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Predictors of Outcome in Patients with Upper Non Variceal Gastrointestinal Bleeding in Emergency Department

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Abstract
Acute upper gastrointestinal bleeding is a life threatening emergency. Modified Glasgow Blatchford score is the current scoring system to evaluate patients with acute UGIB. The purpose of this study was to confirm value of Modified Blatchford scoring system as a predictor of outcome as regard patient's mortality, their need for ICU, duration of hospitalization and need for endoscopic intervention and compare its sensitivity and specificity with and without adding serum lactate level in patients presenting with upper non variceal gastrointestinal bleeding upon admission to the emergency department.
At presentation,51% of patients with low lactate level were classified as high risk Blatchford score while 87.8% of patients with high lactate level were classified as high risk score
2 hours after resuscitation, all patients with high lactate level were classified as high risk.
After 48 hours, mortality rate and ICU admission were significantly higher in group 2 than in group 1.
Keywords: *Upper Non Variceal Gastrointestinal Bleeding, Modified Glasgow Blatchford Scoring System, lactate.*

Introduction

Acute gastrointestinal (GI) bleeding is a common cause of emergency presentation.[1,2]

The Modified Glasgow Blatchford scoring system (MGBS) has been hypothesized to eliminate the subjective components of the Glasgow Blatchford and it might perform as well as current scoring systems. MGBS is used to stratify risk of non-variceal upper gastrointestinal hemorrhage or need of medical or surgical intervention, endoscopic therapy.[3]

Lactate can be used as a predictor of outcome in non variceal UGIB, as elevated lactate level on presentation was an independent predictor of ICU admission, inpatient endoscopy and Packed red blood cell transfusion in patients with acute GIB.

Our aim is to evaluate value of MGBS as a predictor of outcome and compare its sensitivity and specificity with and without adding lactate level in patients presenting with upper non variceal gastrointestinal bleeding upon admission to the emergency department and stratify patients into high risk or low risk for mortality, their need

for ICU hospitalization, prolonged hospital stay and need for endoscopic intervention

Patients and Methods

Study Design

This was a Prospective study, which included 100 patients presenting with upper gastrointestinal bleeding in the form of hematemesis, coffee ground vomitus and/or melena admitted at emergency department (ED) of Alexandria Main university hospital from Jan. 2018 to Jan. 2019.

Tools of Data Collection

Patients have been categorized into 2 groups:

- Group 1: (stable) included 54 patients with stable vital signs
- Group 2: (unstable) included 46 patients who had unstable vital signs at presentation (BP <90/60, pulse >100 b/min, disturbed conscious level, UOP <30 ml /hour).

Patients were classified into high risk and low risk according to Modified Blatchford Score and lactate level has been measured in VBG (venous blood gases).

All individuals in this study were subjected to the following; **History taking**, Demographic data (Age, Gender), medical or surgical history, Drug history (including NSAIDS and steroids, antiplatelet and or anticoagulant).

Clinical Examination Including; General examination: Pale or irritable, vital signs: blood pressure (standing and recumbent), pulse rate, respiratory rate, ABCDE approach, abdominal examination.

Laboratory Investigations

- Complete blood picture (hemoglobin level, platelets and white blood count), Serum urea and creatinine, Liver enzymes (ALT, AST), Coagulation profile (INR, PT, PTT), Random blood glucose level
- Lactate level in VBG (on admission and after initial resuscitation)

Initial resuscitation was done according to our emergency protocol using intravenous fluids (0.9% NaCl normal saline 2 liters), proton pump inhibitors (PPI) (80 mg IV omeprazole). Unstable patients received blood products (packed red blood cells, fresh frozen plasma and platelets)

Radiological investigations

- X-ray chest in patients with suspected chest infection
- Ultrasound abdomen was done for all patients either at presentation or after admission.

Upper Gastrointestinal Endoscope either at initial presentation, after admission or as outpatient after discharge**.**

Outcome

- Follow up of the patients after 48 hours was done to detect any mortality, discharge or continuously admitted under medical care

Results

Table (1): Demographic data of the studied groups

Demographic data	Group 1 (n=54)		Group 2 (n=46)		Chi Square test (P-value)
	N	%	N	%	
• **Age (in years)**					
Mean± standard deviation	47.2±17.0		65.8±12.5		**Mann-Whitney test** $Z = 5.325$ P=<0.001*
• **Gender**					
Male	35	64.8	32	69.6	$X^2 = 0.254$
Female	19	35.2	14	30.4	P=0.615

*Significant at ($P \leq 0.05$)

Mean age was statistically significant higher in group (2) than group (1)

Table (2): Distribution of the studied groups according to their BLATCHFORD score

	Group 1 (n=54)		Group 2 (n=46)		*Test of significance* (P-value)
	N	%	N	%	
• **BLATCHFORD score**					
Mean± standard deviation	4.9±3.1		11.9±3.1		**Mann-Whitney test** Z = 7.481 P=<0.001*
• **BLATCHFORD score categories**					
High risk (≥6)	23	42.6	45	97.8	**Chi Square test** X^2= 34.826 P=<0.001*
Low risk (<6)	31	57.4	1	2.2	

*Significant at (P ≤ 0.05)

According to Blatchford score system, 31 patients (57.4%) of group (1) and 1 patient (2.2%) of group (2) were classified as low risk <6, while 23 patients (42.6) of group (1) and 45 patients (97.8) of group (2) were classified as high risk.

Table (3): Lactate level at presentation, after follow up and change in lactate level

	Group 1 (n=54)		Group 2 (n=46)		*Test of significance* (P-value)
	N	%	N	%	
• **Lactate level at presentation**					
Mean± standard deviation	1.9±0.8		3.9±1.2		**Mann-Whitney test** Z = 6.754 P=<0.001*
• **Lactate categories at presentation**					
Low (≤2.5)	43	79.6	8	17.4	**Chi Square test** X^2= 38.504 P=<0.001*
High (>2.5)	11	20.4	38	82.6	
• **Lactate level after resuscitation**					
Mean± standard deviation	1.1±0.3		2.4±0.9		**Mann-Whitney test** Z = 6.740 P=<0.001*
• **Lactate categories after resuscitation**					
Low (≤2.5)	54	100.0	22	47.8	**Chi Square test** X^2= 37.071 P= P=<0.001*
High (>2.5)	0	0.0	24	52.2	

*Significant at (P ≤ 0.05)

At Presentation: number of patients in group (2) who had high lactate level was 38 which was significantly higher than number of patients in group (1).

2 Hours After Resuscitation: all patients (100%) 54 patients in group (1) had normal lactate level after resuscitation. In group (2) 24 patients (52.2 %) had persistently high lactate level.

Table (4): Initial and 48 hours follow up of patients as regard mortality, ICU admission and hospital stay

	Group 1 (n=54)		Group 2 (n=46)		Chi Square test (P-value)
	N	%	N	%	
• **Initial presentation**					
Live	54	100.0	26	56.5	X^2= 29.348 P=<0.001*
Died	0	0.0	20	43.5	
ICU admission	0	0.0	35	76.1	X^2= 63.211 P=<0.001*

• **48 hours follow up**					
Died	0	0.0	20	43.5	X^2= 67.687 P=<0.001*
ICU admission	0	0.0	15	32.6	
Ward admission	24	44.4	10	21.7	
Discharged	30	55.6	1	2.2	

*Significant at (P ≤ 0.05)

The mortality rate and ICU admission were statistically significant more in group (2) than in group (1).

Table (5): Association between Blatchford score with endoscopic intervention and outcome after 48 hours of studied patients

	Low risk (n=32)		High risk (n=68)		Chi Square test (P-value)
	N	%	N	%	
• **Endoscopic intervention**					
Yes	4	12.5	47	69.1	X^2= 27.912 P=<0.001*
No	28	87.5	21	30.9	
• **Outcome after 48 hours**					
Died	0	0.0	20	29.4	X^2= 71.328 P=<0.001*
ICU stay	0	0.0	15	22.1	
Ward admission	4	12.5	30	44.1	
Discharged	28	87.5	3	4.4	
• **Mortality**					
Live	32	100.0	48	70.6	X^2= 11.765 P=0.001*
Died	0	0.0	20	29.4	
• **ICU stay**					
No	32	100.0	33	48.5	X^2= 25.339 P=<0.001*
Yes	0	0.0	35	51.5	

*Significant at (P ≤ 0.05)

Patients with high Blatchford score had significantly higher mortality rate, ICU admission and needed endoscopic intervention more.

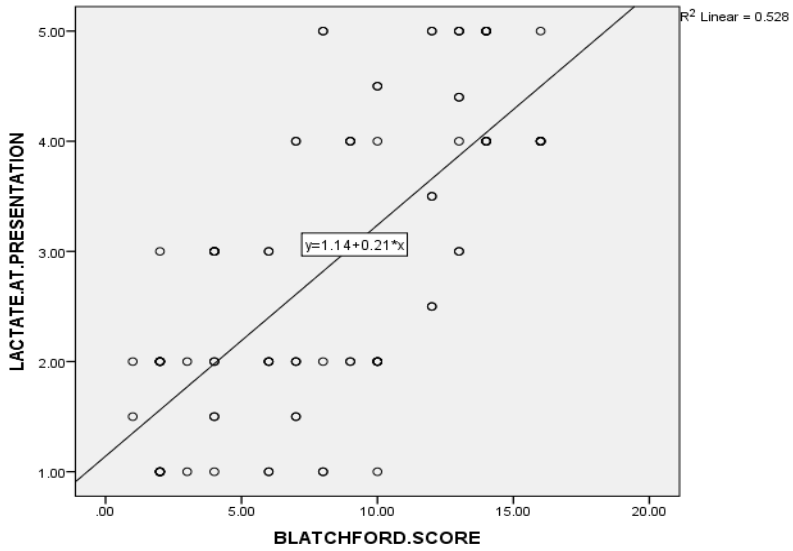
Table (6): Association between lactate at presentation with Blatchford score, endoscopic intervention, outcome after 48 hours in patient's groups

	Low (n=51)		High (n=49)		Chi Square test (P-value)
	N	%	N	%	
• **BLATCHFORD score categories**					
High risk (≥6)	25	49.0	43	87.8	X^2= 17.232 P=<0.001*
Low risk (<6)	26	51.0	6	12.2	
• **Endoscopic intervention**					
Yes	18	35.3	33	67.3	X^2= 10.274 P=0.001*
No	33	64.7	16	32.7	
• **Outcome after 48 hours**					
Died	0	0.0	20	40.8	X^2= 46.599 P=<0.001*
ICU admission	3	5.9	12	24.5	
Ward admission	20	39.2	14	28.6	
Discharged	28	54.9	3	6.1	
• **Mortality**					
Live	51	100.0	29	59.2	X^2= 26.020 P=<0.001*
Died	0	0.0	20	40.8	
• **ICU stay**					
No	48	94.1	17	34.7	X^2= 38.789 P=<0.001*
Yes	3	5.9	32	65.3	

*Significant at (P ≤ 0.05)

At Presentation, patients with high lactate level had statistically significant higher risk score, mortality rate and ICU admission were than patients with low lactate level.

The **Figure (I):** Spearman's correlation between lactate level at presentation and Blatchford score



P= <0.001* Correlation coefficient (r) = 0.715

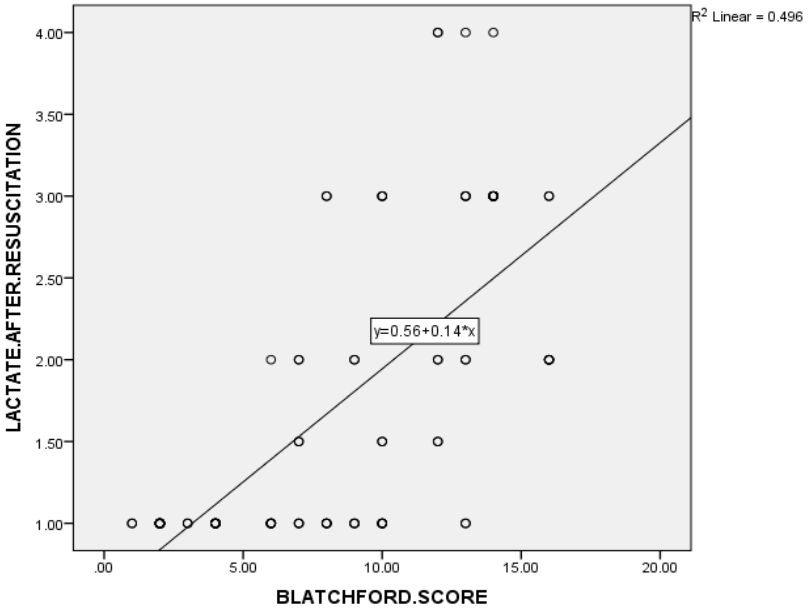
Table (7): Association between lactate 2 hours after resuscitation with Blatchford score, endoscopic intervention, outcome after 48 hours of studied patients

	Low (n=79)		High (n=24)		Chi Square test (P-value)
	N	%	N	%	
• **BLATCHFORD score categories**					
High risk (≥6)	44	57.9	24	100.0	X^2= 14.861 P=<0.001*
Low risk (<6)	32	42.1	0	0.0	
• **Endoscopic intervention**					
Yes	30	39.5	21	87.5	X^2= 16.835 P=0.001*
No	46	60.5	3	12.5	
• **Outcome after 48 hours**					
Died	6	7.9	14	58.3	X^2= 58.699 P=<0.001*
ICU stay	5	6.6	10	41.7	
Ward admission	34	44.7	0	0.0	
Discharged	31	40.8	0	0.0	
• **Mortality**					
Live	70	92.1	10	41.7	X^2= 29.002 P=<0.001*
Died	6	7.9	14	58.3	
• **ICU stay**					
No	65	85.5	0	0.0	X^2= 58.647 P=<0.001*
Yes	11	14.5	24	100.0	

*Significant at (P ≤ 0.05)

2 hr after resuscitation, patients with high lactate level still had higher mortality rate and ICU admission than in patients with low lactate level.

The **Figure (2):** Spearman's correlation between lactate level after resuscitation and Blatchford score



P= <0.001* Correlation coefficient (r) = 0.755

Lactate at presentation in prediction of patient's instability

ROC curve was used to determine the ability of lactate level at presentation to predict instability of patients. we found that sensitivity 87% and specificity 80%

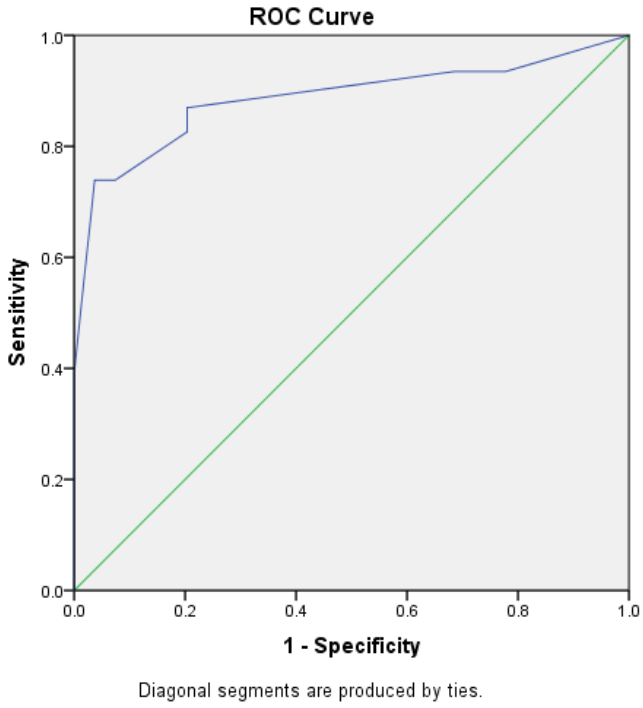


Figure (3): ROC cure for lactate at presentation in prediction of patient's instability

Area under curve= 88.6%, p= <0.001

*Selected cutoff value for lactate= 2.25, where sensitivity= 87.0% and specificity= 80%

Coordinates of the Curve

Test Result Variable(s): lactate.at.presentation

Positive if Greater Than or Equal To[a]	Sensitivity	1 – Specificity
.0000	1.000	1.000
1.2500	.935	.778
1.7500	.935	.685
2.2500	.870	.204
2.7500	.826	.204
3.2500	.739	.074
3.7500	.739	.037
4.2000	.391	.000
4.4500	.348	.000
4.7500	.304	.000
6.0000	.000	.000

The test result variable(s): lactate.at.presentation has at least one tie between the positive actual state group and the negative actual state group.

a. The smallest cutoff value is the minimum observed test value minus 1, and the largest cutoff value is the maximum observed test value plus 1. All the other cutoff values are the averages of two consecutive ordered observed test values.

Lactate after resuscitation in prediction of patient's instability

ROC curve was used to determine the ability of lactate level after resuscitation to predict instability of patients. We found that sensitivity 76.1% and specificity 94.4%.

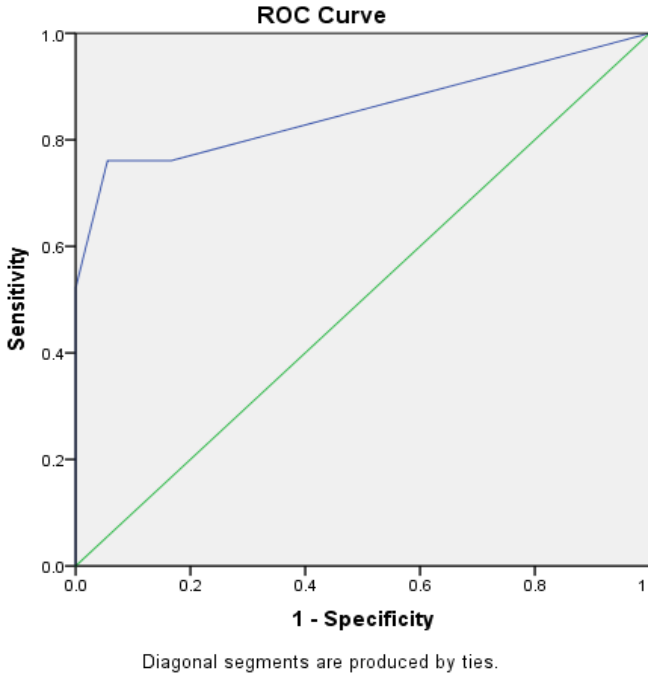


Figure (4): ROC curve for lactate after resuscitation in prediction of patient's instability.

Area under curve= 85.4%, p= <0.001

* Selected cutoff value for lactate= 1.75, where sensitivity= 76.1%, specificity= 94.4%.

Coordinates of the Curve

Test Result Variable(s): lactate.at.resucitation

Positive if Greater Than or Equal To[a]	Sensitivity	1 – Specificity
.0000	1.000	1.000
1.2500	.761	.167
1.7500	.761	.056
2.5000	.522	.000
3.5000	.087	.000
5.0000	.000	.000

The test result variable(s): lactate. at. resucitation has at least one tie between the positive actual state group and the negative actual state group.

a. The smallest cutoff value is the minimum observed test value minus 1, and the largest cutoff value is the maximum observed test value plus 1. All the other cutoff values are the averages of two consecutive ordered observed test values.

Discussion

Upper non variceal GIT bleeding is a major health problem currently in Egypt, the current study aimed at using MGBS score together with the serum lactate level to risk stratify such patients and detect their need for intervention whether medical or surgical.

In doing this, the study population was divided into two groups according to the hemodynamic stability, where group 1 was the HD stable group and group 2 was the HD unstable

In the present study, it was observed that the number of older patients with a mean age of 61.92 years was significantly higher in group (2) than in group (1) denoting that older patients are at high risk to develop massive GIT bleeding, which may be explained by the presence of multiple comorbidities and consumption of multiple drugs. Other studies reported the same results as the mean age of the included patients was 61.92 years, which donating high risk.[(4)]

The current study showed that serum lactate at presentation, after follow up and changes in lactate level provedto be a possible predictor of patient outcome. Lactate level was significantly higher in unstable patients who had prolonged hospital admission, or required ICU admission and also a higher mortality rate was documented.

The researchers in the present study found out that most of patients with high Blatchford score had high serum lactate level as well. These had synergistically influenced the mortality rate, ICU admission and duration hospital admission were more in patients presented with high lactate level

Moreover, after 48 hours follow up of patients; mortality rate, hospital admission and ICU admission rates were directly proportional with high lactate level and there was statistically significant difference between the 2 groups. Wada et al[(5)] reported similar results in their study.

Also, El-kersh et al.[(6)] outlined the predictive role of lactate in patients with Upper GIT bleeding, who presented to the Emergency department.

Therefore, Lactate proved to be a sensitive and specific predictor of outcome in patients presented with non-variceal UGIB at presentation with a sensitivity of 87% and specificity 80%, and after resuscitation with a sensitivity of 76.1% and specificity of 94.4%.

MGBS system is sensitive and specific scoring system used to stratify patients with non-variceal UGIB and detect their need for medical or surgical intervention

Conclusion

Lactate is a sensitive predictor for patient's instability, ICU admission, inpatient endoscopy and patient mortality in patients with UGIB even after 48 hours.

Lactate measurement provides clinically useful information in patients with acute GIB and supports its use in the initial clinical management decision.

Lactate has a positive correlation with MGBS system as regard ICU admission, endoscopic intervention, hospital stay and patient mortality.

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