# THE ASSESSMENT OF SERUM CITRULLINE AS A SEPSIS MARKER IN EARLY DETECTION OF SEPSIS IN ACUTE LEUKEMIA PATIENTS

Dalia Ahmed Nafea, Aida Aly Nazeer, Wafaa Ahmed El-Nenaey,* Nermeen Yousri Ali Hassan

Department of Internal Medicine, Department of Clinical and Chemical Pathology,* Faculty of Medicine, Alexandria University

## Introduction

A serious organ failure known as sepsis is brought on by a poorly controlled host response to an infection. This study assessed Citrulline role as a marker to sepsis in patients with acute leukemia after induction chemotherapy. The study found that ANC was significantly lower in acute leukemia patients after induction chemotherapy compared to controls, and both CRP and PCT levels were significantly higher in acute leukemia patients on the first day of fever compared to the seventh day of fever. Citrulline levels were significantly lower in acute leukemia patients on the first day of fever compared to the seventh day of fever and in controls. Citrulline demonstrated promise as a marker for detecting early bacteremia in patients with acute leukemia.. There were negative correlations between citrulline and APACHE II, and positive correlations between CRP and APACHE II.

## Aim of the Work

This study purpose was to assess citrulline's potential as an early sepsis marker in acute leukemia patients receiving chemotherapy

## Patient and Methods

The study conducted on 50 subjects included 30 patients with acute leukemia who experienced fever following chemotherapy and 20 healthy subjects as control. The study aimed to detect early sepsis in patients with acute leukemia and developed a comprehensive approach for diagnosis. The approach involved thorough history taking, clinical examination, and routine laboratory investigations. Sepsis prediction was done using the APACHE II score and serological markers such as CRP, serum PCT, and serum citrulline. Proper statistical comparisons were made to assess the role of citrulline as a sepsis marker.

## Results

**Table 1:** Correlation between Citrulline with CRP in patients group (n = 30)

| | $r_s$ | P |
|---|---|---|
| **Citrullinevs.CRP** | | |
| **1st day** | -0.453* | 0.012* |
| **7th day** | -0.364* | 0.048* |

rs: Spearmancoefficient *:Statisticallysignificantatp≤0.05

**Table 2:** Diagnostic performance for CRP, PCT and Citrulline to discriminate patients (n = 30) from control (n = 20) in 1st day

| | AUC | p | 95%C.I | Cutoff | Sensitivity | Specificity | PPV | NPV |
|---|---|---|---|---|---|---|---|---|
| **CRP** | 1.000 | <0.001* | 1.000 – 1.000 | >3 | 100.0 | 100.0 | 100.0 | 100.0 |
| **PCT** | 0.885 | <0.001* | 0.792 – 0.978 | >170 | 70.0 | 80.0 | 84.0 | 64.0 |
| **Citrulline** | 0.967 | <0.001* | 0.917 – 1.000 | ≤11 | 96.67 | 95.0 | 96.7 | 95.0 |

AUC: AreaUnder aCurve pvalue: Probability value CI: Confidence Intervals
NPV: Negativepre dictive value PPV: Positivepre dictive value *:Statistically significantat p≤0.05

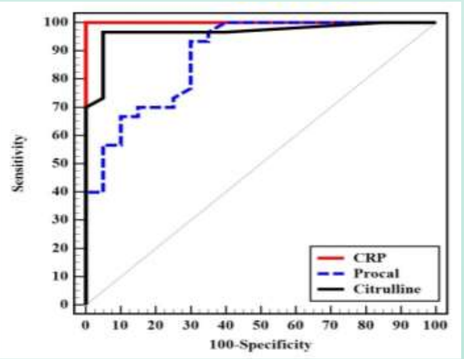


**Figure 1:**
ROC curve for CRP, PCT and Citrulline for discriminating both the involved patients (n= 30) from control (n= 20) in1st day

**Table 3:** Diagnostic performance for CRP, PCT and Citrulline to discriminate patients (n = 30) from control (n = 20) in 7th day

| | AUC | p | 95%C.I | Cutoff | Sensitivity | Specificity | PPV | NPV |
|---|---|---|---|---|---|---|---|---|
| CRP | 1.000 | <0.001* | 1.000 – 1.000 | >3 | 100.0 | 100.0 | 100.0 | 100.0 |
| PCT | 0.704 | 0.015* | 0.546 – 0.862 | >127 | 60.0 | 70.0 | 75.0 | 53.8 |
| Citrulline | 0.855 | <0.001* | 0.736 – 0.974 | ≤18 | 90.0 | 60.0 | 77.1 | 80.0 |

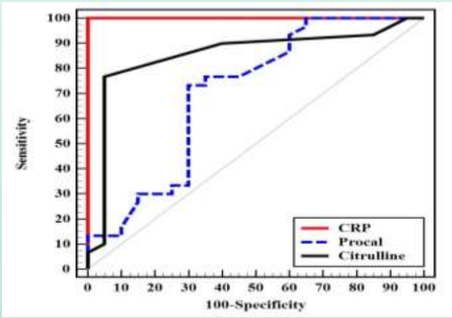


**Figure 2:**
ROC curve for CRP, PCT and Citrulline to discriminate patients (n = 30) from control (n = 20) in 7th day

## Conclusion

Although the culture of the pathogenic organism continues to be the gold standard for research and identification of bacterial infections, delaying the findings might have a negative impact on the course of treatment for patients who have febrile neutropenia following acute leukemia chemotherapy. As a result, the assessment of serological biomarkers such as citrulline, PCT, and CRP may be used to quickly and indirectly demonstrate bacteremia and aid in the optimization of antibiotics in this high-risk group.
These findings suggest that CIT might be used to gauge the risk of bacteremia in acute leukemia patients receiving chemotherapeutic treatment.