Prevalence of gastrointestinal bleeding and frequency of selected predictors of mortality on the Medical Emergency Ward at Mulago Hospital

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Abstract

Background

Gastroenterologists of Mulago hospital noted that many patients with gastrointestinal bleeding are transferred to their ward from the emergency ward without adequate resuscitation. They recommended that blood should be ring fenced for patients with gastrointestinal bleeding (GI) on the emergency ward so that urgent resuscitation can be done. There was however no current data on the prevalence of GI bleeding in the emergency ward to provide a guide of how much blood should be ring fenced. This was partly because the medical records are not adequately completed as designed. We thus undertook a study to estimate the prevalence of GI bleeding on the emergency ward by incorporating quality improvement methods in the process of data collection to improve the documentation practice on the Casualty assessment form (CAF).

Methods

This was a cross sectional study incorporating quality improvement methods in the process of data collection from the CAF for patients attending the emergency ward. Focus group discussions and key informant interviews were conducted to ascertain the root causes of inadequate completion of this form. The health care team was educated on documentation of GI bleeding while being assessed weekly for knowledge and practice of completion of the CAF. The filled CAF were assessed for adequate completion while looking out for a documented diagnosis of GI bleeding and selected predictors of mortality.

Results

Of the 1881 CAF assessed, 278 had a documented diagnosis of GI bleeding, resulting in a prevalence of 6.8%. Of the patients with GI bleeding, 14.1% of them had age greater than 60 years old, 24.0% had a systolic blood pressure less than 100mmHg and 44.5% had a heart rate greater than 100 beats per minute.

Conclusion

The prevalence of GI bleeding on the medical emergency ward of Mulago hospital is high, with 1 in every 15 patients having this condition. This calls for strategies for resuscitative management of this potentially life threatening condition. Among the selected predictors of mortality, tachycardia was most frequent followed by hypotension. These should always be assessed in a patient with GI bleeding and resuscitative measures with blood transfusion and intravenous fluids undertaken to correct them.

Background

Gastrointestinal bleeding is classified as upper or lower gastrointestinal bleeding, separated anatomically by the ligament of Treitz. Acute upper gastrointestinal bleeding should be suspected in patients with haematemesis, coffee-ground vomiting, melaena or unexplained fall in haemoglobin. In up to 20% of

cases, acute upper gastrointestinal bleeding (AUGIB) may mimic lower gastrointestinal bleeding. Features that predict AUGIB in cases of haematochezia include haemodynamic instability, increased serum urea: creatinine ratio, and reduced haematocrit. The diagnosis is confirmed with endoscopy, which may also serve to provide therapeutic interventions (K. Siau et al., 2017)

Acute lower gastrointestinal bleeding manifests as hematochezia (maroon or red blood passed through the rectum). Uncommonly, lower gastrointestinal bleeding can manifest as melena (black, tarry stools), or, conversely, brisk (rapid) upper gastrointestinal bleeding can manifest as hematochezia (Gralnek, Neeman, & Strate, 2017).

At the initial encounter with a patient with gastrointestinal bleeding, risk assessment is performed to determine the severity of upper gastrointestinal bleeding according to vital signs and patient factors. Tachycardia (heart rate ≥ 100 beats per minute), hypotension (systolic blood pressure ≤ 100 mm Hg), age older than 60 years, and major coexisting conditions are associated with an increased risk of further bleeding and death (Rockall, Logan, Devlin, & Northfield, 1996).

Risk-assessment tools are available and are useful in identifying patients at risk of mortality. For example, discharge from the emergency department followed by outpatient care has been suggested for patients with a Glasgow–Blatchford score of 0, 0 to 1, or, in patients who are less than 70 years of age, 0 to 2 (on a scale of 0 to 23, with higher scores indicating higher risk). A prospective study showed that when hospitalized; less than 1% of such patients require intervention and less than 0.5% die (Laursen et al., 2015).

There are no current data on the prevalence of GI bleeding and selected predictors of mortality on the medical emergency ward. This is partly because the medical records are not adequately completed as designed. For example, the casualty assessment form was designed to be completed by the health care team and left in the emergency ward after the patient is either discharged or transferred to another ward. Reviewing data from this form if it is adequately completed and left on the emergency ward would provide data that can be used to estimate the prevalence of various conditions. Unfortunately this form is neither regularly adequately completed, nor is it left on the emergency ward in many instances when the patient is being transferred for specialized care. This poor clinical documentation practice in our setting had also been recognized among other challenges that affect optimal care of severely ill patients in resource limited settings (Cummings et al., 2017). In order to obtain a more accurate estimate of the prevalence of GI bleeding on the emergency ward it was essential to improve the process of documentation and storage of the data on the casualty assessment form by using quality improvement methods.

A more accurate estimation of the prevalence of gastrointestinal bleeding on the emergency ward of Mulago hospital would inform policy on the burden of this condition and lead to better planning for strategies and resources required to care for these patients such as blood for blood transfusion, drugs like terlipressin and space for resuscitation of these patients. Since the current prevalence of GI bleeding on the emergency ward was not known, proper planning for improving the care of these patients was

unlikely to be done and some of these patients whose lives could have been saved with adequate resuscitation, might die.

The general objective was to determine the prevalence of GI bleeding and selected predictors of mortality among patients admitted on the medical emergency ward of Mulago hospital, so as to generate more accurate information to contribute to improving patient care by using it in planning strategies for adequate resuscitation of these patients.

Methods

This was a cross-sectional study incorporating quality improvement methods in the process of data collection. The study was conducted on the medical emergency ward of the Directorate of Medicine, Mulago hospital, currently operating in Kiruddu, Kampala, Uganda. This emergency ward has a bed capacity of 25 beds and receives an average of 30 patients in a 24-hour period and 900 patients over a month period. The patients stay in the emergency ward for a short period after which they are either admitted to the specialized ward with respect to their disease or are discharged home if they don't need to be admitted. The emergency healthcare team is composed of eight medical officers, fifteen nurses, four intern doctors and one physician. These were the members of the health team we primarily targeted to get involved in the study.

Casualty assessment forms of all patients attending the medical emergency ward of Mulago national referral hospital during the study period were assessed for adequate completion while looking out for a documented diagnosis of GI bleeding and selected predictors of mortality. Consecutive sampling of the casualty assessment forms which were filled by the quality improvement team during the study period of 13 weeks was done.

The data were collected using a data collection tool by the principal investigator and research assistants who first conducted the focus group discussions and key informant interviews to find out the root causes of inadequate completion of the CAF and then did education sessions with ongoing knowledge and CAF completion assessment.

Data analysis and management

Data collected were entered into the computer using EPI-DATA (version 3.1) software to minimize data entry errors and exported to STATA/IC 11.0 for analysis. Data were then backed up and archived in both soft and hard copies to avoid loss. Confidentiality was ensured by de-identification using numbers instead of patients' names. Qualitative data were recorded by the notes taker and then transcribed into themes to aid in data analysis.

Results

The study was conducted between July and October 2018. We used quality improvement methods in the process of data collection so that we could estimate the prevalence of GI bleeding on the emergency ward of Mulago hospital with more accuracy. The QI methods included mapping of the documentation process, identifying the root causes of inadequate documentation through focus group discussions and key informant interviews, intervening by educating health workers on the emergency ward regarding documentation on the CAF and then assessed the trend of completion of the form while looking out for the documented diagnosis of GI bleeding and the selected predictors of mortality namely age, systolic blood pressure and pulse rate. The following were the results of these assessments.

Social-demographic characteristics of the study participants

The social-demographic characteristics of the study participants have been categorized between two groups; those of the entire study participants and those who had a documented diagnosis of GI bleeding. The characteristics of the former group are summarized in Table 1 below while for the latter group in Table 2. Among those with a diagnosis of GI bleeding, majority were male 77 (60.2%), of Catholic faith 44 (34.4%) and from central Uganda 60 (46.9%).

Table 1
Demographic characteristics of all the study participants

Characteristic	Frequency (N = 1881)	Percentage
Age (mean, SD)	43.9, ($\pm$ 19.6)	
Sex		
Male	941	50.0
Female	917	48.8
Not recorded	23	1.2
Religion		
Muslim	319	17.0
Catholic	605	32.2
Anglican	24	1.3
Pentecostal	527	28.0
Others	205	10.9
Not recorded	200	10.6
Occupation		
Employed	634	33.7
Not employed	578	30.7
Others	168	8.9
Not recorded	500	26.6
Region of origin		
Central	996	53.0
West	383	20.4
East	230	12.2
North	85	4.5
Not recorded	187	9.9

Table 2
Demographic Characteristics of patients with GI bleeding

Characteristic	Frequency (N = 128)	Percentage
Age (mean, SD)	41.3, 17.2	
Sex		
Male	77	60.2
Female	51	39.8
Religion		
Muslim	18	14.1
Catholic	44	34.4
Anglican	3	2.3
Pentecostal	35	27.3
Others	19	14.8
Not recorded	9	7.0
Occupation		
Employed	49	38.3
Not employed	43	33.6
Others	8	6.3
Not recorded	28	21.9
Region of origin		
Central	60	46.9
West	31	24.2
East	16	12.5
North	9	7.0
Not recorded	12	9.4
Outcome on transfer for specialised care		

Prevalence of gastrointestinal bleeding

Out of the 1881 CAFs assessed during the study period, 128 of these forms had a documented diagnosis of gastrointestinal bleeding, giving an overall prevalence of 6.8%. The weekly prevalence ranged between 3.2% and 9.8%. These findings are presented on the run chart in Fig. 1 below.

Characteristic	Frequency (N = 128)	Percentage
Improved	5	3.9
Unimproved	121	94.5
Died	2	1.6
Prevalence of gastrointestinal bleeding		
Out of the 1881 CAFs assessed during the study period, 128 of these forms had a documented diagnosis of gastrointestinal bleeding, giving an overall prevalence of 6.8%. The weekly prevalence ranged between 3.2% and 9.8%. These findings are presented on the run chart in Fig. 1 below.		

Predictors of mortality among patients with gastrointestinal bleeding

The selected clinical characteristics which predict a high risk of mortality among patients with GI bleeding were age, systolic blood pressure and pulse rate. The median age of patients with GI bleeding was 39 years with interquartile range of 13 to 80 years. Only 18 (14.1%) patients were greater than 60 years of age. Hypotension (systolic blood pressure less than 100 mmHg) was observed in 30 (24.0%) patients while tachycardia (pulse rate greater than 100 beats per minute) was recorded for 57 (44.5%) of the patients. Further, 15 (11.7%) of the patients had both hypotension and tachycardia. Only one patient had age greater than 60 years, hypotension and tachycardia. Two patients died on the emergency ward and both had hypotension but were less than 60 years and had no tachycardia. The Table 3 below summarizes these findings.

Table 3
Proportion of GI bleeding patients with selected predictors of mortality

Clinical Parameter	Number of GI Bleeding patients (N = 128)	Proportion
Age > 60yrs	18	14.1%
SBP < 100 mmHg	30	24.0%
HR > 100 bpm	57	44.5%
NB: Percentages not mutually exclusive.		

Discussion

This study aimed to determine the prevalence of gastrointestinal bleeding and the frequency of selected predictors of mortality on the medical emergency ward of Mulago hospital with quality improvement methods incorporated in the process of data collection from the casualty assessment forms (CAF). Before the study was done, the CAF were not being filled adequately and were not being kept on the emergency ward and therefore would not be used to give us an estimate of the prevalence of GI bleeding. We therefore used quality improvement methods to improve the process of documentation on the CAF so

that we estimate the prevalence of GI bleeding with more accuracy. The results and discussion of the quality improvement methods have been written and submitted for publication separately. The prevalence of GI bleeding obtained after improving the documentation process is more accurate and reflects the burden of this life threatening medical emergency.

We found a prevalence of gastrointestinal bleeding of 6.8%. This is higher than the prevalence of 2.0% that was found in a Nigerian study (Rukewe, Otegbayo, & Fatiregun, 2015). However, this study only looked at upper gastrointestinal bleeding at the emergency department of a tertiary hospital in Nigeria and much as it was a retrospective study based on review of medical records, they did not incorporate quality improvement methods in the process of data collection. Indeed, they stated missing data as a major limitation in their study. Other studies in similar resource setting have evaluated causes of GI bleeding (Alema, Martin, & Okello, 2012), (Alatise et al., 2014), (Harries & Wirima, 1989) and as such, it is not possible to compare our findings with theirs since we did not study etiology of the GI bleeding in our study. GI bleeding has been characterized better in high resource settings with incidence rates of 134 per 100,000 in the UK (K Siau et al., 2017) and being the most common cause of hospitalization due to gastrointestinal disease in the United States, accounts for more than 507,000 hospitalizations annually in the US (Peery et al., 2015).

Basing on the Rockall criteria (Rockall et al., 1996) our patients were at a low risk of mortality. This is attributed to the fact that only 14.1% were above the age of 60 years; hypotension was prevalent in only 24% and tachycardia in 44.5%. These findings add support to earlier findings that mortality from GI bleeding is largely the result of complications associated with other illnesses (Marmo R, 2008) rather than bleeding to death.

Limitations of the study

We abstracted the diagnosis of GI bleeding as recorded on the CAF. These were not confirmed by endoscopy. Even with quality improvement measures, the CAF were not completed adequately. However, the estimate of the prevalence may not be far from the true prevalence since the diagnosis field was well completed during the study period.

Conclusions

The prevalence of GI bleeding on the medical emergency ward of Mulago hospital appeared higher than other resource limited settings with 1 in every 15 patients having this condition. This calls for laying of strategies for resuscitative management of this potentially life threatening medical emergency. Among the selected predictors of mortality, tachycardia was most frequent followed by hypotension. These should always be assessed in a patient with GI bleeding and resuscitative measures with blood transfusion and intravenous fluids undertaken to correct them.

Recommendations

Basing on the prevalence of GI bleeding on the emergency ward, there is need for creation of triage and resuscitation areas to allow for quick identification and effective emergency care of these patients. In addition, blood and potentially lifesaving medications such as terlipressin and proton pump inhibitors should be ring-fenced and availed for this medical emergency. With 1 in every 15 patients presenting with GI bleeding in the emergency ward which has an average of 30 patients being admitted in 24 hours, it implies that at least 4 units of blood should always be preserved for transfusion of these patients on a daily basis, assuming each patient needs at least 2 units of blood.

Abbreviations

CAF: Casualty assessment form, GI: Gastrointestinal, HR: Heart rate, QI: Quality improvement, SBP: Systolic blood pressure.

Declarations

Ethical approval and consent to participate

Approval to conduct the study was sought from the Department of Medicine, Makerere University College of Health Sciences and from the School of Medicine Research and Ethics Committee (SOM-REC) under registration number REC REF 2018-189. Patients' consent to participate in the study was waived by SOM-REC as there was no direct interaction with patients but rather a review of their casualty assessment form.

Consent for publication

Not applicable.

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Availability of data and materials

The datasets used or analysed during this study are available from the corresponding author on reasonable request.

Authors' contributions

IK conceived and conducted the study with substantial contributions from MK and ES throughout the conduction of the study and writing of the manuscript. All authors critically revised the manuscript and approved the final version.

Competing interests

The authors declare that they have no competing interests.

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References

- Alatise, O. I., Aderibigbe, A. S., Adisa, A. O., Adekanle, O., Agbakwuru, A. E., & Arigbabu, A. O. (2014). Management of overt upper gastrointestinal bleeding in a low resource setting: a real world report from Nigeria. *BMC Gastroenterol*, *14*, 210. doi:10.1186/s12876-014-0210-1
- Alema, O. N., Martin, D. O., & Okello, T. R. (2012). Endoscopic findings in upper gastrointestinal bleeding patients at Lacor hospital, northern Uganda. *Afr Health Sci*, *12*(4), 518-521.
- Cummings, M. J., Goldberg, E., Mwaka, S., Kabajaasi, O., Vittinghoff, E., Cattamanchi, A., . . . Davis, J. L. (2017). A complex intervention to improve implementation of World Health Organization guidelines for diagnosis of severe illness in low-income settings: a quasi-experimental study from Uganda. *Implementation Science*, *12*(1), 126. doi:10.1186/s13012-017-0654-0
- Gralnek, I. M., Neeman, Z., & Strate, L. L. (2017). Acute Lower Gastrointestinal Bleeding. *N Engl J Med*, *376*(11), 1054-1063. doi:10.1056/NEJMc1603455
- Harries, A. D., & Wirima, J. J. (1989). Upper gastrointestinal bleeding in Malawian adults and value of splenomegaly in predicting source of haemorrhage. *East Afr Med J*, *66*(2), 97-99.
- Laursen, S. B., Dalton, H. R., Murray, I. A., Michell, N., Johnston, M. R., Schultz, M., . . . Stanley, A. J. (2015). Performance of new thresholds of the Glasgow Blatchford score in managing patients with upper gastrointestinal bleeding. *Clin Gastroenterol Hepatol*, *13*(1), 115-121.e112. doi:10.1016/j.cgh.2014.07.023
- Marmo R, K. M., Cipolletta L. (2008). Predictive factors of mortality from nonvariceal upper gastrointestinal hemorrhage: a multicenter study. *American Journal of Gastroenterology*, 1639-1647.
- Peery, A. F., Crockett, S. D., Barritt, A. S., Dellon, E. S., Eluri, S., Gangarosa, L. M., . . . Sandler, R. S. (2015). Burden of Gastrointestinal, Liver, and Pancreatic Diseases in the United States. *Gastroenterology*, *149*(7),

1731-1741.e1733. doi:10.1053/j.gastro.2015.08.045

Rockall, T., Logan, R., Devlin, H., & Northfield, T. (1996). Risk assessment after acute upper gastrointestinal haemorrhage. *Gut*, 38(3), 316-321.

Rukewe, A., Otegbayo, J. A., & Fatiregun, A. (2015). CLINICAL CHARACTERISTICS AND OUTCOME OF PATIENTS WITH UPPER GASTROINTESTINAL BLEEDING AT THE EMERGENCY DEPARTMENT OF A TERTIARY HOSPITAL IN NIGERIA. *Annals of Ibadan postgraduate medicine*, 13(2), 89-93.

Siau, K., Chapman, W., Sharma, N., Tripathi, D., Iqbal, T., & Bhala, N. (2017). Management of acute upper gastrointestinal bleeding: an update for the general physician. *J R Coll Physicians Edinb*, 47(3), 218-230. doi:10.4997/jrcpe.2017.303

Siau, K., Chapman, W., Sharma, N., Tripathi, D., Iqbal, T., & Bhala, N. (2017). Management of acute upper gastrointestinal bleeding: an update for the general physician. *JOURNAL OF THE ROYAL COLLEGE OF PHYSICIANS OF EDINBURGH*, 47(3), 219.

Figures

Figure 1

Run chart showing weekly prevalence of GI bleeding

Study flow diagram

Figure 2

Study flow diagram