Haemorrhage from the upper alimentary tract

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EDITORIAL SYNOPSIS This is a study based on 587 patients with acute bleeding from the upper alimentary tract. After excluding 17 with carcinoma of the stomach and 11 with oesophageal varices, the overall mortality was 7.7%. No fewer than 51% of patients were over 60 years of age. Emergency surgery was needed in 14.3%. From follow-up studies it is concluded that elective gastrectomy should be performed in patients with gastric ulcer in whom bleeding ceases after admission.

MATERIAL

During the four-year period 1957-60 there were 618 admissions to this unit for the treatment of haemorrhage from the upper alimentary tract. Some patients were admitted on more than one occasion and the total number of patients involved was 587 (Table I). Of this total, 11 (1.9%) were found to be bleeding from oesophageal varices and 17 (2.9%) from carcinoma of the stomach. Of the remaining 559 patients who are the subject of more detailed study, 285 (51%) were over the age of 60 and 232 (42%) were women. The age distribution of the cases is shown in Figure 1.

TABLE I

SOURCE OF HAEMORRHAGE

Duodenal ulcer	210	(35.6%)
Gastric ulcer	155	(26.5%)
Acute group	157	(26.8%)
Post-operative group	21	(3.6%)
Incompletely investigated group	16	(2.7%)
Total	559	
Carcinoma of stomach	17	(2.9%)
Oesophageal varices	11	(1.9%)
Grand total	587	

DUODENAL ULCER There were 210 patients in the series found to have a duodenal ulcer: 88 (42%) were over the age of 60 and 47 (22.4%) were women. There were 10 deaths (4.8%), the mortality rising to 10% over the age of 60 years. Emergency surgery was undertaken in 25 cases (11.9%), of which five were women, and there were three deaths.

GASTRIC ULCER There were 155 patients bleeding from a gastric ulcer and of these 98 (63.5%) were over the age of 60, and 77 (49.5%) were women. There were 26 deaths (16.8%), the mortality rising

to 24.5% over the age of 60 years. Emergency surgery was undertaken in 51 cases (33%), of which 23 were women, and there were nine deaths.

One patient was admitted with abdominal pain and haematemesis. He had a chronic gastric ulcer and cirrhosis with thrombosis of the mesenteric vein and gangrene of the small gut. The gangrenous gut was resected and the patient made a satisfactory recovery. This patient was readmitted 18 months later with ascites, which did not respond to medical treatment, and he died 12 days later following a

FIG. 1. Age distribution of cases.

haematemesis. At necropsy he had an eroded artery in the floor of a gastric ulcer of the lesser curve, measuring 6×4 cm. The liver showed severe 'hobnail' fibrosis with regeneration nodules and a hepatoma involving most of the right lobe. The hepatoma had extended into and occluded the hepatic veins. The portal vein contained organizing ante-mortem thrombus throughout its length.

ACUTE GROUP This group includes all patients in whom barium meal examination, emergency operation, or necropsy failed to reveal evidence of peptic ulceration, carcinoma, or oesophageal varices. There were 157 patients in this group with 79 (50·2%) over the age of 60 and 90 (57·3%) women. There were four deaths, all in patients over 60, giving a mortality of 2·5% for the whole group (5% over the age of 60). Five patients (3·2%) had emergency surgery.

Seven patients were found to be bleeding from gastritis and of these the diagnosis was made at gastroscopy in one patient, at emergency operation in five, and at necropsy in one.

A number of other lesions were demonstrated in this group and the relation of these lesions to the haemorrhage is uncertain. These lesions included duodenal diverticulum (9), oesophageal diverticulum (1), jejunal and Meckel's diverticula (1), oesophageal reflux only (1), and hiatus hernia (14). (An hiatus hernia was demonstrated in a further 14 patients, 10 of whom also had a duodenal ulcer and four had a gastric ulcer.) Eight patients gave a history of taking salicylates before the haemorrhage.

Only in one patient in this group was the haemorrhage the main factor in causing death. In the other three the fall in haemoglobin was very small and the causes of death in these three cases were chronic myeloid leukaemia, acute myocardial infarction, and bronchopneumonia, respectively.

POST-OPERATIVE GROUP Most of these patients had had operations many years before admission here with haemorrhage and the operations were done at a number of different hospitals. The types of operation performed and the lesion present at the time of these operations are shown in Table II. The total number of patients in this group is 21. There were no deaths

and none required emergency surgery. Elective surgery was carried out for stomal ulcer in 10 cases; six patients with previous gastro-enterostomy for duodenal ulcer had dismantling of the gastro-enterostomy and Polya gastrectomy, three patients with previous Polya gastrectomy had vagotomy, and one patient with previous gastro-enterostomy and vagotomy had a Polya gastrectomy. In the other 11 patients in this group no ulcer could be demonstrated on barium meal or gastroscopy and further surgery was not undertaken.

INCOMPLETELY INVESTIGATED GROUP There were 10 women and six men who were incompletely investigated. Barium meals were not done in four of them because of pregnancy, in one who discharged himself prematurely, in two because of severe deformity due to rheumatoid arthritis, in one patient who was disabled by hemiplegia, and in three patients over 80 and four over 90 who were too frail or ill to stand this examination. One woman, aged 51, died of a stroke two days after admission with haematemesis. There were three deaths in the group and permission for necropsy was refused in all.

INCREASED BLEEDING TENDENCY Three patients had an increased bleeding tendency. Acute gastritis was responsible for the bleeding in one with chronic myeloid leukaemia, while a duodenal ulcer was the source in one with idiopathic thrombocytopenia and in another with hereditary telangiectasia.

TREATMENT

Our routine of treatment of these patients follows the generally accepted methods of giving liberal oral fluids and soft foods, adequate sedation, and transfusion.

TRANSFUSION It is our general policy to transfuse patients freely. We consider that patients are better able to survive repeated haemorrhage if the haemoglobin is maintained at a reasonable level and we took as our guide the level of 70% (Haldane). Indications for transfusions were, therefore, first the

TABLE II

TYPES OF OPERATION ORIGINALLY PERFORMED
IN POST-OPERATIVE GROUP

Operation	No. of Cases
Billroth I gastrectomy for gastric ulcer	4
Billroth I gastrectomy for duodenal ulcer	1
Polya gastrectomy for duodenal ulcer	6
Gastro-enterostomy for duodenal ulcer	9
Gastro-enterostomy and vagotomy for duodenal ulcer	1

TABLE III

PROPORTION OF PATIENTS REQUIRING TRANSFUSION
RELATED TO DIAGNOSIS

Cause of Haemorrhage	No. Requiring Transfusion
Duodenal ulcer	103 (48%)
Gastric ulcer	101 (64·7%)
Acute group	72 (45·8%)
Post-operative group	9 (42·8%)

treatment of shock and secondly the maintenance of a haemoglobin level of 70%. Transfusion was most often required in patients bleeding from gastric ulcer (Table III).

EMERGENCY SURGERY Emergency surgery was undertaken in 80 patients (14.3%) with 12 deaths, a mortality of 15%. Over the same period there were 58 elective operations following haemorrhage without any deaths. Emergency operation was required more often for bleeding from gastric ulcer than for bleeding from duodenal ulcer (Table IV).

TABLE IV

NUMBERS OF PATIENTS REQUIRING EMERGENCY SURGERY

Cause of Bleeding	Under Age 60		Age 60 and Over		Total	
	No.	%	No.	%	No.	%
Duodenal ulcer	11 (1) ¹	9	14 (2)	15.9	25 (3)	11.9
Gastric ulcer	17 (1)	29.8	34 (8)	35	51 (9)	33
Acute group	2 (-)	2.7	3 (-)	4.3	5 (-)	3.5

¹Deaths in parenthesis

The main indications for emergency surgery were persistent and recurrent haemorrhage. Perforation and pyloric stenosis each precipitated operation on two occasions. On six occasions no ulcer was demonstrated at laparotomy and gastrotomy and in four of these partial gastrectomy was performed. In three of these four the presence of gastritis was confirmed histologically. In one of the two in whom gastrectomy was not performed (a man aged 43) bleeding persisted after operation and the patient died. At necropsy a shallow gastric ulcer was found in the lower half of the stomach with an eroded artery in its base. The other five recovered without further bleeding.

ELECTIVE SURGERY Elective surgery was undertaken in 58 patients (11%). The incidence of elective surgery in the various diagnostic groups is shown in Table V.

TABLE V

NUMBERS OF PATIENTS TREATED BY ELECTIVE SURGERY IN RELATION TO DIAGNOSIS

Cause of Haemorrhage	Incidence of Elective Surgery		
	Under Age 60	Age 60 and Over	Total
Duodenal ulcer	14 (11.3%)	11 (12.5%)	25 (11.9%)
Gastric ulcer	10 (14%)	9 (9.3%)	19 (11.1%)
Acute group	1 (1.3%)	3 (4.4%)	4 (2.8%)
Stomal ulcer	5 (45.5%)	5 (50%)	10 (47.5%)

RESULTS OF TREATMENT

RECURRENT HAEMORRHAGE We use the term 'recurrent haemorrhage' to mean a further episode of

haemorrhage some months or years after the completion of treatment for a first haemorrhage. Many of our patients have not been followed for a full year after their first haemorrhage and may have gone elsewhere with a subsequent haemorrhage. Recurrent haemorrhage rates are therefore incomplete. However, the incidence of recurrent haemorrhage at present is shown in Table VI and for the reasons already mentioned these are minimum figures and the true incidence will be higher. The

TABLE VI

PROPORTION OF PATIENTS HAVING A SECOND HAEMORRHAGE ONE, FIVE, AND 35 YEARS AFTER THE FIRST

Source of Haemorrhage	Interval between First and Second Haemorrhage		
	0—1 Year	0—5 Years	0—35 Years
Duodenal ulcer	27 (14.6%)	56 (30.3%)	75 (40.6%)
Gastric ulcer	11 (12.5%)	28 (31.8%)	41 (46.6%)
Acute group	13 (9%)	25 (17.4%)	27 (18.8%)

recurrence rates do not vary significantly with age and are similar in the gastric and duodenal ulcer groups. As might be expected, the overall recurrence rates are a little lower than in other reported series (Donaldson, Handy, and Papper, 1958; Gardner and Baronofsky, 1959; Ward-McQuaid, Pease, McEwen Smith, and Twort, 1960). Figures quoted are the number of patients surviving a first haemorrhage without surgery and having a second haemorrhage within one, five, and 35 years. It will be seen that over 40% of patients bleeding from a demonstrable duodenal or gastric ulcer have had a second haemorrhage.

DEATHS There were 43 deaths in the series related to haemorrhage. Two other patients, who were admitted to hospital with haematemeses, died of other conditions while in the ward. One of these died of extensive recurrence of a chromophobe

FIG. 2. Mortality by age groups.

adenoma of the pituitary and the other from carcinomatosis, the primary being in the bronchus. The overall mortality is, therefore, 7.7%, and the age distribution of the deaths is shown in Figure 2. As in other series (Coghill and Willocx, 1960), elderly men fare worse than elderly women. The mortalities over the age of 60 are shown in Table VII.

TABLE VII

PERCENTAGE MORTALITY IN PATIENTS OVER 60
WITH DUODENAL AND GASTRIC ULCER

Source of Haemorrhage	Men	Women
Duodenal ulcer	11.2	7.7
Gastric ulcer	28.3	23.6
Total	15.3	12.8

MORTALITY OF FIRST AND SUBSEQUENT HAEMORRHAGE

The mortality from second haemorrhage was less than that for the first ones (Table VIII) but still very much higher in the gastric ulcer group than in the other two. Deaths from third haemorrhage are among such small groups that the figures are not significant.

TABLE VIII

MORTALITY OF FIRST AND SUBSEQUENT HAEMORRHAGES

Source of Haemorrhage	First	Second	Third
	Deaths Mortality (%)	Deaths Mortality (%)	Deaths Mortality (%)
Duodenal ulcer	8 3.8	1 1.7	1 3.2
Gastric ulcer	21 13.6	3 7.3	1 11.8
Acute group	4 2.5	— —	— —

DEATHS FOLLOWING EMERGENCY SURGERY Twelve patients died after surgery had been undertaken; one, aged 83, had stomal hold-up after a Billroth I gastrectomy and after a second operation to convert this to a Polya gastrectomy the anastomosis broke down. One patient, aged 79, had a giant gastric ulcer (6 cm. diameter) which lay in close proximity to the diaphragm; repeated haemorrhage made emergency surgery her only hope of survival but chronic bronchitis and her general debility led to her death after operation. One patient died of haemorrhage from a chronic gastric ulcer not visualized at laparotomy and gastrotomy (already mentioned). Three patients died of pulmonary emboli; two from acute myocardial infarctions; one from pneumonia due to resistant staphylococcus; one from leakage from the duodenal stump after Polya gastrectomy; one had splenectomy alone in view of his thrombocytopenia (platelets 36,000) and at necropsy was found to have died of haemorrhage from a duodenal ulcer and one died of secondary haemorrhage from the gastro-duodenal artery 20

days after emergency gastrectomy for a duodenal ulcer.

DEATHS FOLLOWING MEDICAL TREATMENT Thirty-one patients died without having surgery. One patient persistently refused operation and died of perforation of a gastric ulcer. Twelve patients died of haemorrhage; one died within minutes of her arrival on the ward before transfusion could be given; another died on the day of admission despite transfusion, for a gastric ulcer had eroded the splenic artery leading to profuse haemorrhage; another patient died of massive haemorrhage from a gastric ulcer while being transfused before operation; one patient had chronic myeloid leukaemia and died of profuse haemorrhage from acute gastritis despite transfusion. Eight patients were aged 77 to 93, and in view of their frail general condition surgery was not considered. Despite transfusion in all but one, they died of haemorrhage. In retrospect we feel that more active transfusion and early emergency surgery might have saved some of them. We now believe that old age should not deny any patient the hope that surgery alone might offer. The cause of death in the other 18 patients was: myocardial infarction (7), bronchopneumonia (6), cerebrovascular accident (3), cor pulmonale (1), and left ventricular failure (1).

DISCUSSION

This series is of relatively elderly patients, 51% being aged 60 or over. The rapid increase in mortality above this age, due to the increasing incidence of cardiovascular, cerebrovascular, and pulmonary diseases, has been stressed before (Avery Jones, 1956). The mortality of 7.7% appears average for this elderly group (Table IX). The comparable series described by Large (1960) has the low mortality of 5.9%.

As in most other series the prognosis is much worse for haemorrhage from gastric than duodenal ulcers and the mortalities in the 'acute group' and post-operative group are small. The mortality of haemorrhage from gastric ulcer is more than twice that from duodenal ulcer, even allowing for the greater proportion of elderly patients in the former group (Fig. 3). Moreover, the transfusion rates are higher and the emergency surgery rate is nearly three times as high. These two criteria may reasonably be said to indicate the greater tendency of haemorrhage from gastric ulcers to be both severe and persistent. In this group we have again found that haemorrhage from large gastric ulcers is likely to persist. Patients known to have a large gastric ulcer

TABLE IX

COMPARISON WITH SOME OTHER REPORTED SERIES

Series	Percentage of Cases Over Age 60	Percentage Emergency Operations	Percentage Mortality in Series	No. of Patients in Series
Cates (1959)	33	13.5	5.4	300
Gaunt (1960)	34.5	4.5	4.5	
Ward-McQuaid <i>et al.</i> (1960)	38	24.5	6.25	400
Avery Jones (1956)	40	10	7.9	1,764
Fraenkel and Truelove (1955)	42	14.1	5.6	377
Avery Jones (1961)	43.5	10.5	4.1	534
Waterson (1956)	45	9	9.3	
Large (1960)	50.9	19.9	5.9	488
Present series	51	14.3	7.7	559

as the source of haemorrhage should have emergency surgery (Strange, 1959).

From our figures it appears that about half of those patients surviving their first haemorrhage from a gastric ulcer without operation will have a further haemorrhage and the mortality of this second haemorrhage is likely to be about 7%. Thus, 3% or more of those surviving their first haemor-

rhage from gastric ulcer are likely to die from a second haemorrhage. This is greater than the mortality of elective gastrectomy in experienced hands. We have no figures for the incidence of haemorrhage after gastrectomy for gastric ulcer, but it appears to be very low and such recurrence is unlikely to be serious. We therefore feel that elective gastrectomy should be seriously considered in patients over the age of 60 who have their first haemorrhage from a demonstrated gastric ulcer.

Nine patients died of acute myocardial infarction complicating gastro-intestinal haemorrhage and two of these had emergency surgery. It is now routine practice in this unit to have an electrocardiogram done on all patients over the age of 50 admitted with haemorrhage in an effort to avoid operating in the presence of acute myocardial infarction. We have also found a pre-operative electrocardiogram of value as a base-line in the event of post-operative collapse following either emergency or elective surgery.

In view of the very low incidence of active peptic ulceration during pregnancy, it was a surprise to find four pregnant women in this series. The diagnosis of peptic ulcer in all was presumptive only because none attended for radiological investigation after parturition. One of them, however, had a history of peptic ulcer and had a second haemorrhage requiring transfusion six weeks after the first. Since completion of this series we have had a case of a pregnant woman bleeding from a chronic duodenal ulcer who required emergency gastrectomy with satisfactory outcome for mother and child (Strange, 1962).

REFERENCES

- Cates, J. E. (1959). A review of 300 patients with haematemesis or melaena. *Brit. med. J.*, 1, 206-211.
 Coghill, N. F., and Willock, R. G. (1960). Factors in the prognosis of bleeding chronic gastric and duodenal ulcers. *Quart. J. med.*, 29, 575-596.
 Donaldson, R. M., Handy, J., and Papper, S. (1958). Five year follow-up study of patients with bleeding duodenal ulcer with and without surgery. *New Engl. J. Med.*, 259, 201-207.
 Fraenkel, G. J., and Truelove, S. C. (1955). Haematemesis, with special reference to peptic ulcer. *Brit. med. J.*, 1, 999-1002.

FIG. 3. Comparative mortality for gastric and duodenal ulcer cases by age groups.

- Gardner, B., and Baronofsky, I. D. (1959). The massively bleeding duodenal ulcer with special reference to crater. *Surgery*, 45, 389-402.
- Gaunt, R. T. (1960). Quoted by Ward-McQuaid *et al.* (1960).
- Jones, F. Avery (1956). Haematemesis and melaena with special reference to causation and to the factors influencing the mortality from bleeding peptic ulcers. *Gastroenterology*, 30, 166-190.
- (1961). *Abdominal operations*, edited by R. Maingot, 4th ed., p. 286. Lewis, London.
- Large, J. M. (1960). Gastro-duodenal haemorrhage as a surgical emergency. *Brit. med. J.*, 1, 932-935.
- Strange, S. L. (1959). Giant innocent gastric ulcer. Its behaviour and treatment. *Brit. med. J.*, 1, 476-480.
- (1962). Massive haemorrhage from duodenal ulcer in pregnancy. *Proc. roy. Soc. Med.*, 55, 798-799.
- Ward-McQuaid, J. N., Pease, J. C., McEwen Smith, A., and Twort, R. J. (1960). Surgery in bleeding peptic ulcers. *Gut*, 1, 258-265.
- Waterson, A. P. (1956). Haematemesis and melaena in Cambridge. *Amer. J. dig. Dis.*, 1, 193-205.