

Original Research

Determination of lactate /albumin ratio in patients of sepsis in ICU

Kriti Soni

MBBS Student, Govt. Medical College, Sector 32, Chandigarh, India

ABSTRACT:

Aim: Determination of lactate /albumin ratio in patients of sepsis in ICU. **Materials & methods:** A total of 50 patients were enrolled. All cases of sepsis (defined by Mean arterial pressure, urine output, Pao₂, Leucocytosis, thrombocytopenia, unexplained metabolic acidosis and markers of poor prognosis (SOFA score) in ICU were taken consecutively till sample size achieved. The resulting study group was 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). The data obtained was analysed. **Results:** Mean lactate and albumin levels were found to be 29.13 and 5.98 respectively. Mean Lactate to albumin ratio was found to be 0.205. **Conclusion:** Lactate/albumin ratio is an independent predictor for the mortality among sepsis patients admitted to ICU.

Key words: Lactate /albumin, Sepsis

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Corresponding author: Kriti Soni, MBBS Student, Govt. Medical College, Sector 32, Chandigarh, India

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INTRODUCTION

Sepsis is life-threatening organ dysfunction caused by dysregulated host responses to infection, and septic shock is a subset of sepsis in which underlying circulatory and cellular/metabolic abnormalities are sufficiently profound to substantially increase mortality. Patients with sepsis are usually treated in the intensive care unit (ICU). Sepsis results from infection and these patients often develop multiple organ-system failure. Aggressive management, including control of the infection source and support of failing organ-systems, is needed for optimal outcomes.^{1, 2} The progressive increase in the number of sepsis and septic shock survivors emphasizes the long-term consequences of sepsis such as cognitive dysfunction and functional disabilities, psychiatric morbidity, decreased health-related quality of life, unplanned hospital readmissions, and late mortality. 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.^{3, 4} 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.^{5, 6} Hence; under the light of above-mentioned data, the present study was undertaken for determining lactate /albumin ratio in patients of sepsis in ICU.

MATERIALS & METHODS

The present study was undertaken for determining lactate /albumin ratio in patients of sepsis in ICU. A total of 50 patients were enrolled. All cases of sepsis (defined by Mean arterial pressure, urine output, Pao₂, Leucocytosis, thrombocytopenia, unexplained metabolic acidosis and markers of poor prognosis (SOFA score) in ICU were taken consecutively till sample size achieved. The resulting study group was 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). The data obtained was analysed. The data was stratified and analysed in accordance with the aims and objectives of the project. Qualitative data was presented as percentage and proportion. Quantitative data was presented as mean and standard deviation.

RESULTS

Mean age of the patients of the present study was 46.8 years. 72 percent of the patients were males while remaining 28 percent were females. S. procalcitonin was found to be 11.84 while S. creatinine levels and S. total bilirubin levels were found to be 2.74 and 3.16 respectively. Mean lactate and albumin levels were found to be 29.13 and 5.98 respectively. Mean Lactate to albumin ratio was found to be 0.205.

Table 1: Descriptive results

| Parameter | Mean | SD |
|-----------------------|------|-----------|
| T. bilirubin | 3.52 | 5.98 |
| S. creatinine | 2.96 | 2.45 |
| Platelet Count (lakh) | 1.9 | 109074.71 |
| S. procalcitonin | 12.3 | 21.5 |

Table 2: Lactate and albumin levels

| Parameter | Mean | SD |
|-----------|-------|-------|
| Lactate | 5.98 | 4.96 |
| Albumin | 29.13 | 7.36 |
| L:A Ratio | 0.205 | 0.178 |

DISCUSSION

Even to the present day, sepsis, including severe sepsis and septic shock, represents a major health care issue with concerning mortality rates. Using certificated death data, sepsis was listed as a cause of death in at least 6% among the causes of in-hospital deaths, which may be estimated as the lower limit. The global trend even shows a rising incidence of sepsis and septic shock despite generally decreasing mortality rates, which correlates with the establishment of the Early Goal Directed Therapy (EGDT) guideline. The prognosis of critical ill patients is central in clinical routine, especially in consideration of its high relevance in determination of further therapy strategies and increased risk of death even after hospital discharge. Septic patients suffer from low peripheral oxygenation leading to anaerobic glycolysis due to insufficient oxygen delivery, which leads to lactate production.⁷⁻⁹ Hence; under the light of above-mentioned data, the present study was undertaken for determining lactate /albumin ratio in patients of sepsis in ICU.

In the present study, mean age of the patients of the present study was 46.8 years. 72 percent of the patients were males while remaining 28 percent were females. S. procalcitonin was found to be 11.84 while S. creatinine levels and S. total bilirubin levels were found to be 2.74 and 3.16 respectively. Mean lactate and albumin levels were found to be 29.13 and 5.98 respectively. Mean Lactate to albumin ratio was found to be 0.205. Yu G et al determined the efficacy of the lactate area score (calculated from repeated lactate measurements during initial resuscitation) as a prognostic marker of septic shock in the emergency department (ED). They performed a retrospective study of adult patients with septic shock in the ED of a single tertiary medical center. A total of 362 patients were enrolled in this study, and the overall 28-day

mortality was 31.8%. The lactate area score of serial lactate levels as well as the initial lactate levels were significantly higher in the non-survivor group. However, in multivariate analysis, only the lactate area score was significantly associated with 28-day mortality. The early lactate area score may be a possible prognostic marker for predicting the 28-day mortality of adult septic shock patients.¹⁰ Noer A et al determined the Lactate / Albumin ratio in sepsis patients, so that it can be used as a marker predictor of mortality in sepsis patients that is more accessible at a cheaper and more specific cost for sepsis that can be used in simple facilities without reducing accuracy. They concluded that there is a significant positive relationship between day lactate / albumin ratio 3 and day 3 SOFA score in sepsis patients, so that the Lactate / Albumin ratio can be used as a predictor of mortality in sepsis patients associated with SOFA scores. But there was no significant relationship between day lactate / albumin ratio level and day 1 SOFA score in sepsis patients. They suggested that the serial lactate / albumin ratio associated with the SOFA score can be used as a marker for predictors of mortality in septic patients admitted to the ICU.¹¹ Kendall H et al examined the relationship between the trend of serum albumin over time and mortality in adults admitted to the intensive care unit (ICU) with sepsis. Serum albumin trend, admission serum albumin level, and lowest serum albumin level were significant unique predictors of mortality. The probability of survival decreases by 70.6% when there is a strong negative trend in serum albumin level, by 63.4% when admission serum albumin is ≤ 2.45 g/dl, and by 76.4% when the lowest serum albumin is ≤ 1.45 g/dl. They encouraged clinicians to measure serum albumin levels in patients with sepsis. Low serum albumin levels and a strong negative trend in serial measurements should instigate aggressive monitoring and treatment in this population.¹²

CONCLUSION

Lactate/albumin ratio is an independent predictor for the mortality among sepsis patients admitted to ICU.

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