PROGNOSTIC FACTORS IN PATIENTS WITH SEPSIS SYNDROME

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Summary

Septicemia is a leading cause of mortality in hospitalized patients. The septic response is now a contributing factor in more than 1,00,000 deaths per year in the United States. Incidence of sepsis is increasing due to increase in the risk factors such as comorbid conditions like diabetes mellitus, immunocompromised status of patients etc. Objective of the study is to describe the clinico-demographic profile and to identify the factors which affect the prognosis in patients suffering from sepsis syndrome. The charts of sixty consecutive patients admitted in a tertiary care hospital were analyzed. Out of sixty patients 20 survived. Higher mortality as age increases was found statistically significant. Co morbid conditions also contributed significantly to mortality. Most common organism was staphylococci. Admissions in ICU or number of days in the ICU were not significantly associated with outcome. Cephalosporins were the most common antimicrobial agent prescribed. Most important finding of the study is the statistically significant relationship between comorbid conditions like diabetes mellitus and mortality due to sepsis syndrome. Respiratory infection as a source of infection also seen to adversely affect the outcome. Most common organism associated with sepsis syndrome was staphylococci, though the finding was statistically not significant

Key words-Sepsis, Mortality, septic shock, sepsis syndrome, septicemia

Introduction

 The incidence of sepsis is increasing due to increase in the risk factors like comorbid conditions, immunocompromised status of patients etc. This study was conducted to identify clinic-demographic profile of patients in India with sepsis syndrome.
The American College of Chest Physicians/Society of Critical Care Medicine Consensus Panel developed definitions of the various stages of sepsis, which can be briefly summarized as follows: Bacteremia is the presence of viable bacteria in the blood, sepsis is a systemic response to infection. Septic shock is sepsis with hypotension despite adequate fluid resuscitation.[1] Sepsis syndrome is the association of sepsis with altered organ perfusion and/or altered organ function.[2]

The sepsis syndrome is recognized clinically by the presence of 2 or more of the following: pyrexia or hypothermia, tachycardia, respiratory rate greater than 20 breaths per minute or a $PaCO2$ in arterial gas less than 32 mm Hg and WBC count greater than 12,000 cells/µL, less than 4000 cells/µL, or greater than 10% band forms. [1] Severe sepsis and septic shock occur in persons with preexisting illness or trauma. If sepsis is not diagnosed and treated early, it can become self-perpetuating and elderly persons in particular, are at a greater risk of death from sepsis [3]
Septicemia is a leading cause of mortality in hospitalized patients. The septic response is now a contributing factor in more than 1,00,000 deaths per year in the United States[4]. According to hospital discharge diagnoses, sepsis is the leading cause of death in non-coronary adult intensive care units (ICUs) and thirteenth leading cause of death among hospitalized patients overall. [5,6] The incidence of sepsis is increasing due to many attributable factors like aging of the population, increasing longevity of patients with chronic diseases, widespread use of antimicrobial agents, glucocorticoids and other immunosuppressive agents, indwelling catheters and mechanical ventilation. [4,7] However, many aspects of the epidemiology of septicemia remain poorly defined. Little has been published regarding the occurrence, clinical characteristics, complications, survival and patterns of drug utilization in sepsis in India.

The main objectives of this study are to evaluate demographic and clinical profile of the patients, types of bacteria responsible for septicemia, antimicrobial utilization and thereby identify prognostic factors contributing towards survival of the patients.

Subjects and Methods

The charts of sixty consecutive patients admitted in a tertiary care hospital in south India were reviewed. Information was collected regarding patient's demographics, documentation of a clinical diagnosis of an infection, source of the infection, signs of organ dysfunction, physician's orders and clinical chart notes regarding the infection. The presence of risk factors like concurrent use of corticosteroids & anticancer drugs, immunocompromised status were noted. Positive bacterial cultures were identified and the microbial pathogens werenoted. Diagnosis of sepsis syndrome including septicemia, sepsis & septic shock were considered. Information about the antibiotics, admissions to ICU and duration of stay in ICU were also taken into account. The source of the specimens for cultures were recorded such as blood, urine, sputum, CSF, pleural/ascitic fluid or swabs of cutaneous or mucosal samples. Permission was obtained from institutional review board for the study.

Statistical analysis

The acquired data was analyzed by using SPSS v15. Chi square test was applied wherever required and P value of <0.05 was considered statistically significant.

Results

Out of 60 patients studied, 20 survived and 40 died. Mortality rate was found to be 67%. Majority of the patients who died were in the age group of 19-64 yrs. This age distribution was found significant [P=<0.01]. Among the patents aged more than 65 years, the mortality rate was 86%[12/14]. Gender distribution was statistically insignificant. Higher prevalence of co-morbid conditions like diabetes mellitus[25%], immunocompromised status[22.5%], intake of anticancer drugs[15%] and glucocorticoids[5%] among non survivors was found to adversely affect prognosis [P=<0.01]. Distribution of important symptoms and signs of sepsis like fever, tachycardia, tachypnoea etc. among survivors and those who did not was not significant [P>0.05]. Distribution of various signs of organ dysfunctions among survivors and non survivors were also not significant. Among 28 patients who had lungs as the source of infection 89.3% died. Even among those who did not survive, lung was the source of infection in 62.5% of patients whereas it was the source in only 15% of the patients who survived.

Table 1: Clinico – demographic profile of patients with septic syndrome

Characteristics		Survivors n=20	Non survivors n=40	P value
Age	< 2 years	4[20]	0	
	2-18 years	2[10]	1[2.5]	< 0.05
	19-64 years	12[60]	27[67.5]	
	≥ 65 years	2[10]	12[30]	
Sex	Males	10[50]	25[62.5]	NS
	Females	10[50]	15[37.5]	
Symptoms * & signs [A patient might have had more than one symptom]	Fever	13[65]	22[55]	
	Tachycardia	10[50]	22[55]	
	Tachypnea	10[50]	21[52.5]	
	Lethargy	7[35]	15[37.5]	NS
	Swollen/tender limbs	4[20]	11[27.5]	
Co-morbidity	Diabetes mellitus	3[15]	10[25]	
	Anticancer drugs	0	6[15]	<0.01
	Corticosteroids	0	2[5]	
	Immuno-compromised	0	9[22.5]	
	Elevated urea,creatinine	7[35]	18[45]	
	Hypoxemia	7[35]	8[20]	

Signs of organ dysfunction	Respiratory failure	3[15]	17[42.5]	NS
	Jaundice	3[15]	16[40]	
	Metabolic acidosis	2[10]	9[22.5]	
	Shock	3[15]	6[15]	
	DIC	1[5]	4[10]	
	Acute encephalopathy	1[5]	3[7.5]	
Source of infection	Lungs	3[15]	25[62.5]	<0.01
	Skin & Wound infection	5[25]	3[7.5]	
	Abdominal	2[10]	3[7.5]	
	Genitourinary	3[15]	1[2.5]	
	Puerperal sepsis	1[5]	5[12.5]	
	Intravascular devices	1[5]	1[2.5]	
	Unidentified	5[25]	2[5]	
Diagnosis	Septicemia	2[10]	5[12.5]	NS
	Sepsis	16[80]	26[65]	
	Septic shock	2[10]	9[22.5]	

This difference of higher prevalence of lungs being the source of infection, as compared to other sources, among nonsurvivors was found significant [P = < 0.01]. Distribution of various stages of sepsis syndrome like septicaemia, sepsis and septic shock among survivors and non-survivors was not significant. [Table 1]

Culture and sensitivity was tested in various body exudates in 55 patients. Various organisms were isolated in 35 patients. *Staphyllococci* was the most common organism isolated among both survivors and non survivors. But type of organism isolated did not significantly affect outcome in this study. [Table 2].

 Out of 60 patients, 22 were managed in intensive care unit, out of which 14 died. The number of patients was maximum in the stay period of 3-4 days, in ICU, among both survivors and non survivors. But this was not statistically significant. Majority of the patients [60%] received empirical antimicrobial therapy irrespective of the results of culture and sensitivity tests. However in 30% of the patients, antimicrobial agents were changed after the sensitivity test. Only among three patients antibiotic choice was entirely decided by the sensitivity results. But these various modalities of antibiotic selection did not have statistical significance in the survival or non survival.

Cephalosporins were the chosen antimicrobial agent in 53.3% of patients followed by penicillins [33.3], metronidazole [31.7%] fluoroquinolones [18.3%], aminoglycosides [16.7%] and others. Every patient was on more than one antibiotic at any given time.

Discussion

A strong linear association was found, in this study, between co-morbid conditions and mortality. The results of the study show that mortality rate is 67% in patients with sepsis syndrome. Those with predisposing factors like diabetes mellitus, those on anticancer drugs and corticosteroids and those with immunocompromised status showed much more risk of dying. Clinical symptoms and signs were recorded but did not contribute in the prognosis detection and the same holds true

for signs of organ dysfunction. Lung as a source of infection was an important prognostic indicator as compared to others in this study. Respiratory tract was the predominant infection site in the study of sepsis syndrome by Hans Kieft *et al* and shock and an immunocompromised state were significantly associated with mortality. [8]

Pittet *et al* has done bedside prediction of mortality from bacteremic sepsis in ICU patients where they found that the best two prognostic factors were APACHE II score and number of organ dysfunction. [9] They found mortality was 43%. But in the present study, mortality rate has been found to be 67% and at the same time the prognostic factors, which predicted the mortality, have been found to be lung as a source of infection and co-morbid conditions.

In the study done by Mortlock S *et al* and Escande MC *et al*, *staphylococci* (16%) were the most common organisms which were found in bacteremic patients attending a cancer hospital. Similar result is also found in this study. [10]

In a study of epidemiology of sepsis syndrome in eight academic medical centers by Kenneth E *et al*, bloodstream infection was found in 28% patients where as in the current study, bloodstream infection was found in 63.6% of patients in whom culture was done. [11]

Conclusion

Most important finding of the study is the statistically significant relationship between comorbid conditions like diabetes mellitus and mortality of sepsis syndrome. Respiratory tract as a source of infection also seen to adversely affect the outcome. Most common organism associated with sepsis syndrome was staphylococci, though the finding was statistically not significant.

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