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Upper Gastrointestinal Bleeding at a Public Referal Hospital in Malawi

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Abstract

Background: Upper gastrointestinal bleeding (UGIB) is a medical emergency. Timely and appropriate treatment can be lifesaving. Where medical equipment and supplies are inadequate, management of upper gastrointestinal bleeding is challenging. Methods: A retrospective review of charts of patients who were admitted during the year 2010, with a diagnosis of Upper Gastrointestinal Bleeding (UGIB), was done at Kamuzu Central Hospital, Lilongwe, Malawi. A Rockall score was applied to determine mortality risk. Results: A total number of 187 records (119 men and 68 women, mean age of 40.7 ± 15.3 years) were reviewed. The mortality rate was 23.5%, with a non-significant gender difference. Bleeding oesophageal varices were the most common clinical cause of UGIB (42.8%), with more males (63.1%) than females affected. About 40% of patients had no cause of UGIB indicated in their records. 14 (7.5%) patients had a normal oesophagogastroduodenoscopy (OGD). Oesophageal tumor was present in 2.7% of the subjects as a cause of UGIB. Access to endoscopy, for diagnosis and therapeutic intervention, and surgery (Hassab procedure) was available to less than 50% of the patients. Sixteen patients (9.5%) had surgery after endoscopy due to lack of variceal banding materials. Conclusion: Upper gastrointestinal bleeding is an important and common clinical problem at Kamuzu Central Hospital. Oesophageal varices seem to be the commonest cause of UGIB. Inadequacy of resuscitation materials and perhaps timely diagnostic and therapeutic endoscopic and surgical interventions are important limiting factors to favourable patient outcome. Work towards regular provision and supply of interventional resources regarding UGIB management may improve patient outcome.

Keywords

Upper Gastrointestinal Bleeding (UGIB), Oesophageal Varices, Oesophageal Tumor, Endoscopy

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1. Introduction

Upper gastrointestinal tract bleeding (UGIB) is a common reason for emergency hospitalization with high mortality and medical care costs [1]. Whilst peptic ulcer bleeding is the most common cause of upper gastrointestinal bleeding worldwide, responsible for about 50% of all cases, some studies in sub Saharan Africa indicate esophageal varices as the most common cause [2] [3].

In Malawi and other sub Saharan African nations, the primary cause of these varices is suspected to be portal hypertension secondary to *Schistosoma mansoni*. Schistosomiasis is endemic in 76 countries, most of which are in Africa [4] [5].

Patients with UGIB are commonly seen and admitted to Kamuzu Central Hospital (KCH), Lilongwe, Malawi [4]. Treatment of patients with UGIB at KCH includes transfusion of whole blood, administration of drugs e.g. proton pump inhibitors and propanolol, endoscopic banding and oesophagogastric devascularisation and splenectomy (OGDS)—Hassab procedure, for esophageal varices [6]. However, the treatment given fluctuates with resource availability. Bands for endoscopic banding are often lacking, while somatostatin and its analogues are not available and other drugs are periodically available. The demographics, diagnoses, and outcomes of patients with UGIB at KCH have not been evaluated at least in the last decade.

The aim of our study was to examine the demographics, severity of disease, diagnoses and outcomes of patients with UGIB admitted to KCH from January to December 2010.

2. Materials and Methods

2.1. Study Setting

The study was conducted at Kamuzu Central Hospital (KCH) in Lilongwe, Malawi. The hospital is a tertiary care institution with 600 beds, although at times the total number of patients admitted can range up to 1000. It serves as a referral center for all district hospitals in the central region of Malawi, which has about 5 - 6 million inhabitants [7]. The hospital has a 24-hour Emergency Department, a Surgical High Dependency Unit with 5 beds and an Intensive Care Unit with 4 beds.

2.2. Study Population

This was a retrospective study, reviewing admission charts of patients with a diagnosis of UGIB, who were admitted between 1st January and 31st December 2010. Patients over 18 years of age, that were admitted for vomiting blood or passing melena within 24 hours before admission were included in the study. Furthermore, patients with a cause of death related to UGIB, regardless of the initial cause for admission, were also included the study. Records of “Upper GI bleeding”, “Upper GIT bleeding”, gastric or duodenal ulcer bleeding, esophageal varices, vomiting blood or black lumps, hematemesis and peptic ulcer disease (PUD) was considered as UGIB as the cause of death. Furthermore “GI bleeding” or “GIT bleeding” was also included because of the probability of an upper localization in acute, fatal cases. Patients with known chronic liver diseases, cancer of the stomach or esophagus or gastritis were not considered UGIB unless a history of hematemesis was noted. Bleeding from oropharynx that could not be attributed to a pulmonary or upper airway cause was presumed to be gastrointestinal. Patients referred from other hospitals were included in the study if they matched the criteria at the time of admission at the initial hospitalization.

2.3. Study Design and Data Collection

We reviewed approximately 5000 admission charts for patients admitted for UGIB from January to December 2010. A total number of 187 patients met the definition of UGIB for the retrospective review.

The data was collected from the charts from the male and female adult general surgery wards, the surgical high dependency unit and the intensive care unit archives. All available charts from the study period indicated were reviewed, although there is no guarantee that the archives were complete. From the eligible patients, date of admission, readmissions, date of death, age, gender, residency, heart rate, systolic blood pressure and comorbidities were extracted. Furthermore, endoscopic diagnosis, endoscopic bleeding were also recorded and final Rockall score was calculated by the study team.

A clinical diagnosis was assigned in all patients who did not have an endoscopically verified diagnosis. The

diagnosis was set to "Upper gastrointestinal bleeding—no other diagnosis specified" unless the patient had signs of liver disease. Liver disease was defined as the presence of either one of the following: hepatomegaly, ascites or liver cirrhosis or at least two of the following clinical signs: splenomegaly, jaundice, finger clubbing or dilated veins on the abdominal wall. If the patient was found positive for liver disease, the diagnosis "Oesophageal varices" was assigned, due to the high prevalence of the condition in the setting of the study. If the cause of death for a patient was listed as an UGIB secondary to liver disease, the patient was assigned oesophageal varices as clinical diagnosis and got their comorbidity diagnosis modified accordingly.

2.4. Definitions

The numerical risk scoring was done in accordance with the original Rockall study [8], with some additions to comorbidity. Total score is calculated by simple addition. A score less than 3 carries good prognosis but total score more than 8 carries high risk of mortality. The Rockall score can be applied prior to diagnosis to determine patient with higher mortality risk and post-endoscopic diagnosis score includes the addition of the diagnosis score (**Table 1**).

Patients between 60 - 79 years of age were assigned 1, while patients over 80 got 2 points. Signs of shock were defined as a heart rate of over 100 beats per minute or a systolic blood pressure under 100 mmHg at presentation, which yielded 1 and 2 points respectively.

For this study, the concept of comorbidity was broadened to include HIV disease and active tuberculosis due to the high prevalence in Malawi, *i.e.* these were considered major comorbidities and given a score of 2. Furthermore, since few patients had a confirmed diagnosis of liver disease, which yields 2 points on the comorbidity score, signs of ascites or hepatomegaly were considered signs of liver disease. Additionally, jaundice, finger clubbing, dilatation of abdominal veins and splenomegaly were considered signs of liver disease if at least two were present or together with ascites or hepatomegaly, as outlined above. Congestive heart failure and ischemic heart disease were assigned 2 points as a major comorbidity. 3 points were given to patients presenting with renal failure, liver cirrhosis and/or failure or metastatic cancer. Endoscopic diagnoses were divided into normal endoscopy, with no signs of bleeding, or Mallory-Weiss tear (0 point), gastrointestinal malignancy (2 points) and all other diagnoses (1 point), while signs of endoscopic bleeding scored 0 point if no bleeding or dark spots only were present and 2 points for the occurrence of spurting vessels, adherent clots or blood. The points were then added to produce a maximum pre-endoscopic Rockall score of 7 and a maximum score of 11 post-endoscopy.

Haemoglobin levels were only recorded if they were collected before the patient had a blood transfusion while other laboratory analyses could be collected at any time.

2.5. Data Management and Analysis

Study data were collected and managed using REDCap electronic data capture tools hosted at University of North Carolina. REDCap (Research Electronic Data Capture) is a secure, web-based application designed to support data capture for research studies [9]. The application is accessible online and this allowed all involved investigators to access relevant data, regardless of location. All data was initially entered into a Microsoft excel database template and then uploaded into REDCap during the study.

For data analysis, some general characteristics were first stratified by whether the participant was male or

Table 1. Rockall score.

Variable	Score 0	Score 1	Score 2	Score 3
Age	<60	60 - 79	>80	
Shock	No shock	Pulse > 100	SBP < 100	
Comorbidity	No major		Congestive heart failure, ischemic heart disease, major morbidity (HIV disease, active TB)	Renal failure, liver failure, metastatic cancer
Diagnosis on endoscopy	Mallory-Weiss or normal endoscopy	All other diagnoses	Gastrointestinal malignancy	
Evidence of bleeding on endoscopy	No bleeding or dark spots		Blood, adherent clot, spurting vessel	

female. 2-sample t-tests for continuous participant characteristics and Pearson's chi-square test for categorical participant characteristics were used to examine which variables differed significantly between males and females. Bivariate relations between the various participant characteristics and mortality (the outcome of interest) were then examined. For dichotomous exposure variables, 2-sample t-tests were performed while Pearson's chi-square test was performed for categorical participant characteristics. Multiple logistic regression were performed to estimate odds ratios for mortality based on specific patient characteristics. A multiple logistic regression model was created to estimate adjusted odds ratios, with only pre-endoscopic Rockall score and undergoing endoscopy remaining in the model. Variables without an effect on adjusted mean were removed from the model. Stata 12.0 (Stata Corp, College Station, TX) was used for the analyses.

2.6. Ethical Considerations

An international Institutional Review Board (IRB) for this study through the University of North Carolina, Chapel Hill, USA has been approved (IRB Number IRB11-1649) in addition to a local IRB via the National Health Science Research Committee in Malawi (NHSRC #891). Since this was a retrospective study, the main risk to the patients was breach of confidentiality. All data was stored on a secure, password-protected computer with data backed up to the UNC Project secured servers.

3. Results

Approximately 5000 patient charts were reviewed for patients admitted at Kamuzu Central Hospital with a diagnosis of UGIB during the year 2010. A total number of 187 Malawians (119 men and 68 women) met the inclusion criteria of UGIB in our study, with a mean age of 40.7 ± 15.3 years ranging from 18 to 86 years (**Table 2**). The gender difference was not statistically significant. Overall, patients in our study had a relatively favorable Rockall score, with a mean pre-endoscopic score of 1.87 ± 1.47 and post-endoscopic score of 3.23 ± 1.93, among those who had endoscopy. The mortality rate was 23.5% (43 deaths out of 187 total patients), with a non-significant gender difference.

Bleeding oesophageal varices was the most common clinical cause of UGIB (**Table 3**). About 40% of patients had no identified cause of UGIB, clinical and/or endoscopic, indicated in their inpatient records and this was the second highest designation in the records. 14 (7.5%) patients with UGIB had a normal esophagogastroduodenoscopy (EGD). Oesophageal tumor was present in 2.7% of the subjects as a cause of UGIB.

Access to endoscopy, for diagnosis and therapeutic intervention, and surgery (OGDS) was available to less than one half of the patients (**Table 4**). There was not any capability for oesophageal banding in 2010 and sixteen patients with oesophageal varices had surgery after endoscopy due to lack of banding materials during the year.

Table 2. Patient characteristics.

Characteristic	Overall mean (SD)	Number in sample (n)
Age in years	40.7 (15.3)	171
% Male	63.4%	186
% Female	36.5%	186
Heart rate*	99.1 (20.4)	163
Systolic blood pressure*	109 (21.1)	162
Pre-endoscopic rockall score*	1.87 (1.47)	163
Rockall score	3.23 (1.93)	70
Haemoglobin	7.21 (3.1)	96
% Transfused	58.5%	171
Total units transfused	3.14 (2.5)	98
% Endoscopy	45.3%	170
% Operation	10.1%	168

Table 3. Clinical causes of upper gastrointestinal bleeding (N = 187).

Clinical diagnoses	Number 187	%
Oesophageal varices	80	42.8%
UGIB no diagnosis	74	39.6%
UGIB normal	14	7.5%
Other	6	3.2%
Oesophageal tumor	5	2.7%
Gastric cancer	2	1.07%
Mallory Weiss syndrome	2	1.07%
Traumatic	2	1.07%
Gastritis	1	0.53%
Oesophagitis	1	0.53%

Table 4. Endoscopic and surgical intervention in UGIB patients.

Intervention	N 168 (%)[†]
Endoscopy[*] only	60 (35.7%)
Surgery only	1 (0.6%)
Endoscopy[*] and surgery	16 (9.5%)
Neither endoscopy[*] nor surgery	91 (54%)

[*]Either diagnostic only or diagnostic and therapeutic; [†]Only 168 patients out of 187 included in this because 19 patients only had data from death files which did not record whether endoscopy of surgery had been done.

Factors including tachycardia, higher pre and post-endoscopy Rockall score, lower systolic blood pressure and lower pre-transfusion haemoglobin level were present in the patients who died. However, only systolic blood pressure and pre-endoscopic Rockall score were statistically significantly different between survivors and deceased (**Table 5**).

4. Discussion

UGIB was more common in males 118 (63.1%) than females in our study population, although the difference was not statistically significant. Male preponderance is a common finding in a number of African studies on UGIB. Suba *et al.*, record a proportion of 56.2% at Kilimanjaro Christian Medical Centre, Tanzania,in their study [3]. Tijjani *et al.* report an almost 3:1 male to female ratio with a mean age of 43.2 ± 13.5 in UGIB patients in their study in northwestern Nigeria [10]. It is suggested that higher prevalence of underlying illnesses among males, such as liver disease; and higher tendency of alcohol consumption among males may explain this observation [11].

Bleeding oesophageal varices as a cause of UGIB was the most common clinical diagnosis (42.8%). A significant proportion of patients (40%) had no clinical cause of UGIB indicated in their hospital records. In view of limited access to diagnostic and therapeutic endoscopy, it is difficult to determine with certainty the most common cause of UGIB in this population. In an earlier study at same setting, Harries and Wirima report oesophageal varices (45%), duodenal ulcer (16%), and gastritis/erosions (9%), among others, as common causes of UGIB diagnosed by endoscopy [4]. The trend of UGIB morbidity among patients may not have changed significantly over the two decades since their study. Wolf *et al.* report a 17% prevalence of oesophageal varices among all patients undergoing endoscopy at KCH where UGIB was the second most common indication (21%) after dysphagia [12].

Sixteen patients (9.5%) had EGDS after endoscopy. This was the only consistently available intervention in

Table 5. Bivariate association between patient characteristics and mortality*.

Characteristic	Observations (n)	Mean value discharged	Mean value deaths	Deaths %	P-value
Age	171	40.2	43.3		0.326
Gender					
Male	118			25.4	0.326
Female	68			19.1	0.326
Heart rate (bpm)	163	98.4	103		0.284
Systolic blood pressure (mmHg)	162	112	97.2		<0.001
Pre-endoscopic Rockall score	163	1.7	2.8		<0.001
Post-endoscopic Rockall score	70	3.2	4.7		0.190
Haemoglobin levels prior to transfusion (g/dl)	96	7.5	5.8		0.066

*Tests based on Pearson's chi-square for categorical variables and t-tests for continuous variables.

treating the UGIB patients with esophageal varices due to erratic availability of endoscopic therapeutic supplies, and therefore comparative statistics in respect to mortality outcome between the two groups could not be performed. Makdissi *et al.* have observed good clinical results and avoided haemorrhagic recurrence in 75.3% of schistosomal patients who have had OGDS procedure combined with postoperative endoscopic treatment [13]. Surgery alone was performed in our patients who had oesophageal varices confirmed by endoscopy. Fifty four percent of the patients had neither endoscopy nor surgery. Surgical intervention (OGDS) was not carried out without endoscopic confirmation of oesophageal varices. Despite low access to endoscopy, patients required adequate resuscitation with intravenous fluids, blood and blood products, which were inadequate or unavailable, therefore surgery would not readily be done.

Patients in our study had a relatively favourable pre-endoscopic Rockall score, 1.7 in those who were discharged from hospital and 2.8 in those who died (**Table 4**). Only about 45.3% of patients had endoscopy, therefore the post-endoscopic Rockall score may not have a substantial comparable statistical or clinical argument. Despite a favourable pre-endoscopic score, a worrisome mortality rate (23.5%) due to UGIB was observed. While such a high mortality rate may be rarein high-income nations [14], in the absence of adequate resuscitation resources, active vigilant patient monitoring and lack of access to timely endoscopic and surgical interventional measures, it is unfortunately a reality in many low income countries. Suba *et al*. report a similar observation in their study, an overall mortality of 17%, and suggest delayed presentation to health facilities, and comorbidities as influential factors [11].

5. Conclusion

Upper gastrointestinal bleeding is an important and common clinical problem at Kamuzu Central Hospital. Oesophageal varices seem to be the commonest cause of UGIB. Inadequacy of resuscitation materials and perhaps timely diagnostic and therapeutic endoscopic and surgical interventions are important limiting factors to favourable patient outcome. Work towards regular provision and supply of interventional resources regarding UGIB management may improve patient outcome.

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