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Outcomes of Endoscopic Therapy in Patients with Peptic Ulcer Bleeding

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ABSTRACT

Background: The use of endoscopy is crucial in the treatment of bleeding from peptic ulcers.

Objective: To evaluate the clinical, laboratory, and endoscopic findings related to poor prognosis and to analyze the outcomes related to the treatment of peptic ulcer bleeding with different methods of endoscopic therapy.

Patients and Methods: Thirty patients who underwent endoscopic treatment and were diagnosed with peptic ulcer bleeding at Zagazig University Hospitals (Intensive Care Units, Internal Medicine Departments, and Upper Gastrointestinal Endoscopy Units) participated in our prospective observational cohort study stratified as follows: adrenalin injection, argon plasma coagulation (APC), and adrenalin injection followed by argon plasma coagulation.

Results: Patients treated with adrenaline injection modality had a higher percentage of rebleeding 71.4%, more red blood cell transfusion units with a median of 4 units, more hospital stay lengths with a median of 8.5 days compared with argon plasma coagulation and combined (adrenalin plus APC therapy) as less rebleeding were observed (40% and 0%) respectively, and fewer units of red blood cell transfusion (2% and 2%) respectively. Hospital stay median was 3.5 days in APC and 4 days in combined therapy. According to univariate logistic regression, nonsteroidal anti-inflammatory drugs (NSAIDs) intake, large ulcer size, and high GBS were predictive factors of post-endoscopic rebleeding.

Conclusion: Combining endoscopic adrenaline injection with argon plasma coagulation is more effective than either method alone in stopping bleeding from peptic ulcers and identifying risk factors may help in improving the prognosis of peptic ulcer bleeding.

Keywords: Peptic ulcer bleeding, Adrenalin, Argon plasma coagulation, Risk factors.

INTRODUCTION

Upper GIT bleeding is the most common cause of hospitalization. The majority of patients had esophageal varices and the second cause was found to be peptic ulcers [(1)]. Age, comorbidities, shock, endoscopic diagnosis, hemoglobin level at bleeding episode, lesions' size and/or grade, and stigmata of recent hemorrhage are all established risk variables that influence outcomes in the upper gastrointestinal bleeding (UGIB) context [(2)].

Risk of upper gastrointestinal bleeding has been stratified using a variety of scoring systems. The Glasgow-Blatchford score (GBS) and the Rockall score are the most popular (both pre-and post-endoscopy) [(3)]. The GBS was developed to identify patients who would benefit from no further care (such as endoscopy or a transfusion). Mortality risk is measured by Rockall scores, although these ratings were never intended to be used as decision aids [(4)].

Stigmas of recent hemorrhage are typically defined using the Forrest classification, which is as follows: (Forrest Ia-spurting bleeding, Forrest Ib-oozing bleeding, Forrest IIa- non-bleeding visible vessel, Forrest IIb- adherent clot, Forrest IIc- hematin on ulcer base, Forrest III- clean ulcer base) [(5)].

First-line therapy for UGIB is endoscopic hemostasis [(6)]. Due to its ease of use, epinephrine injections are the most prevalent modality, however sclerosants (absolute ethanol, polidocanol) and tissue adhesives (thrombin/fibrin glues) are also commonly injected. Hemostasis is achieved through vasoconstriction and the local tamponade action. Methods of applying heat can be broken down into two categories: those requiring physical touch and those that do not. Noncontact methods, such as argon plasma coagulation, are safe and relatively simple to use mechanically, while contact methods, such as a heater probe or bipolar electrocoagulation, provide appositional pressure, resulting in a heat-sink effect and tissue coagulation with contraction of the blood vessels: clips placement and hemospray powder are all endoscopic modalities for the treatment of non-variceal upper gastrointestinal bleeding (NVUGIB) [(7)].

The aim of the work was to evaluate the clinical, laboratory, and endoscopic findings related to poor prognosis and to analyze the outcomes related to the treatment of peptic ulcer bleeding with different methods of endoscopic therapy.

PATIENTS AND METHODS

Thirty patients underwent endoscopic treatment and were diagnosed with peptic ulcer bleeding, at Zagazig University Hospitals. Intensive Care Units, Internal Medicine Departments, and Upper Gastrointestinal Endoscopy Units, participated in our prospective observational cohort study.

Inclusion criteria: Age 18–70 years, both sexes, patients who were diagnosed with peptic ulcer bleeding after initial endoscopy.

Exclusion criteria: Patients diagnosed other than a

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peptic ulcer in any form of upper gastrointestinal bleeding (UGITB) or cancer, patients who refused endoscopy or enrollment in the study, patients initiating treatment with surgery or embolization**.**

The patients were divided randomly into 3 groups according to the endoscopic modality used:

Group (I): that included 14 patients treated with adrenalin injection only

Group (II): that included 10 patients treated with argon plasma coagulation

Group (III): that included 6 patients treated with combined therapy, which was adrenalin followed by argon plasma coagulation

Half of the patients treated with adrenalin injection received more than 1:10000 ml and others received equal or less than 1:10000 ml.

Lab investigations were: Complete blood count (CBC) including (Hb, PLT), Liver function tests including [S. Albumin, Total bilirubin, alanine aminotransferase (ALT), aspartate aminotransferase (AST), anaplastic lymphoma kinase (ALK), ph, and international normalized ratio (INR)]. Kidney function tests including (Urea and Creatinine), and helicobacter pylori Ag in stool.

Calculation of Blatchford score (GBS) was done on all patients. The Glasgow Blatchford score is calculated without the need for endoscopic results and is based on simple clinical observations as well as hemoglobin and blood urea concentrations. The requirement for immediate intervention can be predicted with the Glasgow Blatchford score shortly after hospital admission **(8).**

(C) Endoscopic components: Time to endoscopy (more or less than 24 hours at admission and within two weeks due to rebleeding methods, and results of endoscopic hemostasis, Forrest classification). Information was gathered on adrenalin injections, including the volume given, (APC), and a combination of these two modalities for endoscopic therapy.

Methods of endoscopy treatment:

I) Epinephrine injection therapy:

In our study, the high-risk lesion's surrounding tissue was injected with epinephrine using a catheter inserted into the endoscope's operating channel. Once the catheter was in place, the needle stretched to inject the epinephrine. Injections of the fluid were made in quadrants around the ulcer's base. The goal was to cause local vasoconstriction and a tamponade effect to reduce blood flow to the affected area **(9)**.

II) Argon plasma coagulation:

First, we specified the particular anatomical positions, and the effect of the electrode, whether enface or tangential, limited to the tissue nearest to it. Power levels of 40 to 50 W, a flow rate of 0.8 L/min, and applications lasting 0.5 to 2.0 seconds at a distance of 2 to 8 mm between the probe and tissue were used **(10).**

III) Combination therapy adrenaline injection plus argon plasma coagulation:

Plasma coagulation, adequate necrosis, hemostasis, and hemorrhages were achieved by first injecting diluted epinephrine (1/10000) on all four sides of the suspected site of bleeding, followed by endoscopic treatment with a foot pedal and two probes 2.3 and 3.2 mm of argon gas at a distance of 2 to 8 mm from the desired location. As soon as the endoscopic examination confirmed that the bleeding had ceased, the treatment was discontinued **(11).**

Follow up:

Patients were followed up as regards initial hemostasis, rebleeding, recurrent bleeding, required blood transfusion, length of hospital stay, surgery, and death.

Ethical consent:

An approval of the study was obtained from Zagazig University Academic and Ethical Committee (ZU-IRB#9346/23-2-2022). Every patient signed an informed written consent for acceptance of participation in the study. This work has been carried out in accordance with The Code of Ethics of the World Medical Association (Declaration of Helsinki) for studies involving humans.

Statistical analysis:

In order to analyze the acquired data, Statistical Package for the Social Sciences, version 20 was used to execute it on a computer (SPSS). In order to convey the findings, tables and graphs were employed. The quantitative data were presented in the form of the mean, median, standard deviation, and confidence intervals. The information was presented using qualitative statistics such as frequency and percentage. Binary stepwise logistic regression analysis was used for prediction of independent variables of binary outcome. Significant predictors in the Univariate analysis were entered into regression model using Enter method. Adjusted odds ratios and their 95% confidence interval were calculated. Pearson Chi-Square test and Fisher’s exact test were used to assess qualitatively independent data. The significance of a P value of 0.05 or less was determined.

RESULTS

Demographic characters and medical history of the studied group are shown in table 2.

Table (1): Demographic characters, medical history, medication of studied patients (n.30)

Age (years) Mean ±SD Range	54.9±12.3 (20-69)	
	n.	**%**
Sex Males Females	17 13	56.7 43.3
Special habit		
Smoker Non-smoker Alcoholic	10 20 1	33.3 66.7 3.3
Body mass index (BMI)		
Non obese Obese	11 19	36.7 63.3
Chronic disease	**23**	**76.7**
Chronic liver disease ○ Child Pugh score Median (range)	12 8(6-9)	40.0
Diabetes mellitus	6	20.0
Chronic kidney disease ○ On dialysis (2 patients) ○ Conservative treatment (2 patients)	4	13.3
Hypertension	12	40.0
Cancer ○ Hepatocellular carcinoma (HCC) (n.1) ○ Prostatic cancer (n.1)	2	6.7
Cardiac disease complicated with AF	3	10.0
Chronic obstructive pulmonary disease (COPD)	1	3.3
Rheumatoid arthritis	1	3.3
Medication	**14**	**46.7**
Nonsteroidal anti-inflammatory drugs (NSAIDs) Steroid Warfarin Aspirin	14 2 3 6	46.7 6.7 10.0 20.0

There was a significantly higher hemoglobin value at discharge after endoscopic treatment compared to its value at admission among peptic ulcer patients **(Table 2).**

Table (2): Laboratory finding at admission and at discharge in patients with peptic ulcer bleeding (n=30)

Laboratory finding	**Laboratory finding**		**P**
	At admission	**At discharge**	
CBC **HB gm/dl** Mean ±SD	7.4±1.96	8.8±1.4	0.001
WBCs (×10^3/uL) Mean ±SD	8.34±1.75	8.2±1.6	0.19
PLT (×10^3/uL) Mean ±SD	239.33±42.63	237±41.7	0.18
ALT(U/L) Mean ±SD	31.9±6.3	32.2±7.1	0.18
AST(U/L) Mean ±SD	31.3±6.3	31.8±6.9	0.17
Serum albumin(g/dl) Mean ±SD	3.37±0.72	3.4±0.63	0.59
Total bilirubin(mg/dl) Mean ±SD	1.12±0.22	1.1±0.21	0.66
Alkaline phosphatase(U/L) Mean ±SD	105.7±23.31	105.7±22.51	0.78
INR Mean ±SD	1.39±0.23	1.3±0.22	0.56
Kidney function test urea nitrogen (mg/dl) Mean ±SD	22.5±5.3	23.1±5.4	0.16
Serum creatinine (mg/dl) Mean ±SD	1.17±0.22	1.19±0.23	0.11
Positive H. pylori antigen in stool	20 (66.7%)		

There was significant rebleeding among older patients, males, patients on medications such as NSAID, and high GBS **(Table 3)**.

Table (3): Risk factors of rebleeding according to demographic and clinical history (n. 30)

	Rebleeding within (3 days+ recurrent bleeding in 2 weeks)				n.	p-value
	Yes n.14		No n.16			
Age in years Mean ±SD	59.7±11.9		50.8±11.3			**0.044**
Sex	No.	%	No.	%		
Males	11	64.7	6	35.3	17	**0.024**
Females	3	23.1	10	76.9	13	
Special habit						
Smoker	6	60.0	4	40.0	10	0.44
Non-smoker	8	40.0	12	60.0	20	
Alcoholic	1	100.0	0	0.0	1	0.47
BMI						
Non-obese	6	54.5	5	45.5	11	0.51
Obese	8	42.1	11	57.9	19	
H pylori Ag in stool						
Negative	5	50.0	5	50.0	10	0.70
Positive	9	45.0	11	55.0	20	
Glasgow Blatchford bleeding score Median (range)	13 (7-17)		9 (2-13)			**0.004**
Comorbidities						
Chronic disease	12	52.2	11	47.8	23	0.40
Chronic liver disease	5	41.7	7	58.3	12	0.65
Diabetes mellitus	4	66.7	2	33.3	6	0.65
Chronic kidney disease	3	75.0	1	25.0	4	0.32
Hypertension	6	50.0	6	50.0	12	0.76
Cancer	1	50.0	1	50.0	2	1
Cardiac disease Complicated by AF	2	66.7	1	33.3	3	0.59
COPD	0	0.0	1	100.0	1	1
Rheumatoid arthritis	1	100.0	0	.0	1	0.47
Medication						
NSAID	10	71.4	4	28.6	14	**0.026**
Steroid	2	100.0	0	.0	2	0.21
Warfarin	3	100.0	0	.0	3	0.09
Aspirin	4	66.7	2	33.3	6	0.38

This table shows that the larger size of ulcers was significantly associated with rebleeding after endoscopic treated modalities. It is obvious that patients of adrenaline injection modality were more likely to be exposed to rebleeding, followed by patients of APC modality, and none the of patients treated with combined adrenaline inj+APC was exposed to rebleeding **(Table 4)**.

Table (4): Risk factors of rebleeding regard ulcer characters and treatment modalities (n.30)

Variables	Rebleeding (within 3 days +recurrent bleeding within 2 weeks)				n.	p-value
	Yes n.14		No n.16			
	No.	%	No.	%		
Time of endoscopy						
≤24 hours	6	42.9	8	57.1	14	0.70
> 24 hours	8	50.0	8	50.0	16	
Ulcer location						
Body	0	0.0	2	100.0	2	0.49
Antrum	2	22.2	7	77.8	9	0.12
Lesser curvature	1	50.0	1	50.0	2	1
Cardia	1	50.0	1	50.0	2	1
Prepyloric	1	33.3	2	66.7	3	1
Duodenum First	9	60.0	6	40.0	15	0.14
Ulcer number Median (range)	1(1-3)		1(1-2)			0.41
Ulcer size Median (range)	2.6 (1.5-4)		0.75 (0.2-2)			**0.0001**
Forrest classification						
1a	2	66.7	1	33.3	3	0.82
1b	5	41.7	7	58.3	12	
2a	7	50.0	7	50.0	14	
2b	0	.0	1	100.0	1	
Treatment modalities						
Adrenaline injection	10	71.4	4	28.6	14	
APC	4	40.0	6	60.0	10	**0.012**
Combined adrenaline Adrenaline Inj+APC	0	.0	6	100.0	6	

Hemostasis occurred for all patients immediately after endoscopic treatment modalities. Rebleeding within 3 days and recurrent bleeding occurred for 33.3%, 13.3% of patients respectively, and they needed repeated endoscopy. Failure of endoscopic treatment occurred for one patient and surgery was indicated. 70.0% of patients needed blood transfusion with median of 3 unit and range (1-9) unit. Hospital stays per day ranged (1 -20) with median of 5 days **(Figure 1)**.

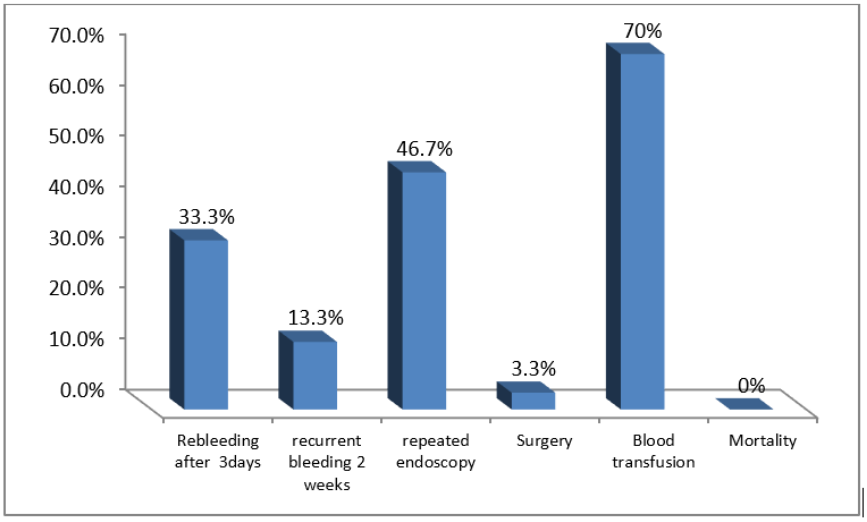

Figure (1): Percent of endoscopic treatment modalities outcome among peptic ulcer patients

Table 5 clarifies a significantly higher percent of rebleeding among patients treated with adrenaline injection and the APC group. None of the patients treated with combination of adrenaline injection +APC was manifested with rebleeding. Same patients with rebleeding were managed with repeated endoscopy. Units of blood transfusion and hospital stay to adrenaline injection group were significantly much more than APC group, and combination of adrenaline injection+APC group.

Endoscopic treatment failed and surgery was done in one patient because of obvious bleeding in 65 years old, male, who had a past history of hypertension, chronic kidney disease, and treatment with NSAIDs. He complained of epigastric pain and melena and had pallor and lower limb edema. He was admitted to the hospital with hypotension, and tachycardia. Endoscopy was done in less than 24 hours from admission. He had three ulcers with size 3 cm.

The results of investigation at admissions were (HB 3.3, WBC 20.7, PLT 240)**,** liver function test (S. albumen 2.14, ALT 25, AST 27, T. bilirubin 0.21, INR 1.1, ALK.Ph 70), kidney function test (S. creatinine 2.72, Urea nitrogen 38.6). Investigations after the surgery were (HB 9.5, WBC 20, PLT 230), liver function test (S. albumen 2.14, ALT 25, AST 26, T. bilirubin 0.21, INR 1, ALK. Ph 70), kidney function test (S. creatinine 2.2, Urea nitrogen 24).

Table (5): Comparison of outcomes according to endoscopic treatment modalities for peptic ulcer patients (n.30)

Outcome	Endoscopic treatment modalities			p
	Adrenaline injection n.14	APC n.10	Combination of adrenaline injection +APC (n.6)	
	No.(%)	No.(%)	No.(%)	
Hemostasis immediately after treatment	14(100.0%)	10(100.0%)	6(100.0%)	1
Rebleeding within 3 days + recurrent bleeding within 2 weeks	10(71.4%)	4(40.0%)	0(0.0%)	0.012
Repeated endoscopy	10(71.4%)	4(40.0%)	0(0.0%)	0.012
Surgery (failure endoscopic)	1(7.1%)	0(0.0%)	0(0.0%)	0.55
Blood transfusion	9(64.3%)	8(80.0%)	4(66.4%)	0.69
Unit of blood Median(range)	4 (2-9)	2 (1-4)	2 (1-3)	0.007
Comparison of each group	P1=0.006	P2 =0.72	p3=0.015	
Hospital stay per days Median(range)	8.5 (4-20)	3.5 (1-6)	4 (2-5)	0.0001
Comparison of each group	P1 =0.0001	P2 =0.91	P 3=0.002	

P1: Comparison between Adrenaline injection & APC. P2: comparison between APC & Combination Adrenaline injection +APC). P3: Comparison between adrenaline injection& Combination Adrenaline injection +APC.

Univariate logistic regression indicated that sex, NSAID intake, size of the ulcer, and Glasgow Blatchford bleeding score are predictive factors of post-endoscopic rebleeding **(Table 6).**

Table (6): Univariate logistic regression for predicting factors of rebleeding after endoscopic modalities in patients with peptic ulcer bleeding

Predictors	B	S.E.	Wald	Sig.	Exp (B)	95% C.I. for EXP (B)	
						Lower	Upper
Age (old age)	0.079	.043	3.345	0.067	1.082	0.994	1.178
Males	1.810	.831	4.742	0.029	6.111	1.198	31.164
NSAID intake	2.015	.827	5.941	0.015	7.500	1.484	37.905
Size of ulcer	5.692	2.5	5.321	0.021	296.403	2.353	3733
Adrenaline injection versus APC	1.322	.876	2.279	0.131	3.750	0.674	20.861
Glasgow Blatchford bleeding score	0.419	.161	6.779	0.009	1.521	1.109	2.086

DISCUSSION

Our prospective study included 30 patients who underwent different endoscopic modalities randomly divided into 3 groups; first included 14 patients who were treated with diluted adrenalin injection, the second group included 10 patients treated with argon plasma coagulation and the third group included 6 patients treated with combined modalities, which were adrenalin injection plus argon plasma coagulation.

Our present study tried to explore many data about the role of endoscopic modalities in treating peptic ulcer bleeding and highlight the risk factors that predict the rebleeding in cases of PU.

Regarding the demographic data, our study included 30 patients, their ages ranging from 20- 69 with a mean of 54.9±12.3 years, sex distribution was 17 (56.7%) males and 13(43.3%) females. One-third of patients were smokers (33.3%) and 63.3% were obese. 40.0% of patients had chronic liver disease, 40.0% of patients had hypertension, 20.0% of patients had diabetes, 13.3% of patients had chronic kidney disease, and 46.7% of patients were treated with NSAIDs. In the same line with our study **Kim *et al.*[12],** revealed that the median age of patients was 63 years and 67% were males, 34.7 smokers, 49% were hypertensive, 23.8 % diabetic and the most common drugs used were aspirin 33.4% followed by NSAIDs.

Our study represented the clinical picture of the studied patients; 40% of patients presented with hematemesis and melena, whereas 60% of patients presented with melena only. Systolic blood pressure ranged from 80– 150 with a mean of 109.67±19.74. Diastolic blood pressure ranged from 50–100 with a mean of 68.5±14.92. Glasgow Blatchford bleeding scores of studied patients ranged from 2 to 17 with a mean of 10.4±3.4. A previous study by **Al-Keely *et al.*[13]** showed that 47.3% of patients presented with hematemesis and melena, 40% with melena,12.7 with hematemesis, with measuring vital signs at admission found that 90.7% of patients with systolic blood pressure more than 100 mmHg, diastolic pressure mean was 76.24. Another study by **Ramaekers *et al.* [14],** found that pre-endoscopic GBS has been shown to be the most sensitive and specific in predicting outcomes including recurrent bleeding, need for intervention, and 30-day mortality.

Our study revealed the risk factors of rebleeding according to demographic and clinical history showed that there was significant rebleeding among older patients, males, and patients on medications such as NSAID and high GBS. An observational study by **Lim *et al.* [15],** contradicts ours and revealed that the patients with a GBS of 12 or more were shown to have lower mortality with a presentation to endoscopy time of more than 13 hours, whereas those with lower GBS did not seem to benefit from such early endoscopy.

Our study showed that the risk factors of rebleeding regarding ulcer characters and treatment modalities showed that the larger size of ulcers significantly associated with re-bleeding after endoscopic treated modalities. On the other hand, a previous study by **Chiu *et al.*[16]** showed that the actively bleeding ulcers, size of the ulcer, and high lesser curvature were significant factors of rebleeding.

Our study revealed no difference in the outcomes related to the time of treatment with different endoscopic modalities. However, study by **Kim *et al.* [17],** was not in the same line and found that the majority of data published suggest that early endoscopy less than 24 hours is safe and can reduce transfusion requirement and length of hospital admission with no benefit in reducing the mortality rate. Moreover, a recent study by **Jairath *et al.* [18],** demonstrated that earlier endoscopy (within 12 hours) may be associated with increased efficiency of care and improved control of hemorrhage in high-risk patients.

Our endoscopic findings and treatment modalities at the admission of studied patients, showed that endoscopy was done at less than 24 hours of admission for 46.7% of patients, the main site of the ulcer was the duodenum first part 33.3% then antrum 30.0%, size of all ulcer ranged (0.2 -4 cm) with median of 0.5 cm, a number of ulcers ranged from one to three. Forrest's classification is mainly 2a (46.7%). Another study was in line with our result that the most common site observed was the first part of the duodenum [19]. Another study contradicted our study with the most common site was gastric 60.9%, with 37.8% had H. pylori infection and 32.5 % with 2a Forrest classification, which is in the same line with ours[12].

Our study revealed endoscopic treatment modalities of studied patients were distributed as follows; adrenaline injection was used for 46.7% of patients and APC was used for 33.3% of patients. Combined adrenaline injection +APC was used for 20.0% of patients. Our study outcomes of endoscopic treatment modalities showed that hemostasis occurred for all patients immediately after endoscopic treatment modalities, which is not in line with **Chandrasekar *et al.* [20],** who found that hemostasis rate was 86.6%.

In our study the rebleeding after 3 days and recurrent bleeding occurred were 33.3%, and 13.3% of patients respectively and they needed repeated endoscopy. Hospital stays per day ranged from (1-20) with median of 5 days. Failure of endoscopic treatment occurred for one patient and surgery was indicated, this contradicts the study by **Cheng *et al.* [21],** which revealed that less rate of rebleeding 11.8% within 3 days and 5.4% had in-hospital mortality, also in our study 70.0% of patients needed to receive blood transfusion with median of 3 unit and range (1-9) unit, which is in line with **Kim *et al.* [12],** who found that 63.7% receive blood transfusion with a mean of 3.2.

In our study regarding to endoscopic treatment modalities for peptic ulcer patients, there was a significantly higher percent of rebleeding among patients treated with adrenaline injection and the APC group, while none of the patients treated with

combination of adrenaline injection +APC group manifested with rebleeding. Same patients with rebleeding were managed with repeated endoscopy. Unit of blood transfusion, to adrenaline injection group was significantly much more than APC group, and combination of adrenaline injection +APC group. Hospital stay of adrenaline injection group was significantly much more than APC group, and combination of adrenaline injection +APC group. A previous study by **Lain and McQuaid [(22)],** thought that epinephrine alone wasn't enough and that it needed to be paired with something else. In clinical settings, epinephrine injection is typically performed first to control bleeding and increase visibility for following treatments.

In our study regarding the risk factors of blood transfusion for peptic ulcer patients according to demographic clinical history, peptic ulcer characteristics, and treatment modalities, there was no significant difference in receiving a blood transfusion. **Odutayo *et al.*[(23)]** found that transfusion in UGIB showed a restrictive blood transfusion had a lower risk of rebleeding and all-cause mortality (RR 0.65 [0.44–0.97]). On the other hand, retrospective data from Canada and Australia showed early transfusion and transfusion of more than four units of red blood cell transfusion were associated with increased rebleeding, and this was in line with our findings **[(24)].**

In our study, the univariate logistic regression indicated that sex, NSAID intake, size of the ulcer, and Glasgow Blatchford bleeding score are predictive factors of post-endoscopic rebleeding. previous study by **Kim *et al.* [(12)],** revealed that comorbidities, multidrug use, albumin levels, and presenting with hematemesis/hematochezia were all connected with rebleeding and should be thoroughly evaluated for patient triage and therapy.

CONCLUSION

Patients who are bleeding from a peptic ulcer typically undergo endoscopy as the first line of therapy, the epinephrin injection should be combined with other modalities, and clinical care of individuals experiencing bleeding from a peptic ulcer may benefit from the identification of risk factors.

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