RESEARCH ARTICLE

ROLE OF SERUM HsCRP AS PROGNOSTIC MARKER IN SEPTICEAMIA IN ELDERLY POPULATION

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ABSTRACT

Background: Presence of elevated serum HsCRP is strongly associated with morbidity and mortality in diverse populations with sepsis and is a potentially useful biomarker to risk stratify patients with severe sepsis.

Aims & Objective: We aimed to study whether the serum HsCRP level at presentation in elderly patients with sepsis correlate with stage of sepsis and ultimate outcome.

Material and Methods: In a single centre prospective, observational study conducted in geriatric ward of tertiary care centre, 200 elderly patients (age>60 yrs) with sepsis were included. The primary outcome was 14 days in hospital mortality. Risk factor variable was venous serum HsCRP (mg/l) at presentation.

Results: Mortality at 14 days in elderly patients with sepsis was 20%. Mean serum HsCRP in survivor group was 33.42 ± 21.56 while 57.28 ± 25.31 in mortality group (p value <0.001). The mean serum HsCRP level in survivor and non survivors was 32.49 ± 21.45 and 48.05 ± 16.40 in sepsis, 33.61 ± 25.45 and 67.71 ± 21.49 in severe sepsis, 46.62 ± 10.55 and 73.82 ± 32.87 in MODS while 49.0 ± 26.72 and 101.5 ± 9.19 in septic shock group.

Conclusion: We conclude that initial high serum HsCRP level was associated with increased mortality independent of etiology of sepsis, it also correlate well with severity of sepsis and serum HsCRP level were high in those with septic shock.

KEY-WORDS: HsCRP; Acute Phase Reactant; Infection; Sepsis; Elderly

Introduction

Sepsis is a severe, debilitating clinical condition that substantially alters the lives of those affected. Sepsis is body response to infection. It is defined as the clinical syndrome with the presence of both infection and systemic inflammatory response.[1] The presence of elevated serum HsCRP is strongly associated with morbidity and mortality in diverse populations with sepsis and is a potentially useful biomarker to risk stratify patients with severe sepsis. We aimed to study whether the serum HsCRP level at presentation in elderly patients with sepsis correlate with stage of sepsis and ultimate outcome.

Materials and Methods

The study took place at the Geriatric Division in the Department of General Medicine, Sir Sunder Lal Hospital, BHU, Varanasi, with the collaboration of Microbiology Department, IMS, BHU, Varanasi, between July 2011 and June 2012.

The study included 200 consecutive elderly patients (≥60 years of age) with clinically suspected sepsis. Sepsis definition was based on the presence of infection and 2 or more of the SIRS criteria.[1]

The primary outcome was the hospital mortality at 14 days. Risk factor variable was venous serum HsCRP (mg/l) at presentation which was measured by ELISA method which is based on the principle of a solid phase enzyme linked immunosorbent assay as per standard protocol. In addition, Blood and other site cultures, routine biochemical and hematological tests were done as per standard protocol, while several diagnostic procedures (chest x-rays, ultrasound, etc.) were performed to identify the source of infection. All patients were treated with an empirical antibiotic regimen based on the protocols supervised by the treating consultants. The study protocol was approved by the Hospital Ethics Committee and all subjects gave written consent for participation.

Results

The mean age of the study population was 67.62 ± 6.69 years with maximum number of patients (66%) was in the 60-69 age groups. There were more males (57.5%) than females (42.5%) in this study and the M:F ratio was 1.35. Table 1 shows the outcome of sepsis in the study population at 14 days. Mortality at 14 days in elderly patients with sepsis was 20%. Table 2 shows the outcome of sepsis in relation to the stage of sepsis. Outcome of sepsis in relation to stage of sepsis was statistically significant (p=0.032).

Table-1: Outcome of Sepsis in the Study Population at 14 Days

Outcome of Sepsis	No. of Cases	Percentage
Improved	160	80%
Death	40	20%
Total	200	100%

Table-2: Outcome of Sepsis in Relation to Stage of Sepsis in the Study Population

Stage of Sepsis	Outcome		Total (%)
	Improved (%)	Death (%)	
Sepsis	132 (82.5%)	19 (47.5%)	151 (75.5%)
Severe Sepsis	18 (11.25%)	6 (15%)	24 (12%)
MODS	8 (5%)	11 (27.5%)	19 (9.5%)
Septic shock	2 (1.25%)	4 (10.0%)	6 (3%)
Total	160 (100%)	40 (100%)	200 (100%)

χ^2=8.785, p=0.032

Table-3: Level of Mean Serum HsCRP in Different Stages of Sepsis in Expired and Improved Groups

Group	Number (improved/ Expired)	Improved (n=160)	Expired (n=40)	P value
Sepsis (n=151)	132/19	32.49±21.45	48.05±16.40	0.002
Severe sepsis (n=24)	18/6	33.61±25.45	67.71±21.49	0.007
MODS (n=19)	8/11	46.62±10.55	73.82±32.87	0.038
Septic shock (n=6)	2/4	49.0±26.72	101.5±9.19	0.017

Table-4: Level of Mean Serum HsCRP in Expired and Improved Groups in the Study Population

Parameter	Improved (n=160)	Expired (n=40)	P value
HsCRP	33.42±21.56	57.28±25.31	<0.001

Table 3 shows the level of mean serum HsCRP level in expired and improved groups in different stages of sepsis. Significant correlation was found between the outcome of sepsis and serum HsCRP level in all stages of sepsis, with a p value < 0.05 in each of them. The mean serum HsCRP level in survivor and non survivors was 32.49 ± 21.45 and 48.05 ± 16.40 in sepsis, 33.61 ± 25.45 and 67.71 ± 21.49 in severe sepsis, 46.62 ± 10.55 and 73.82 ± 32.87 in MODS, while 49.0 ± 26.72 and 101.5 ± 9.19 in septic shock group. Table 4 shows the level of mean serum HsCRP level in expired and improved groups in the study population. Significant correlation was found between the outcome of sepsis and Serum HsCRP level with a p value < 0.001.Mean serum HsCRP in survivor group was 33.42 ± 21.56 while 57.28 ± 25.31 in mortality group (p value <0.001).

Discussion

The present study was conducted to evaluate the role of serum HsCRP as a prognostic marker in elderly patients presenting with sepsis. The elderly patients with suspected septicemia were the study subjects in this study.

The mean age of our study population was 67.62 ± 6.69 years with maximum number of patients (66%) in the 60-69 age groups. Similar to our study, Leibovici et al also noted that episodes of bacteremia in the 60-69 age group (656) was nearly double than in patients of 80 years of age or older (339). Also, in a similar study by B.M. Greenberg et al., more patients were in the 65-74 age group (128) than in ≥ 75 age group (110).[2] This difference was even more pronounced in our study probably because in our part of world, less number of people are in the ≥80 age group, as life expectancy is low in our country as compared to developed world.

In our study, 40 patients (20%) expired and outcome of sepsis was significantly correlated with the stage of sepsis at the time of admission (p=0.032). In the study by Leibovici et al., thirty-five percent of patients aged 80 years or older and 30% of patients aged 60-79 years died during hospitalization.[4] This can be explained by the finding that in their study more patients were diagnosed as suffering from septic shock (13% of 60-79 age group and 9% of ≥ 80 years age group) compared to our study (3% of patients were in the septic shock group). They also concluded that shock (or low systolic blood pressure on admission) was significantly associated with fatal outcome. C.A. Gogs et al. carried out a study to analyze the clinical characteristics and determine predictive factors of mortality in previously healthy individuals suffering from severe sepsis.

They also found that the single best clinical indicator of poor outcome was the presence of septic shock on admission.[3]

In our study, the mean serum HsCRP in the improved patients (160) was 33.42 ± 21.56 and it was 57.28 ± 25.31 in expired patients (40). There was significant correlation found between the outcome of sepsis and the mean HsCRP level with an R value=0.330 and p value <0.001. It was also found that the mean serum HsCRP was higher in critically ill patients (including severe sepsis, MODS, Septic shock) as compared to the patients of sepsis who were not critically ill in both the improved and expired groups (p value=0.004).

The plasma CRP levels in the groups definite and Probable sepsis were significantly higher than in the groups Negative and Unlikely sepsis ($p < 0.05$). Plasma CRP of 50 mg/l or more was highly suggestive of sepsis which was similar to our study as plasma CRP is 48 mg/L or more in expired group and 32.49 mg/l or more in improved group.[6]

A 25% or greater increase in the plasma CRP level was highly suggestive of sepsis in critically ill patients. This study pointed to the fact that the 'normal' plasma CRP level in critically ill patients rarely lies within the normal range for a healthy population.[5]

Determination of serum C-reactive protein can be used as an early indicator of infection in patients with SIRS as it was found to be raised in majority of patients with Sepsis, which was similar to our study as it was found to be raised in majority of patients in our study population suspected of septicaemia.[7]

Conclusion

We conclude that initial high serum HsCRP level was associated with increased mortality independent of etiology of sepsis, it also correlate well with severity of sepsis and serum HsCRP level were high in those with septic shock.

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