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Diagnostic Accuracy of Aetiology Score for Predicting Variceal Bleed in Patients of Upper Gastrointestinal Bleeding.

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ABSTRACT

Objective: To assess the diagnostic accuracy of aetiology scoring system for diagnosing variceal bleeding in patients presenting with upper gastrointestinal bleeding using endoscopy as gold standard.

Material and Methods: This cross sectional study was conducted at Department of Medicine Unit, Jinnah hospital Lahore (JHL) from 19th December 2015 to 20th May 2016. In total 230 subjects, fulfilling the inclusion criteria were selected by non-probability consecutive sampling technique and informed consent were obtained. Patients were evaluated for variceal bleeding on the basis of aetiology scoring system and then confirmed with endoscopy. Data was analyzed by using SPSS 21.0 and sensitivity, specificity, positive and negative predictive value of aetiology score was calculated taking endoscopy as gold standard.

Results: Out of 230 patients presenting with upper gastrointestinal bleeding, males and females were 48.3% and 51.7% respectively. The mean age was 41.64 ± 10.53 years, the mean Upper gastrointestinal bleeding Ateiology score system was 3.23± 1.55. The sensitivity, specificity, positive predicted value and negative predicted value at a cutoff value of etiological score ≥ 3.1 for variceal bleeding were 90.70%, 82.18%, 86.67% and 87.37% respectively. it was observed that there was statistically significant association between etiological score ≥ 3.1 and endoscopy.

Conclusion: The UGIB Aetiology Score, composed of 3 parameters, using a cut-off ≥ 3.1 accurately predicted variceal bleeding and may help to guide the choice of initial therapy for UGIB before endoscopy.

Key words: Aetiology, Endoscopy, Scoring System, Upper Gastrointestinal Bleeding.

Author`s Contribution
[1,2] Conception, synthesis, planning of research and manuscript writing Interpretation and discussion
[3-5] Data analysis, interpretation and manuscript writing, [6] Active participation in data collection.

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Introduction

Upper gastrointestinal bleeding (UGIB) is defined as bleeding derived from a source proximal to the ligament of Treitz. Patients with upper gastrointestinal bleeding (UGIB) commonly present with hematemesis (vomiting of blood or coffee-ground like material) and/or melena (black tarry stools).[1] The initial evaluation of a patient with a suspected clinically significant acute upper gastrointestinal (UGI) bleeding includes a history, physical examination, laboratory tests, and in some cases, nasogastric lavage. The goal of the evaluation is to assess the severity of the bleed, identify potential sources of the bleed, and determine if there are conditions present that may affect subsequent management. The information gathered as a part of the initial evaluation is used to guide decisions regarding triage, resuscitation, empiric medical therapy, and diagnostic testing.[2,3] Patients should be asked about prior episodes of upper GI bleeding, since up to 60 percent of patients with a history of an upper GI

bleed are bleeding from the same lesion.[4] In addition, the patient's past medical history should be reviewed to identify important comorbid conditions that may lead to upper GI bleeding or may influence the patient's subsequent management. A thorough history of medication should be obtained. Finally, as with the past medical history, the physical examination should include a search for evidence of significant comorbid illnesses. Laboratory tests include a complete blood count, liver function tests, and coagulation studies.[5]

Whether all patients with suspected acute upper GI bleeding require nasogastric tube (NGT) placement is controversial, in part, because the studies have failed to demonstrate a benefit with regard to clinical outcomes.[6] More often, NGT lavage is used when it is unclear if a patient has ongoing bleeding and thus might benefit from an early endoscopy. In addition, nasogastric tube lavage can be used to remove particulate matter, fresh blood, and clots from the stomach to facilitate endoscopy. The presence of red blood or coffee ground material in the aspirate also confirms an upper GI source of bleeding and predicts whether the bleeding is caused by a lesion at increased risk for ongoing or recurrent bleeding.[7] However, lavage may not be positive if bleeding has ceased or arises beyond a closed pylorus. The presence of non-bloody bilious fluid suggests that the pylorus is open and that there is no active upper GI bleeding distal to the pylorus.[8] Early endoscopy (within 24 hours) is recommended for most patients with acute UGI bleeding, though whether early endoscopy affects outcomes and resource utilization is unsettled.[9] Other diagnostic tests for acute upper GI bleeding include angiography and a tagged red blood cell scan, which can detect active bleeding.[10] There is also interest in using wireless capsule endoscopy for patients who have presented to the emergency department with suspected upper GI bleeding. An oesophageal capsule (which has a recording time of 20 minutes) can be given in the emergency department and reviewed immediately for evidence of bleeding. Confirming the presence of blood in the stomach or duodenum may aid with patient triage and identify patients more likely to benefit from early endoscopy.[11] For locating and identifying bleeding lesions in the upper GI tract, upper endoscopy is highly sensitive and specific diagnostic modality.[12] However as aetiology scoring system is a widely used method,[13] the present study was planned to evaluate diagnostic accuracy of aetiology scoring system for diagnosing variceal bleeding in patients presenting with upper gastrointestinal bleeding using endoscopy as a gold standard.

Material and Methods

This cross sectional study was performed at Department of Medicine Unit II Jinnah hospital Lahore (JHL) from 19th December 2015 to 20th May 2016. Calculated sample size was 230. It was computed on the basis of 95% confidence interval with expected percentage of variceal bleeding in 15% of cases. Taking confidence interval at 95%, 10 % margin of error for 85% sensitivity and 9% margin of error for 81% specificity, taking expected percentage of variceal bleeding in 15% of cases, the sample size was calculated 230. Patients with age 18 - 65 years of either gender with history of Upper gastrointestinal bleeding (UGIB) during last 24 hours were included.

Diagnosed cases of peptic ulcer, patients whose definite cause of UGIB was undetermined or inconclusive on previous endoscopy (on previous medical record) were excluded from study. Non-probability consecutive sampling technique was used. Informed consent was taken. Patients were evaluated for variceal bleeding on the basis of UGIB aetiology scoring system and then confirmed with endoscopy. UGIB Aetiology Score was calculated by: Aetiology Score system = (3.1 x previous diagnosis of cirrhosis) + (1.5 x red vomitus) + (1.2 x red NG aspirate). Where 1 and 0 are used for the presence and absence of previous diagnosis of cirrhosis, red vomitus and red NG aspirate. Total UGIB aetiology score ranges from 1.2-5.8 with a positive cut off value of > 3.1. Varices in the lower third of the oesophagus or in the stomach confirmed on direct visualization on endoscopy, was labelled as “positive” for endoscopy.

Subjects positive for variceal bleed on endoscopy and UGIB aetiology score > 3.1 were tagged as True positive, subjects negative for varices on endoscopy and UGIB aetiology score < 3.1 were labelled as True negative. Individuals having UGIB aetiology score > 3.1 but no varices on endoscopy were called as False positive, subjects with UGIB aetiology score < 3.1 but positive variceal bleed on endoscopy were labelled as False

negative. All the data was entered into a predesigned structured performa and analysed by using SPSS 21. Quantitative variables like gender, presence of variceal bleed on aetiology score and on endoscopy were presented as frequency and percentage. Quantitative continuous variable data such as age and UGIB aetiology score was noted as mean and standard deviation. Diagnostic accuracy, sensitivity, specificity, positive and negative and predictive value were calculated considering variceal bleed endoscopy as gold standard.

Sensitivity: a / (a + c) x 100 or TP / (TP + FN) x 100
Specificity: d / (d + b) x 100 or TN / (TN + FP) x 100
Positive predictive value: TP/TP+ FP x 100
Negative predictive value: TN / FN +TN x 100
Accuracy: TP+ TN / TP+FP+FN+TN x 100

Data was stratified for age, gender, duration of disease (cirrhosis) to deal with effect modifier. Post-stratification chi-square test was used. p-value < 0.05 was considered as statistically significant.

Results

Out of 230 patients presented with UGIB, male and females were 111(48.3%) and 119(51.7%) respectively. Mean age was 41.64 ± 10.53 years and mean UGIB aetiology score system was 3.23± 1.55. Frequency of cirrhosis, red vomitus, red nasogastric aspirate, UGIB aetiology score ≥ 3.1 and frequency of positive endoscopy were shown in Figure 1. Sensitivity, specificity, positive predictive value, negative predictive and diagnostic accuracy were computed. (Table 1) Statistically significant association was found between etiological scores and findings of endoscopy (Table 2)

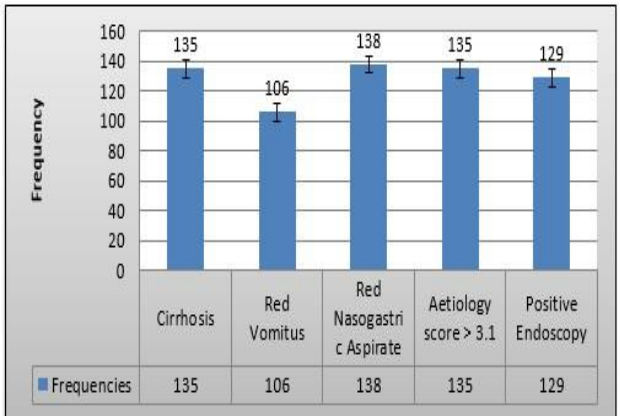

Figure 1: Frequency distribution of variables (n=230)

Table 1: Sensitivity and specificity of UGIB Aetiology score system

Variables	Result (percentage)
Sensitivity	90.70
Specificity	82.18
Positive predictive value	86.67
Negative predictive value	87.37
Diagnostic accuracy	86.9

Table:2 Association of aetiology scores and endoscopy findings (n=230)

Variable		Endoscopy		Total	p-value
		Pos	Neg		
Aetiology Score	Positive	117	18	135	0.000
	Negative	12	83	95	
Total		129	101	230	

Discussion

The initial evaluation of patients with acute upper gastrointestinal bleeding involves an assessment of hemodynamic stability and resuscitation if necessary.[14] GI bleeding is a potentially life-threatening abdominal emergency, that remains a common cause of hospitalization.[15,16] Bleeding from the upper gastrointestinal tract is about four times as common as bleeding from the lower GIT. It is important to identify patients with a low probability of re-bleeding from patients with a high probability of re-bleeding.[3,17]

The purpose of the present study was to evaluate the diagnostic accuracy of aetiology scoring system for diagnosing variceal bleeding in patients presenting with upper gastrointestinal bleeding.A large number of patients having UGIB due to multiple causes (both variceal and non-variceal) for which endoscopy is indicated but facilities are not usually available due to limited recourses (only tertiary care hospital had these diagnostic facility) may get benefit from this scoring system. In this regard we collected the data from 230 cases presenting with upper gastrointestinal bleeding after fulfilling the inclusion criteria. Out of 230 patients presenting with upper gastrointestinal bleeding, male and females were 48.3% and 51.7% respectively. The mean age was 41.64 ± 10.53 years, the mean Ateiology score system was 3.23± 1.55. A

comparable study reported out of 101 patients, 56% were males while the remaining 44% were females.[18] Similar study conducted by Chasawat et al reported that among 261 patients with UGIB 47 (18%) were variceal and 214 (82%) were non-variceal bleeding. previous diagnosis of cirrhosis or presence of signs of chronic liver disease (OR 22.4, 95% CI 8.3-60.4), red or bloody vomitus (OR 4.6, 95% CI 1.7-11.9), and red or bloody NG aspirate (OR 3.3, 95% CI 1.3-8.3). Variceal bleeding predicting scoring model was developed as: Z = (3.1 ×previously diagnosed cirrhosis or presence of signs of chronic liver disease) + (1.4 ×red or bloody vomitus) + (1.2 ×red or bloody NG aspirate) - 4.1, while 1 and 0 are used for the presence and absence of each factor, respectively. The probability of variceal bleeding is calculated from 1/(1+e -Z) or by plotting to the exponential graph. The probabilities of variceal bleeding are >90%, >60%, <10% and <5% for the presence of 3, 2, 1 and 0 factors, respectively. They concluded that three clinical parameters and variceal bleeding predicting score are useful to predict the types of UGIB and may aid clinical judgment for the initial management of UGIB before endoscopy.[16]

The present research revealed that previous diagnosis of cirrhosis was observed in 58.7% patients presenting with upper gastrointestinal bleeding. There were 46.1% patients in which red vomitus was present, 60% patients in which red nasogastric aspirate was present. Existing literature showed that from the patients of upper gastrointestinal bleeding there were 60% patients that have the history of red vomitus, previously diagnosed cirrhosis was found in 36% and red nasogastric aspirate was present in 60%.[13] Similarly another study conducted by Matei D, et al revealed that previously diagnosed cirrhosis was observed in 35.8% patients presenting with upper gastrointestinal bleeding.[19] We observed that there were 58.7% patients in which aetiology score was greater than 3.1 and 41.3 % patients in which aetiology score was less than 3.1. On the other hand, there were 56.1% patients in which endoscopy showed positive results. The sensitivity, specificity, positive predictive value (PPV) and negative predictive value (NPV) at a cut-off value of etiological score $\geq$ 3.1 for variceal bleeding were calculates as 90.70%, 82.18%, 86.67% and 87.37% respectively. Similar results were found in a previous study, it was noticed that the UGIB Aetiology Score by using a cut-off ≥ 3.1, the sensitivity, specificity, accuracy, PPV), and NPV in predicting variceal bleeding were 85%, 81%, 82%, 50%, and 96%, respectively. The score was prospectively validated in another set of 195 UGIB cases (46 variceal and 149 non-variceal bleeding). The PPV and NPV of a score ≥ 3.1 for variceal bleeding were 79% and 97%, respectively.[13]

In another study, the UGIB Aetiology Score by using a cut-off value of 0.968, higher values being predictive of variceal bleeding. PPV and NPV were: 82.7% and 97%, respectively. The score was validated prospectively in another group of 162 patients: PPV and NPV were 72.7% and 95.3%, respectively.(19) Existing literature showed that the sensitivity of the UGIB score was 78.2% and the specificity was 84.3%. The positive predictive value (PPV) was 91.5% and negative predictive value (NPV) was 64.2%. The overall diagnostic accuracy of UGIB score in determining variceal bleeding was found to be 80.2%.[18]

Conclusion

The sensitivity, specificity, positive predicted value and negative predicted value at a cut-off value of etiological score $\geq$ 3.1 for variceal bleeding were found as 90.70%, 82.18%, 86.67% and 87.37% respectively. A significant association was found between etiological score $\geq$ 3.1 and endoscopy. The UGIB Aetiology Score, composed of 3 parameters, using a cut-off ≥ 3.1 accurately predicted variceal bleeding and may help to guide the choice of initial therapy for UGIB before endoscopy.

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