10	0 (0%)

Table 3. Comparison of SOFA Score Categories and Clinical Outcomes at the End of Hospitalization

SOFA Score	**Clinical Outcome, n = 100**	**OR****	**p-value***
	Died	**Survived**	
0–3	28 (28%)	34 (34%)	1.00 (Reference)
4–6	31 (31%)	1 (1%)	37.64
7–9	6 (6%)	0 (0%)	Not estimable

*p-value obtained using **Fisher's exact test**. **Odds ratio (OR) estimated using **logistic regression analysis**. OR for the SOFA score category of 7–9 could not be estimated because complete separation occurred, with all patients in this category experiencing in-hospital mortality. Penalized logistic regression methods (e.g., Firth logistic regression) may provide more reliable estimates under these circumstances.

Table 4. Association Between Individual SOFA Score Components and Clinical Outcomes

SOFA Score Component	Category	Died, n (%)	Survived, n (%)	OR (95% CI)†	p-value‡
Respiratory System (PaO_2/FiO_2)	≥300 mmHg	8 (8%)	32 (32%)	1.00 (Reference)	<0.001
	<300 mmHg	57 (57%)	3 (3%)	76.00 (18.84–306.59)	
Coagulation (Platelet Count)	≥150 ×10³/μL	60 (60%)	34 (34%)	1.00 (Reference)	0.797
	<150 ×10³/μL	5 (5%)	1 (1%)	2.83 (0.32–25.22)	
Liver Function (Serum Bilirubin)	<1.2 mg/dL	44 (44%)	32 (32%)	1.00 (Reference)	0.037
	≥1.2 mg/dL	21 (21%)	3 (3%)	5.09 (1.40–18.50)	
Cardiovascular System (MAP)	MAP ≥70 mmHg	64 (64%)	35 (35%)	—	0.650
	Vasopressor required*	1 (1%)	0 (0%)	—	
Central Nervous System (Glasgow Coma Scale)	GCS 15	47 (47%)	35 (35%)	—	0.007
	GCS <15	18 (18%)	0 (0%)	—	
Renal Function (Serum Creatinine)	<1.2 mg/dL	49 (49%)	33 (33%)	1.00 (Reference)	0.046
	≥1.2 mg/dL	16 (16%)	2 (2%)	5.39 (1.16–24.93)	

† Odds ratios were estimated using **binary logistic regression**. ‡ *p*-values were calculated using **Fisher's exact test**. One patient required low-dose norepinephrine (<0.1 μg/kg/min); no patients received dopamine or dobutamine.

Table 5. Association Between SOFA Score Categories and Clinical Characteristics

Clinical Characteristic	Category	SOFA 0–3	SOFA 4–6	SOFA 7–9	p-value*
Age	≤45 years	14 (14%)	11 (11%)	0 (0%)	0.322
	46–59 years	25 (25%)	8 (8%)	3 (3%)	
	≥60 years	23 (23%)	13 (13%)	3 (3%)	
Sex	Male	40 (40%)	21 (21%)	4 (4%)	0.990
	Female	22 (22%)	11 (11%)	2 (2%)	
Tumor Histology	Adenocarcinoma	35 (35%)	20 (20%)	4 (4%)	0.956
	Squamous cell carcinoma	18 (18%)	8 (8%)	1 (1%)	
	Adenosquamous carcinoma	9 (9%)	4 (4%)	1 (1%)	
Tumor Stage	Stage III	5 (5%)	3 (3%)	0 (0%)	0.780
	Stage IVA	35 (35%)	18 (18%)	5 (5%)	
	Stage IVB	22 (22%)	11 (11%)	1 (1%)	
Oncologic Emergency	Cancer-related pain	2 (2%)	2 (2%)	0 (0%)	0.650
	Malignant pleural effusion	28 (28%)	13 (13%)	3 (3%)	
	Superior vena cava syndrome	19 (19%)	8 (8%)	0 (0%)	
	Decreased consciousness	8 (8%)	6 (6%)	2 (2%)	
Comorbidity	None	25 (25%)	14 (14%)	2 (2%)	0.895
	Present	37 (37%)	18 (18%)	4 (4%)	
Type of Comorbidity	Tuberculosis	15 (15%)	7 (7%)	0 (0%)	0.367
	Cardiovascular	7 (7%)	1 (1%)	1 (1%)	

	disease				
	Chronic kidney disease	2 (2%)	0 (0%)	0 (0%)	
	Hypertension	9 (9%)	5 (5%)	1 (1%)	
	Diabetes mellitus	5 (5%)	4 (4%)	2 (2%)	
Length of Hospital Stay	<3 days	11 (11%)	10 (10%)	2 (2%)	0.091
	3–4 days	17 (17%)	10 (10%)	1 (1%)	
	5–6 days	22 (22%)	3 (3%)	1 (1%)	
	7–9 days	9 (9%)	8 (8%)	1 (1%)	
	≥10 days	3 (3%)	1 (1%)	1 (1%)	
Anticancer Therapy	No	39 (39%)	23 (23%)	6 (6%)	0.151
	Yes	23 (23%)	9 (9%)	0 (0%)	

**Fisher's exact test.*