PO Box 2345, Beijing 100023, China
www.wjgnet.com
wjg@wjgnet.com

ELSEVIER

World J Gastroenterol 2005;11(29):4570-4573
World Journal of Gastroenterology ISSN 1007-9327

• *BRIEF REPORTS* •

Acute upper gastrointestinal bleeding in operated stomach: Outcome of 105 cases

Vassiliki N Nikolopoulou, Konstantinos C Thomopoulos, George I Theocharis, Vassiliki A Arvaniti, Constantine E Vagianos

Vassiliki N Nikolopoulou, Konstantinos C Thomopoulos, George I Theocharis, Vassiliki A Arvaniti, Division of Gastroenterology, Department of Internal Medicine, University Hospital, Patras, Greece
Constantine E Vagianos, Department of Surgery, University Hospital, Patras, Greece
Correspondence to: Vassiliki N Nikolopoulou, Associate Professor of Medicine, University of Patras, Medical School, PO Box 1045, Patras 26110, Greece. bnikolop@med.upatras.gr
Fax: +30-261-0993982
Received: 2004-05-25 Accepted: 2004-07-27

Abstract

AIM: To compare the causes and clinical outcome of patients with acute upper gastrointestinal bleeding (AUGB) and a history of gastric surgery to those with AUGB but without a history of gastric surgery in the past.

METHODS: The causes and clinical outcome were compared between 105 patients with AUGB and a history of gastric surgery, and 608 patients with AUGB but without a history of gastric surgery.

RESULTS: Patients who underwent gastric surgery in the past were older (mean age: 68.1±11.7 years *vs* 62.8±17.8 years, $P = 0.001$), and the most common cause of bleeding was marginal ulcer in 63 patients (60%). No identifiable source of bleeding could be found in 22 patients (20.9%) compared to 42/608 (6.9%) in patients without a history of gastric surgery ($P = 0.003$). Endoscopic hemostasis was permanently successful in 26 out of 35 patients (74.3%) with peptic ulcers and active bleeding or non-bleeding visible vessel. Nine patients (8.6%) were operated due to continuing or recurrent bleeding, compared to 23/608 (3.8%) in the group of patients without gastric surgery in the past ($P = 0.028$). Especially in peptic ulcer bleeding patients, emergency surgery was more common in the group of patients with gastric surgery in the past [9/73 (12.3%) *vs* 19/360 (5.3%), $P = 0.025$]. Moreover surgically treated patients in the past required more blood transfusion (3.3±4.0 *vs* 1.5±1.7, $P = 0.0001$) and longer hospitalization time (8.6±4.0 *vs* 6.9±4.9 d, $P = 0.001$) than patients without a history of gastric surgery. Mortality was not different between the two groups [4/105 (3.8%) *vs* 19/608 (3.1%)].

CONCLUSION: Upper gastrointestinal bleeding seems to be more severe in surgically treated patients than in non-operated patients.

Key words: Operated stomach; Active bleeding; Endoscopic hemostasis

Nikolopoulou VN, Thomopoulos KC, Theocharis GI, Arvaniti VA, Vagianos CE. Acute upper gastrointestinal bleeding in operated stomach: Outcome of 105 cases. *World J Gastroenterol* 2005; 11(29): 4570-4573
http://www.wjgnet.com/1007-9327/11/4570.asp

INTRODUCTION

Surgical management of peptic ulcer diseases has steadily decreased over the past 20 years. Several therapeutic improvements, such as the widespread use of acid suppressive drugs and the eradication of *Helicobacter pylori*, are responsible for this decrease[1-3]. Upper gastrointestinal bleeding, however, remains a common emergency situation presenting a high rate of morbidity and mortality[4-6]. This, despite the introduction and wide application of endoscopic hemostasis, has significantly reduced the need for emergency surgical hemostasis and improved the mortality and morbidity in these patients[7-11]. High or subtotal gastrectomy and antrectomy supplemented with vagotomy have been successfully applied in the past to the treatment of bleeding peptic ulcer. Anastomotic ulcer is a post-gastrectomy complication and bleeding of such an ulcer is a particularly frightening complication. Several factors mainly related to surgical inadequacies or uncommonly to the presence of ectopic hormone-producing tumors, are associated with the formation of an anastomotic ulcer after gastric surgery[12,13]. Few reports are available on the role of endoscopic hemostasis in active ulcer bleeding.

The purpose of this study was to compare the outcome between patients with a history of gastric surgery and active bleeding anastomotic ulcers and those with active upper gastrointestinal bleeding but without gastric surgery in the past.

MATERIALS AND METHODS

During the last 5 years, 105 patients with a history of gastric surgery and active upper gastrointestinal bleeding (AUGB) were admitted to our hospital. The outcome of this group of patients was compared to 608 patients with AUGB but without a history of gastric surgery. No patient was excluded because of age or concurrent diseases. Patients presented with hematemesis and/or melena, as well other clinical or laboratory evidence of acute blood loss, and those with iron deficiency anemia and history of gastric surgery who reported melena and/or hematemesis were included in this

study. All patients underwent emergency endoscopy either during the first 24 h after admission or immediately after resuscitation in case of massive bleeding. Three senior gastroenterologists performed all endoscopic examinations. Pre-medication included local pharyngeal anesthesia with xylocaine spray. Stigmata of active or recent bleeding were classified according to the Forrest classification[14]: Forrest Ia: active spurting bleeding; Ib: active oozing bleeding; IIa: non-bleeding visible vessel (NBVV); IIb: adherent clot; and IIc: spots. A NBVV was defined as a raised, red spot resistant to washing. Endoscopic injection hemostasis with adrenaline diluted at 1:10 000 in 0.9% saline (A/S) and/or end or clips were performed on all patients with active spurting or oozing bleeding or NBVV.

Endoscopic A/S hemostatic injections were performed via the working channel of an endoscope using a disposable injector. The injections were administered into the ulcer base in a circumferential fashion as close as possible to the visible vessel. As a routine, a total of 15 mL was injected, approaching to 30 mL was injected when control of bleeding was not easily achieved. Marginal ulcer was defined as the recurrent ulceration at or around the gastro-jejunal stoma or within the afferent or efferent loop.

After endoscopic hemostasis, patients were carefully observed and managed by the same medical team of gastroenterologists and surgeons. Blood pressure and pulse rate were checked before endoscopy, during and after injection therapy. After hemostasis, all patients with peptic ulcer bleeding routinely received intravenously the standard doses of proton pump inhibitors (omeprazole 40 mg/d). Blood transfusion was given, if Hb was less than 100 g/L and if there were signs of ongoing bleeding. After early stabilization of the patients, recurrence of bleeding was considered when vomiting of fresh blood and signs of massive melena were found in conjunction with either shock or decrease in hemoglobin concentration by at least 20 g/L over a 24-h period. In case of re-bleeding, endoscopy was repeated and in most cases, a second endoscopic hemostasis either by A/S injection, or by placement of endoclips was carried out. Although the criteria for emergency surgical hemostasis were individualized, in most cases patients received emergency surgery when bleeding was not controlled after endoscopic hemostasis and transfusion of more than 5 U of blood over a 24-h period or 12 U over 48 h, and when intra-hospital re-bleeding occurred while on sufficient medical treatment with hemodynamic evidence of shock (systolic pressure <100 mmHg, pulse rate >100/min).

After discharge, all patients were routinely followed up. A second endoscopy with biopsies was performed after 4-6 wk and if the ulcer was completely healed, a third endoscopy was performed after 1 year.

The patient's age, sex, type of gastric operation, previous consumption of non-steroidal anti-inflammatory drugs (NSAIDs), clinical presentation, initial hemodynamic status, hemoglobin at admission, endoscopic findings, number of blood transfusions, days of hospital stay and clinical outcome were also analyzed.

Differences between groups were tested for significance. Continuous variables were expressed as mean±SD and compared using Student's *t* test. Categorical variables were expressed as percentages and compared using χ^2 test. A *P* value less than 0.05 was considered statistically significant. Statistical analysis was performed using SPSS version 10.0 for Windows.

RESULTS

A total of 105 patients (96 men and 9 women, mean age 68.1±11.7 years) with a history of gastric surgery were admitted to our hospital due to AUGB. The investigated parameters in this patient group were compared to those in the well-matching group of patients with AUGB but without gastric surgery in the past and the cause of bleeding was due to a benign peptic ulcer. Table 1 provides an overview of the clinical characteristics and emergency endoscopic findings in both patient groups. A marginal ulcer with endoscopic stigmata of hemorrhage was identified in 63 patients (60%) in the first group. Endoscopy failed to show any source of bleeding in 22 patients (21%) and none of these patients received a new surgical intervention for severe bleeding. Spurting bleeding was identified in 10 (13.7%), oozing bleeding in 7 (9.6%) and NBVV in 18 (24.6%) patients (Table 2). Endoscopic hemostasis was permanently successful in 26 out of 35 (74.3%) patients. Twelve patients underwent a second endoscopic hemostasis with injection of A/S and/or endoclips because of re-bleeding while four patients with re-bleeding did not undergo second endoscopic injection therapy or any other hemostatic treatment. Emergency surgical hemostasis for persistent or recurrent bleeding was required in 9 out of 105 patients (8.6%) and in 9 out of 73 patients (12.3%) with peptic ulcer bleeding (Table 3). Four patients died (3.8%), two of them died after surgery with a post-surgical mortality of 22.9%. Causes of death were respiratory failure (n = 2, one of them preoperatively), cerebral ischemia (n = 1, the patient died post-operatively) and hemorrhagic shock (n = 1, the patient died pre-operatively).

Table 1 Characteristics of patients recruited in the study

	Gastric surgery in the past n = 105 group A, n (%)	No surgery in the past n = 608 group B, n (%)	*P*
Age (yr)	68.1±11.7	62.8±17.8	0.001
Sex:men/women	96/9	470/138	0.0009
NSAIDs	41/105	398/608	<0.0001
Ht at admission (%)	27.9±6.5	26.9±7.8	NS
Gastric ulcers	0	141 (23.1)	
Duodenal ulcers	9 (8.6)	215 (35.3)	0.00019
Marginal ulcers	63 (60)	0	
Dieulafoy's ulcers	1 (1)	4 (0.7)	NS
Varices	1 (1)	83 (13.7)	
Mallory-Weiss	1 (1)	31 (5.1)	
Esophagitis	1 (1)	8 (1.3)	
Gastric cancer	3 (2.9)	18 (2.9)	NS
Erosions	1 (1)	46 (7.5)	
None	22 (20.9)	42 (6.9)	0.0003
Other	1 (2)	5 (0.8)	
Non-cooperative	1 (1)	15 (2.5)	

When the results of patients with a history of gastric surgery were compared with those patients who had no

gastric surgery, there was a statistically significant difference in age, consumption of NSAIDs, number of blood transfusions, length of hospital stay, percentage of patients with spurting bleeding and need for surgical intervention (Tables 1-3). In the control group, endoscopy failed to show any source of bleeding in 42 (6.9%) patients ($P = 0.0003$). Similarly in the control group, the re-bleeding/continued bleeding rate and the mortality rate did not differ statistically from the patients who had gastric surgery in the past. Nineteen patients in the control group (3.1%) died after surgery.

Table 2 Endoscopic stigmata of the patients with bleeding peptic ulcers

	Patients with gastric surgery in the past and benign ulcers $n = 73/105$, n (%)	Patients without surgery in the past and benign ulcers $n = 360/608$, n (%)	P
Forrest Ia	10 (13.7)	30 (8.3)	NS
Forrest Ib	7 (9.6)	32 (8.8)	NS
Forrest IIa	18 (24.6)	63 (18.6)	NS
Forrest IIb	8 (11.0)	38 (10.5)	NS
Forrest IIc	3 (4.1)	41 (11.3)	NS
Forrest III	27 (36.9)	152 (42.2)	NS

Table 3 Outcome of patients recruited in the study

	Patients with surgery in the past total $n = 105$ benign ulcers $n = 73$	Patients without surgery in the past total $n = 608$ benign ulcers $n = 360$	P
Blood transfusions	3.3±4.0	1.5±1.7	0.0001
Hospital d	8.57±4	6.86±4.75	0.001
Re-bleeding	13/105	66/608	NS
Emergency surgery (overall), n (%)	9/105 (8.6)	23/608 (3.8)	0.028
Emergency surgery, n (%) (peptic ulcers)	9/73 (12.3)	19/360 (5.3)	0.025
Duodenal ulcers	1	11	
Gastric ulcers	–	7	
Marginal ulcers	7	–	
Dieulafoy's ulcers	1	1	
Mortality (overall), n (%)	4/105 (3.8)	19/608 (3.1)	NS
Post-surgical mortality, n (%)	2/9 (22.2)	6/23 (26)	NS

DISCUSSION

Gastric surgery has been successfully used in the treatment of peptic ulcer disease; however, the potential complications after gastric surgery are numerous[15,16]. Ulcer recurrence rate after surgery for peptic ulcer diseases varies according to the nature of the procedure, pathophysiology of the underlying disease, and operator's skill. One of the major complications is bleeding from marginal ulcers[17,18]. Recurrent ulcers after Billroth II gastrectomy may result in retained antral mucosa in the closed duodenal stump, which can be a source of hypergastrinemia. In patients after vagotomy and pyloroplasty, a recurrent ulcer may be due to an incomplete vagotomy[19-25].

In this study, recurrent ulcers were found in 70% of patients with AUGB after gastric surgery. Marginal ulcer was detected in 63% of patients, while recurrent duodenal ulcer was found in 8.6%. All patients with recurrent duodenal ulcers underwent pyloroplasty and elective vagotomy. Two patients in the group had Dieulafoy's ulcer. The majority were male and elderly patients. It is well known that patients after partial gastrectomy are at high risk of developing adenocarcinoma[26,27]. In our study, three patients (2.9%) after Billroth II gastrectomy were proved to have adenocarcinoma in the anastomotic area. In patients who had gastric surgery in the past, diagnostic failure at emergency endoscopy for AUGB occurred in 22 patients (21%), and 18 of them underwent a new endoscopy check after 24 h, though it failed to detect any lesions. These patients were admitted because of iron deficiency anemia and reported melena and/or hematemesis. None needed emergency surgical intervention. An explanation for this high incidence of missed lesions at the emergency endoscopy stage is that the presumed lesions are superficial and they heal quickly. Anemia is a sequel of gastrectomy. AUGB was not found in 42 (6.9%) of the control group of patients. According to Cheng *et al*[27], peptic ulcers including marginal ulcer and Dieulafoy's lesions are the major missed diagnosis during AUGB. Limited endoscopic vision due to excessive blood and clots is a well-known problem which results in inadequate examination during AUGB.

When the two groups of patients were compared, the upper gastrointestinal bleeding seemed to be more severe in patients with a history of gastric surgery. The need for new surgical intervention was greater in this group. This may be due to the differences in blood supply in the anastomotic area. The marginal ulcer receives blood from the jejunal branches of the superior mesenteric artery or gastric branches of the celiac artery[28]. In this study, the presence of a spurting artery was noted more in patients who had gastric surgery in the past. Similarly, the successful rate of endoscopic intervention was higher in the control group. In a previous study, we also found that an anastomotic ulcer is a factor associated with failure of endoscopic injection hemostasis in bleeding peptic ulcers[29]. A new surgical intervention was required in 8.6% of patients after gastric surgery, compared to 3.8% of patients in the control group who underwent surgical hemostasis. Seven of the nine operated ulcers in the gastric surgery group were marginal ulcers and located mostly at the saddle area of the jejunal loop. The angulation phenomenon characterizing the saddle area makes it a weak point during food impulsion. Furthermore, it also receives the least supply of blood[28]. Whether blood supply or other aggressive factors attribute to the development of resistant bleeding marginal ulcers needs to be confirmed. The mortality rate (overall and post-surgery) was the same in the two groups.

In conclusion, upper gastrointestinal bleeding in surgically treated patients seems to be more severe than that in non-operated patients. New surgical intervention is a significant challenge, not only because of the technical difficulties of a further operation, but also because of the requirement of a more radical procedure. More studies are required to confirm our findings.

REFERENCES

1 **Adkins RB Jr,** De Lozier JB 3rd, Scott HW Jr, Sawyers JL. The

management of gastric ulcers-a current review. *Ann Surg* 1985; **201**: 741-751
2 **Feldman M,** Burton M. Histamine 2-receptor antagonists. Standard therapy for acid-peptic diseases (second of two parts). *N Engl J Med* 1990; **323**: 1749-1755
3 **Walan A,** Bader JP, Clasen M, Classen M, Lamers CB, Piper DW, Rutgersson K, Eriksson S. Effect of Omeprazole and ranitidine on ulcer healing and relapse rates in patients with benign gastric ulcer. *N Engl J Med* 1989; **320**: 69-75
4 **Laine L,** Peterson WL. Bleeding peptic ulcer. *N Engl J Med* 1994; **331**: 717-727
5 **Rockall TA,** Logan RF, Devlin HB, Northfield TC. Incidence of and mortality from acute upper gastrointestinal haemorrhage in the United Kingdom. Steering Committee and members of the National Audit of Acute Upper Gastrointestinal Haemorrhage. *Br Med J* 1995; **311**: 222-226
6 **Turner IB,** Jones M, Piper DW. Factors influencing mortality from bleeding peptic ulcers. *Scand J Gastroenterol* 1991; **26**; 661-666
7 **Rajgopal C,** Palmer KR. Endoscopic injection sclerosis: effective treatment for bleeding peptic ulcer. *Gut* 1991; **32**: 727-729
8 **Meier R,** Wettstein A. Treatment of acute nonvariceal upper gastrointestinal hemorrhage. *Digestion* 1999; **60**(Suppl): 47-52
9 **Thomopoulos K,** Nikolopoulou V, Katsakoulis E, Markou S. The effect of endoscopic therapy on the clinical outcome of patients with peptic ulcer bleeding. *Scand J Gastroenterol* 1997; **32**; 212-216
10 **Holman RAE,** Davis M, Gough KR, Smith RB. Value of centralized approach in the management of haematemesis and melaena: experience in a distinct general hospital. *Gut* 1990; **31**: 504-508
11 **Silverstein FE,** Gilbert DA, Tedesco FJ, Buenger NK. Persing J. The national ASGE survey on upper gastrointestinal bleeding. *Gastrointest Endosc* 1981; **27**: 80-93
12 **Shin JS,** Chen KW, Lin XZ, Lin CY, Chang TT, Yang CC. Active, bleeding marginal ulcer of Billroth II gastric resection: A clinical experience of 18 patients. *AJG* 1994; **89**: 1831-1835
13 **Bini E,** Unger J, Weinshel E. Outcomes of endoscopy in patients with iron deficiency anemia after Billtoth II partial gastrectomy. *J Clin Gastroenterol* 2002; **34**: 421-426
14 **Feldman M,** Richardson CT, Fordtran JS. Experience with sham feeding as a test for vagotomy. *Gastroenterology* 1980; **79**: 792-795
15 **Forrest JA,** Finlayson NDC, Shearman DJC. Endoscopy in gastrointestinal bleeding. *Lancet* 1974; **2**: 394-397
16 **Holscher AH,** Klingele C, Bollschweiler E, Schroder W, Siewert JR. Postoperative recurrent after gastric resection-results-surgical treatment. *Chirurg* 1996; **67**: 814-820
17 **Printen KJ,** Scott D, Mason EE. Stomal ulcers after gastric bypass. *Arch Surg* 1980; **115**: 525-527
18 **Braley SC,** Nguyen NT, Wolfe BM. Late gastrointestinal hemorrhage after gastric bypass. *Ober Surg* 2002; **12**: 404-407
19 **Erdozain Sosa JC,** Guerrero Vega E, Martin-de-Argila C, Gonzalez Murillo M, Presa Valle M, Munoz Nunez F, Lizasoain Urkola J, Suarez de Parga J, Herrera Abian A, Molina Pere E. Upper digestive hemorrhage in the operated stomach (Billroth I and II): clinical course and prognosis. *Rev Esp Enferm Dig* 1994; **85**: 87-90
20 **Emas S,** Grupcev G, Eriksson B. Ten-year follow-up of a prospective, randomized trial of selective proximal vagotomy with ulcer excision and partial gastrectomy with gastroduodenostomy for treating corpore gastric ulcer. *Am J Surg* 1994; **167**: 596-600
21 **Ogoshi K,** Mitomi T. Recurrent peptic ulcer after surgery in Japan-a nationwide-questionnaire survey of 57 institutions. *Nippon Geka Gakkai Zasshi* 1992; **93**: 393-399
22 **Touchet J,** Orsoni P, Caamano A, Picaud R. Treatment of recurrent ulcers after parietal cell vagotomy. Analysis of 18 cases. *Ann Chir* 1992; **46**: 570-577
23 **Fukushima K,** Sasaki I, Naito H, Matsuno S. Long-term follow-up study after pylorus-preserving gastrectomy for gastric ulcer. *Nippon Geka Gakkai Zasshi* 1991; **92**: 401-410
24 **Bretzke G,** List A. The site of recurrent ulcer following stomach surgery (Billroth I and II). *Z Gesamte Inn Med* 1990; **45**: 78-80
25 **Tersmette AC,** Giardiello FM, Tytgat GN, Offerhaus GJ. Carcinogennesis after remote peptic ulcer surgery: the long - term prognosis of partial gastrectomy. *Scand J Gastroenterol* 1995; **212**: 96-99
26 **Greene FL.** Discovery of early gastric remnant carcinoma. Results of a 14-year endoscopic screening program. *Surg Endosc* 1995; **9**: 1199-1203
27 **Cheng CL,** Lee CS, Chen PC, Wu CS. Overlooked lesions at emergency endoscopy for acute nonvariceal upper gastrointestinal bleeding. *Endoscopy* 2002; **34**: 527-530
28 **Oglevie SB,** Smith DC, Mera SS. Bleeding marginal ulcers: angiographic evaluation. *Radiology* 1990; **174**: 943-944
29 **Thomopoulos K,** Mitropoulos I, Katsakoulis E, Vagianos CE, Mimidis KP, Hatziargiriou MN, Nikolopoulou V. Factors associated with failure of endoscopic injection therapy in bleeding peptic ulcers. *Scand J Gastroenterol* 2001; **36**: 664-668

Science Editor Wang XL **Language Editor** Elsevier HK