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Predictors of in-hospital mortality in a cohort of elderly Egyptian patients with acute upper gastrointestinal bleeding

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Abstract

Acute upper gastrointestinal bleeding (UGIB) affects large number of elderly with high rates of morbidity and mortality. Early identification and management of the factors predicting in-hospital mortality might decrease mortality. This study was conducted to identify the causes of acute UGIB and the predictors of in-hospital mortality in elderly Egyptian patients.

286 elderly patients with acute UGIB were divided into: bleeding variceal group (161 patients) and bleeding nonvariceal group (125 patients). Patients' monitoring was done during hospitalization to identify the risk factors that might predict in-hospital mortality in elderly.

Variceal bleeding was the most common cause of acute UGIB in elderly Egyptian patients. In-hospital mortality rate was 8.74%. Increasing age, hemodynamic instability at presentation, co-morbidities (especially liver cirrhosis associated with other co-morbidity) and failure to control bleeding were the predictors of in-hospital mortality.

Increasing age, hemodynamic instability at presentation, co-morbidities (especially liver cirrhosis associated with other co-morbidity) and failure to control bleeding should be considered when triaging those patients for immediate resuscitation, close observation, and early treatment.

Abbreviations: ALT = alanine transferase, AST = aspartate aminotransferase, AUC = area under the curve, GAVE = gastric antral vascular ectasia, GI = gastrointestinal, Hb = hemoglobin, n = number, PHT = portal hypertension, ROC = receiver operating characteristic, SD = standard deviation, UGIB = upper gastrointestinal bleeding, WBCs = white blood cells.

Keywords: acute upper gastrointestinal bleeding, elderly, in-hospital mortality

1. Introduction

Acute upper gastrointestinal bleeding (UGIB) in elderly patients is a life-threatening medical emergency that needs optimal evaluation and appropriate intervention.[1] UGIB in the elderly remains a major clinical challenge as it is associated with higher rates of hospitalization, morbidity, and mortality than in younger patients.[2]

Despite significant advances in diagnosis and treatment of UGIB, mortality rate in elderly is still increasing.[3] This is probably due to increased frailty, less tolerability of the elderly to hemodynamic changes resulting from acute bleeding episodes, underlying co-morbidities, as well as concomitant use of multiple medications.[4]

Early identification of the predictive factors of mortality during acute UGIB may be beneficial for patients' risk stratification. High risk patients will require hospital admission, rapid resuscitation, close observation, and prompt endoscopic intervention, while the low risk ones can be discharged early and managed on an outpatient basis, thus decreasing costs and optimizing medical resources in emergency departments.[5,6]

The aim of this study was to identify the cause of acute UGIB and to determine the predictive factors of in-hospital mortality in a cohort of elderly Egyptian patients.

2. Patients and methods

This prospective study was carried out in endoscopy units of Internal Medicine Department (the patients were recruited from the emergency room and intensive care unit) and Tropical Medicine Department, Tanta University Hospitals, during the period from October 2016 to October 2017.

Patients aged ≥60 years presented with acute UGIB were included in the study; while patients aged <60 years were excluded from the study with no other exclusion criteria.

Around 286 patients aged ≥60 years presented with acute UGIB were enrolled in this study.

Patients included in this study were divided into 2 groups according to the source of bleeding after doing upper gastrointestinal (GI) endoscopy. Bleeding variceal group: included 161 patients presented with bleeding gastroesophageal varices and bleeding nonvariceal group: included 125 patients presented with bleeding source other than gastroesophageal varices.

The study protocol was performed according to the ethical guidelines of the Helsinki Declaration. A written informed consent was signed by all patients participating in this study.

All patients were subjected to the following: complete history taking, physical examination, laboratory investigations (complete blood count, blood urea and serum creatinine, and liver function tests) and upper GI endoscopy.

Before performing upper GI endoscopy, all patients were admitted to hospital and immediately resuscitated. Transfusion with packed red blood cells was given when indicated (hemoglobin level <8 gm/dL).[7] Empirical therapy with either somatostatin analogue (sandostatin, novartis); 50 μg IV as an initial bolus followed by continuous infusion of 25–50 μg/hour for 2 to 5 days or proton pump inhibitor infusion, pantoprazole (pantazol, 40 mg, Sigma–Tec pharmaceutical industries, Egypt) 80 mg as an initial bolus followed by continuous infusion of 8 mg/hour for 72 hours was given for suspicion of bleeding gastroesophageal varices or peptic ulcer respectively.[8,9] Ceftriaxone vial (ceftriaxone, Sandoz), IV 1 g/24 h for 5 days was given to all patients with variceal bleeding, on the other hand antibiotics were not given to patients with nonvariceal source.

2.1. Upper GI endoscopy

It was performed once the patients were hemodynamically stabilized. After identification the bleeding lesion (variceal or nonvariceal source), appropriate endoscopic haemostatic procedure was applied.[1]

Bleeding from a variceal source was considered if the endoscopy revealed any sign of variceal hemorrhage including a spurting or oozing bleeding varix, a varix with a nipple sign, red wale marks, or cherry red spots. Peptic ulcer was considered to be the bleeding source if there was an ulcer with any of the following signs: a spurting or oozing bleeding vessel, adherent blood clot, or red spots on ulcer base.[10]

2.2. Follow-up

Patients' monitoring was done during hospital admission regarding: control of bleeding, rebleeding, complications, or death in order to identify the possible risk factors that might predict in-hospital mortality in those elderly patients.

Elderly patients in our study were aged ≥ 60 years.[11] In-hospital rebleeding was defined as a new episode of hematemesis or melena with drop of hemoglobin levels >2 g/dL during hospitalization after the initial bleeding had stopped.[12] In-hospital mortality was considered when death occurring during hospitalization for the particular episode of acute UGIB.[13]

2.3. Statistical analysis

Patients' data were tabulated and processed using Statistical Program for Social Science (SPSS) (version 23; SPSS Inc., Chicago, IL). Quantitative data were expressed as means ± standard deviation (SD) and were analyzed using unpaired t test.

While qualitative data were expressed as frequency and percentage and were analyzed using Chi-square test. Univariate analysis was done to identify predictive factors of in-hospital mortality. Variables that became statistical significance in the univariate analysis were subsequently included in multivariate analysis. In all tests, probability (P) value was considered significant when < .05.

3. Results

There were no significant differences between bleeding variceal and nonvariceal groups as regard to age and sex (P = .149 and .166) respectively, while there were significant differences regarding the following: presenting symptom (P = <.0001), bleeding episodes (P = <.0001), hemodynamic status (P = 0.0001), co-morbidities (P = <.0001), hemoglobin level at presentation (P = <.0001) and the number of units of packed red blood cells received (P = 0.0010) as shown in Table 1.

Concerning the cause of bleeding in the studied patients, our results revealed that the most common cause of acute UGIB was variceal bleeding (56.29%), while nonvariceal bleeding was the cause in (43.71%). Esophageal varices were the most common source of bleeding in the variceal group (72.05%); on the other hand, peptic ulcer was the most common source of bleeding in the nonvariceal group (71.2%) as shown in Table 2.

There was no significant difference between bleeding variceal and nonvariceal groups as regards control of initial bleeding (0.2700), while there were significant differences regarding the following: active bleeding (P = .0007), rebleeding (P = .0236) and in-hospital mortality (P = .0376) as shown in Table 3.

Twenty patients (7%) of the 286 patients—enrolled in this study—suffered from renal impairment on admission, 2 of them died post endoscopy during hospitalization, but with no significant impact on mortality P = .065.

Of the 286 patients, 57 (19.93%) critically ill patients were initially admitted to intensive care unit (ICU) due to hemodynamic instability which was not corrected by initial resuscitation, disturbed consciousness, and/or associated sever comorbidities. Endoscopy was done after stabilization of patients' general conditions; however 16 died post endoscopy during hospitalization, with significant impact on mortality P = <.0001*.

In-hospital mortality rate of the elderly patients was 8.74%. Univariate analysis was done to identify predictive factors of in-hospital mortality as shown in Table 4. Variables that reached the statistical significance in the univariate analysis were subsequently included in multivariate analysis which showed that increasing age, hemodynamic instability at presentation, co-morbidities (especially liver cirrhosis associated with other co-morbidity), and failure to control bleeding were independent risk factors, significantly associated with in-hospital mortality among elderly patients presented with acute UGIB as shown in Table 5.

4. Discussion

In the present study, we focused on acute UGIB in a cohort of elderly Egyptian patients, in terms of its causes as well as predictive factors of in-hospital mortality.

Inspite of the associated co-morbidities and multiple drugs used in the studied patients which might increase the risk for the development of peptic ulcer disease, our results revealed that variceal bleeding was the most common cause of acute UGIB in elderly patients (56.29%).

Clinical data of the studied groups.

Variables		Bleeding variceal group N: 161		Bleeding nonvariceal group N: 125		Total N: 286		P-value
		N	%	N	%	N	%	
Age, years	Range	60–83		60–86		60–86		.149
	Mean±SD	67.58±5.32		68.55±6.03		68±5.65		
Sex	Male	119	73.91	83	66.4	202	70.63	.166
	Female	42	26.09	42	33.6	84	39.37	
Presenting symptom	Hematemesis	48	29.81	21	16.8	69	24.13	<.0001*
	Melena	36	22.36	75	60	111	38.81	
	Hematemesis and melena	77	47.83	29	23.2	106	37.06	
Bleeding episodes	Previous bleeding episodes	94	58.39	40	32	134	46.85	<.0001*
Hemodynamic status	Hemodynamic instability	107	66.46	55	44	162	56.64	.0001*
Co-morbidities	No co-morbidity	0	0	56	44.8	56	19.58	<.0001*
	Liver cirrhosis only	114	70.81	22	17.6	136	47.55	
	Co-morbidity other than cirrhosis	0	0	43	34.4	43	15.03	
	Cirrhosis and other co-morbidity	47	29.19	4	3.2	51	17.83	
Hemoglobin level at presentation, g/dL	Range	3.5–9.8		3.2–11.6		3.2–11.6		<.0001*
	Mean±SD	7.03±1.89		7.98±2.06		7.44±2.01		
Number of units of packed red blood cells received	Range	0–5		0–5		0–5		.001*
	Mean±SD	1.7±1.5		1.11±1.43		1.44±1.49		

* It means significant.

This result was comparable to that of Shalaby et al[14] who confirmed that esophageal varices were responsible for 55% of acute UGIB in elderly patients. On the other hand, our result was much higher than that reported by Antler et al[15] who documented that variceal bleeding in elderly represented only 12% of UGIB.

This difference in the percentage of variceal bleeding between Egyptian and western countries could be explained by the fact

Endoscopic bleeding lesions among the studied patients.

Endoscopic bleeding lesions		N	%
Bleeding variceal lesion (N:161) 56.29%	Esophageal varices	116	72.05
	Gastroesophageal varices	40	24.84
	Isolated gastric varices	5	3.11
Bleeding nonvariceal lesion (N:125) 43.71%	Gastric ulcer	51	40.8
	Duodenal ulcer	38	30.4
	Gastroduodenal erosions	15	12
	Gastroesophageal reflux disease (GERD) & lower esophageal ulcers	8	6.4
	Portal hypertensive gastropathy (PHG)	7	5.6
	Gastric antral vascular ectasia (GAVE)	2	1.6
	Gastric tumor	3	2.4
	Arteriovenous (AV) malformation	1	0.8

AV = Arteriovenous, GAVE = Gastric antral vascular ectasia, GERD = gastroesophageal reflux disease, PHG = portal hypertensive gastropathy.

Clinical outcomes of the studied patients.

Parameter		Bleeding variceal group N: 161		Bleeding nonvariceal group N: 125		P-value
		N	%	N	%	
Active bleeding	Presence of active bleeding	39	24.22	11	8.8	.0007*
	No active bleeding	122	75.78	114	91.2	
Control of initial bleeding	Failure to control bleeding	13	8.07	6	4.8	.270
	Control bleeding	148	91.93	119	95.2	
Rebleeding	Rebleeding	24	14.91	8	6.4	.0236*
	No rebleeding	137	85.09	117	93.6	
In-hospital mortality	Deceased	19	11.8	6	4.8	.0376*

* It means significant.

Table 4

Univariate analysis of predictors of in-hospital mortality in the studied patients.

Parameter		Deceased (n: 25)		Survival (261)		Adjusted OR (95% CI)	P-value
		N	%	N	%		
Age, years	Range	63–85		60–86		1.453 (1.053–3.526)	<0.0001*
	Mean ± SD	72.92 ± 6.07		67.53 ± 5.39			
Sex	Male	19	76	183	70.11	1.426 (0.474–6.352)	.5371
	Female	6	24	78	29.89		
Presenting symptom	Hematemesis	7	28	62	23.75	2.352 (1.249–6.531)	.0104*
	Melena	3	12	108	41.38		
	Hematemesis and melena	15	60	91	34.88		
Bleeding episodes	1st episode	10	40	142	54.41	0.974 (0.352–1.895)	.1679
	Recurrent	15	60	119	45.59		
Hemodynamic status	Stable	4	16	120	45.98	6.324 (2.107–8.521)	.0039*
	Unstable	21	84	141	54.02		
Co-morbidities	No co-morbidity	0	0	56	21.46	3.521 (1.653–7.214)	<.0001*
	Cirrhosis only	4	16	132	50.57		
	Co-morbidity other than cirrhosis	4	16	39	14.94		
	Cirrhosis and other co-morbidity	17	68	34	13.03		
Hemoglobin level at presentation, g/dL	Range	3.2–9.8		3.5–11.6		2.521 (1.309- 5.324)	0.0004*
	Mean ± SD	6.09 ± 1.98		7.57 ± 1.97			
Number of packed red blood cells received during resuscitation	Range	0–5		0–5		3.457 (2.451–7.532)	0.0001*
	Mean ± SD	2.52 ± 1.58		1.34 ± 1.45			
Bleeding source	Variceal	19	76	142	54.41	2.524 (1.132- 5.962)	.0376*
	Nonvariceal	6	24	119	45.59		
Active bleeding	Presence of active bleeding	17	68	33	12.64	12.452 (3.526–27.854)	<.0001*
	No active bleeding	8	32	228	87.36		
Control of initial bleeding	Control of bleeding	17	68	250	95.79	0.235 (0.054–0.745)	<.0001*
	Failure to control bleeding	8	32	11	4.21		
Rebleeding	Rebleeding	16	64	16	6.13	5.324 (4.174–9.521)	<.0001*
	No rebleeding	9	36	245	93.87		

* It means significant.

that Egypt has the highest prevalence rate of hepatitis C viral infection (HCV) worldwide (15%–20%) in addition to hepatitis B (3.2%) and bilharzial infestation which were considered the major risk factors for high incidence of chronic liver diseases with a sequel of variceal bleeding.[13,16]

On the contrary to our results, bleeding peptic ulcer was reported as the main source of UGIB among elderly in several studies: Thongbai et al[3] stated that the most common cause of

Table 5

Multivariate analysis of predictors of in-hospital mortality in the studied patients.

	Multivariate	
	Adjusted OR (95% CI)	P-value
Age	1.136 (1.029–1.254)	.011*
Variceal bleeding	1.210 (0.266–5.503)	.805
Presence of active bleeding	1.022 (0.204–5.114)	.979
Presenting symptom	0.468 (0.207–1.058)	.068*
Co-morbidities	4.919 (1.954–12.386)	.001*
Hemodynamic instability	12.566 (1.078- 146.412)	.043*
Hemoglobin level at presentation, g/dL	2.138 (0.613–7.456)	.233
Packed red blood cells received during resuscitation	3.107 (0.750–12.868)	.118
Failure to control bleeding	0.086 (0.013–0.563)	.010*
Rebleeding	0.868 (0.228–3.312)	.836

* It means significant.

acute UGIB was peptic ulcer bleeding which accounted for 84.8% of UGIB in their elderly patients. Also Charatcharoenwitthaya et al[12] found that 68% of acute UGIB was derived from bleeding peptic ulcers which were attributed to increase prescribing of potentially ulcerogenic drugs. Farrell and Friedman[4] as well documented that acid-related disorder (e.g., esophagitis, gastritis and peptic ulcer disease) accounted for 70% to 91% of hospital admissions for UGIB in the elderly.

In the current study, in-hospital mortality rate of the elderly was 8.74%. Similar result was obtained by Nahon et al[17] who revealed that in-hospital mortality rate of the elderly was 8.93%. On the other hand, low mortality rate of 3.41% was reported in a study of Thongbai et al[3] who attributed that to small number of cirrhotic portal hypertensive patients (11.22%)—who carried a higher risk of mortality—included in their study.

As regard to predictors of in-hospital mortality, our results showed that increasing age, hemodynamic instability at presentation, co-morbidities (especially liver cirrhosis associated with other co-morbidity) and failure to control bleeding were independent risk factors that were significantly associated with in-hospital mortality among elderly patients presented with acute UGIB.

Data from numerous studies revealed heterogeneous results concerning these predictive factors of in-hospital mortality: Thongbai et al[3] showed that mortality was significantly associated with hemodynamic instability at presentation, red blood in nasogastric aspiration, comorbidity especially coronary

artery disease, and creatinine >1.5 mg/dL. Charatcharoenwit-thaya et al[12] revealed that predictive factors of mortality were hemodynamic instability at presentation, co-morbidity with liver cirrhosis or disseminated malignancy, number of units of packed red blood cells transfusion during admission, and occurrence of rebleeding. Farrell and Friedman[4] identified the following factors as increasing the risk of mortality: age >60 years, hemodynamic instability, associated co-morbidities, failure to control bleeding, or rebleeding.

There were conflicting data about an increased risk of in-hospital mortality in patients with acute UGIB and increasing age. Although some studies[4,18,19] reported increased rates of in-hospital mortality with advancing age as in our study, other studies had not confirmed a higher mortality risk, especially after endoscopic therapy.[17,20–23]

There were some limitations to this work as; lack of a control group of younger patients, it was carried out in a single center, it did not include therapeutic modalities used among those patients.

5. Conclusion

The most common cause of UGIB in elderly patients was variceal bleeding. In-hospital mortality rate was 8.74% and the predictive factors of in-hospital mortality for those elderly patients were: increasing age, hemodynamic instability at presentation, co-morbidities (especially liver cirrhosis associated with other co-morbidity) and failure to control bleeding. These parameters should be put in mind when triaging those high risk patients for immediate resuscitation, close observation, and early treatment. For the benefit of the patient, and to decrease costs and optimize medical resources of the hospital.

We recommend large scale multicenter studies to elucidate the clinical application of these parameters as patients' risk stratification tools, in order to efficiently manage this high risk group of elderly patients with UGIB.

Author contributions

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