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GASTROINTESTINAL BLEEDING;

PREVALENCE AND RISK FACTORS ASSOCIATED WITH GASTROINTESTINAL BLEEDING AMONG MECHANICALLY VENTILATED PATIENTS.

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ABSTRACT… Background: Gastrointestinal bleeding (GIB) among patients with critical illness is one of the leading sources of mortality and morbidity. The prevalence of GIB differs from 15-50 percent during first 24 hours stay in intensive care unit. Mechanical ventilation is a most leading risk factor of GIB among patients admitted in ICU (intensive care unit). **Objectives:** The objective of the study is to know the prevalence and risk factors associated with gastrointestinal bleeding among mechanically ventilated patients. **Study Deign:** Retrospectively study. **Setting:** Ch Rehmat Ali Memorial Trust Hospital, Lahore. **Period:** 1st October 2017 to 31st March 2018. **Materials and Method:** A group of 120 patients in intensive care unit who received mechanical ventilation for a period of 48 hours or above were included. **Results:** Among 56 patients with gastrointestinal bleeding, mean age was 49.2±12.1, mean length of ICU stay was 29.2±16.6 and mean duration of ventilation was 30.2±20.5. Among 64 patients with no gastrointestinal bleeding, mean age was 51.9±15.0, mean length of ICU stay was 12.7±6.8 and mean duration of ventilation was 13.5±7.9. There were 12 (21.1%) mortalities among patients with gastrointestinal bleeding and 10 (15.6%) mortalities among patients with no gastrointestinal bleeding. **Conclusion:** Study concluded that length of ICU stay, duration of ventilation, renal failure, liver failure and mortalities were more among patients with gastrointestinal bleeding.

Key words: Prevalence, Risk Factors, Gastrointestinal Bleeding, Mechanically Ventilated.

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INTRODUCTION

Gastrointestinal bleeding is considered most significant problem among critically ill patients admitted in ICU, causing considerable morbidity and mortality in few cases.[1] Gastrointestinal bleeding can be classified as occult, obscure and overt. The occult bleeding is invisible for physician or patient. Obscure gastrointestinal bleeding is referred to persistent bleeding wherein a source is unidentified on the colonoscopy, radiography of small bowel or upper endoscopy. Obscure bleeding could be either occult or overt, with bleeding source mostly seen in small bowel. The overt GIB is visible, for example bloody or coffee-ground emesis (hematemesis), blood clots or blood presence in feces (hematochezia) or black tarry stools (melena).[2]

The prevalence of GIB differs from 15-50 percent during first 24 hours stay in intensive care unit[3] and that of clinically important upper GI bleeding from 2-6 percent.[4] It is recommended that mechanical ventilation is a most leading risk factor of GIB among patients admitted in ICU.[5] Occult bleeding is mostly encountered among critically ill patients differs from 15 to 50 percent,[6] while overt bleeding occurs among 4 to 25 percent patients who are critically ill.[7]

The clinically significant bleeding prevalence is found more lower (0.6 to 2.6%).[7] Such bleeding is described like over bleeding complicated during 24 hours by a decrease in the blood pressure (BP) above 20 mmHg, a raise in the pulse rate above 20 beats in one minutes or a decrease in systolic BP above 10 mmHg calculated on sitting position or a reduction in hemoglobin level of above 20 g/l without increase in the Hb levels after the subsequent transfusion by number of units transfused minus 20 g/l.[8]

At presentation, frequent indication and symptom

comprise hematemesis (73 percent) and melena (21 percent) while coffee-ground emesis (6 percent); although, patients could also undergo abdominal tenderness, epigastric pain or dizziness.[9]

Among critical ill patients, bleeding pathophysiology is associated with acute systemic disease procedure and critical care treatments themselves.[10] Stress ulcer-associated bleeding happens like an outcome of gut ischemia in context several organ failure. Among patients with severe illness who have hypotension bouts - and hence hypoperfusion - with ensuing ischemia to several organ system, gastrointestinal bleedings are measured an entire disease process manifestation.[11] Even when a systematic circulation is upheld, still there could be intestinal hypoperfusion. General medications utilized in the intensive care units has been associated with gastrointestinal bleeding: sedatives and opiates for the intubated patients are related to decreases in the gut motility and in ventous return, as are vasopressors.[10]

Clinical studies indicated advantage of the prophylaxis of pharmacologic GIB among patients of mechanical ventilation.[3] The prophylaxis, however, is not cost-effect, but could boost ventilator-associated pneumonia rate.[12] The global guidelines regarding management of acute septic and sepsis shock released in the year 2008 demonstrated that limitations should be thought before utilizing stress ulcer prophylaxis for the prevention of gastrointestinal bleeding.[3,13]

MATERIAL AND METHODS

This retrospective study was carried out at Ch Rehmat Ali Memorial Trust Hospital, Lahore from 1st October 2017 to 31st March 2018. A group of 120 patients of ICU who received mechanical ventilation for a period of 48 hours or above were included. During study gastrointestinal bleeding was classified into apparent and clinically significant bleeding. Apparent bleeding was identified if there was confirmation of the hematemesis, “coffee ground” substance or positive occult blood in melena, hematochezia or nasogastric aspirates. The patients excluding from study were those who had previous history of ulceration or gastrointestinal bleeding, brain death, current gastrointestinal surgery, active bleeding from throat or nose. Patients’ demographic data included age, stay time in ICU, ventilation duration, ventilation, parameters and patterns, APACHE II score, ICU mortality, dysfunction of several organs and biochemistry indexes, coagulation function, kidney and liver functions. Data was analyzed by using SPSS version 20.0. Chi-square test was used to assess the association between risk factors and gastrointestinal bleeding. P-value $\leq$ 0.05 was considered significant. Confidentiality of the data was ensured and proper consent was obtained before data collection.

RESULTS

Among 120 patients, 56 had gastrointestinal bleeding, 41 had positive occult blood or coffee ground substance in the nasogastric aspirates, 6 patients had positive occult blood in the stools, 1 had hematochezia, 3 patients had hematemesis and 1 had both hematochezia and hematemesis. There were 4 patients with GIB, 2 had clinically significant bleeding (one patient had hypotension while the other one required surgery). Majority of the patients (38) had GIB during initial 48 hours and 18 during initial two weeks of the mechanical ventilation (Figure-1).

Table-I exhibits that the mean age of 56 patients with gastrointestinal bleeding was 49.2$\pm$12.1, mean duration of ICU stay was 29.2$\pm$16.6, mean duration of ventilation was 30.2$\pm$20.5 and mean APACHE II score was 24.5$\pm$6.1 while MOD score was 5.4$\pm$4.1. Likewise mean age of 64 patients with no gastrointestinal bleeding was 51.9$\pm$15.0, mean duration of ICU stay was 12.7$\pm$6.8, mean duration of ventilation was 13.5$\pm$7.9 and mean APACHE II score was 25.8$\pm$5.7 while MOD score was 5.0$\pm$3.7. The results were found statistically significant ($P\leq0.05$) except for age and APACHE II score.

Table-II highlights that among 56 patients with gastrointestinal bleeding, 32 (57.1%) were males and 24 (42.9%) were females. Among 64 patients with no gastrointestinal bleeding,

35 (54.7%) were males and 29 (45.3%) were females. There were 12 (21.1%) mortalities among patients with gastrointestinal bleeding and 10 (15.6%) mortalities among patients with no gastrointestinal bleeding. As far as ventilator setting is concerned, result showed that among patients with GI bleeding, 23 (41.1%) had FiO_2 ≥60%, 21 (37.5%) patients had Peak inspiratory pressure ≥30cmH_2O and 12 (21.4%) patients had PEEP ≥10cmH_2O. Like was among patients without GI bleeding, 33 (51.6%) had FiO_2 ≥60%, 15 (23.4%) patients had Peak inspiratory pressure ≥30cmH_2O and 16 (25.0%) patients had PEEP ≥10cmH_2O. Results shows that among patients with GI bleeding, 9 (16.1%) had renal failure, 10 (10.7%) liver failure, 11 (19.6%) coma, 16 (28.6%) had Platelets count <50x10^9/L, 17 (30.4%) Prolonged PT, 19 (33.9%) Prolonged APTT, 23 (41.1%) prophylaxis, 11 (19.6%) surgery and 26 (46.4%) had enteral nutrition in first 24 hours while 15 (26.8%) patients had sedation. Similarly among patients with no GI bleeding, 3 (4.7%) had renal failure, 1 (1.6%) liver failure, 12 (18.7%) coma, 5 (7.8%) had Platelets count <50x10^9/L, 19 (29.7%) Prolonged PT, 7 (10.9%) Prolonged APTT, 24 (37.5%) prophylaxis, 12 (18.7%) surgery and 39 (60.9%) had enteral nutrition in first 24 hours while 17 (26.6%) patients had sedation (Table-II), Figure-1). The results were found statistically significant for ICU mortality, Peak inspiratory pressure ≥30cmH_2O, Renal failure, Liver failure, Platelets count <50x10^9/L, Prolonged APTT and Enteral nutrition in first 24 hours.

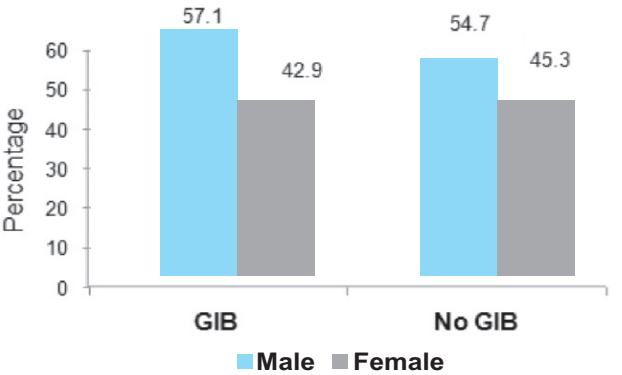

Figure-1. Sex distribution of mechanically ventilated patients

	GIB (*n* = 56)	No GIB (*n* = 64)	P-value
Age in years	49.2±12.1	51.9±15.0	0.15
Length of ICU stay	29.2±16.6	12.7±6.8	0.05
Duration of ventilation	30.2±20.5	13.5±7.9	0.04
APACHE II score	24.5±6.1	25.8±5.7	0.38
MOD score	5.4±4.1	5.0±3.7	0.02

Table-I. Characteristics of mechanically ventilated patients

Variable	GIB (*n* = 56)	No GIB (*n* = 64)	P-value
Gender			
Male	32 (57.1%)	35 (54.7%)	0.41
Female	24 (42.9%)	29 (45.3%)	0.37
ICU mortality	12 (21.4%)	10 (15.6%)	0.03
Ventilator Setting			
FiO_2 ≥60%	23 (41.1%)	33 (51.6%)	0.67
Peak inspiratory pressure ≥30cm H_2O	21 (37.5%)	15 (23.4%)	0.01
PEEP ≥10cmH_2O	12 (21.4%)	16 (25.0%)	0.38
Renal failure	9 (16.1%)	3 (4.7%)	0.02
Liver failure	6 (10.7%)	1 (1.6%)	0.03
Coma	11 (19.6%)	12 (18.7%)	0.45
Platelets count <50x10^9/L	16 (28.6%)	5 (7.8%)	0.00
Prolonged PT	17 (30.4%)	19 (29.7%)	0.51
Prolonged APTT	19 (33.9%)	7 (10.9%)	0.02
Prophylaxis	23 (41.1%)	24 (37.5%)	0.77
Surgery	11 (19.6%)	12 (18.7%)	0.31
Enteral nutrition in first 24 hrs	26 (46.4%)	39 (60.9%)	0.03
Sedation	15 (26.8%)	17 (26.6%)	1.77

Table-II. Risk factors in mechanically ventilated patients

DISCUSSION

Gastrointestinal bleeding is most significant problem among critically ill patients admitted in intensive care units. Current study was carried out to know the prevalence and risk factors associated with gastrointestinal bleeding among mechanically ventilated patients. To acquire proper results, total 120 patients (56 with GIB and 64 with no GIB) were included in the study and found that mean age of patients with GIB was 49.2±12.1 years and for patients with no GIB the mean age was 51.9±15.0 years while the findings of the study carried out by Fattahi and associates (2005) showed mean age of patients with GIB 67.46±11.86 years and for patients with no GIB the mean age was 60.32±16.46 years.[14]

As far as length of ICU is concerned, study revealed that mean length of ICU stay was 29.2±16.6 for patients with GIB and 12.7±6.8 for patients with no GIB and the results were found statistically significant. A recent study carried out by Kumar and coworkers[10] also showed significant results and asserted that mean length of ICU was 15.0 among patients with GIB. Study further offered significant results and found that mean duration of ventilation was 30.2+20.5 among patients with GIB and 13.5+7.9 among patients with no GIB. The findings of our study are comparable with the study undertaken by Chu and teammates[3] who reported significant results and found that mean duration of ventilation was 29.3+21.6 among patients with GIB and 12.6+9.3 among patients with no GIB.

It was found during study that among patients with GIB, 57.1% were males and 42.9% were females while among patients with no GIB, 54.7% were male and 45.3% were females. This corresponds to the findings of study undertaken by Kumar and coworkers[10] who confirmed that among patients with GIB, 56.9% were males and 43.1% were females.

In our study ICU mortality rate was 21.4% among patients with GIB and 15.6% among patients with no GIB. Study further disclosed that among patients with GI bleeding, 41.4% had FiO_2 ≥60%, 37.5% patients had Peak inspiratory pressure ≥30cmH_2O, 21.4% had PEEP ≥10cm H_2O, 16.1% had renal failure, 10.7% liver failure and 19.6% patients had coma while among patients with no GI bleeding, 51.6% had FiO_2 ≥60%, 23.4% patients had Peak inspiratory pressure ≥30cmH_2O and 25.0% patients had PEEP ≥10cmH_2O, 4.7% had renal failure, 1.6% liver failure and 18.7% patients had coma. Virtually the findings of our study are comparable with the study done by Chu and teammates[3] who asserted that mortality rate was 21.2% among patients with GIB and 15.5% among patients with no GIB. Similarly among patients with GI bleeding, 36.3% had FiO_2 ≥60%, 31.9% patients had Peak inspiratory pressure ≥30cmH_2O, 15.9% had PEEP ≥10cmH_2O, 15.9% had renal failure, 10.6% liver failure and 20.4% patients had coma while among patients with no GI bleeding, 35.7% had FiO_2 ≥60%, 16.3% patients had Peak inspiratory pressure ≥30cmH_2O and 17.1% patients had PEEP ≥10cmH_2O, 3.9% had renal failure, 2.3% liver failure and 18.6% patients had coma.

It was found during study that 28.6%, 30.4% and 33.9% patients with GI bleeding had platelets count <50x10^9/L, prolonged PT and prolonged APTT, respectively. Among patients with no GI bleeding, 7.8%, 29.7% and 10.9% had platelets count <50x10^9/L, prolonged PT and prolonged APTT, respectively. But the findings of a similar study conducted by Haghbin and fellows[1] showed that 38.0%, 55.5% and 24.5% patients with GI bleeding had platelets count <50x10^9/L, prolonged PT and prolonged APTT, respectively and among patients with no GI bleeding, 18.0%, 35.5% and 11.7% had platelets count <50x10^9/L, prolonged PT and prolonged APTT, respectively. Study further disclosed that 41.1%, 19.6%, 46.4% and 26.8% patients with GIB had prophylaxis, surgery, enteral nutrition in first 24 hrs and sedation, respectively while 37.5%, 18.7%, 60.9% and 26.6% patients with no GIB had prophylaxis, surgery, enteral nutrition in first 24 hrs and sedation, respectively. The results of a study performed by Chu et al[3] are almost comparable with our study results who also indicated that 39.8%, 20.4%, 46.0% and 26.5% patients with GIB had prophylaxis, surgery, enteral nutrition in first 24 hrs and sedation, respectively while

37.2%, 18.6%, 60.5% and 26.4% patients with no GIB had prophylaxis, surgery, enteral nutrition in first 24 hrs and sedation, respectively.

CONCLUSION

Study concluded that length of ICU stay, duration of ventilation, renal failure, liver failure and mortalities were more among patients with GIB. Further studies are required on vast level to know the prevalence and risk factors associated with gastrointestinal bleeding among mechanically ventilated patients to reduce the rate of complications and mortalities.

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AUTHORSHIP AND CONTRIBUTION DECLARATION

Sr. #	Author-s Full Name	Contribution to the paper	Author=s Signature
1	Mujtaba Jaffary	Writing of manuscript and data collection.	
2	Nida	Statistical analysis and compiling of results.	
3	Saeed Ahmad Khan	Guidance in wiriting the manuscript.	