

ORIGINAL RESEARCH

Assessment of serum procalcitonin in acute febrile illness as a predictor of bacterial infection

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ABSTRACT

Background: Infectious diseases are a major cause of mortality worldwide and exert a significant burden on the public health care system. The present study was conducted to assess serum procalcitonin in acute febrile illness as a predictor of bacterial infection. **Materials & Methods:** 70 patients with acute febrile illness of both genders were included. Serum Procalcitonin was measured using Finecare PCT rapid quantitative test. Levels of serum PCT > 0.5ng/ml were considered elevated. **Results:** Out of 70 patients, males were 40 and females were 30. 26 patients had TLC <11000 with PCT <0.5 and 12 had TLC >11000 with PCT <0.5. 21 patients had TLC <11000 with PCT >0.5 and 11 had TLC >11000 with PCT >0.5. The difference was non- significant (P> 0.05). **Conclusion:** Serum procalcitonin is a useful marker of bacterial infection.

Key words: Serum procalcitonin, Infectious diseases, urinary tract infection

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INTRODUCTION

Infectious diseases are a major cause of mortality worldwide and exert a significant burden on the public health care system. Delay in timely initiation of appropriate therapy can have devastating consequences in infectious diseases.¹ While early antibiotic use in an acute febrile illness can be life-saving in certain situations, inappropriate and excess antibiotic use promotes development of antibiotic resistance.² Hence it is prudent to initiate antibiotics in the presence of adequate evidence that the infection is bacterial. Although a positive culture for bacteria is the gold standard test for definitive diagnosis of bacterial infections, it requires a minimum of three days before results are available.³

PCT is a calcitonin precursor consisting of 116 amino acids. PCT is usually secreted by the thyroid gland, and trace amounts of it can be measured in the blood.⁴ However, expression of the CALC1 gene, which produces PCT, is rapidly increased by stimulation of inflammatory cytokines in infectious conditions, such as pneumonia and urinary tract infection. PCT is rapidly secreted into the blood from the thyroid gland,

spleen, liver, and kidney. In previous studies, PCT level has been shown to predict the severity and prognosis of disease.⁵ These characteristics make serum procalcitonin a suitable marker for early detection of bacterial infection and to rule out viral infection. Serum procalcitonin levels is being increasingly utilised as a guide for starting antibiotic therapy in infectious condition.⁶ The present study was conducted to assess serum procalcitonin in acute febrile illness as a predictor of bacterial infection.

MATERIALS & METHODS

The present consisted of 70 patients with acute febrile illness of both genders. All were informed regarding the study and their written consent was obtained. Data such as name, age, gender etc. was recorded. A through clinical examination was carried out. Serum Procalcitonin was measured using Finecare PCT rapid quantitative test. Normal reference range was 0- 0.5ng/ml. Levels of serum PCT > 0.5ng/ml were considered elevated. Leucocytes level was also measured. Data thus obtained were subjected to

statistical analysis. P value < 0.05 was considered significant.

RESULTS

Table I: Distribution of patients

Total- 70		
Gender	Males	Females
Number	40	30

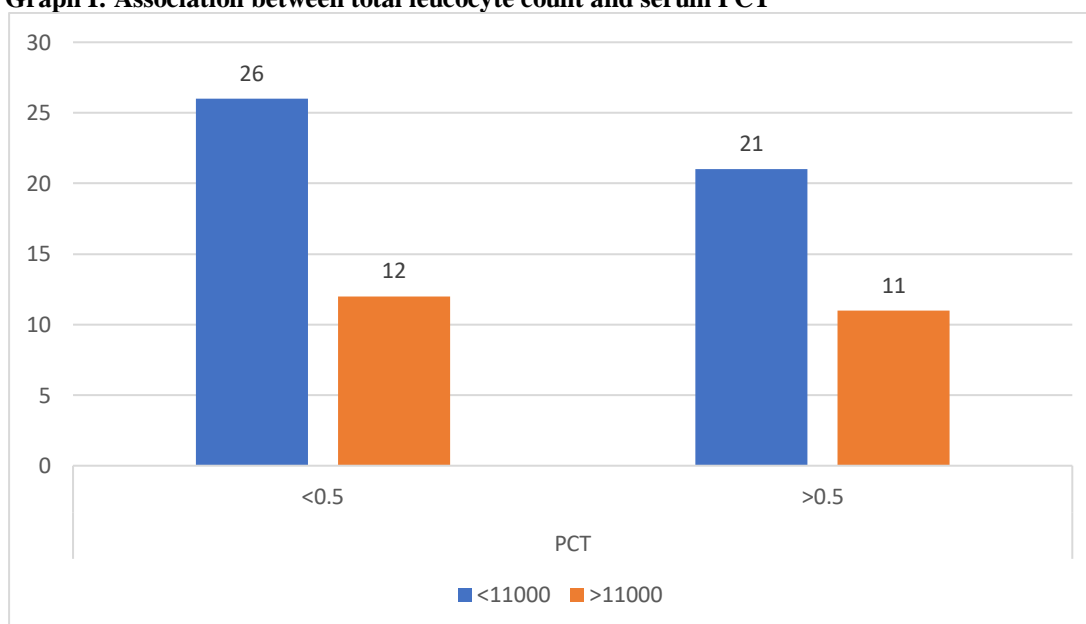
Table I shows that out of 70 patients, males were 40 and females were 30.

Table II: Association between total leucocyte count and serum PCT

Total leucocyte count	PCT		P value
	<0.5	>0.5	
<11000	26	21	0.82
>11000	12	11	
Total	38	32	

Table II, graph I shows that 26 patients had TLC <11000 with PCT <0.5 and 12 had TLC >11000 with PCT <0.5. 21 patients had TLC <11000 with PCT >0.5 and 11 had TLC >11000 with PCT >0.5. The difference was non-significant (P> 0.05).

Graph I: Association between total leucocyte count and serum PCT



DISCUSSION

Total leucocyte count (TLC) is a readily available test and may be elevated in bacterial infections. But it is non-specific as it can also be elevated in non-infectious conditions like trauma, emotional stress, surgery, certain medications and smoking.⁷ Moreover, a normal or low leucocyte count does not rule out bacterial infection. A rapidly available test with reasonable sensitivity and specificity is required to detect bacterial infections and differentiate it from viral infections in the emergency setting.⁸ Such a test will aid in critical decision making such as initiation of broad-spectrum antibiotics even before culture reports are available. Recently Serum procalcitonin (PCT) has been described as a specific biomarker for bacterial infection.⁹ The present study was conducted to assess serum procalcitonin in acute febrile illness as a predictor of bacterial infection.

We found that out of 70 patients, males were 40 and females were 30. Shashidharan et al¹⁰ studied the levels of serum procalcitonin in acute febrile illness and its correlation with bacterial culture and sensitivity. A total of 68 adults presenting with an acute febrile illness were included in the study. Serum procalcitonin, total leucocyte count were measured and samples sent for bacterial culture and sensitivity immediately on admission, before the institution of therapy. A highly significant association was found between elevated serum procalcitonin levels of >0.5 mg/ml and a positive culture for bacteria.

We found that 26 patients had TLC <11000 with PCT <0.5 and 12 had TLC >11000 with PCT <0.5. 21 patients had TLC <11000 with PCT >0.5 and 11 had TLC >11000 with PCT >0.5.

U P Dior et al¹¹ among febrile parturients, leucocytosis was not found to be reliably associated with bacterial infection. P. Hausfater et al¹² reported

that leucocyte count was not found to be independently associated with systemic bacterial infection.

Chirouze et al¹³ determined the serum PCT level, C-reactive protein (CRP) level, and erythrocyte sedimentation rate (ESR). Of 165 patients, 22 (13%) had bacteremic episodes and 143 (87%) had nonbacteremic episodes. PCT levels, CRP levels, and ESRs were significantly higher in bacteremic patients than in nonbacteremic patients. The best cutoff value for PCT was 0.4 ng/mL, which was associated with a negative predictive value of 98.8%. Area under the receiver operating characteristic curve was 0.83 for PCT, which was significantly higher than that for CRP and ESR. A serum PCT level of <0.4 ng/mL accurately rules out the diagnosis of bacteremia. The use of PCT assessment could help physicians limit the number of blood cultures to be processed and the number of antibiotic prescriptions.

Lee et al¹⁴ evaluated the effectiveness of using the PCT level as a predictive test for bacteremia in acute pyelonephritis. Pre-treatment PCT level was 0.77 ng/mL (95% CI: 0.42–1.60 ng/mL) in the blood culture-negative group and 4.89 ng/mL (95% CI: 2.88–9.04 ng/mL) in the blood culture-positive group, and the increase between the two groups was statistically significant. The area under the receiver operating characteristic curve of PCT level for prediction of bacteremia was 0.728. A cut-off value of 1.23 ng/mL indicated a sensitivity of 79.0 % and specificity of 60.0 % for PCT level.

The limitation the study is small sample size.

CONCLUSION

Authors found that serum procalcitonin is a useful marker of bacterial infection.

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