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Original Research Paper

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SIGNIFICANCE OF SERUM LACTATE/ALBUMIN RATIO AS AN INDICATOR OF MORBIDITY AND MORTALITY IN SEPSIS

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ABSTRACT

INTRODUCTION: Sepsis is a clinical syndrome that occurs as a complication of a severe infection,which is associated with high morbidity and mortality. APACHE II scoring system were used widely to assess outcome in severe sepsis and septic shock but this is time consuming, expensive and lengthy process having multiple variables to calculate, so it is very impractical to use APACHE II scoring system in busy emergency room. The association of APACHE II score, serum lactate albumin ratio value will be examined in our study. This study aimed at investigating the lactate/albumin ratio as a prognostic marker of Sepsis **MATERIAL AND METHODS:** A total of 120 patients with sepsis were inpatients of R.L Jalappa hospital were included in the study. Each patient who is admitted in intensive care unit (ICU), medical intensive care unit (MICU) Acute physiological and chronic health evaluation (APACHE) II score was calculated. Serum Lactate, serum albumin and serum lactate albumin ratio was calculated within first 6 hours period. The association of APACHE II score, serum lactate value, serum albumin value and serum lactate albumin ratio value was examined. **RESULTS:** The mean Lactate/Albumin ratio was found to be increased in patients with sepsis/septicemic shock. On correlating between APACHE II score and serum lactate Albumin ratio p value was significant.**CONCLUSION:** This study indicates that serum lactate albumin ratio shows strong correlation with APACHEII score in predicting mortality in severe sepsis and septic shock.

KEYWORDS :

INTRODUCTION:

Sepsis is a clinical syndrome that occurs as a complication of a severe infection, which is associated with high morbidity and mortality.[1] Severe sepsis with septicemic shock will lead to generalized tissue hypoxia. because of low oxygen supply, anerobic metabolism will occur and subsequately lead to lactate production. Many studies have shown that lactate levels are useful parameter in diagnosis and prognosis in sepsis and septicemic shock patient.[2]Serum Albumin is a negative acute phase reactant.[3]Low serum albumin is related to severity of infection.[4] Instead of analysis of single factors alone,combining lactate and Albumin will have better correlation with Sepsis,Septicemic shock and mortality.[5] Lots of studies have been done to investigate the procalcitonin, pro-BNP, CRP to predict mortality in critically ill patients. But only few studies have evaluated the prognostic significance of serum lactate albumin ratio in a patient with severe sepsis and septic shock. It is readily available and inexpensive.APACHE II scoring system were used widely to assess outcome in severe sepsis and septic shock but this is time consuming, expensive and lengthy process having multiple variables to calculate, so it is very impractical to use APACHE II scoring system in busy emergency room. The association of APACHE II score, serum lactate albumin ratio value will be examined in our study. This study aimed at investigating the lactate/albumin ratio as a prognostic marker of Sepsis

MATERIAL AND METHODS

A total of 120 patients with sepsis were inpatients of RL Jalappa hospital were included in the study. Each patient who is admitted in intensive care unit (ICU), medical intensive care unit (MICU) conscious level, temperature, heart rate, respiratory rate, systemic blood pressure, blood glucose level, complete blood count, serum electrolytes, renal function test, bicarbonate, Fio2, arterial PH, serum lactate level, serum albumin alone. Acute physiological and chronic health evaluation (APACHE) II score was calculated. Serum Lactate, serum albumin and serum lactate albumin ratio was calculated within first 6 hours period. The association of APACHE II score, serum lactate value, serum albumin value and serum lactate albumin ratio value was examined.

STATISTICAL ANALYSIS:

Data was entered into Microsoft excel data sheet and was analyzed using SPSS 22 version software. Categorical data was represented in the form of Frequencies and proportions. **Chi-square test or Fischer's exact test** (for 2x2 tables only) was used as test of significance for qualitative data.

Continuous data was represented as mean and standard deviation. **Independent t test** was used as test of significance to identify the mean difference between two quantitative variables

Correlations were performed with **Pearson Correlation coefficient**

Receiver operating characteristic (ROC) was used compare between APACH II and Lactate/albumin ratio in predicting mortality . A test that predicts an outcome no better than chance has an area under the ROC curve of 0.5. An area under the ROC curve above 0.8 indicated fairly good prediction.

Graphical representation of data: MS Excel and MS word was used to obtain various types of graphs

P value (Probability that the result is true) of <0.05 was considered as statistically significant after assuming all the rules of statistical tests.

Statistical software: MS Excel, SPSS version 22 (IBM SPSS Statistics, Somers NY, USA) was used to analyze data

RESULTS

Table 1: Distribution of gender among expired and improved patients

Age group	Survived		Expired	
	N	%	N	%
21-40yrs	16	15.1%	2	14.3%
41-60yrs	40	37.7%	7	50.0%
>60yrs	50	47.2%	5	35.7%

In this study lowest age group was 22 years and the highest age group was 87years.The mean age of the study group was 58+/-1 years. The P value was 0.659, there was no statistically significant difference found between age and outcome

Table2: Distribution of gender among expired and improved patients

Sex	Survived		Expired	
	N	%	N	%
Female	45	42.5%	3	21.4%
Male	61	57.5%	11	78.6%

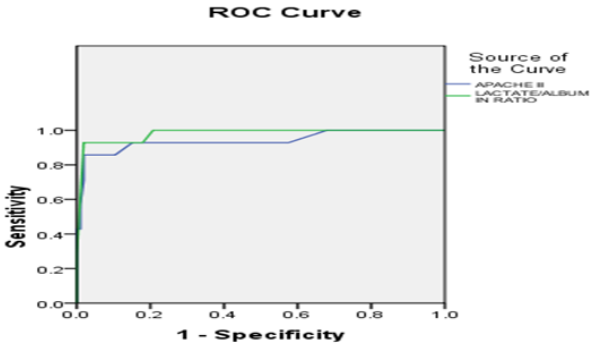
In our present study there was male predominance,61 were male and 45 were female. Among 106 survivors,45 were female and 61 were male. Among Expired patients,11 were male and 3 were female.

TABLE 3: Distribution of patients according to APACHE II SCORE

APACHE II	Survived		Expired	
	N	%	N	%
<18	56	52.8%	1	7.1%
>18	50	47.2%	13	92.9%

Mean APACHE II was 20.26 .APACHE2 score ranging from 9 to 37.Among 57 patients who had APACHE 2 score of less than 18, 1 succumbed to death. 68 patients had APACHE 2 score than 18,50 people survived and 13 people succumbed to death. P value was <0.01,there was a statistically significant difference found between APACHE II and outcome

Table 4: Receiver operating characteristics curve (ROC) analysis between APACHE II score, serum lactate and serum lactate albumin ratio (n=240)



Diagonal segments are produced by ties.

Area Under the Curve					
Test Result Variable(s)				Asymptotic 95% Confidence Interval	
	Area	Std. Error	P value	Lower Bound	Upper Bound
APACHE II	0.940	.044	<0.001	.000	1.000
Lactate/albumin ratio	0.980	.015	<0.001	.000	1.000

TABLE 5 : Pearson correlation between APACHE II score and serum lactate albumin ratio

		Lactate/albumin ratio
APACHE II	Pearson Correlation	0.884**
	P value	.000

Receiver operating characteristics(ROC) comparing serum lactate albumin ratio and APACHE II score in predicting mortality.Area under the curve value for lactate albumin ratio was 0.90 [p<0.001]) where as value under the ROC curve for APACHE II score is slightly higher AUC=0.94 [p<0.001]).

On correlation between APACHE II score and serum lactate albumin ratio it shows positive correlation with correlation coefficient of 0.884 and P value <0.01 indicating that serum lactate albumin ratio shows strong correlation with APACHE II score in predicting mortality in sepsis.

DISCUSSION:

Sepsis a Multi organ dysfunction syndrome is a major cause of mortality in India .The application of APACHE II score help us in assessing the prognosis and help the care givers in making improved decisions. But APACHE 2 score is time consuming and expensive,it is impractical to use it in emergency. In this study we correlated Serum lactate/Albumin ratio with APACHE 2 score. So we can use this ratio to assess outcome in sepsis patients.120 subjects were included in study, mean age was 58+/-1 years, which was comparable to Study done by Angus DC et al which showed mean age of 60(6).Elderly people constituted major part of our study. In our study 48 patients were female and 72 patients were male. Among 120 subjects, Male were affected more than female. Similar trend was observed by S TODI et al(7) which showed males predominately affected constituting 57.71%.,study done by Angus DC et al(6) showed similar trend. male patients constituting upto 51.9%.In our study mortality was 32 %which was comparable to study done by Rangel-Frausto et al (8)with mortality ranging from 20-35%.In our study 120 subjects, among non survivors 3 were female and 11 were male suggesting mortality rate is higher in male compared to female. Which is also similar to study done by Angus DC et al(8) which showed women had less mortality rate compared to men. In our study mortality rate increased with age. Study by Greg S et al (9) reported that age was independent predictor of mortality.In our study, it was observed mortality was more among with patient with high serum lactate/albumin ratio. Study by Choi Sl(10) also reported that gradual increase in serum lactate albumin ratio there is corresponding increase in mortality. Similar trend was observed by B wang et al(5)On comparing APACHE 2 score with Serum lactate to Albumin ratio, p value was significant indicating Serum lactate Albumin ratio shows strong correlation with APACHE 2 score in predicting mortality. Similar findings were observed in study by Thapa S(11) who showed that Serum lactate to Albumin ratio was comparable to APACHE 2 score in sepsis patients.

REFERENCES

1. Osborn TM, Nguyen HB, Rivers EP. Emergency medicine and thesurviving sepsis campaign: an international approach to managing severe sepsis and septic shock. Annals of emergency medicine.2005;46(3):228-31.
2. Mikkelsen, M.E.; Miltiades, A.N.; Gaieski, D.F.; Goyal, M.; Fuchs, B.D.; Shah, C.V.; Bellamy, S.L.; Christie, J.D.Serum lactate is associated with mortality in severe sepsis independent of organ failure and shock.Crit. Care Med. 2009, 37, 1670–77.
3. Artero A, Zaragoza R, Camarena JJ, Sancho S, González R, nogueirajm. Prognostic factors of mortality in patients with community-acquired blood stream infection with severe sepsis and septic shock. Journal of critical care. 2010;25(2):276-81.
4. Al-Subaie N, Reynolds T, Myers A, Sunderland R, Rhodes A, Grounds R,et al. C- reactive protein as a predictor of outcome alter discharge from the intensive care: a prospective observational study. British journal of anaesthesia. 2010;105(3):318-25.
5. Wang B, Chen G, Cao Y, Xue J, Li J, Wu Y. Correlation of lactate/albumin ratio level to organ failure and mortality in severe sepsis and septic shock. J critcare 2015; 30: 271-75.
6. Angus DC, Linde-Zwirble WT, Lidicker J. Epidemiology of severe sepsis in theUnited States: Analysis of incidence, outcome, and associated costs of care. Crit Care Med. 2001;29:1303–10.
7. Todi S, Chatterjee S, Bhattacharyya M. Epidemiology of severe sepsis in India. Crit Care. 2007;11:65.
8. Rangel-Frausto MS, Pittet D, Costigan M, Hwang T, Davis CS, Wenzel RP. The natural history of the systemic inflammatory response syndrome (SIRS). A prospective study. JAMA. 1995 Jan 11;273(2):117-23.
9. Greg S etal.The Effect of Age on the Development and Outcome of Adult Sepsis.Crit Care Med. 2006;34(1):15-21.
10. Choi S, Ha E, Jhang W, Park S. Association between the lactate/albumin ratio and mortality in pediatric sepc shock paents with underlying chronic disease: retrospective pilot study. Minerva pediatricaian. 2016
11. Thapa, Sameer & Prasad, Pratap & Shakya, YM. Serum Lactate Albumin Ratio as a Predictor of Mortality in Severe Sepsis and Septic Shock at Tribhuwan University Teaching Hospital, Kathmandu. Birat Journal of Health Sciences. 2017;2(2):191