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TO STUDY THE VALUE OF HEMODYNAMIC PARAMETERS IN COMPARISON TO LACTATE VALUES AND OUTCOME OF ILLNESS

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Conflicts of Interest: Nil
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Abstract:

Background:

A total of 50 patients were included into study of prospective, non-intervention study was undertaken after ethical committee approval in the Department of Surgery, Amaltas Institute of Medical Sciences, Dewas, M.P., India for 01 year time duration.

Result: Above table suggest out of 50 patients of major trauma and sepsis there is 14(28%) non-survived and 36(72%) survived.

Above table suggest that out of 21 patients of sepsis 12(57.1%) survived and 9(42.9%) non-survived and out of 29 patients of major trauma 24(82.8%) survived and 5(17.2%) non-survived. Thus, p-value <0.01 statistically significant result.

Above table suggest that rising serum lactate levels predict mortality in trauma and sepsis irrespective of age of patients. Because results are statistically insignificant (p > 0.01

Conclusion: Lactate levels that increase serially or persist at high levels indicate ongoing worsening of patient condition, which may be unrecognized otherwise, and the need for a more aggressive treatment. They also hint at the need for greater resources for the hospital and patient.

Lactate values probably need to be followed for longer periods in critical patients even when they have tided over the present crisis. The utility of regular lactate analysis in these patients would depend on factors such as availability and cost of test also. There are no existing studies to support the above premise.

Keywords: Hemodynamic, Lactate, Illness &

Introduction

Many variables measured in critically ill patients have been used to estimate severity of disease, prognosticate morbidity and mortality, evaluate costs of treatment, and finally indicate specific treatment and monitor the adequacy of treatment and its timing. It is unlikely that one measurement can replace all of these, but in the remainder of this manuscript we will show that lactate levels may come close. Although in our mind strongly linked to tissue hypoxia, lactate levels follow many more metabolic processes not related to tissue hypoxia and, therefore, subject to many disturbances found in various clinical situations.

Lactic acidosis due to increase in blood lactate levels occurs when the body is overwhelmed by its need for energy and oxygen. Metabolism in ischemic tissue in patient of trauma and sepsis shifts from aerobic to anaerobic and body buffer system are overcome by the surge in lactate production. Global tissue hypoxia may remain undetected on assessment on the basis of physical finding, vital signs, central venous pressure and urine output. Elevated blood lactate level therefore provide an insight to the presence of global tissue hypoxia – a forerunner to the development of shock and MODS. Timely identification of ongoing events before they take an ominous turn is essential in the management of the patient in shock. And hence, many minds and hands continue to engage in the pursuit of a subtle signal, a warning to an impending crisis.

Material & Method

A prospective, non-intervention study was undertaken after ethical committee approval in the

Department of Surgery, Amaltas Institute of Medical Sciences, Dewas, M.P., India for 01 year time duration. A total of 50 patients were included into study.

Inclusion and Exclusion Criteria:

➢ The study included the following patients, in the age group of 5-60 yrs in ICU or ward:

1). Patients admitted within 12 hrs of trauma including road accidents, burns, rail-road accidents, fall from height and assault etc;

2). Patients of suspected or overt sepsis including those criteria for SIRS, septic shock and MODS.

➢ Patients with the following positive history were excluded from the study:

- Co morbidities – Bronchial asthma, DM, IHD, CHF, renal failure, renal transplant, malignancy, chronic pancreatitis.
- History of acute alcohol ingestion, ingestion of poison.
- Chronic medication for diabetes, asthma, tuberculosis, iron supplementation, epilepsy, AIDS.
- Known Inborn Error of Lactate Metabolism.

The patients were admitted and treated as deemed necessary under different surgical units.

Data Collection:

The following data was collected:

- Hospital registration number.
- Date and time of injury/inclusion into study.
- Vitals on admission and at regular intervals, with records of urine output, oxygen saturation, and CVP, as and when available.
- Blood lactate levels at admission, 12hrs, 24hrs, 48hrs.
- Initial work-up: Hb, PCV, T & D, WBC counts, random blood sugar, s. electrolytes: arterial blood gases(as per discretion of treating doctor)
- Documentation of organ dysfunction with s. creatinine, s. bilirubin, platelet count, chest x-ray, arterial blood gases (where available).
- Outcome was recorded as survival or non-survival.
- A record of no. of days of hospital stay was also kept after inclusion into the study.

Treatment was left to the discretion of the attending consultant. Finally, records were also kept of the types of organ dysfunction and certain intervention including ventilator support, dialysis and surgery.

Results

Table 1:

Outcome	N	%
Died	14	28.0%
Survived	36	72.0%
Total	50	100.0%

Above table suggest out of 50 patients of major trauma and sepsis there is 14(28%) non-survived and 36(72%) survived.

Table 2:

Etiology	Outcome		Total
	Died	Survived	
Sepsis	9	12	21
	42.9%	57.1%	100.0%
Trauma	5	24	29
	17.2%	82.8%	100.0%
Total	14	36	50
	28.0%	72.0%	100.0%
p- value <0.01			

Above table suggest that out of 21 patients of sepsis 12(57.1%) survived and 9(42.9%) non-survived and out of 29 patients of major trauma 24(82.8%) survived and 5(17.2%) non-survived. Thus, p-value <0.01 statistically significant result.

Table 3:

Lactate Levels	Sepsis		Trauma	
	Died	Survived	Died	Survived
</= 20	1	0	1	6
	100.0%	0.0%	14.3%	85.7%
21-40	3	9	2	16
	25.0%	75.0%	11.1%	88.9%
> 40	5	3	2	2
	62.5%	37.5%	50.0%	50.0%
Total	9	12	5	24
	42.9%	57.1%	17.2%	82.8%
p- value	**0.125**		**0.17**	

Above table suggest that rising serum lactate levels predict mortality in trauma and sepsis irrespective of age of patients. Because results are statistically insignificant($p > 0.01$)

Discussion

In a recent publication, Meregalli,*et al.*[4] have shown that despite similar hemodynamic variables, serum lactate values can categorize post-surgical patients into survivors and non survivors within 12 hours of ICU admission. They came to the conclusion that lactate, especially when hemodynamic variables were taken into consideration, seemed to have a similar value in identifying survivors as the SAPS and APACHE II scoring systems and offered even better relevant bedside clinical information in terms of patient condition at the moment.

Porter and Ivatury[5] reviewed the role of traditional endpoints of resuscitation and arrived at the conclusion that using these end points may leave a substantial number of patients, up to 50 to 85% in some cases, in compensated shock, which if allowed to persist would lead to death of the patient. They supported the use of lactate, base deficit, and gastric intramucosal pH as the appropriate endpoints of resuscitation of trauma patients attained within 24 hours of injury for effective resuscitation. The association of lactic acidosis with increased mortality in critically ill patients is well recognized. Lactate levels on admission in trauma patients have been found to correlate with patient survival and also with development of complications. Multiple organ failure after trauma is established within 24 hours of injury in the majority of people who develop it - emphasizing the important role and need for a marker of tissue injury.[6,7]

Conclusion

Lactate levels that increase serially or persist at high levels indicate ongoing worsening of patient condition, which may be unrecognized otherwise, and the need for a more aggressive treatment. They also hint at the need for greater resources for the hospital and patient.

Lactate values probably need to be followed for longer periods in critical patients even when they have tided over the present crisis. The utility of regular lactate analysis in these patients would depend on factors such as availability and cost of test also. There are no existing studies to support the above premise.

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