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A prospective study of lactate, lactate clearance and Glasgow-Blatchford score for prediction of adverse outcomes in patients with upper gastrointestinal bleeding

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Background:

Upper gastrointestinal bleeding (UGIB) is a common condition which carries significant morbidities and mortality. Lactate has been used as a predictor of severity and risk of mortality in many conditions.

Limited data of predictive role and cut-off value of lactate and lactate clearance in UGIB.

The objective is to determine correlation between lactate, lactate clearance and Glasglow-Blatchford score (GBS) and to investigate whether lactate, lactate clearance and GBS are predictive of adverse outcomes in patients with UGIB.

Patients & Methods:

A prospective observational study was conducted at Emergency Department, Phramongkutklao Hospital, Thailand during September 2017 - October 2018. Patients presenting with non-variceal UGIB were enrolled.

Data collection:

Serum lactate was measured at the time of arrival (initial lactate) and 6 hours later. Rebleeding, organ failure, intensive care unit (ICU) admission and death were assessed as adverse clinical outcomes. Correlation between lactate, lactate clearance and GBS and predictive value of these parameters for adverse clinical outcomes were analyzed .

Results & discussion:

Of 130 patients enrolled, 73% were male and mean age was 66 years old. The most common comorbidities were hypertension and DM. Mean SBP was 122 mmHg, Pulse rate 97 bpm. Mean initial lactate was 3.3 (0.8-24.1) mmol/L and mean GBS was 7.1. 44 patients (33%) received PRC transfusion. EGD was performed in 91 patients (71%) and 43 patients (33.1%) had adverse outcomes.

Initial lactate level weakly correlated with GBS (r=0.238, p=0.006). Initial lactate of $\geq$ 8 mmol/L was predictive of ICU admission (p=0.038) and 30- day mortality (p=0.024) while GBS predicted organ failure (p < 0.001) and composite adverse outcomes (p < 0.001).

There was no correlation between lactate clearance and GBS and also any adverse outcomes.

Outcome	N	Initial lactate, mmol/L	*P* value	% Lactate clearance	*p* value
Rebleeding			0.342		0.664
Yes	5	1.7 (0.8-32)		38.5 (1.0-53.6)	
No	125	2.1 (0.8-24.1)		26.9 (-100-81.8)	
Organ failure			0.168		0.695
Respiratory failure	5	1.9 (1.2-3.62)		22.2 (-78.6-56.5)	
Acute kidney injury	33	2.8 (0.8-24.1)		20.8 (1.0-81.8)	
None	92	2.0 (0.8-16.8)		30.2 (-100-80.3)	
ICU admission			0.110		0.343
Yes	5	4.6 (1.2-18)		44.8 (1.0-66.1)	
No	125	2.1 (0.8-24.1)		26.9 (-100-81.8)	
30-day mortality			0.191		0.572
Yes	4	5.2 (1.5-9.2)		13.0(1.0-56.52)	
No	126	2.1 (0.8-24.1)		28.8(-100 - 81.8)	
Composite adverse outcome			0.267		0.822
Yes	43	2.3 (0.8-24.1)		25.0 (-78.6-81.8)	
No	87	2.0 (1.0-16.4)		29.4 (-100-80.3)	

Table 1.Correlation between lactate, lactate clearance and adverse outcomes

Outcome	N	Initial lactate	*p* value
Rebleeding			0.317
Yes	5	2.0 (1.0-11.0)	
No	125	8.00 (0-17.0)	
Organ failure			<0.001*
Respiratory failure	5	9.0 (1.0-11.0)	
Acute kidney injury	33	11.0 (3.0-16.0)	
None	92	5.5 (0-17.0)	
ICU admission			0.104
Yes	5	10.0 (4.0-17.0)	
No	125	7.0 (0-16.0)	
30-day mortality			0.105
Yes	4	10.5 (10.0-16.0) 7.0 (0-17)	
No	126		
Composite adverse outcomes			<0.001*
Yes	43	10.0 (1-17)	
No	87	6.9 (0-16)	

Table 2. Correlation between GBS and adverse outcomes

Outcome	N	Initial lactate < 8 mmol/L (%)	Initial lactate $\geq$ 8 mmol/L (%)	*p* value
Rebleeding				1.00
Yes	5	5 (4.13)	-	
No	125	116 (95.9)	9 (100)	
Organ failure				0.131
Respiratory failure	5	5 (4.1)	-	
Acute kidney injury	33	28 (23.1)	5 (55.6)	
None	92	88 (72.7)	4 (44.4)	
ICU admission				0.038*
Yes	5	3 (2.5)	2 (22.2)	
No	125	118 (97.5)	7 (77.8)	
30-day mortality				0.024*
Yes	4	2 (1.7)	2 (22.2)	
No	126	119 (98.4)	7 (77.8)	
Composite adverse outcome				0.156
Yes	43	38 (31.4)	5 (55.6)	
No	87	83 (68.6)	4 (44.4)	

Table 3. Correlation between lactate level and adverse outcomes

Conclusion & perspectives:

Initial serum lactate, at cut-off value of $\geq$ 8 mmol/L, may have a role in triage of UGIB patients at high risk in addition to the currently used screening tools.

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