



Research Article

STUDY ON CLINICAL PROGNOSIS OF PATIENTS ADMITTED WITH SEPSIS

A. Joseph Panneerselvam¹ and Girubaharan D²

¹Department of General Medicine, K.A.P.V Government Medical College, Trichirapalli

²Department of General Medicine, Ramanathapuram Government Medical College, Ramanathapuram

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ABSTRACT

We decided to undertake a study to determine prognostic profile of patients admitted with severe sepsis. A total number of 110 cases of sepsis admitted in the medical wards were studied. This prospective study was conducted with the hospital ethics committee approval and informed written consent. The commonest clinical feature among patients was altered blood pressure 84 (88.4%) followed by altered temperature 78 (82.1%), Altered sensorium 77 (81.8%) and breathlessness 77 (81.1%). Oliguria was seen in 60 (63.2%) patients. Tachycardia was seen in 60 (63.2%) patients and tachypnea was present in 52 (54.7%) cases. Hemodynamic and renal dysfunctions have been the most prevalent disorders, respiratory involvement and thrombocytopenia have gone down while coagulopathy has increased significantly. Mortality has decreased significantly. We have performed a multivariate analysis of the early prognostic factors. Type, origin, sepsis etiology, lactate and the presence of organ dysfunction -except for hyperbilirubinemia and hypotension- were the most important mortality factors. The prognosis of sepsis and septic shock remains poor. Although prognostic factors have been identified for some patients, groups have not yet been able to identify the immediate or long-term prognosis for the majority of these septic patients.

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INTRODUCTION

Triggering of evidence-based treatment systems requires recognition of sepsis and the initiation of a treatment response as early as possible. For the last two decades, sepsis has been defined as suspected or evident infection accompanied by at least two signs of systemic inflammatory response syndrome (SIRS). Observations of patients with suspected infection, including vital signs and organ function, have been insufficiently monitored for development of sepsis, especially at ward level. Ward nurses, who are at the bedside of patients in hospital, are in a key position to identify early-stage sepsis and development of organ failure, yet they have not been central to the sepsis campaign. It is not known how a systematic continuation of observations of SIRS and organ failure in hospitalized patients with suspected or confirmed infection will impact the outcomes of patients with sepsis. Sepsis, the human body's systemic inflammatory and coagulopathic response to infection, is a life-threatening illness that often progresses to a severe form manifested by multiple organ failure and death, even after the primary infection or clinical insult has been treated successfully. Sepsis is the leading cause of death in non-coronary adult intensive care units in the United States and the ninth leading cause of death overall, based on data from the year 2000 for septicemia. The initial steps in the diagnosis of sepsis are a thorough medical history and a complete physical examination of the patient.

There are numerous clinical manifestations of sepsis, but the most common are fever or hypothermia, unexplained tachycardia, leukocytosis or leukopenia, thrombocytopenia or coagulopathy, altered blood pressure and altered mental status. Other symptoms are oliguria, unexplained lowering of the mean arterial blood pressure. Initial assessment also includes a complete blood count with differential, complete biochemistry profile, platelet count, prothrombin time, activated partial thromboplastin time, urine analysis and arterial blood gases. A diagnosis of severe sepsis, septic shock and multiple organ dysfunction syndrome requires careful evaluation of the respiratory, cardiovascular, renal, gastrointestinal, hepatic, central nervous and hemostatic organ systems for signs of dysfunction. Although there is much advancement in diagnosing early sepsis, there are no standard thresholds of laboratory results available to identify septic patients at high risk of organ dysfunction. The clinician must identify dysfunction in more than one organ system to diagnose multiple organ dysfunction syndrome. The only organ dysfunction score or severity of illness instrument that has been validated for use within patients over time is the Sequential Organ Failure Assessment score. Hence we decided to undertake a study to determine clinical profiles of patients admitted with severe sepsis.

**Corresponding author: A. Joseph Panneerselvam*

Department of General Medicine, K.A.P.V Government Medical College, Trichirapalli

AIM

To study prognostic factors in patients admitted with sepsis.

MATERIALS AND METHODS

Indira Gandhi Government General Hospital and Post Graduate Institute, Pondicherry is a 500 bedded tertiary care hospital which caters to five lakh population in and around Pondicherry. A total number of 110 cases of sepsis admitted in the medical wards were studied. This prospective study was conducted with the hospital ethics committee approval and informed written consent. We recruited the cases based on the inclusion criteria.

After initial clinical assessment the cases were subjected to urine, hematological, biochemical investigations including renal and hepatic functions. In addition all cases were tested for their coagulation profile, arterial blood gas, C-Reactive Protein, assay, appropriate culture and sensitivity tests in blood, urine, intra-vascular lines, sputum, Cerebrospinal fluid, X-ray chest PA view, electro cardiogram, ultra sonogram of abdomen were taken in all the cases.

The following tests were done based on the clinical presentation:

1. Echocardiogram - To measure LV dysfunction and LV Ejection Fraction
2. X-Ray abdomen - erect view for suspected intra abdominal and retroperitoneal pathology
3. CT Scan abdomen - for suspected intra abdominal and retroperitoneal pathology
4. Lumbar puncture - for suspected meningitis

Inclusion Criteria

1. Age > 18 years
2. Febrile patients with evidence of at least one organ system failure
3. Critically ill patients with positive blood cultures
4. Critically ill patients with co-morbid conditions, eg. diabetes, heart failure, COPD, CRF, immuno deficiency.
5. Patients with characteristic features of severe sepsis, eg. hypoxemia, hypotension, DIC.

Exclusion Criteria

1. Patients with negative blood cultures
2. Patients treated elsewhere with antibiotics

Altered temperature include both fever ($>37.5^{\circ}\text{C}$) and hypothermia ($< 35^{\circ}\text{C}$). Similarly altered blood pressure include both hypotension (BP $<90/60\text{mm Hg}$) and hypertension (BP $>140/90\text{mmHg}$). Changes in total count include both leucocytosis ($>12 \times 10^9/\text{l}$) and leucopenia ($<4 \times 10^9/\text{l}$). Altered ABG consists of any one of metabolic and respiratory acidosis or alkalosis. Positive culture patients were treated with appropriate antibiotics after culture and sensitivity reports (aerobic / anaerobic / amoebic / fungal). Patients diagnosed with sepsis were treated with appropriate antibiotics / antifungals / antiamoebic, inotropes, mechanical ventilation, renal replacement therapy, surgical interventions which were tailored according to the need of the patients and the outcome was studied. Data analysis was done using SPSS 11.5, Microsoft Excel software using Windows version-17. Pearson's 'P'- value, chi-Square tests. odds ratio and multivariate logistic

regressions, confidence intervals were used to determine statistical significance. Statistical analysis was done between individual clinical signs and symptoms versus outcome of the patient :Statistical analysis was done on individual symptoms and signs – altered temperature, altered blood pressure, tachypnea, cyanosis, oliguria, anemia, jaundice, tachycardia, arrhythmias, bleeding, thrombotic episodes, perforation, delerium, coma, and they are correlated with the outcome of patients admitted with sepsis.

RESULTS

Patients admitted with sepsis were evaluated clinically and with laboratory investigations. Out of 110 cases, 13 cases of them were found to have alternate diagnosis and hence excluded. Two of them did not give consent for the study, hence 95 cases were enrolled and studied. Out of 95 patients, the commonest age group was between 41-60 years. The youngest was 20 years and the oldest 75. The mean age at presentation was 54. Out of the total 95 patients, 51 (53.7%) were male and 44 (46.3%) patients were female. The sex distribution was almost equal in the study. The male to female ratio was 1:0.86. The commonest clinical feature among 95 patients was altered blood pressure 84 (88.4%) followed by altered temperature 78 (82.1%), Altered sensorium 77 (81.8%) and breathlessness 77 (81.1%). Oliguria was seen in 60 (63.2%) patients. Tachycardia was seen in 60 (63.2%) patients and tachypnea was present in 52 (54.7%) cases. Lung is the commonest organ involved (70%) followed by urinary tract (55%) and bacteremia (40%) in patients with sepsis.

Hemodynamic and renal dysfunctions have been the most prevalent disorders, respiratory involvement and thrombocytopenia have gone down while coagulopathy has increased significantly. Mortality has decreased significantly. We have performed a multivariate analysis of the early prognostic factors. Type, origin, sepsis etiology, lactate and the presence of organ dysfunction -except for hyperbilirubinemia and hypotension- were the most important mortality factors.

DISCUSSION & CONCLUSION

The diagnosis of sepsis involves a thorough medical history, complete physical examination and clinical and laboratory profiles which may determine the risk of morbidity and mortality. Although there is much advancement in diagnosing early sepsis, there are no standard thresholds for individual clinical and laboratory parameter to identify septic patient at risk for poor outcome. There are many clinical scoring systems such as SOFA score, APACHE II score that have provided useful tool in the assessment of septic patient which are based on cardio-pulmonary, renal, liver and central nervous function. Since some of the variables in the scores require sophisticated technologies and materials, besides being technically demanding, they cannot be routinely used in the government hospitals or charitable institutions of health care which have limited resources. Hence with limited resources, we undertook the study of clinical and laboratory profiles to assess the severity of sepsis and its outcome. In our study, the mean age at presentation is 54 years which is comparable with other studies like Angus DC *et al* (53 yrs), Martin GS, Mannio DM *et al* (54 yrs). In our study, the incidence of sepsis in males is 53% and females 47%. The male to female ratio is 1:0.86. This is also similar to other studies like Linde-Zwible WT,

Lidicker J *et al*, and Eaton S, Mannino DM *et al*. The commonest clinical finding in our study is altered blood pressure (88.4 %) followed by altered temperature (82.1%). This is similar to the studies of Rodrigues JC, *et al*, motot I, Spring CL, and Wheeler AP, Bernaud GR. The study of Dinarello CA showed similar results to our study. Altered sensorium is seen in 81.8 % of the patients with sepsis and the presence of the altered sensorium has a statistically significant correlation with the outcome of patients. This in turn is similar to the results of studies by Balk RA, Eidelman LA *et al*, Papadopoulos ML Ely EN, Trumen B *et al* and Inouyesk *et al* Severity of septic encephalopathy correlates significantly with high mortality rate and poor outcome in patients with sepsis, which was also seen in our study. This also correlates with the study of Spring CL, Shutneyctt *et al* Tachycardia, tachypnea and hyperventilation is seen in 63.2 %, 54.7 %, 36% of our patients respectively. It also indicates poor outcome in patients. In our study all these variables correlates with the outcome of the patient and attain statistically significant except for tachycardia with correlates but does not attain statistical significance. This in turn is similar to the studies of Bone RC *et al* and Artiagas A Brighawk *et al*

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