Original Research Article

To evaluate the role of PCT as a prognostic marker in sepsis and its importance in outcome and mortality

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Abstract:

Background & Method: The aim of this study is to evaluate the role of PCT as a prognostic marker in sepsis and its importance in outcome and mortality. After taking all aseptic precautions blood samples were drawn from all patients within 24 hours of admission to the ICU for hemoglobin, total leukocyte count, erythrocyte sedimentation rate, serum total bilirubin, SGPT, blood urea, serum creatinine, blood culture and estimation of serum Procalcitonin. Day zero was defined as the first observational day at admission, and the next day was named day 1, then day 2, and so on.

Result: Out of 100 patients, 20 patients were deceased and 80 patients were survived in our study. A significantly higher proportion of non survivors demonstrated higher PCT concentrations as compared to those who were alive at ICU discharge. By using Chi-square test the difference was found to be statistically significant (P = 0.015).

Conclusion: The current review was an endeavor to evaluate the convenience of Procalcitonin as a biomarker of sepsis in the early delineation of grown-up patients confessed to the emergency unit thought sepsis. The review results uncovered that the expansion of serum procalcitonin to the standard work-up of basically sick patients with thought sepsis could increment demonstrative sureness and help in better persistent administration. Nonetheless, further huge scope studies are prescribed to assess the symptomatic as well as prognostic utility of PCT in ICU setting of tertiary consideration medical clinics in India.

Keywords: PCT, sepsis, outcome and mortality.

Study Designed: Observational Study.

1. INTRODUCTION

Sepsis, also called "blood poisoning" or septicaemia, is defined as presence of systemic inflammatory response syndrome (SIRS) caused by an infection. It is characterized by signals of inflammation (vasodilatation, leukocyte accumulation, increased micro-vascular permeability) occurring in tissues. In the literature definitions of sepsis is somewhat inconsistent, as is the use of terms like septicaemia, sepsis or sepsis syndrome[1]. Sometimes sepsis has been defined as blood culture positive infection, sometimes as an inflammatory state without infection at all.

An agreement meeting between the American School of Chest Doctors (ACCP) and the General public of Basic Consideration Medication (SCCM) in 1991 characterized the clinical models for fundamental fiery reaction disorder (SIRS), sepsis, serious sepsis and septic shock[2]. These definitions were distributed in 1992, and in many sepsis concentrates on patients are as yet ordered on this basis[3]. Notwithstanding, sepsis implies an extremely heterogeneous patient populace, which changes in etiology and seriousness; hence, generally pertinent symptomatic measures and treatment algorhythms are hard to be characterized. In any case, sepsis has turned into a vital wellbeing monetary issue overall around the world[4].

Sepsis is a state brought about by microbial attack from a neighborhood irresistible source into the circulatory system which prompts indications of foundational disease in far off organs," this was the principal logical meaning of sepsis[5]. Sepsis alludes to the fundamental reaction to serious contamination by any class of miniature life form. Sepsis can be essentially characterized as a range of clinical indications made by safe reaction of a patient disease by miniature life form. Sepsis, septicemia, and circulatory system diseases (bacteremia) were considered to allude to a similar clinical condition, and, by and by, the terms were frequently utilized reciprocally. It goes from foundational incendiary reaction (SIRS) to numerous organ brokenness (MODS) and at last death[6].

2. MATERIAL & METHOD

The present prospective, cross-sectional, observational study was undertaken on 100 patients in the department of biochemistry of Index Medical College Hospital & Research Centre, Indore from Jan 2020 to Dec 2021. The study cohort consisted of adult patients admitted to the ICU on suspicion of infection. Informed written consent was taken from all the subjects.

After taking all aseptic precautions blood samples were drawn from all patients within 24 hours of admission to the ICU for hemoglobin, total leukocyte count, erythrocyte sedimentation rate, serum total bilirubin, SGPT, blood urea, serum creatinine, blood culture and estimation of serum Procalcitonin. Day zero was defined as the first observational day at admission, and the next day was named day 1, then day 2, and so on. Body temperature, pulse, blood pressure and respiratory rate were recorded daily after admission into ICU. Symptoms and clinical signs, underlying diseases, and diagnosis at admission were recorded. After collecting the data it will be evaluated and compared between the study groups for diagnostic & prognostic value of Procalcitonin.

Inclusion criteria's:
1. Heart rate >90 beats/min.
2. Temperature >38 degree Celsius or < 36degree Celsius
3. Respiratory rate >20 breaths/min.

Exclusion criteria's:
1. Failure to obtain informed consent
2. Age less than 18 years
3. Trauma

4. Surgery

3. RESULTS

Table No. 01: Gender Distribution of patients

Sex (M/F)	Number of patients	Percentage (%)
Male	69	69.0
Female	34	31.0
Total	100	100.0

The above table shows the distribution of patients according to sex. In the present study, 69% of the study patients were males and 31% were females.

Table No. 02: Symptoms wise distribution of patients

Symptoms	Number of patients	Percentage (%)
Fever	83	83
Chills & rigors	41	41
Cough	36	36
Shortness of breath	47	47
Pain in abdomen	14	14
Burning micturition	16	16
Headache	10	10
Nausea & vomiting	12	12

Altered sensorium	20	20

The above table shows the symptoms wise distribution of patients. In our study the most common symptom was fever (83%), followed by chills & rigors (41%) and shortness of breath (47%).

Table No. 03: Common signs wise distribution of patients

Common signs	Number of patients	Percentage (%)
Febrile-high temperature	25	25
Tachycardia	41	41
Tachypnoea	23	23
Hypotension	11	11

The above table shows the common signs wise distribution of patients.
In our study, tachycardia (41%) was the most common sign followed by high temperature (25%) and tachypnoea (23%).

Table No. 04: Comparison of Procalcitonin concentration with outcome at day zero

Outcome	PCT concentration		Number of patients	P Value
	≤0.5 ng/mL	≥0.5ng/mL		
Survivors	42	38	80	
Non-survivors	02	18	20	<0.05

Chi-square ' 2' test *applied. P value < 0.05 was taken as statistically significant*
The above table shows Comparison of PCT concentration in relation to Outcome of the patients. Out of 100 patients, 20 patients were deceased and 80 patients were survived in our study. A significantly higher proportion of non survivors demonstrated higher PCT concentrations as compared to those who were alive at ICU discharge. By using Chi-square test the difference was found to be statistically significant (P = 0.015).

4. DISCUSSION

Sepsis is a serious disease nevertheless a typical reason for grimness and mortality in asset restricted settings like India. In any event, when microbiologic diagnostics are free, bacteremia is just distinguished in an extent of patients who present with sepsis and circulatory system contaminations. In this symptomatic quandary, Procalcitonin (PCT) has invigorated extraordinary interest as a possibly more unambiguous marker for bacterial disease.

A large portion of the sepsis patients who had mortality had high PCT level (> 2ng/ml) at the hour of confirmation. A concentrate by Martin et al., (2003) [7] showed that mortality in patients with sepsis from different focuses changed somewhere in the range of 16.8 and 31.8%. Sands et al., (1997) [8] concentrated on sepsis in eight scholastic clinical focuses revealed a death pace of 34%. Mortality could be credited to mature and different gamble factors that are more normal in that age bunch. An extra gamble factor for expanded mortality would be diabetes. As of late Nargis W et al., (2014) [9] announced that the patients with PCT level more than 10ng/ml uncovered death pace of 16.6%.

In this review, we saw that PCT might be an early prognostic marker in patients with sepsis since the people who eventually passed on showed an essentially higher recurrence of raised PCT focuses on confirmation than the people who were alive at ICU release. The current review is additionally in concurrence with past information which shows that patients with unfortunate guess had more elevated levels of procalcitonin on first day of the sickness

In any case, different examinations recorded that the course of PCT fixations as opposed to the underlying level assumes a significant part for guess detailed that serum PCT level didn't anticipate mortality and starting focus was not fundamentally unique among survivors and non-survivors. The prognostic worth of the underlying PCT focus on affirmation actually still needs to be explained.

5. CONCLUSION

The current review was an endeavor to evaluate the convenience of Procalcitonin as a biomarker of sepsis in the early delineation of grown-up patients confessed to the emergency unit thought sepsis. The review results uncovered that the expansion of serum procalcitonin to the standard work-up of basically sick patients with thought sepsis could increment demonstrative sureness and help in better persistent administration. Nonetheless, further huge scope studies are prescribed to assess the symptomatic as well as prognostic utility of PCT in ICU setting of tertiary consideration medical clinics in India.

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