

ORIGINAL RESEARCH

Evaluation of correlation of lactate /albumin ratio in sepsis patients admitted in ICU: An observational study

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ABSTRACT

Background: Evaluation of correlation of lactate /albumin ratio in outcome of patients of sepsis in ICU. **Materials & methods:** 50 patients admitted to ICU were subjected to detailed history and examination followed by investigations. Lactate/albumin ration was assessed. **Results:** Majority of the subjects belonged to the age range of 40 to 60 years. Mean age was found to be 49.7 years. 80 percent of the patients were males while the remaining were females. Mean lactate to albumin ratio was found to be 0.191. Mean serum prolactin levels were 9.74 among subjects with lactate/albumin ration of less than 0.15. Significant correlation was seen while associating lactate to albumin ratio with serum prolactin levels. **Conclusion:** Lactate/albumin ratio could be used as an independent predictor for the mortality among sepsis patients admitted to ICU.

Key words: Lactate, Albumin, Sepsis

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INTRODUCTION

Sepsis is a medical emergency that describes the body's systemic immunological response to an infectious process that can lead to end-stage organ dysfunction and death. Despite significant advancements in the understanding of the pathophysiology of this clinical syndrome, advancements in hemodynamic monitoring tools, and resuscitation measures, sepsis remains one of the major causes of morbidity and mortality in critically ill patients.¹⁻³

There has been a marked evolution in our understanding of the molecular pathobiology and immunology of sepsis. Previously it was felt that hemodynamic manifestations of sepsis were primarily related to the hyperimmune host response to a particular pathogen. However, a large body of work on the molecular basis of sepsis has revealed a far more nuanced and complex interplay between the infectious agent and host that together produce the heterogeneous manifestations of sepsis.^{4,5}

Lactate clearance is defined as the rate of decline in lactate concentration, and this has been recommended as an end point in early goal-directed therapy in critically ill patients in sepsis. Significant reduction in

mortality have been seen in lactate-guided resuscitation than without lactate monitoring.⁶ The colloid crystalloid controversy continues and especially the role of albumin for resuscitation and maintenance fluid in sepsis and septic shock. Albumin for fluid resuscitation in sepsis was not associated with decrease mortality rates in 2 RCTs. However, the ALBIOS RCT demonstrated that the addition of 20% albumin to crystalloids reached higher targeted mean arterial pressure within 6 h of administration and lowered fluid balance over the first 7 days. There was a suggestion of lower mortality in the subgroup of patients who had septic shock.⁷ Hence; under the light of above-mentioned data, the present study was undertaken for determining the correlation of lactate /albumin ratio in outcome of patients of sepsis in ICU.

MATERIALS & METHODS

The present study was undertaken for determining the correlation of lactate /albumin ratio in outcome of patients of sepsis in ICU. Inclusion criteria for present study included 50 patients with sepsis admitted in ICU. The resulting patients were subjected to detailed history and examination followed by investigations (CBC, ESR, CRP, Bacterial culture, liver function

test, renal function test, arterial blood gas analysis for lactate, serum albumin level). Correlation of lactate/albumin ration was assessed. All the results were recorded in Microsoft excel sheet and were subjected to statistical analysis.

RESULTS

Majority of the subjects belonged to the age range of 40 to 60 years. Mean age was found to be 49.7 years.

80 percent of the patients were males while the remaining were females. Mean lactate to albumin ratio was found to be 0.191. Mean serum prolactin levels were 9.74 among subjects with lactate/albumin ration of less than 0.15. Significant correlation was seen while associating lactate to albumin ratio with serum prolactin levels.

Table 1: Lactate and albumin levels

Parameter	Mean	SD
Lactate	4.95	3.11
Albumin	25.97	4.28
L:A Ratio	0.191	0.43

Table 2: Correlation of lactate to albumin ratio with S. Procalcitonin levels

Lactate: Albumin ratio	Mean S. Procalcitonin	SD	p- value
≥0.15	15.32	25.13	0.000 (Significant)
<0.15	9.74	15.37	

Table 3: Correlation of lactate albumin ratio with outcome

Correlation Value	r-value	p-value
	-1.332	0.000 (Significant)

DISCUSSION

In sepsis, oxygen debt ensues because of the mismatch between the oxygen demand and the delivery with global tissue hypoxia. Despite early guidelines for goal-directed volume hemodynamic resuscitation and monitoring, the optimal end points for resuscitation remain uncertain. It is generally accepted that the use of structured set of hemodynamic end points such as pulse rate, blood pressure, mean arterial pressure, or urine output significantly improve hospital mortality. However, measures to determine tissue oxygen delivery have remained controversial. Central venous oxygen saturation (ScvO₂) or mixed venous oxygen saturation has been used to assess the balance of tissue oxygen delivery and consumption. But need for specialty equipment, training, and the resources required to monitor ScvO₂ has led to search for an alternative marker for defining resuscitation adequacy that is less invasive.⁷⁻¹⁰

Majority of the subjects belonged to the age range of 40 to 60 years. Mean age was found to be 49.7 years. 80 percent of the patients were males while the remaining were females. Mean lactate to albumin ratio was found to be 0.191. Mean serum prolactin levels were 9.74 among subjects with lactate/albumin ration of less than 0.15. Significant correlation was seen while associating lactate to albumin ratio with serum prolactin levels. Basile-Filho A et al compared the different predictive values of prognostic indices and biological markers in the outcome of 847 surgical patients admitted to the intensive care unit (ICU) in the postoperative phase. The patients were divided into survivors (n=765, 57.4% males, age 61, interquartile range 51-71) and nonsurvivors (n=82,

57.3% males, age 70, interquartile range 58-79). APACHE II, APACHE II death probability (DP), SOFA, SAPS 3, SAPS 3 DP, CRP, albumin, and lactate were recorded on ICU admission (first 24hours). The ICU and overall in-hospital mortality were 6.6 and 9.7%, respectively. The APACHE II, APACHE II DP, SAPS 3, SAPS 3 DP, and SOFA scores showed a better performance than CRP/albumin ratio, CRP, albumin, or lactate to predict in-hospital mortality of surgical critically ill patients. Even though all indices were able to discriminate septic from nonseptic patients, only APACHE II, APACHE II DP, SOFA and to a lesser extent SAPS 3, SAPS 3 DP, and blood lactate levels could predict in the first 24-hour ICU admission surgical patients who have survived sepsis.¹⁰

Liu Z et al compared the prognostic accuracy of the lactate level, the SOFA score and the qSOFA score for mortality in septic patients using the public Medical Information Mart for Intensive Care III database (MIMIC III). A total of 3713 cases were initially identified. The analysis cohort included 1865 patients. The 24-h average lactate levels and the worst scores during the first 24 h of ICU admission were collected. Patients in the higher lactate group had higher mortality than those in the lower lactate group. Lactate was an independent predictor of sepsis prognosis. The AUROC of lactate was significantly higher than that of qSOFA, and it was similar to the AUROC of SOFA (AUROC, 0.686 [95% CI, 0.661–0.710]). But the timing of lactate relative to SOFA and qSOFA scores was inconsistent. Lactate is an independent prognostic predictor of mortality for patients with sepsis.¹¹Kacar CK et al assessed the effect of age, gender, estimated glomerular filtration

ate, albumin and lactate on mortality on critically ill patients admitted to intensive care unit. They concluded that albumin and lactate levels did not affected overall mortality.¹²

CONCLUSION

Lactate/albumin ratio could be used as an independent predictor for the mortality among sepsis patients admitted to ICU.

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