Section: General Medicine

Original Research Article

CLINICAL PROFILE OF PATIENTS WITH SEPSIS SPECTRA ADMITTED IN INTENSIVE CARE UNIT IN A TERTIARY CARE SETUP

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Abstract

Background: Sepsis is the leading cause of mortality in intensive care units (ICUs). Also, sepsis is considered a syndrome that is often misdiagnosed or missed to be diagnosed because of its diverse nonspecific clinical manifestations. This study aimed to describe the epidemiology, patient characteristics, aetiology, risk factors, comorbidities, and outcomes of patients with sepsis. **Materials and Methods:** A prospective observational study was conducted on 150 patients with sepsis at the Government Medical College Hospital, Tirunelveli, over 2 years. Patients with acute cerebral vascular events, acute coronary syndrome, acute pulmonary oedema, status asthmaticus, cardiac arrhythmias (as the primary diagnosis), status epilepticus, trauma, and burn injury were excluded from the study. **Results:** Immunocompromised states, such as HIV, autoimmune diseases, and organ transplantation, were found in 78.90% of patients which can exist as a predominant contributing factor for the development of sepsis. Only 34.86% of patients had chronic alcoholism as an underlying contributing factor. Most of the participants (65.14%) did not have chronic alcoholism. The most common comorbidity associated with death along with sepsis was coronary artery disease (14/44), followed by chronic obstructive pulmonary disease (9/44) and cerebrovascular disease (7/44). **Conclusion:** Our study serves as a tool that documents the clinical, laboratory, and etiological profiles of sepsis patients admitted to the ICU, particularly during the first two days of admission. It also documents the common outcome of sepsis and evaluates the prognostic SOFA score and its efficacy in predicting the outcome in patients with sepsis.

INTRODUCTION

Sepsis is the leading cause of mortality in intensive care units. Also, sepsis is considered a syndrome that is often misdiagnosed or missed to be diagnosed because of its diverse nonspecific clinical manifestations. Sepsis is the cause of 30% of intensive care admissions worldwide. Its incidence has increased, particularly in the last few decades, probably because of the availability of diagnostic investigations. Knowledge of the various definitions of the spectrum of sepsis syndrome will help in the early diagnosis and further initiation of appropriate management.

Secondary complications of sepsis after discharge from intensive care setups, such as late mortality, impaired quality of life, immune dysfunction, and secondary infections related to prolonged antibiotic therapy (fungal infections), should also be studied and recognised, as these also contribute to the overall morbidity caused by this syndromic sepsis. In addition, various risk factors such as uncontrolled diabetes mellitus, immunodeficiency, low socioeconomic status, and alcoholism are commonly associated with the development of sepsis. Individuals with associated risk factors are more prone to develop severe sepsis, and management of these patients, such as early identification as high-risk, is warranted.

The importance of sepsis-associated organ dysfunction has been highlighted. Septic shock management guidelines and bundles are recommended to provide efficient and prompt early directions for therapeutic resuscitation. Appropriately following this bundle was known to prevent sepsis-related organ dysfunction and failure,

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such as acute kidney injury, acute respiratory distress syndrome, and brain dysfunction, in various randomised controlled trials conducted in the present decade. Additionally, various novel prognostic markers and therapeutic strategies have been investigated. The results of these RCTs indicate that because of these newer syndromic approaches and therapeutic bundles, mortality due to sepsis has shown a considerable decrease of approximately 20% in the present decade compared to the last decade. However, long-term outcomes, such as readmissions and sequelae, remain to be addressed.

Newer studies like our study serve to document the trend of sepsis in intensive care units in our hospital and also compare various prognostic markers, such as SOFA scoring, and clinical variables in detail. As sepsis is an ever-changing scenario, knowledge of current trends in sepsis is mandatory, as it helps to further compare and contrast with other RCTs in the literature which will yield knowledge for various therapeutic strategies that will work for our locality (such as microbiological prevalence). The implementation of these corrections may help us leap forward in prevent morbidity and mortality due to sepsis in the intensive care unit.

Aim

This study aimed to describe the epidemiology, patient characteristics, aetiology, risk factors, comorbidities, and outcomes of patients with sepsis.

MATERIALS AND METHODS

This prospective observational study included 150 patients admitted to the intensive care units of the Government Medical College Hospital, Tirunelveli, who fulfilled the criteria for sepsis for two years. The study was approved by the institutional ethics committee before initiation, and informed consent was obtained from all patients.

Inclusion Criteria

Patients aged >12 years with suspected or documented infection with an acute increase greater than or equal to Sepsis-related Organ Failure Assessment (SOFA) points were included.

Exclusion Criteria

Patients aged ≤ 12 years, sepsis diagnosed outside the Government Medical College Hospital, non-infectious causes of severe inflammatory response syndrome (SIRS), presence of acute cerebral vascular events, acute coronary syndrome, acute pulmonary oedema, status asthmaticus, cardiac arrhythmias (as primary diagnosis), status epilepticus, trauma, and burn injury were excluded.

Methods

Data collections

All the data are presented as frequencies and percentages.

RESULTS

In the study population, the majority of individuals fell into the > 60-year category (56.8%). The second most common age group was 50-60 years (35.9%). The least common age group was 30-39 years (1.6%). Of these, 71.56% were male and 28.44% were females. Sepsis was more prevalent in males than in females and age did not alter this preponderance. In addition, 30.28% of patients developed respiratory failure and were on mechanical ventilation. The remaining 69.72% did not develop the need to use mechanical ventilation. [Table 1]

Blood cultures were negative in the majority of the patients (85.3%). Among the microorganisms isolated, Klebsiella was the most common, accounting for 11.01% of patients, and Pseudomonas accounted for 3.6% of patients. Urine cultures did not show any microorganism isolation in the majority (60.55%) of patients. Among the isolated organisms, the most common organism was Klebsiella (20.18%), followed by E. coli (17.43%). The least commonly isolated organism was Proteus, accounting for 1.83%. [Table 2]

Diabetes is more commonly associated with sepsis-related mortality due to sepsis. years (26 of 86 patients died). Pneumonia was the most common source of sepsis associated with mortality (25 out of 50 deaths), followed by urosepsis (4 out of 43 deaths) and meningitis (2 out of 12 deaths). Cellulitis was the least common cause of sepsis associated with mortality (1 out of 4). [Table 3]

Death (mortality) was most common in the >60 years age group, followed by the 50-60 years age group. Mortality was more common among males in both the > 60-year-old and 50-60-year-old age groups; mortality was more common among males, whereas mortality was more common in the younger age group (40-49 years age group). [Table 4]

When comparing the presence of comorbidity with the occurrence of death, the most common comorbidity associated with death along with sepsis was coronary artery disease (14/44), followed by chronic obstructive pulmonary disease (9/44), and cerebrovascular disease (7/44). Bronchiectasis and benign prostatic hypertrophy were comorbidities that were not associated with mortality in the study group. [Table 5]

Table 1: Demographic data and other parameters

		Frequency	Percentage (%)
Age	30 to 39	3	1.6
	40 to 49	8	5.5
	50 to 60	43	35.9
	>60	55	56.8

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Gender	Male	78	71.5
	Female	31	28.4
Mechanical ventilator	Yes	33	30.2
	No	76	69.7
Hypertension	Yes	51	46.7
	No	58	53.2
Immunocompromised state	Yes	86	78.9
	No	23	21.1
Alcohol dependence	Yes	38	34.8
	No	71	65.1
Co-morbidities	BPH	5	4.2
	Bronchiectasis	2	1.6
	CAD	28	23.5
	CKD	10	8.4
	COPD	9	7.5
	CVA	7	5.8
	RA	2	1.6
	Nil	56	47.06
Source of sepsis	Cellulitis	4	3.6
	Meningitis	12	11.01
	Pneumonia	50	45.8
	Urosepsis	43	39.4

Table 2: Microorganisms in various cultures and sensitive antibiotic

		Frequency	Percentage
Microorganisms in blood culture	Klebsiella	12	11.01
	Pseudomonas	4	3.6
	Negative	93	85.3
Microorganisms in urine culture	Klebsiella	22	20.1
	E. coli	19	17.4
	Proteus	2	1.8
	No growth	66	60.5
Microorganisms in sputum culture	E. coli	11	10.09
	Klebsiella	23	21.1
	Proteus	6	5.5
	Pseudomonas	8	7.3
	S. aureus	2	1.8
	No growth	59	54.1
Microorganisms in pus culture	E. coli	2	1.8
	Klebsiella	2	1.8
	Nil	105	96.3
Sensitive antibiotics	Amikacin	75	23.08
	Ceftazidime	34	10.4
	Cotrimoxazole	10	3.08
	Gentamycin	56	17.2
	Meropenem	39	12
	Nitrofurantoin	14	4.3
	Piptaz	85	26.1
	Nil	12	3.6

Table 3: Comparison of diabetes and source of infection vs outcome

		Outcome			Total
		Alive	AMA	Death	
Diabetes	Yes	56	4	26	86
	No	16	1	6	23
Source of infection	Cellulitis	2	1	1	4
	Meningitis	8	2	2	12
	Pneumonia	25	0	25	50
	Urosepsis	37	2	4	43

Table 4: Comparison of age and gender vs outcome

Age group and sex	Outcome			Total
	Alive	AMA	Death	
30-39	3	0	0	3
Male	3	0	0	3
40-49	4	1	3	8
Male	4	1	1	6
Female	0	0	2	2
50-60	29	3	11	43
Male	21	3	9	33
Female	8	0	2	10

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>60	36	1	18	55
Male	23	1	12	36
Female	13	0	6	19

Table 5: Comparison of comorbidities vs outcome

Comorbidities	Outcome			Total
	Alive	AMA	Death	
BPH	5	0	0	5
Bronchiectasis	2	0	0	2
CAD	13	1	14	28
CKD	8	1	1	10
COPD	3	6	9	18
CVA	0	0	7	7
RA	0	0	2	2
Nil	41	4	11	56

DISCUSSION

In our study, we compared host characteristics such as age, sex, presence of comorbidities, presence of diabetes, and source of sepsis with outcomes of mortality and improvement, and factors of significance were analysed. Among age and sex, older age (>50 years) and male sex were more commonly associated with worse death outcomes. However, in the younger age group (40-49 years), females suffered more deaths due to sepsis. Comorbidities such as coronary artery disease, COPD, and CVA were more commonly associated with higher mortality due to sepsis in our study group. However, patients with bronchiectasis did not show any mortality in our study group.

Diabetes is an independent risk factor that contributes to mortality in patients with sepsis. In our study group, 30.2% of patients with diabetes died due to sepsis. Among the sources of infection, pneumonia was the most common source commonly associated with mortality (50% of pneumonia with sepsis patients died in our study group). The least common cause of sepsis associated with mortality in our study group was localised infection (cellulitis). The mean age of all patients in our study group was 61.23 with the majority of patients aged > 60 years, followed by the 50-60 age group. Young patients (< 39 years) accounted for only 1.62% of the study group. This is similar to studies by Paary et al. in which the mean age was 54.1 Males constitute a majority in our study which is 71.56% which is comparable to the study by Paary et al.[1]

In our study population, pneumonia was the most common aetiology (46.96%), followed by urosepsis (39.13%), meningitis (10.43%), and the least common being localised cellulitis (3.48%). This is similar to the study by Paary et al. in which the respiratory tract contributes to 37.2% of the aetiology of sepsis in their study population.[1] It is in contrast to other studies by Engel et al. and Karlsson et al. in which respiratory infections contributed to 43-84% of aetiology of sepsis patients.[2,3]

The important outcome parameters were the development of hypotension/shock, need for mechanical ventilation, duration of ICU stay, and outcome after treatment. These were assessed in our study population and the most prevalent were documented. The prevalence of septic shock (severe sepsis) in our study (30.28%) was similar to that reported by Parry et al,[1] (30.6%). However, the need for mechanical ventilation was much greater than our study in Karlsson et al. study (89%) and Mohan et al. study (79.8%).[3,4]

In our study, the mortality rate was 29.36%, similar to that reported by Finfer et al. (26.5%) and Brun-Buisson et al. (35%).5,6 However, the mortality rate was lower than that reported by Mohan et al. (57.6%) and Chatterjee et al. (55.3%).[4,7]

CONCLUSION

Sepsis is the most common diagnosis in the intensive care unit and is often missed owing to its diverse nonspecific clinical manifestations and variable etiological profile. Our study serves as a tool that documents the clinical, laboratory, and etiological profiles of sepsis patients admitted to the ICU, particularly during the first two days of admission. It also documents the common outcome of sepsis and evaluates the prognostic SOFA score and its efficacy in predicting the outcome in patients with sepsis. It documents the common clinical profile, laboratory variability, etiological syndromes, microbiological aetiology, outcome, and prognostic factors in predicting outcomes in patients with sepsis, which further helps in better early diagnosis and appropriate treatment.

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