



Liver Cirrhosis is a Risk Factor of Repeat Acute Hemorrhagic Rectal Ulcer in Intensive Care Unit Patients

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Background: Acute hemorrhagic rectal ulcer (AHRU) can be found in patients with severe comorbid illness, who are bedridden for a long time. Per anal suturing is a quick and feasible treatment. However, recurrent bleeding occurs frequently after suture ligation of a bleeder and can be life-threatening. However, the risk factor for recurrent bleeding is not well known. Our study tries to clarify the risk factor of repeat AHRU in Intensive Care Unit (ICU) patients. **Materials and Methods:** From January 2004 to December 2009, the medical records of 32 patients, who were admitted to the ICU of the Tri-Service General Hospital, a tertiary referral center in Taiwan, and who underwent per anal suturing of acute hemorrhagic rectal ulcer were retrospectively reviewed. **Results:** Of the 96 patients who received emergency treatment for acute massive hematochezia, 32 patients were diagnosed with AHRU. Eight (25%) patients had recurrent bleeding following suture ligation of AHRU and underwent a reoperation; no patient had recurrent bleeding after the second operation. The duration from the first hematochezia attack to surgery ($P = 0.04$), liver cirrhosis ($P = 0.002$), and coagulopathy ($P = 0.01$) were the risk factors of recurrent bleeding after suture ligation of a bleeder. Multivariate logistic regression analysis indicated that liver cirrhosis ($OR = 37.77$, $P = 0.014$) was an independent risk factor for recurrent bleeding. **Conclusion:** AHRU could be a major cause of acute massive hematochezia in patients with severe illness. Our data showed that per anal suturing could quickly and effectively control bleeding. We found that liver cirrhosis was an independent risk factor for recurrent bleeding. Therefore, treatment of a liver cirrhosis patient with AHRU should be more aggressive, such as, early detection and proper suture ligation.

Key words: Acute hemorrhagic rectal ulcer, liver cirrhosis, recurrent bleeding, rectal bleeding, intensive care unit

INTRODUCTION

The occurrence of major lower gastrointestinal (LGI) hemorrhage in Intensive Care Unit (ICU) patients has been reported to range from 0.15 to 0.94%.^{1,2} A recent report has found that an acute hemorrhagic rectal ulcer (AHRU) is the leading cause (31.6%) of acute LGI bleeding in ICU patients.³ The characteristics of AHRU are sudden-onset, painless, and massive anal bleeding in bedridden patients with severe underlying disease, as is the case in most patients in the ICU.⁴ AHRU can be quickly managed with per anal suture ligation of the bleeder via an anoretractor,⁵ and the disease can also be managed with endoscopic hemostasis. Unfortunately,

recurrent bleeding occurs frequently, requiring a second suture ligation or a second endoscopy with hemostasis. The risk factors for recurrent bleeding are not well known. We present a retrospective study of 32 ICU patients with severe comorbidities, who have had AHRU. We describe the characteristic of AHRU, the risk factors for re-bleeding, and the outcomes of these patients.

MATERIALS AND METHODS

Between January 1, 2004, and December 31, 2009, the medical records of patients who developed anorectal bleeding and underwent transanal suture ligation after admission to the ICU of the National Defense Medical Center, a tertiary referral center in Taiwan, were retrospectively reviewed. The patients were restricted to the following criteria:

1. Acute onset painless hematochezia;
2. Active bleeder over the distal rectum confirmed by an anoretractor and performance of suture ligation;
3. Increase in heart rate by > 20 beats per minute; and
4. Required blood transfusion; the blood transfusion amount was not restricted.

Received: October 23, 2013; Revised: November 6, 2013;
Accepted: November 18, 2013

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Liver cirrhosis is a risk factor of repeat

Combined upper gastrointestinal and LGI bleeding was excluded. Patients with hematochezia from hemorrhoids, anal fissures, and recent anal surgery were excluded. No patient had a history of pelvic radiation.

The patients' data were collected, including sex, age, comorbid disease, duration from bleeding to operation, Acute Physiology and Chronic Health Evaluation II (APACHE II) score, coagulopathy (international normalized ratio (INR) >1.5), thrombocytopenia (platelet count <150,000/mm³), approximate blood loss, blood transfusion amount, recurrent bleeding, and clinical outcome.

We analyzed the differences in the potential risk factors for recurrence of acute hemorrhagic rectal ulcer bleeding after suture ligation of the bleeder in patients, by using a t-test and a chi-squared or Fisher's exact test. For risk factors that were significantly associated with recurrence in the bivariate analyses, at $P < 0.05$, we fitted multivariable logistic regression models to estimate the odds ratios, with 95% confidence intervals for each potential risk factor and the study outcomes. All analyses were performed using the SPSS, version 17.0, for Windows (SPSS, Inc.). The significance level was 5% for all analyses.

RESULTS

Patient general characteristics

Between January 1, 2004 and December 31, 2009, of 96 patients who received emergency management for acute massive hematochezia, 32 patients were diagnosed with AHRU [Table 1]. All 32 patients with AHRU received urgent surgical intervention with transanal suture ligation of the bleeder. Eight (25%) patients had recurrent bleeding and a second operation was performed; no patient had recurrent bleeding after the second operation. The general characteristics of the patients and group comparison result are summarized in [Table 2]. Group 1 was the 'recurrent bleeding' group and group 2 was the 'no recurrent bleeding' group. Most patients were elderly, and the mean age was 74.2 years (range: 34 to 93 years). There were 14 men and 18 women. Fifteen (46.8%) patients had hemodialysis and six (18%) patients had cirrhosis of the liver. Eleven (34%) patients had coagulopathy and 16 (50%) patients had thrombocytopenia. The mean duration from the first hematochezia to surgery was 8.2 hours (range: 3 to 24 hours). Seventeen (53%) patients died during hospitalization due to other clinical diseases. The mean blood transfusion amount was 6.2 units (range: 2 to 16 units) and the mean blood loss was 1212 ml (range: 200 to 3500 ml). The duration from the first hematochezia attack to surgery ($P = 0.04$), liver cirrhosis ($P = 0.002$), and coagulopathy ($P = 0.01$) were risk factors for recurrent bleeding after suture ligation of the bleeder. Multivariate logistic regression analysis indicated that

liver cirrhosis (OR = 37.77, $P = 0.014$) was an independent risk factor for recurrent bleeding.

Diagnosis, management, and outcome of acute hemorrhagic rectal ulcer

In our hospital, if patients have massive hematochezia, the colorectal surgeon is consulted. The diagnosis flow chart is shown in Figure 1. If the blood is found to be fresh and not mixed with stool by digital rectal examination (DRE), anorectal bleeding is highly suspected. An emergency ano retractor exam is performed with the patient in the lateral decubital position. If dark reddish blood or blood mixed with stool is found by DRE, a bleeding source from the proximal colon or upper gastrointestinal tract is highly suspected. Angiography, computed tomography angiography (CTA) or colonoscopy will be performed depending on the patient's condition and the attending doctor's decision. In our study, 26 patients presented with massive bleeding with fresh blood, not mixed with stool, and were quickly diagnosed with AHRU by anoretractor. Another five patients were diagnosed using colonoscopy, and only one patient was diagnosed using angiography.

The bleeding was successfully treated via transanal suture ligation in all patients, and no complications were present after the procedure. Eight patients developed recurrent bleeding following transanal suture ligation of the bleeder. The duration from initial suture ligation to recurrent bleeding ranged from three to ten days. In our study, 17 patients died due to other comorbid diseases.

DISCUSSION

Acute massive LGI hemorrhage is commonly found in ICU patients, and the disease is a common clinical problem

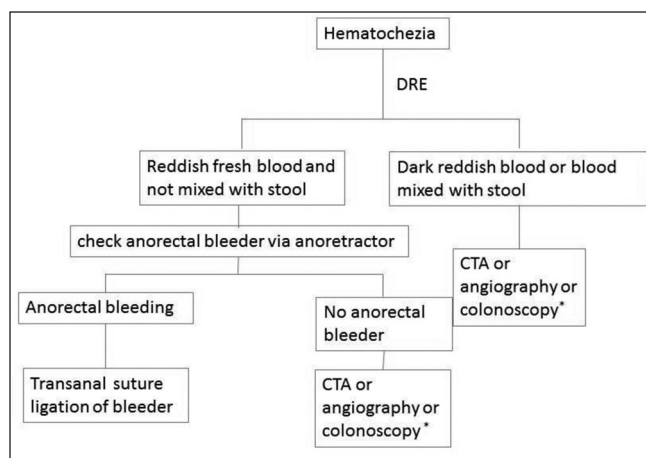


Figure 1. Diagnosed flow chart for acute hematochezia in our institution; *The choice of CTA or angiography or colonoscopy depend on patient's condition and decision making of attending physician; CTA = computer tomography angiography; DRE = digital rectal examination

Table 1. Clinical Characteristics of the Patients

No.	Sex	Age	HD	LC	Thrombocytopenia	PT prolonged ¹ , INR	Underlying Disease	Duration ² (hours)	Blood loss (ml)	Blood Transfusion (Units)	Died	APACHE II ³
Group 1												
1	F	75	Yes	No	Yes	Yes, 2.1	CAD, CRF	5	800	4	No	25
2	F	80	Yes	No	Yes	No, 1.3	Steven-Johnson syndrome, CRF, CHF	3	300	2	Yes	28
3	F	92	No	No	No	No, 1.4	Femur neck fracture, DM	7	1700	12	No	18
4	M	58	Yes	No	Yes	Yes, 1.6	Pneumonia, CVA, DM, CRF	15	2500	14	No	20
5	F	83	No	No	No	No, 1.1	SDH	4	200	2	Yes	28
6	F	83	No	No	No	Yes, 1.6	CHF	3	600	2	Yes	30
7	F	76	Yes	No	Yes	No, 1.2	UTI, septic shock, CRF	4	800	3	Yes	39
8	M	84	Yes	No	Yes	No, 1.2	Pneumonia, CRF	20	3200	16	Yes	32
9	F	74	Yes	No	No	Yes, 1.6	Infectious endocarditis, CAD, CRF	17	2800	14	Yes	39
10	M	81	No	No	No	No, 1.0	Pneumonia, CAD	6	1000	6	Yes	36
11	M	87	No	No	Yes	No, 1.0	Pneumonia, CAD, CHF	7	700	4	No	20
12	F	91	No	No	Yes	No, 1.0	Pneumonia, CVA	3	800	3	No	13
13	F	69	No	Yes	Yes	No, 1.1	LC, UTI, colon cancer	8	1500	8	No	16
14	F	73	No	No	No	No, 1.0	CVA, UTI	8	1200	5	No	10
15	F	76	Yes	No	No	No, 1.2	UTI, DM, CRF	3	200	2	Yes	14
16	M	92	Yes	No	No	No, 1.0	PPU, CRF	10	1000	6	No	13
17	F	84	Yes	No	No	No, 1.2	CVA, CRF, bladder cancer	8	1000	5	Yes	16
18	M	34	No	No	No	No, 1.0	ICH, UTI	6	800	3	No	13
19	F	61	Yes	No	No	No, 1.0	Pneumonia, UTI, CVA, DM, CRF	4	500	3	No	14
20	M	61	No	No	Yes	No, 1.0	Pneumonia, Myelodysplastic syndrome	3	300	2	Yes	16
21	M	55	No	No	No	No, 1.0	CVA, DM, Pneumonia	5	800	4	No	20
22	M	76	Yes	No	No	No, 1.0	Acute cholangitis, CRF	8	1200	6	No	12
23	M	73	No	No	No	No, 1.0	Sick sinus syndrome, DM	8	500	3	No	14
24	M	82	Yes	No	Yes	Yes, 1.7	CAD, CRF, CVA	4	800	5	Yes	16
Group 2												
1	F	77	No	Yes	Yes	Yes, 1.8	Traumatic cervical spinal shock, LC	6	1000	4	Yes	18
2	M	65	No	Yes	Yes	No, 1.1	LC, fulminant hepatitis	12	1700	10	No	26
3	F	77	No	Yes	Yes	Yes, 1.7	ICH, LC	12	2800	14	No	20

(Continued)

Liver cirrhosis is a risk factor of repeat

Table 1. (Continued)

No.	Sex	Age	HD	LC	Thrombocytopenia	PT prolonged ¹ , INR	Underlying Disease	Duration ² (hours)	Blood loss (ml)	Blood Transfusion (Units)	Died	APACHE II ³
4	F	70	No	No	Yes	Yes, 1.7	Intestinal obstruction, CVA, Pneumonia	8	1000	5	Yes	29
5	F	74	Yes	No	No	Yes, 1.8	UTI, CAD, CRF	24	3500	15	Yes	33
6	M	72	Yes	Yes	Yes	Yes, 2.0	Liver abscess, septic shock, LC, CRF	18	1500	7	Yes	29
7	F	93	No	No	No	No, 1.0	Pneumonia, CVA, CAD Parkinsonism	5	1300	7	Yes	34
8	M	47	Yes	Yes	Yes	Yes, 1.9	LC, CRF, DM	7	800	2	Yes	14

HD = hemodialysis; LC = liver cirrhosis; PT = prothrombin time; INR = international normalized ratio; APACHE II = acute physiology and chronic Health Evaluation II; CAD = coronary artery disease; CRF = chronic renal failure; CHF = congestive heart failure; DM = diabetes mellitus; SDH = subdural hemorrhage; UTI = urinary tract infection; CVA = cerebral vascular accident; ICH = intracranial hemorrhage; PPU = perforated peptic ulcer; Group 1: No recurrent bleeding; Group 2: Recurrent bleeding; ¹PT prolonged: INR > 1.5; ²Duration from bleeding to operation; ³APACHE II was calculated at the time the bleeding occurred.

Table 2. Group comparison

Group Statistics	Recurrence		P-value
	Yes n = 8 (%)	No n = 24 (%)	
Age (years)	71.88±12.94	75.00±13.49	0.571
Duration ¹ (hours)	11.50±6.59	7.04±4.54	0.040
Bleeding amount (ml)	1700±959.17	1050±789.61	0.065
Blood transfusion (units)	8.25±4.33	5.58±4.19	0.133
APACHE II	25.38±7.29	20.92±8.95	0.273
Sex			
Male	3 (37.5)	11 (45.8)	1.000
Female	5 (62.5)	13 (54.2)	
HD			
Y	3 (37.5)	12 (50.0)	0.691
N	5 (62.5)	12 (50.0)	
LC			
Y	5 (62.5)	1 (4.2)	0.002
N	3 (37.5)	23 (95.8)	
Thrombocytopenia			
Y	6 (75.0)	10 (41.7)	0.22
N	2 (25.0)	14 (58.3)	
PT prolonged ²			
Y	6 (75.0)	5 (20.8)	0.010
N	2 (25.0)	19 (79.2)	
Death			
Y	6 (75.0)	11 (45.8)	0.229
N	2 (25.0)	13 (54.2)	

P values were calculated by means of the t-test, chi-square test or Fisher's exact test; ¹Duration: from bleeding to operation;

²PT prolonged: INR > 1.5

with multiple causes, including rectal ulcer, hemorrhoids, angiodysplasia, diverticulosis, and ischemic colitis. The major causes of LGI bleeding in hospitalized patients are ischemic colitis and rectal ulcers.^{1,2,6} It has been reported previously that AHRU is the most common cause of acute LGI bleeding in ICU patients.³

'Acute hemorrhagic rectal ulcer' was first described by Soeno *et al.*,⁷ in Japan, and then Fujimaki *et al.*⁸ reported it as a syndrome. The clinical characteristics of AHRU are that it most commonly occurs in elderly, bed-ridden patients, with severe underlying illnesses,^{4,9,10} who present with sudden onset, painless, massive rectal bleeding. Most of our patients had these symptoms.

Rectal ulcer has the following differential diagnoses: Radiation rectal ulceration, solitary rectal ulcer syndrome, ischemic proctitis, stercoral ulcer, and rectal ulcers secondary to treatment with nonsteroidal compounds. A stercoral ulcer is an impaction of fecal material with pressure compression on the colonic wall. The lesion is usually located in the rectosigmoid area, and occurs in constipated, bedridden patients. Solitary rectal ulcer syndrome predominantly occurs in young adults with a history of constipation, self-digitation, or rectal prolapse, and presents as rectal bleeding, mucous discharge, and tenesmus. Ischemic proctitis usually presents as diarrhea, rectal bleeding, fever, abdominal pain, and leukocytosis. The clinical history and symptoms mentioned above are not similar to those of our patients. In our study, no patient had a history of pelvic radial therapy or treatment with nonsteroidal compounds.

The mechanism of AHRU is still unclear. Nakamura *et al.*¹¹ reported the effect of a change in position on blood flow in the rectal mucosa, and explained that bedridden patients had a higher risk of AHRU.

If a patient has a life-threatening lower gastrointestinal hemorrhage, early detection of the bleeding source and treatment are challenges in clinical practice. In our hospital, if the patient has a fresh bloody stool and the blood is not mixed with stool, emergency anorectal bleeder checking via an anoretractor is performed. The examination can safely, quickly, and easily diagnose anorectal bleeding. If an anorectal bleeder is found, emergency suture ligation of the bleeder is performed. Transanal suture ligation of anorectal bleeders can be performed safely at the bedside without major complications.

There are advantages and disadvantages of per anal suture at the bedside. The advantages are that only simple tools are needed, it can be quickly performed, continuous hemodynamic monitoring and resuscitation are possible, and patients do not need to be transferred. The disadvantages are that an upper rectum bleeder cannot be controlled by per anal suture, the light quality at the bedside is poor, and placement of the anoretractor over the rectum can make the patient uncomfortable.

A previous report showed that the recurrent bleeding rate following endoscopic hemostasis of AHRU was 48.3%, and the study showed that patients who suffered hypovolemic shock and received anticoagulants were more likely to develop re-bleeding after endoscopic treatment ($P = 0.005$).³ In our study, the recurrent bleeding rate of transanal suture ligation of AHRU was 25%, and the duration from the first hematochezia attack to surgery ($P = 0.04$), liver cirrhosis ($P = 0.002$), and coagulopathy ($P = 0.01$) were risk factors for recurrent bleeding after suture ligation of the bleeder. Liver cirrhosis (OR = 37.77, $P = 0.014$) was an independent risk factor.

There are limitations of our study. First, due to the retrospective design of our study, we may not be able to provide accurate data and information regarding the patient's general condition. Second, ICU patients have multiple severe diseases, and there may have been cofactors related to the recurrent bleeding that we were not able to identify. Third, there is a small sample size in the study; larger sample size studies are required to validate our results.

CONCLUSION

Acute hemorrhagic rectal ulcer is life threatening and it is also an important cause of acute massive hematochezia in patients with severe illness. Our data showed that per anal suture could quickly and effectively control bleeding and resulted in a lower rate of recurrent bleeding than endoscopic hemostasis. However, the recurrent bleeding rate was still high after suture ligation of bleeders. We found that liver cirrhosis was an independent risk factor for recurrent bleeding, and suggest that physicians treat such patients more aggressively.

DISCLOSURE

All authors declare no competing financial interests.

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