



Case Fatality Rate among Septicemia Patients in a Tertiary Care Hospital of Western India

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Financial Support: None declared
Conflict of Interest: None declared
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How to cite this article:

Naik KP, Patel DS, Patel BB, Patel DM. Case Fatality Rate among Septicemia Patients in a Tertiary Care Hospital of Western India. *Natl J Community Med* 2017; 8(11):694-697.

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Date of Submission: 15-08-17

Date of Acceptance: 28-11-17

Date of Publication: 30-11-17

ABSTRACT

Objective: The present study was carried out to study common sites of infection and organisms leading to sepsis commonly, to study various agents and host factors leading to sepsis and their prognostic importance and fatality rate due to sepsis.

Method: The present prospective study was conducted in patients with clinical features suggestive of sepsis were included in the study. Gram stain and culture of the material from the primary site of infection for the microbial etiology was taken. Other appropriate laboratory data depending upon the requirement was done.

Results: Among 50 cases of sepsis studied, 34 were male (68%) and 16 were female (32%). DM was the common co-morbid condition along with IHD, COPD, pulmonary Koch's, hypertension and alcoholic liver disease. The common complications were respiratory failure, kidney failure and shock. The overall case fatality rate was found to be 42%. It was observed that mortality was higher among the patients presenting with shock (73%) and abnormal liver function tests (70%).

Conclusion: Higher fatality rate was associated with age above 58 years, female gender, increase in co-morbid conditions, patients presenting with shock and abnormal liver function tests and increase in number of organ failures. Mortality was higher in patients with positive blood culture and patients with gram negative septicemia.

Key words: Sepsis, fatality rate, Gram stain, Gram negative septicemia

INTRODUCTION

Sepsis refers to the systemic response to serious infection. It can be a response to infection by any class of microorganism. Any site of infection can result in sepsis or septic shock. Microbial invasion of blood stream is not essential for the development of sepsis. However, blood cultures yield bacteria or fungi in approximately 20-40% of cases of severe sepsis, and 40-70% of cases of septic shock.¹ The presence of bacteraemia is an indicator of disseminated infection, and also generally indicates a poorer prognosis when associated with localized disease.²

Sepsis has been reported to be the most common cause of death in noncoronary intensive care unit. It is an increasingly common cause of mortality and morbidity, particularly in the elderly, immunocompromised and critically ill patients. Approximately 25-35% of patients with severe sepsis and 40-55% of patients with septic shock die within 30 days.^{3,4}

The incidence of sepsis and septic shock has been increasing since 1930s and all the recent evidence suggests that this rise will continue. The reason for the increasing incidence are many: increased use of invasive devices such as intravenous catheters, widespread use of cytotoxic and immunosuppres-

sive drug therapies for cancer and transplantation, increased life span of patients with cancer and diabetics who are prone to develop sepsis and increase in infections due to antibiotic resistant organisms.⁵

Clinicians, intensivists and infectious disease specialists have employed different terminologies for similar but overlapping clinical conditions. Previous large well designed trials have not reduced overall mortality as interpretations of results have been obscured by the use of varying definitions for the following terms: Infection, bacteraemia, sepsis, septicaemia, sepsis syndrome, septic shock etc. The changing pattern and frequent emergence of resistant bacteria makes the problem more difficult.⁶

The American College of Chest Physicians/ Society of Critical Care Medicine (ACCP/SCCM) consensus conference was held in 1991 with the goal of agreeing on a set of definitions that could be applied to the patients with sepsis and its sequelae. So, assessment of microbial profile, the antibiotic sensitivity pattern of isolates and focus of infection, in greater detail, according to ACCP/SCCM criteria is required to help the clinician to plan a strategy for treatment of cases.⁷

With this background the present study was carried out to study common sites of infection and organisms leading to sepsis commonly, to study various agents and host factors leading to sepsis and their prognostic importance and fatality rate due to sepsis.

METHOD

The present prospective study was conducted at SMIMER medical college during 2014-2015. Approval from institutional ethical committee was sought before initiation of study. Written consent was obtained from participants of the study.

Patients more than 18 years of age admitted with sepsis were chosen. Diagnosis of sepsis was made by the detailed history with predictable risk factors. Clinical features of the infection - fever, hypothermia <36°C or hyperthermia >38°C, tachycardia (heart rate more 90 beats per minute), tachypnea (respiratory rate more than 20 per minute), leucocytosis >12000 mm³ or leucopenia <4000mm³ or >10% of immature (band) cells, acute altered mental status, thrombocytopenia, hypotension (systolic BP <90mm Hg) were noted.

Definitive etiological diagnosis requires isolation of microorganism from the blood and local site of infection. Gram stain and culture of the material from the primary site of infection for the microbial etiology was taken. Other appropriate laboratory data depending upon the requirement was done.

Careful skin preparation is important to reduce the risk of introducing contaminants into the blood culture media. The vein from which blood is to be drawn must be chosen before the skin is disinfected. If the patient has an existing IV line, the blood is to be drawn below the existing line. Blood was collected for culture sensitivity and for routine investigations. Other specimens investigated were sputum, urine, pleural fluid, ascitic fluid, burn, wound swab according to primary infection present.

RESULTS

A total of 50 adult patients with the clinical diagnosis of septicemia (according to ACCP/SCCM consensus conference criteria) were studied. Among the 50 septicemia patients, the age ranged from 18 years to 80 years with the mean age 51 years. The incidence was more in the age group 58-67 years. In our study, among 50 cases of sepsis studied, 34 were male (68%) and 16 were female (32%).

Table 1: Fatality rate among septicemia cases according to age, gender and TLC

Variables	Recovered n=29 (%)	Died n=21 (%)	Total Cases n=50 (%)
Age Group (years)			
18-27	4 (80)	1 (20)	5
28-37	4 (57)	3 (43)	7
38-47	4 (50)	4 (50)	8
48-57	5 (56)	4 (44)	9
58-67	9 (64)	5 (36)	14
68-77	3 (60)	2 (40)	5
> 77	0 (0)	2 (100)	2
Gender			
Male	22 (65)	12 (35)	34
Female	7 (44)	9 (56)	16
TLC (Cumm)			
< 4000	4 (50)	4 (50)	8
4000-11000	4 (80)	1 (20)	5
11000-20000	15 (65.2)	8 (34.8)	23
20000-30000	5 (50)	5 (50)	10
>30000	1 (25)	3 (75)	4

*TLC- total leucocyte count

As shown in table 1, the overall case fatality rate was 42%. The mortality was more in age group above 58 years. Mortality was observed more in the females compared to the males.

As shown in table 2, DM was the common comorbid condition along with IHD, COPD, pulmonary Koch's, hypertension and alcoholic liver disease. The common complications were respiratory failure, kidney failure and shock.

Table 2: Septicemia and predisposing factors

Factors	Frequency (%)
Co-morbid conditions	
Diabetes mellitus	14 (28)
Ischemic heart disease	12 (24)
COPD, Pulmonary Koch's	9 (18)
Hypertension	9 (18)
Alcoholic liver disease	7 (14)
Chronic kidney disease	3 (6)
Cerebrovascular Stroke	2 (4)
Malignancy	2 (4)
Benign prostatic hypertrophy	2 (4)
Patient living with HIV	2 (4)
No comorbid conditions	16 (32)
Organ failure	
Respiratory failure	18 (36)
Kidney failure	17 (34)
Shock	15 (30)
Altered liver function test	10 (20)
Coagulopathy	10 (20)
Neurology	5 (10)

Table 3: Number of co morbid conditions and outcome of septicemia

Number of comorbid conditions	Total	Recovered (%)	Died (%)
0	16	12 (75)	4 (25)
1-2	22	13 (59.1)	9 (40.9)
3-4	12	4 (33.3)	8 (66.7)
Total	50	29	21

Table 4: Relation of organ failure & outcome in septicemia

Organ failure	Number of deaths	Fatality Rate
Respiratory failure (n=18)	8	44.4%
Kidney failure (n=17)	11	64.7%
Shock (n=15)	11	73.3%
Altered liver function test (n=10)	7	70%
Coagulopathy (n=10)	6	60%
Neurology (n=5)	3	60%

Table 5: Number of organs failure & mortality

Number of Organ failure	Cases	Died	Fatality Rate
0	10	2	20%
1	20	6	30%
2	11	6	54.5%
3	4	3	75%
4	5	4	80%

Table 6: Blood culture positive & mortality

Blood culture	Cases	Recovered (n=29) (%)	Died (n=21) (%)
Positive	13	5 (38.5)	8 (61.5)
Negative	37	24 (64.9)	13 (35.1)

Our study showed that mortality increased with increase in comorbid conditions. (Table 3)

It was observed that mortality was higher among the patients presenting with shock (73%) and abnormal liver function tests (70%). (Table 4)

As shown in table 5, in present study mortality increased with increasing number of organ failures.

As shown in table no. 6, out of 13 culture positive patients, 8 (61.5%) died due to sepsis while out of 37 culture negative patients, 13 (35.1%) died.

DISCUSSION

This prospective study was performed to assess the focus of sepsis in intensive care unit and to study the microbiological profile in adult patients with sepsis.

Among the 50 septicemia patients, the age ranged from 18 years to 80 years with the mean age 51 years. The incidence was more in the age group 58-67 years. Jeans Louis Vincent et al⁸ in a study done at European ICU also showed that sepsis was more common with older age group (50-60 years) with mean age of study population 56.7 years. TodiS et al⁹ showed that sepsis was more common in elderly people the mean age of the study population was 54.9 years.

In our study, among 50 cases of sepsis studied, 34 were male (68%) and 16 were female (32%). The study by previous workers have also indicated higher incidence among men. Jeans Louis et al⁸ study observed that sepsis was more common in men (63%). TodiS et al⁹ study showed that sepsis was more common in males (67%) than females.

In our study observed that most number of sepsis patients had leucocytosis while 16% had leucopenia. The study by Aline Pamela et al¹⁰ showed by sepsis was associated with leucocytosis & leucopenia, which correlates with our study.

In respiratory infections, bacterial pneumonia and Koch's with secondary infection were the common diagnosis. Common comorbid conditions associated with respiratory infections were pulmonary Koch's, COPD, DM and IHD.

In the present study, the overall fatality rate was 42%. The mortality was more in age group above 58 years. Mortality was observed more in the females compared to the males. Our study showed that mortality increased with increase in total leucocyte count. The study by Aline Pamela¹⁰ also showed that leucopenia and leucocytosis was more associated with mortality.

In our study, DM was the common co-morbid condition along with IHD, COPD, pulmonary

Koch's, hypertension and alcoholic liver disease. The study by S. Shridharan et al¹¹ showed that DM (45%) was the common co-morbid condition followed by hypertension and COPD. Silva et al¹² in their study on sepsis reported a common co-morbid condition was hypertension (38%), DM (21%), malignancy (18%), COPD (14%).

In our study, the common complications were respiratory failure, kidney failure and shock. The study by Jesus Blanco showed that the common complications associated with sepsis are respiratory failure, shock, kidney failure.¹³ The study by Jean Louis Vincent showed that the common complications associated with sepsis were shock, kidney failure and respiratory failure.⁸

The study by R. Goldwasser et al¹⁴ in Brazil showed 20% positive blood culture. Study by S. Shreedharan¹¹ showed that bacteria was present in 20% in blood culture. In our study, blood culture was positive in 13 patients giving overall bacteriological positive septicemia in 26%. In our study, total positive culture from the foci was seen in 34 patients. Among them 13 patients had positive blood culture.

In our study, 42% mortality was observed. The study by S. Shreedharan et al¹¹ showed that mortality was 31.5% in sepsis patients. The study by Eliezer Silva¹² showed that the mortality was 34%.

Our study showed that mortality increased with increase in comorbid conditions. It was observed that mortality was higher among the patients presenting with shock (73%) and abnormal liver function tests (70%). Mortality also increased with increasing number of organ failures. The study by Derek C. Angus showed that mortality was more with 3 or more organ failure.¹⁵ The study by Jean Louis Vincent et al⁸ also showed that mortality was higher with 3 or more organ failures. Our findings correlate with the above studies. Our study showed that mortality was higher in patients with positive blood culture.

CONCLUSION

Fatality rate due to sepsis was found 42% in the present study. Higher fatality rate was associated with age above 58 years, female gender, increase in co-morbid conditions, patients presenting with shock and abnormal liver function tests and increase in number of organ failures. Mortality was higher in patients with positive blood culture and patients with gram negative septicemia.

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