

## To Determine the Impact of A Bleeding Care Pathway in the Treatment of Acute Upper Gastrointestinal Bleeding: An Observational Study

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### Abstract

**Aim:** The aim of our study to evaluate the Impact of a bleeding care pathway in the management of acute upper gastrointestinal bleeding.

**Methods:** The prospectively observational study was conducted in the Department of General Medicine, Nalanda Medical College and Hospital, Patna, Bihar, India, 150 upper GI bleeding patients were included in this study. In order to assess our objectives, these data were compared with data of matched patients with upper GI bleed admitted in SCU prior to implementation of GI (BCP)s in bleeding control unit (pre-BCU). The data collected for both the groups of patients included the history, examination, laboratory investigations, and different outcomes.

**Results:** A total of 150 patients were admitted with UGI bleed. Of the 150 patients studied, 50 belonged to pre-BCU group and 100 patients were admitted in BCU. There were 25 (50%) patients with variceal and 19 (38%) with non-variceal bleed; while 3 (6%) had variceal and non-variceal source of bleed and in 3 (6%) patients the source was not identified after gastroscopy and colonoscopy. The distribution of demographics, such as age, gender, and comorbid condition, number of patients requiring transfusion, and number of blood products transfused were similar in the two groups. The number of patients with upper GI bleed due to esophageal varices was higher in the BCU period 60(60%) vs. pre-BCU 25 [50%];  $p = 0.005$ ). There were 34 (34%) patients in BCU period with non-variceal bleed. The mean (SD) time from admission to EGD improved after implementation of BCU and pathways from 20.9 (7.5) to 9.55 (10.5) hours ( $p$ -value  $<0.001$ ). We found BCU stay improvement (BCU 1.97 [1.5] days vs. pre-BCU (2.44 [1.5] days);  $p <0.001$ ).

**Conclusion:** A BCU implementation showed improvement in time to UGI endoscopy, and did not reduce BCU stay or impact survival.

**Keywords:** gastrointestinal, bleeding, endoscopy

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## Introduction

Acute upper gastrointestinal bleed (AUGIB) is one of the most common medical emergencies in the UK, with an estimated incidence of 134 per 100,000,[1] roughly equating to one presentation every 6 min.[2] Despite advances in therapeutics and endoscopy provision, mortality following AUGIB over the last two decades has remained high, with over 9,000 deaths annually in the UK.[3] The first UK audit of AUGIB in 1993 reported an overall mortality of 14% (11% in patients admitted with AUGIB, and 33% of inpatients who develop AUGIB).[4] A follow-up national audit in 2007 demonstrated a mortality of 10% (7% in patients admitted with AUGIB, and 26% of inpatient bleeds).[5] Consequently, UK-relevant guidelines have been published by the National Institute for Health and Care Excellence (NICE)[6] the Scottish Intercollegiate Guidelines Network (SIGN) in conjunction with the British Society of Gastroenterology (BSG)[7] and, more recently, the European Society of Gastrointestinal Endoscopy (ESGE).[8] Despite this, the 2015 National Confidential Enquiry into Patient Outcome and Death (NCEPOD) of UK patients with AUGIB highlighted variations in practice and raised concerns regarding suboptimal patient care, releasing a series of recommendations.[2] The aim of our study was to standardize the treatment and to study the utility and efficacy of BCU in the management of upper GI bleeding at our institution. The aim of our study to evaluate the Impact of a bleeding care pathway in the management of acute upper gastrointestinal bleeding.

## Material and methods

The prospective observational study was conducted in the Department of General Medicine, Nalanda Medical College and Hospital, Patna, Bihar, India, after taking the approval of the protocol review committee and institutional ethics

committee. 150 upper GI bleeding patients were included in this study. In order to assess our objectives, these data were compared with data of matched patients with upper GI bleed admitted in SCU prior to implementation of GI (BCP)s in bleeding control unit (pre-BCU). The data collected for both the groups of patients included the history, examination, laboratory investigations, and different outcomes. Success of BCP was assessed and compared with pre-BCU admissions for the following variables: (1) time between admission and upper GI endoscopy, (2) length of pre- BCU/BCU stay, (3) total hospital admission, and (4) mortality.

## Statistical analysis

Data are presented as mean (SD) or number (%) as applicable. Differences in proportions were assessed by using the Chi-square test or Fisher exact test wherever appropriate. For continuous variables, one way analysis of variance and independent sample t-test were used to assess the difference of means. All analysis was done using SPSS (version 21.0). All *p*-values were two-sided and considered as significant if  $<0.05$ .

## Results

A total of 150 patients were admitted with UGI bleed. Of the 150 patients studied, 50 belonged to pre-BCU group and 100 patients were admitted in BCU.

There were 25 (50%) patients with variceal and 19 (38%) with non- variceal bleed; while 3 (6%) had variceal and non-variceal source of bleed and in 3 (6%) patients the source was not identified after gastroscopy and colonoscopy. The distribution of demographics, such as age, gender, and co- morbid condition, number of patients requiring transfusion, and number of blood products transfused were similar in the two groups (Table1). The severity of liver disease based on the Child Turcotte Pugh (CTP) score was comparable in the two groups; similarly,

the severity of non-variceal bleed related findings were also comparable in pre-BCU and BCU era based on all patient refined—diagnosis related groups (APR—DRG) classification system. [9,10,11] There was no difference in the use of octreotide and terlipressin in the two groups as reported by Abid et al. [12] from our centre during the same period.

4 (8%) patients were receiving NSAIDs or aspirin in pre-BCU group as compared to 7 (7%) in BCU group the number of patients with upper GI bleed due to esophageal varices was higher in the BCU period 60(60%) vs. pre-BCU 25 [50%];  $p =$

0.005). Among patients with non-variceal bleed, 19 (38%) belonged to pre-BCU group; of these 9 (47.37%) had bleeding from gastric ulcer/erosions, 6 (31.58%) had duodenal ulcer, 2 (10.53%) had both gastric and duodenal ulcer, 1 (5.26%) had gastric cancer and 1 (5.26%) esophageal cancer.

There were 34 (34%) patients in BCU period with non-variceal bleed; 17 (50%) patients had gastric ulcer/erosions, 12 (35.29%) had duodenal ulcer, 2 (5.89%) had both gastric and duodenal ulcers, 2 (5.89%) had Mallory Weiss tear and 1 (2.86%) had a gastric cancer.

**Table 1 Characteristics of patient admitted before and after start of bleeding care unit**

Variables	Pre-BCU $n=50$	BCU $n=100$	$p$ -value
Age (years) (mean [SD])	57.5 (13.5)	55.9 (14.8)	0.21
Male	30 (60)	65 (65)	0.58
Comorbid illnesses	20 (40)	40(40)	0.77
Transfusion	35 (70)	75 (75)	0.55
Average number of blood products (mean [SD])	1 (2)	1 (1)	0.57
Causes of UGI bleed			
Esophageal variceal bleed	25 (50)	60 (60)	0.005
Non-esophageal variceal bleed	19 (38)	34 (34)	
Both EV and non-EV bleed	3 (6)	5(5)	
No source of bleeding identified	3 (6)	1 (1)	

**Table 2 Comparison of overall outcome variables in pre-BCU and BCU period**

Variables	Pre-BCU; $n=50$	BCU; $n=100$	P value
Time between admission and endoscopy (hours)	20.9 (7.5)	9.55 (10.5)	<0.001
BCU length of stay (days)	2.44 (1.5)	1.97 (1.5)	<0.001
Length of hospital stay (days)	4.5 (2.18)	4.10 (2.72)	0.54
Survival ( $n$ [%])	45(90)	96 (96)	0.22

The mean (SD) time from admission to EGD improved after implementation of BCU and pathways from 20.9 (7.5) to 9.55 (10.5) hours ( $p$ -value <0.001; Table 2). We found BCU stay improvement (BCU 1.97 [1.5] days vs. pre-BCU (2.44 [1.5] days);  $p <0.001$ ). There was an improvement in the mean length of BCU

stay as compared to pre-BCU after BCPs were implemented ( $p <0.001$ ). There was no difference in total length of hospital admission. There was no difference in survival of patients admitted with upper GI bleed in pre-BCU and BCU period.

## Discussion

The implementation of BCU and BCP was successful in reducing time to endoscopy from admission. We were unable to achieve improvement in total length of hospital stay and survival in patients with upper GI bleed.

Pathways propose an idea that transforming the care of all patients in the same manner may impact the outcome. The pathways are used in patient care with a varied success in different disease states. [13,14] In clinical practice, pathways were used initially in the management of patients in coronary care units. The role of BCPs in management of GI bleed is insufficient. There are a few studies with limited success in management of upper GI bleed based on BCP, particularly non-variceal reported from developed countries. [15,16] similar data are not available from developing countries.

Pfau et al.[14] did not demonstrate any improvement in the time to endoscopy; we achieved this success mainly by changing the practice of performing endoscopy within 24 h of admission. While some studies [15] have been able to demonstrate a reduction in total length of stay in hospital, others were unable to do so. Similarly, survival improvement has not been reported in any of the reports, except in one report which demonstrated a trend of improved survival. This study reported a mortality reduction to 10% with better monitoring. At our center, survival was over 94% in the pre-BCU and BCU data; similar results have been reported in other and our previous studies.[17,18,19] We believe that the difference in survival was not significant because the survival was already high and the sample size needed for demonstrating the difference in outcome was not adequate. Our report has achieved some important targets including reduction in time to endoscopy from admission and length of stay in BCU in subsequent years. Achievement of a single outcome in a pathway can be translated

into significant impact in the clinical practice. We have achieved success in two outcomes which can be easily translated into reduction in the cost of management by reducing the time to endoscopy and ultimately reducing the length of stay in BCU. Pfau et al. [16] achieved cost-saving by reducing the use of IV H<sub>2</sub>-receptor antagonists and routine chest radiographs, though they were unable to demonstrate reduction in time to endoscopy and hospital stay as they have only short time data.

One of the problems with BCPs is that they have not been tested in scientific or controlled settings to monitor the improvement in outcomes, such as length of stay and duration of a procedure. Little research has been done on the efficacy of the BCP in an individual patient. One reason is that at any one medical center, “pathway” care cannot be compared with “usual” care because of contamination from the pathway intervention. Despite all these limitations, the pathways are being used to assess the improvement in quality of healthcare services.

### Conclusion

A BCU implementation showed improvement in time to UGI endoscopy, and did not reduce BCU stay or impact survival. It was also concluded that BCP implementation in UGI bleeding management was useful if practiced over longer time period.

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