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CLINICAL PROFILE, MICROBIAL SPECTRUM, AND EARLY OUTCOMES IN SEPTIC SHOCK: A PROSPECTIVE OBSERVATIONAL STUDY FROM A TERTIARY CARE EMERGENCY DEPARTMENT

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Abstract

Background: Septic shock remains a major contributor to emergency department (ED) mortality. Timely recognition and management are crucial to improving patient outcomes. This study aimed to assess the clinical profile, microbiological spectrum, treatment strategies, and outcomes of patients presenting with septic shock in a tertiary care ED. **Methods**: A prospective observational study was carried out over a one-year period in the Emergency Department of Government Medical College (GMC), Srinagar. A total of 102 adult patients diagnosed with septic shock and meeting the predefined inclusion criteria were enrolled. Comprehensive clinical and microbiological data were systematically recorded. Severity of illness was assessed using SOFA and qSOFA scores, and patient outcomes were monitored over a 72-hour follow-up period. **Results:** Among the 102 patients, the most affected age group was 61–70 years (31.4%), with a slight male predominance (55.9%). Fever (67.6%) and cough (54.9%) were the most common presenting symptoms. Respiratory infections were the leading cause (52%), followed by urinary tract infections (38.2%). Comorbidities included diabetes mellitus (44.4% mortality, $p = 0.001$) and hypertension (16.7% mortality, $p = 0.006$). Gram-negative organisms were isolated in 81.8% of cases, with Acinetobacter identified in 27.3%. Meropenem was the most frequently used antibiotic (43.1%). The overall mortality rate was 25.5%. Non-survivors had a significantly higher mean SOFA score on admission (12.6 vs. 9.5; $p < 0.001$). qSOFA score showed no statistically significant correlation with mortality ($p = 0.115$). **Conclusion:** Septic shock in the ED is associated with substantial mortality, particularly in older adults with comorbidities. Early administration of broad-spectrum antibiotics and SOFA-based risk stratification remain critical to improving clinical outcomes.

Keywords: Septic shock, Emergency department, SOFA score, qSOFA score, Microbial profile, Antibiotic therapy, Patient outcomes

Introduction

Septic shock is a critical medical condition characterized by a significant drop in blood pressure due to severe infection, leading to inadequate organ perfusion and potential multi-organ failure. Despite advancements in medical care, septic shock remains a leading cause of mortality in intensive care units (ICUs) worldwide. In India, the burden of sepsis and septic shock is substantial, with studies indicating a prevalence rate of severe sepsis at 6% among hospital admissions and an ICU mortality

rate of 56%.[1] The management of septic shock necessitates prompt and effective intervention. Initial treatment focuses on stabilizing respiratory and circulatory functions through supplemental oxygen, mechanical ventilation, and fluid resuscitation. Early administration of broad-spectrum antibiotics, following appropriate microbiological cultures, is crucial to target the underlying infection.[2] Source control, involving the removal or drainage of the infection site, is also a vital component of therapy.[3] Understanding the clinical spectrum of patients presenting with septic shock is essential for improving patient outcomes. A study conducted in a tertiary care hospital in North India reported an incidence of severe sepsis at 30.6%, with a mortality rate of 51.6%.[4] Another multicenter prospective registry observed a septic shock mortality rate of 55%. [5]The World Health Organization and the World Health Assembly have declared sepsis as a public health problem.[6] Despite the availability of potent antibiotics and refined supportive care, the mortality of septic patients remains high with overall estimates to 30% and increasing to 50% when associated with shock.[7,8] Given the substantial burden of septic shock and its associated high mortality rates in Indian ICUs, there is an imperative need for comprehensive studies focusing on its prevalence, emergency management, and in-hospital outcomes. Such research will provide valuable insights into the clinical spectrum of septic shock, facilitate the development of standardized treatment protocols, and ultimately improve patient outcomes in tertiary care settings across North India.

Materials and Methods

This prospective, hospital-based study was conducted in the Department of Emergency Medicine at Government Medical College (GMC), SMHS Hospital, Srinagar, Jammu and Kashmir, over a one-year period from May 1, 2021, to April 30, 2022. The study included all adult patients presenting to the Emergency Department with septic shock. A total of 102 patients were enrolled based on specific inclusion and exclusion criteria.

Inclusion Criteria

- Adult patients aged 18 years and above.
- Patients with suspected or documented septic shock, defined as the presence of infection and a quick Sequential Organ Failure Assessment (qSOFA) score ≥2.
- The qSOFA criteria used included:
  - Respiratory rate ≥22/min
  - Altered mentation (Glasgow Coma Scale <15)
  - Systolic blood pressure ≤100 mmHg

Exclusion Criteria

- Patients below 18 years of age.
- Patients who declined to participate or did not provide informed consent.

Methodology

Eligible patients presenting with features of septic shock were included in the study after informed consent. Clinical parameters were recorded at presentation. The Sequential Organ Failure Assessment (SOFA) score was calculated for each patient at the time of admission and again at 72 hours to evaluate organ dysfunction and disease progression.

SOFA Scoring Parameters

Table 1: The SOFA scoring system is based on six organ systems, each scored from 0 to 4 based on the degree of dysfunction

Organ System	0	1	2	3	4
Respiratory (PaO_2/FiO_2)	>400	≤400	≤300	≤200	≤100
Coagulation (Platelets $x10^3/\mu l$)	>150	101–150	51–100	21–50	0–20
Liver (Bilirubin mg/dL)	<1.2	1.2–1.9	2.0–5.9	6.0–11.9	>12.0

CNS (Glasgow Coma Scale)	15	13–14	10–12	6–9	<6
Cardiovascular (MAP or vasopressor use)	MAP >70	MAP ≤70 or low-dose dopamine/dobutamine	Moderate dopamine or low-dose epinephrine/ norepinephrine	High-dose dopamine or moderate vasopressors	High-dose epinephrine or norepinephrine
Renal (Serum creatinine or urine output)	<1.2	1.2–1.9	2.0–3.4	3.5–4.9 or <500 mL/day	>5.0 or <200 mL/day

Upon arrival at the Emergency Department, blood samples were obtained from all enrolled patients and promptly sent for baseline investigations, including complete metabolic panels, blood lactate levels, and blood cultures. These investigations were conducted within one hour of presentation to ensure timely diagnosis and management. Following sample collection, patients were administered intravenous fluids, vasopressors, and empirical broad-spectrum antibiotics in accordance with sepsis management protocols.

Statistical Analysis:

The collected data were compiled and initially entered into Microsoft Excel spreadsheets. Subsequently, the dataset was exported to the Statistical Package for the Social Sciences (SPSS) software, version 20.0 (SPSS Inc., Chicago, Illinois, USA) for detailed analysis. Continuous variables were presented as mean ± standard deviation (SD), while categorical variables were summarized using frequencies and percentages. Data visualization was carried out using bar and pie charts. For the comparison of continuous variables, Student's independent t-test or the Mann-Whitney U test was applied, depending on the distribution of the data. Categorical variables were compared using the Chi-square test or Fisher's exact test, as appropriate. A p-value of less than 0.05 was considered statistically significant. All statistical tests were two-tailed.

Results

Over the one-year study period from May 2021 to April 30, 2022, a total of 95,206 patients were admitted to the Emergency Department. Among these, 4,812 patients presented with various infectious conditions. Of those, 776 patients were diagnosed with sepsis. Following the application of inclusion criteria, 102 adult patients with septic shock were identified and enrolled in the study, reflecting the subset of critically ill patients requiring intensive management for septic shock.

Table 2: Demographic Distribution of Study Patients

Variable	Category	Number	Percentage (%)
Age (Years)	≤ 40	14	13.7
	41–50	10	9.8
	51–60	23	22.5
	61–70	32	31.4
	71–80	23	22.5
	Total	102	100
	Mean ± SD (Range)	**60.1 ± 15.48 (19–80)**	
Gender	Male	53	52.0
	Female	49	48.0
	Total	102	100
Residence	Rural	73	71.6
	Urban	29	28.4

The age distribution revealed that the majority of patients were in the age group of 61–70 years (31.4%), followed by those aged 51–60 years and 71–80 years, each constituting 22.5% of the cohort. A smaller proportion of patients belonged to the younger age groups: ≤40 years (13.7%) and 41–50 years (9.8%). The mean age of the patients was 60.1 ± 15.48 years, with a range from 19 to 80 years. Regarding gender distribution, males comprised 52.0% (n=53) of the study population, while females

accounted for 48.0% (n=49). In terms of residence, a predominant proportion of the patients were from rural areas (71.6%), whereas 28.4% were from urban settings. These findings indicate that the study population was predominantly older, with a nearly equal gender distribution and a greater representation from rural backgrounds.

Table 2: Clinical Profile and Diagnostic Details of Study Patients

Parameter	Category	Number	Percentage (%)
Presenting Complaints	Fever	69	67.6
	Cough	56	54.9
	Shortness of breath	37	36.3
	Lower abdominal pain	24	23.5
	Loose stools	17	16.7
	Nausea, vomiting	11	10.8
	Burning micturition	5	4.9
Underlying Comorbidities	Hypertension	43	42.2
	Diabetes mellitus	36	35.3
	COPD	29	28.4
	Hypothyroidism	21	20.6
	Stroke	8	7.8
Duration of Illness (Days)	1–2 Days	23	22.5
	3–4 Days	64	62.7
	5–6 Days	12	11.8
	≥ 7 Days	3	2.9
	Mean ± SD (Range)	**3.4 ± 1.78 (1–15 Days)**	
Suspected Infection Site	Respiratory	53	52.0
	Urinary	39	38.2
	Abdomen	31	30.4
	Skin	8	7.8
	CNS	0	0.0
	Unknown	2	2.0
Final Diagnosis	Community-acquired pneumonia	47	46.1
	Urosepsis	29	28.4
	Acute gastroenteritis	12	11.8
	Cholangitis with shock	4	3.9
	Peritonitis	3	2.9
	Appendicitis with perforation	3	2.9
	Staphylococcal septicemia	2	2.0
	Necrotizing fasciitis	1	1.0
	Burn with septic shock	1	1.0
	Total	102	100
Serum Lactate (mmol/L)	< 4	29	28.4
	4–8	67	65.7
	> 8	6	5.9
	Mean ± SD (Range)	**4.7 ± 2.14 (2.1–15)**	

The clinical and diagnostic characteristics of the study patients are detailed in the table above. Among the presenting complaints, fever was the most common symptom, reported in 67.6% of patients, followed by cough (54.9%) and shortness of breath (36.3%). Other symptoms included lower abdominal pain (23.5%), loose stools (16.7%), nausea and vomiting (10.8%), and burning micturition (4.9%). With regard to comorbid conditions, hypertension was the most frequently observed (42.2%), followed by diabetes mellitus (35.3%), chronic obstructive pulmonary disease (COPD) (28.4%), hypothyroidism (20.6%), and a history of stroke (7.8%). The duration of illness at presentation varied, with the majority of patients (62.7%) reporting symptoms for 3–4 days, while 22.5% had illness for 1–2 days. Fewer patients reported symptom duration of 5–6 days (11.8%) and 7 days or more (2.9%). The mean duration of illness was 3.4 ± 1.78 days, with a range of 1 to 15 days. Suspected sites of infection included the respiratory tract in 52.0% of cases, urinary tract in 38.2%, abdominal infections

in 30.4%, skin infections in 7.8%, and unknown sources in 2.0%. No cases of central nervous system (CNS) infections were suspected. In terms of final diagnosis, community-acquired pneumonia was most prevalent (46.1%), followed by urosepsis (28.4%) and acute gastroenteritis (11.8%). Less frequent diagnoses included cholangitis with shock (3.9%), peritonitis (2.9%), appendicitis with perforation (2.9%), staphylococcal septicemia (2.0%), necrotizing fasciitis (1.0%), and burn with septic shock (1.0%). Serum lactate levels, an important prognostic marker, were elevated in the majority of patients. While 28.4% had lactate levels below 4 mmol/L, 65.7% had values between 4–8 mmol/L, and 5.9% had levels exceeding 8 mmol/L. The mean serum lactate level was 4.7 ± 2.14 mmol/L, with a range from 2.1 to 15 mmol/L. These findings underscore the predominance of respiratory infections and the high burden of comorbidities and metabolic derangements in the studied population.

Table 3: Clinical Characteristics, Microbial Profile, Management, and Outcomes of Study Patients (N = 102)

Category	Subcategory	Number	Percentage (%)
Microbial Profile	Gram Positive Bacteria	2	18.2
	Staphylococcus	1	9.1
	MRSA	1	9.1
	Gram Negative Bacteria	9	81.8
	Acinetobacter	3	27.3
	Pseudomonas	2	18.2
	Klebsiella	2	18.2
	Escherichia coli	2	18.2
qSOFA Score	Score 2	13	12.7
	Score 3	89	87.3
Antibiotics Received (within 1 hour)	Meropenem	44	43.1
	Ceftriaxone	20	19.6
	Piperacillin + Tazobactam	18	17.6
	Ciprofloxacin	14	13.7
	Metronidazole	11	10.8
	Vancomycin	10	9.8
	Moxifloxacin / Levofloxacin	6	5.9
Vasopressor Use (On Admission)	Dopamine ≤ 5 or Dobutamine	4	3.9
	Norepinephrine ≤ 0.1	93	91.2
	Norepinephrine > 0.1	5	4.9
Vasopressor Use (After 72 Hours)	Not given	79	77.5
	Dopamine ≤ 5 or Dobutamine	0	0.0
	Norepinephrine ≤ 0.1	6	5.9
	Norepinephrine > 0.1	17	16.7
Outcome	Survivor	76	74.5
	Non-survivor	26	25.5

The clinical characteristics, microbial profile, management strategies, and outcomes of the 102 study patients are summarized comprehensively. Microbiological analysis revealed that gram-negative organisms predominated (81.8%) among culture-positive cases, with *Acinetobacter* being the most common (27.3%), followed by *Pseudomonas*, *Klebsiella*, and *Escherichia coli* (each 18.2%). Gram-positive organisms accounted for 18.2% of isolates, including *Staphylococcus* and MRSA. Regarding the qSOFA score, the majority of patients (87.3%) had a score of 3, while 12.7% had a score of 2, indicating a high risk of poor outcomes in this cohort. In terms of antimicrobial therapy, Meropenem was the most commonly administered antibiotic within the first hour (43.1%), followed by Ceftriaxone (19.6%), Piperacillin-Tazobactam (17.6%), and Ciprofloxacin (13.7%). Other agents used included Metronidazole (10.8%), Vancomycin (9.8%), and Moxifloxacin/Levofloxacin (5.9%).

Vasopressor use was common, with 91.2% of patients receiving low-dose Norepinephrine (≤0.1 µg/kg/min) on admission. A small proportion received Dopamine or higher doses of Norepinephrine. At 72 hours post-admission, 77.5% of patients no longer required vasopressors, while 22.5% continued to receive varying doses of Norepinephrine, indicating ongoing hemodynamic instability in a subset of patients. In terms of clinical outcomes, 74.5% of patients survived, whereas 25.5% succumbed to their illness, underscoring the high mortality associated with severe sepsis and septic shock despite early intervention.

Table 4: Outcome of Study Patients in Relation to Demographics, Comorbidities, and Clinical Scores

Parameter	Subgroup	Survivor (n = 76)	%	Non-survivor (n = 26)	%	P-value
Age (Years)	≤ 40	13	17.1	1	3.8	0.021*
	41–50	8	10.5	2	7.7	
	51–60	20	26.3	3	11.5	
	61–70	21	27.6	11	42.3	
	71–80	14	18.4	9	34.6	
	Mean±SD	**58.3±12.51**	—	**65.1±13.54**	—	
Gender	Male	39	51.3	14	53.8	0.824
	Female	37	48.7	12	46.2	
Comorbidities	Hypertension Present	21	58.3	15	41.7	0.006*
	Hypertension Absent	55	83.3	11	16.7	
	Diabetes Mellitus Present	20	55.6	16	44.4	0.001*
	Diabetes Mellitus Absent	56	84.8	10	15.2	
	COPD Present	15	71.4	6	28.6	0.716
	COPD Absent	61	75.3	20	24.7	
	Hypothyroid Present	13	86.7	2	13.3	0.751
	Hypothyroid Absent	63	72.4	24	27.6	
	Stroke Present	5	62.5	3	37.5	0.697
	Stroke Absent	71	75.5	23	24.5	
qSOFA Score	Score 2	12	92.3	1	7.7	0.115
	Score 3	64	69.5	25	28.1	
SOFA Score	On Admission	**Mean±SD = 9.5±1.53**		**Mean±SD = 12.6±2.26**		<0.001*
	After 72 hours	**Mean±SD = 3.9±1.56**		**Mean±SD = 16.5±2.24**		<0.001*

The outcomes of the study patients were analyzed in relation to age, gender, comorbidities, qSOFA score, and SOFA score. A statistically significant association was observed between age and outcome ($p = 0.021$), with non-survivors showing a higher mean age (65.1 ± 13.54 years) compared to survivors (58.3 ± 12.51 years), indicating increased mortality with advancing age. Gender did not show a significant impact on outcomes ($p = 0.824$), with comparable survival rates between males and females. Among comorbidities, hypertension and diabetes mellitus were significantly associated with poor outcomes ($p = 0.006$ and $p = 0.001$, respectively), suggesting that patients with these conditions were at higher risk of mortality. In contrast, comorbidities such as COPD ($p = 0.716$), hypothyroidism ($p = 0.751$), and a history of stroke ($p = 0.697$) did not show a statistically significant relationship with survival. Regarding clinical scores, although a higher proportion of survivors had a lower qSOFA score (92.3% with score 2 vs. 69.5% with score 3 among non-survivors), the difference was not statistically significant ($p = 0.115$). However, the SOFA score was strongly predictive of outcome. Survivors had significantly lower SOFA scores both on admission (mean = 9.5 ± 1.53) and after 72 hours (mean = 3.9 ± 1.56), while non-survivors had markedly elevated scores at both time points (12.6 ± 2.26 on admission and 16.5 ± 2.24 after 72 hours), with p-values <0.001 in both cases. These findings emphasize the prognostic value of SOFA scoring in identifying patients at high risk of mortality in severe sepsis.

Discussion

Sepsis imposes a considerable disease burden and exerts a profound negative impact on healthcare systems and communities. It remains a frequent cause of admission to intensive care units (ICUs), a pattern likely attributable to both the increasing severity of illnesses among hospitalized patients and the persistently high incidence of healthcare-associated (nosocomial) infections. Notably, sepsis is the leading cause of death in non-coronary ICUs and ranks as the tenth leading cause of death overall.[9,10] Despite advancements in antimicrobial therapies and critical care practices, the mortality rate associated with sepsis remains alarmingly high, with overall estimates approaching 30%, and increasing to as much as 50% in cases complicated by septic shock.

During the one-year study period, a total of 95,206 patients across all age groups were admitted to the emergency department. Among these, 4,812 patients presented with infections, of whom 776 were diagnosed with sepsis. Out of the 776 emergency admissions for sepsis, 102 patients (13.1%) who progressed to septic shock and met the inclusion criteria were enrolled in the present study. These findings are in concordance with those reported by Todi et al. (2010), who documented a 16.45% prevalence of severe sepsis in their intensive therapy unit-based study.[11]In our study, the most commonly affected age group was 61–70 years (n = 32, 31.4%), followed by patients aged 51–60 and 71–80 years (n = 23, 22.5% each). A smaller proportion of patients were under 40 years of age (n = 14, 13.7%) or between 41–50 years (n = 10, 9.8%). The overall mean age of patients was 60.1 ± 15.48 years. There was a slight male predominance, with 53 (52%) male and 49 (48%) female patients. These demographic trends are consistent with the observations made by Balaji MV (2019), who reported that the majority of patients with sepsis were over 60 years of age (n = 24, 48%), followed by 20 patients (40%) aged between 30–60 years, and only 6 patients (12%) aged below 30 years with a male predominance (70% versus 30%).[12] Chattarjee S et al. (2018) conducted a study in which the mean age of patients diagnosed with severe sepsis was 59.19 years (SD ± 18), with a higher proportion of male patients (58.08%) compared to females.[13] Similarly, Hammond NE et al. (2022) reported a median age of 60 years among patients with sepsis, with approximately 60% being male, further corroborating the age and gender distribution seen in sepsis populations.[14]

In our study, the most frequently reported presenting complaint among patients was fever, observed in 69 patients (67.6%), followed by cough in 56 (54.9%) and shortness of breath in 37 (36.3%). Other symptoms included lower abdominal pain in 24 (23.5%), loose stools in 17 (16.7%), nausea and vomiting in 11 (10.8%), and burning micturition in 5 patients (4.9%). These findings are in partial agreement with a study by Babu M et al. (2017), in which patients with severe sepsis primarily presented with fever (47.8%), abdominal pain (30%), and difficulty in breathing (29.1%), while those with septic shock most commonly presented with fever (40.4%), breathlessness (31.9%), and vomiting (23.4%).[15] Likewise, Abhinandan KS and Vedavathi R (2013) documented fever as a universal symptom among all patients, with breathlessness being the second most common, observed in 16 cases.[16] Additionally, decreased urine output was reported in 16 patients, indicating the presence of acute kidney injury.

Regarding underlying health conditions, the most prevalent comorbidities in our study population were hypertension (43 patients, 42.2%), diabetes mellitus (36 patients, 35.3%), chronic obstructive pulmonary disease (COPD) (29 patients, 28.4%), hypothyroidism (21 patients, 20.6%), and a history of stroke (8 patients, 7.8%). Hammond NE et al. (2022) similarly identified diabetes (44.0%) and chronic renal failure (11.6%) as common comorbidities in septic patients.[14] Babu M et al. (2017) also reported high rates of diabetes mellitus (51.2%) and hypertension (44.8%) among their study participants, along with chronic liver disease (30.4%), chronic kidney disease (19.6%), and dyslipidemia (17.2%).[15] Furthermore, a study by Abhinandan KS and Vedavathi R (2013), which included 50 patients categorized into non-survivors (n=32) and survivors (n=18), revealed that diabetes was the most common comorbidity in both groups, followed by hypertension, paraplegia, and either COPD or ischemic heart disease (IHD).[16]

In our study, the suspected sources of infection leading to sepsis included respiratory tract infections in 53 patients (52%), urinary tract infections (UTIs) in 39 patients (38.2%), abdominal infections in

31 patients (30.4%), skin infections in 8 patients (7.8%), while in 2 patients, the source of infection remained unidentified. These findings are consistent with those reported in the dissertation by Balaji MV (2019), who documented pneumonia as the source of sepsis in 34% of cases, UTIs in 28%, central nervous system infections in 16%, skin infections in 10%, and other sources in 6% of cases.[12] The predominance of pneumonia, urinary tract infections, bacteremia, and intra-abdominal infections as common etiologies of sepsis has also been supported by various randomized controlled trials.[63-65]Serum lactate serves as a crucial biomarker reflecting tissue hypoxia and cellular dysfunction, although it does not directly measure tissue perfusion. In line with recent sepsis definitions, elevated lactate levels are considered indicative of cellular distress accompanying refractory hypotension.[19] In our cohort, the mean serum lactate level was 4.7 ± 2.14 mmol/L. The majority of patients (67; 65.7%) had serum lactate levels ranging between 4–8 mmol/L, while 29 patients (28.4%) had levels below 4 mmol/L, and only 6 patients (5.9%) had levels exceeding 8 mmol/L. Microbiological cultures were assessed in all 102 patients to determine the causative organisms. Among patients with severe sepsis, the majority—9 patients (81.8%)—had infections due to gram-negative bacteria. Acinetobacter species were isolated in 3 patients (27.3%), while 2 patients (18.2%) each had gram-positive bacteria, Pseudomonas, Klebsiella, and *Escherichia coli*. Additionally, *Staphylococcus aureus* and MRSA were each isolated in one patient (9.1%). These observations align with findings from Hammond NE et al. (2022), who reported that bacterial infections were the predominant cause of sepsis (77.9%), with gram-negative organisms accounting for 78.8% of cases.[14] Fungal infections were the second most common, observed in 9.6% of cases, while multidrug-resistant pathogens were identified in 44.8% of patients. Similarly, Balaji MV (2019) reported the most common isolates as Escherichia coli (18%), Acinetobacter (12%), Klebsiella (12%), Pseudomonas (14%), Streptococci (14%), MRSA (4%), methicillin-sensitive Staphylococcus aureus (MSSA) (2%), and other organisms (24%).[12]

In our study cohort, a variety of antibiotics were administered to manage suspected infections. Meropenem was the most commonly used antibiotic, prescribed to 44 patients (43.1%), followed by ceftriaxone in 20 patients (19.6%), piperacillin-tazobactam in 18 patients (17.6%), ciprofloxacin in 14 patients (13.7%), metronidazole in 11 patients (10.8%), vancomycin in 10 patients (9.8%), and moxifloxacin or levofloxacin in 6 patients (5.9%). In a study by Babu M et al. (2017), approximately 30% of patients received empiric monotherapy upon presentation to the emergency department, with a greater proportion of patients with septic shock receiving carbapenem therapy.[15] The antibiotics most frequently used in their study were ureidopenicillins (50%), third-generation cephalosporins (41.6%), carbapenems (31.2%), fluoroquinolones (15.6%), and lincosamides such as clindamycin (20.8%).[15]

Once adequate intravascular volume status is established, the timely initiation of vasopressor therapy in fluid-refractory septic shock is critical. Delays in vasopressor administration can result in fluid overload, leading to increased morbidity and mortality. It has been estimated that a delay of one hour in initiating vasopressors may increase mortality by approximately 5.3%.[20] The recommended first-line vasopressor for septic shock is norepinephrine, typically initiated at a dose of 0.5 mcg/kg/min.[21] In our study, upon admission, the majority of patients (93, 91.2%) received norepinephrine at a dose of less than 0.1 mcg/kg/min, while 5 patients (4.9%) required doses above 0.1 mcg/kg/min. Dopamine (at doses <5 mcg/kg/min) or dobutamine was administered to 4 patients (3.9%). After 72 hours, vasopressor support was no longer needed in most cases (79 patients, 77.5%). Norepinephrine at a dose >0.1 mcg/kg/min was still required in 17 patients (16.7%), while 6 patients (5.9%) continued on doses <0.1 mcg/kg/min. Notably, dopamine or dobutamine was not needed in any patient beyond this point.

The overall mortality rate in our study was 25.5% (n=26). Mortality was highest among patients aged 61–70 years (42.3%), followed by those aged 71–80 years (34.6%), 51–60 years (11.5%), 41–50 years (7.7%), and those under 40 years (3.8%). The association between age and mortality was statistically significant ($p = 0.021$). This finding is partially supported by the study of Abhinandan KS and Vedavathi R (2013), where the mean age among non-survivors (51.7 years) was higher compared to survivors (46.84 years), although this difference was not statistically significant ($p = 0.411$).[16]In terms

of gender distribution, mortality was marginally higher in males (51.3%) than females (48.7%), though the difference was not statistically significant (p = 0.824). Similar observations were made by Chatterjee S et al. (2017), who reported no significant difference in mortality between men and women (58.7% vs. 55.1%; p = 0.9).[13]A statistically significant association was found between mortality and comorbidities such as hypertension (16.7% mortality, $p = 0.006$) and diabetes mellitus (44.4% mortality, $p = 0.001$). However, comorbidities like COPD (28.6%), hypothyroidism (13.3%), and stroke (37.5%) showed no significant correlation with mortality ($p > 0.05$). Abhinandan KS and Vedavathi R (2013) reported similar findings, with comorbidities showing no statistically significant difference between survivors and non-survivors ($p = 0.423$), though 6 of 18 deceased patients were diabetic, 5 hypertensive, and 2 had COPD/IHD.[16]

In our cohort, the majority (87.3%) had a qSOFA score of 3, while 12.7% had a score of 2, aligning with Balaji MV (2019), where 68% had a qSOFA score of 3.[12] Similarly, Tian H et al. (2019) found qSOFA ≥2 in 37.3% of 1,716 patients, of whom 54.5% had sepsis.[22] On admission, the mean SOFA score was significantly higher in non-survivors (12.6) than in survivors (9.5, $p < 0.001$). After 72 hours, the mean SOFA score in non-survivors dropped to 2.24 versus 3.9 in survivors. Although mortality was higher in patients with qSOFA score 3 (28.1%) compared to score 2 (7.7%), the association was not statistically significant ($p = 0.115$). Abhinandan KS and Vedavathi R (2013) also observed significantly lower day-3 SOFA scores in survivors (6.84±2.96) versus non-survivors (13.42±4.06).[16] Similarly, Tian H et al. (2019) reported a mortality rate of 47.3% in qSOFA-positive patients versus 4.6% in qSOFA-negative, supporting the predictive value of qSOFA for mortality, as corroborated by our study.[22]

Conclusion

This study highlighted the clinical complexity and burden of septic shock among emergency department admissions. The findings emphasize that older adults, particularly those with underlying comorbidities, remain disproportionately affected. Respiratory and urinary tract infections were the most common sources of sepsis, with gram-negative organisms predominating in microbiological isolates. Despite timely antimicrobial therapy and supportive measures, mortality remained considerable, reaffirming the critical need for early recognition and aggressive management. Prognostic scoring systems such as SOFA demonstrated significant predictive value for outcomes, reinforcing their role in guiding clinical decision-making. These insights underscore the importance of continued vigilance, prompt intervention, and comprehensive sepsis care protocols to improve patient outcomes in high-risk emergency settings.

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