ORIGINAL ARTICLE

Management and outcome of patients undergoing surgery after acute upper gastrointestinal haemorrhage

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SUMMARY

Most patients with acute upper gastrointestinal haemorrhage are managed conservatively or with endoscopic intervention but some ultimately require surgery to arrest the haemorrhage. We have conducted a population-based multicentre prospective observational study of management and outcomes. This paper concerns the subgroup of 307 patients who had an operation because of continued or recurrent haemorrhage or high risk of further bleeding.

The principal diagnostic group was those with peptic ulcer. Of 2071 patients with peptic ulcer presenting with acute haemorrhage, 251 (12%) had an operative intervention with a mortality of 24%. In the non-operative group mortality was 10%. The operative intervention rate increased with risk score, ranging from 0% in the lowest risk categories to 38% in the highest. Much of the discrepancy between operative and non-operative mortality was explainable by case mix; however, for high-risk cases mortality was significantly higher in the operated group. In 78% of patients who underwent an operation for bleeding peptic ulcer there had been no previous attempt at endoscopic haemostasis. For patients admitted to surgical units, the operative intervention rate was about four times higher than for those admitted under medical teams.

In patients with acute upper gastrointestinal haemorrhage operative intervention is infrequent and largely confined to the highest-risk patients. The continuing high mortality in surgically treated patients is therefore to be expected. The reasons for the low use of endoscopic treatment before surgery are not revealed by this study, but wider use of such treatments might further reduce the operative intervention rate. Physicians and surgeons have not yet reached consensus on who needs surgery and when.

INTRODUCTION

Acute upper gastrointestinal haemorrhage is a common reason for emergency admission to hospital. In most UK hospitals[1] patients are admitted under the care of physicians, with very variable involvement of surgical teams. However, some patients ultimately require surgical intervention to arrest haemorrhage because of failure of conservative management or endoscopic haemostatic techniques to prevent recurrent or continued bleeding. In addition, surgeons will occasionally become involved with these patients because of the pathological cause (for example, malignant disease of the upper gastrointestinal tract), or because of complications such as synchronous peptic ulcer perforation or outlet obstruction.

In this paper we describe surgical practice regarding acute upper gastrointestinal haemorrhage and the outcomes after surgical intervention.

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PATIENTS AND METHODS

The National Audit of Acute Upper Gastrointestinal Haemorrhage was a prospective, observational, multicentre, population based study, undertaken in two phases one year apart. Four health regions (North West Thames, South West Thames, West Midlands and Trent) with 74 acute hospitals participated over four months in 1993 and three health regions (North West Thames, South West Thames and West Midlands) with 45 hospitals participated over three months in 1994. Data were collected via standardized questionnaires completed by medical staff involved with each case. The methodology, definitions and entry criteria have been described elsewhere[1]. A validated risk scoring system previously described[2] is used to analyse outcome in the operated and non-operated groups. Each case is given a risk score between 0 and 8+, formulated on the basis of age, co-morbidity, shock at presentation, diagnosis and stigmata of recent haemorrhage. The higher the score the greater the risk of death.

4185 cases of acute upper gastrointestinal haemorrhage were identified during the first phase of the audit and 1625

cases during the second phase. A total of 392 patients (281 in the first phase and 111 in the second phase) underwent an operative procedure during the period of their admission. For this analysis, the data from both phases have been combined.

RESULTS

392 (6.7%) of 5810 patients underwent an operative procedure after presentation with acute upper gastrointestinal haemorrhage. However, only 307 (5.3%) patients had an operation because of continued or recurrent haemorrhage, or because of the presence of major stigmata of recent haemorrhage with high risk of further bleeding. 35 patients were operated on for management of a malignant lesion of the upper gastrointestinal tract rather than because of the haemorrhage *per se* and a further 50 had operations for other reasons such as perforation, peritonitis or gastric outlet obstruction. In these groups the purpose of intervention was not the arrest of haemorrhage so they are not primarily considered here. 251 (82%) of 307 operations for bleeding were for peptic ulcer disease, 16 (5%) for bleeding from malignancy, 16 (5%) for varices, 5 (2%) for erosive disease, 1 (0.3%) for Mallory–Weiss and 15 (5%) for other diagnostic groups. Of the operated peptic ulcer group, 169/251 (67%) were duodenal, 77 (31%) gastric, 2 (1%) oesophageal and 3 (1%) stomal.

Operative mortality

Table 1 shows the number of cases undergoing operation as a proportion of all cases presenting with acute upper gastrointestinal haemorrhage, by diagnosis and with the associated operative and non-operative mortality. 12% of all diagnosed peptic ulcer patients underwent surgery for bleeding and their mortality rate was significantly higher than that of the non-operated group; 24% versus 10% (difference 14%, 95% confidence interval 8.5% to 19.5%).

16 patients with bleeding due to malignancy required operation because of continued or recurrent haemorrhage with a mortality of 44% (7/16). A further 35 were operated on during their admission for primary treatment of their malignancy with a mortality of 29% (10/35). The diagnosis in all cases was either gastric carcinoma or gastric lymphoma.

Operative procedure

The types of surgical procedure undertaken in each diagnostic category are shown in Table 2. 188 (74%) patients with peptic ulcer were managed with excision or under-running of the ulcer and half of these had additional procedures such as vagotomy or drainage (pyloroplasty or gastroenterostomy). 50 (20%) had a partial gastrectomy and 6 (2%) had a total gastrectomy.

Table 3 shows outcome by procedure for duodenal and gastric ulcers. The outcome varied by operative procedure but there is no significant difference in outcome between patients having simple excision or under-running and those having gastric resection—40/184 versus 15/52 (difference in proportions 7.1%, 95% confidence interval −6.6% to +20.8%).

Endoscopy

Of the total 2051 patients with peptic ulcer, 1876 were endoscoped during their admission. Of the 177 not endoscoped, 42 (24%) underwent an operative intervention for bleeding. 346 (17%) of 1846 patients endoscoped received some form of endoscopic haemostatic therapy,

Table 1 **Operative rate and operative and non-operative mortality by diagnosis**

Diagnosis	*Cases*	*Operated for bleeding (%)*	*Non-operative mortality (%)*	*Operative mortality (%)*
No diagnosis	1394	3 (0.2)	289/1374 (21)	0/3 (0)
Peptic ulcer	2051	251 (12)	175/1775 (10)	59/248 (24)
Upper GI malignancy	226	16 (7)	64/172 (37)	7/16 (44)
Varices	262	16 (6)	43/242 (18)	8/14 (57)
Mallory–Weiss	312	1 (0.3)	8/306 (3)	1/1 (100)
Erosions	627	5 (1)	41/619 (6)	1/4 (25)
Oesophagitis	612	0 (0)	45/600 (8)	0/0 (0)
Other diagnoses	326	15 (5)	43/273 (16)	5/15 (33)
Total	5810	307 (5)	708/5361* (13)	81/301† (27)

*57 cases had missing mortality data. A further 85 cases were operated on where the indication was not haemorrhage or the risk of further haemorrhage, 35 for malignancy and 50 for other reasons such as perforation or obstruction. These have been excluded from this analysis
†6 cases had missing mortality data
GI=gastrointestinal

Table 2 **Summary of operative procedure undertaken by diagnosis**

Diagnosis	Cases	Simple under-run or excision (%)	Simple under-run or excision ±drainage (%)	Partial gastrectomy (%)	Total gastrectomy (%)	Laparotomy ±bypass, ±biopsy (%)	Oeso-phageal transection (%)	Porto-systemic bypass (%)	Other (%)
Peptic ulcer	251	94 (37)	94 (37)	50 (20)	6 (2)	1 (0.4)	0	0	6 (2)
Malignancy	51*	3 (6)	1 (2)	19 (38)	6 (12)	14 (28)	0	0	8 (16)
Varices	16	0	0	0	0	2 (13)	6 (38)	6 (38)	2 (13)
Erosive disease	5	1 (20)	3 (60)	0	0	1 (20)	0	0	0
Mallory–Weiss	1	0	0	0	0	0	0	0	1 (100)
Other	15	1 (7)	1 (7)	4 (27)	0	1 (7)	0	0	8 (53)

*This analysis includes the 35 cases operated with malignancy as the indication

Table 3 **Outcome by procedure for peptic ulcers**

	Excision or under-run only		Excision/under-run ±vagotomy ±drainage		Partial gastrectomy		Total gastrectomy		Other	
	Cases	Deaths (%)	Cases	Deaths (%)	Cases	Deaths (%)	Cases	Deaths (%)	Cases	Deaths (%)
Gastric ulcer	34	7 (21)	14	3 (21)	23	3 (13)	4	1 (25)	1	1 (100
Duodenal ulcer	59	17 (29)	77	13 (17)	25	12 (48)	0	0	4	2 (50)

usually injection of sclerosant or adrenalin. 57 (17%) of these patients subsequently underwent an operative intervention for bleeding. Of the 1528 patients endoscoped in whom endoscopic haemostatic therapy was not attempted, 151 (10%) subsequently required an operation. Of the total 251 with peptic ulcer requiring operation for bleeding, 209 (83%) were endoscoped. 18 (87%) of these had major stigmata of recent haemorrhage recorded and 118 (56%) had a visible/spurting vessel or adherent clot. 56 (47%) of these 118, or 56 (22%) of all 251 peptic ulcer patients undergoing surgery, had endoscopic haemostatic therapy as a first-line treatment.

Of the 16 patients with varices who subsequently underwent an operation, 5 had a Sengstaken tube placed and 4 had injection sclerotherapy before surgical intervention.

Risk-adjusted outcome

Figure 1, indicating the distribution of risk scores in operated (for bleeding) and non-operated patients with a diagnosis of peptic ulcer, shows that the proportion of high-risk cases was much greater in the operative group. The mortality within each risk category is given in Table 4. For both operated and non-operated groups, the mortality in those with a score of 4 or less is low (zero in the operated category). The rate of operative intervention is also very low in these low-risk categories.

Although overall the risk-adjusted mortality does not differ between operated and non-operated cases (standardized mortality ratio 1.09, 95% confidence interval 0.8 to 1.4), when analysed together cases scoring 5 or more did have a higher mortality in the operated group—28.2% versus 20.0% (95% confidence interval for the difference 1.5% to 14.9%).

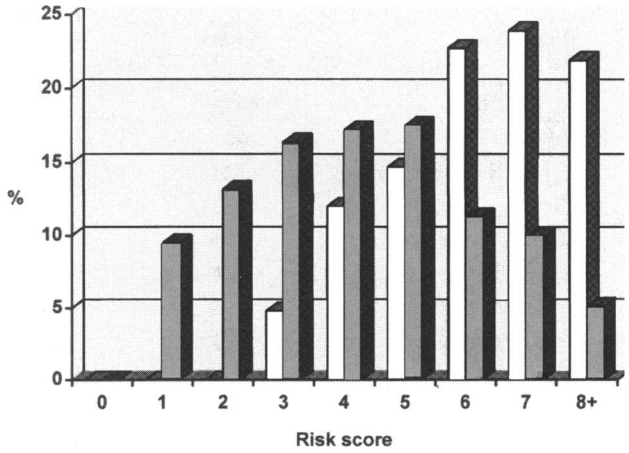

Figure 1 **Distribution of risk categories for operated (□) and non-operated cases (■)**

Table 4 **Operation rate and mortality rate for peptic ulcers by risk score**

	Not operated		Operated		
Risk score	**Cases**	**Deaths (%)**	**Cases**	**Deaths (%)**	**% operated**
0	0	0 (0)	0	0 (0)	0%
1	169	0 (0)	0	0 (0)	0%
2	236	3 (1)	0	0 (0)	0%
3	292	6 (2)	12	0 (0)	4%
4	307	10 (3)	30	0 (0)	9%
5	312	45 (14)	37	4 (11)	11%
6	201	25 (13)	57	12 (22)	22%
7	177	49 (28)	60	23 (38)	25%
8+	91	37 (41)	55	20 (36)	38%
Total	1785	175 (10)	251	59 (24)	12%

Admitting team

Operative rate was four times higher in the group initially admitted to a surgical team than in those admitted initially to a medical team. Table 5 shows slightly higher proportions of cases in the higher-risk categories for patients admitted under the care of surgeons, but within each risk category the operative intervention rate remains between two and five times higher for cases admitted initially under a surgical team.

DISCUSSION

Operative intervention after acute upper gastrointestinal haemorrhage has probably decreased since the advent of endoscopic techniques to prevent further haemorrhage. Only 5% of all patients admitted with haematemesis and melaena currently proceed to operation, with peptic ulcer remaining the most common diagnosis requiring surgical intervention. Studies[3] before 1980 report about a 25% operative intervention rate for the peptic ulcer group compared with the current 12%. The high mortality in the surgical group reflects the severity of the cases coming to surgery and this is well demonstrated by comparing the distribution of risk scores in the operated and non-operated groups (Figure 1). Although much of the discrepancy in operative and non-operative mortality is explainable in these terms, patients in the high-risk categories do have a significantly greater mortality when an operation is undertaken; thus, reduction of the need for surgery, for example by successful endoscopic haemostasis, might reduce the mortality in this group of patients. The fact that low-risk patients do not die whether an operation is eventually required or not supports the data from a previous study[4] which suggested that early surgical intervention in young patients is not justified.

Table 5 **Operative rate by risk category for peptic ulcer patients admitted by physicians and surgeons**

	Medical admissions		Surgical admissions	
Risk	**n (%)**	**n operated (%)**	**n (%)**	**n operated (%)**
0	0 (0)	0 (0)	0 (0)	0 (0)
1	157 (9)	0 (0)	12 (4)	0 (0)
2	218 (12)	0 (0)	18 (7)	0 (0)
3	273 (16)	7 (3)	31 (11)	5 (16)
4	298 (17)	17 (6)	39 (14)	13 (33)
5	301 (17)	26 (9)	49 (18)	11 (22)
6	210 (12)	34 (16)	47 (17)	23 (49)
7	183 (10)	33 (18)	54 (19)	27 (50)
8+	119 (7)	37 (31)	27 (10)	18 (67)
Total	1759 (100)	154 (9)	267 (100)	97 (35)

Despite similar case-mix severity, the operative intervention rate for cases admitted primarily to surgical teams is four times higher than that of those admitted to medical teams. It is difficult to say whether this represents overintervention on the part of surgeons or underreferral on the part of physicians but the size of the discrepancy suggests that both explanations may be true—i.e. some patients who require an operation are being denied it and some who do not need an operation are having one. Whilst much research into acute upper gastrointestinal haemorrhage has focused on endoscopic therapy, very little work has been done on determining which patients require intervention; 'who needs surgery and when?' is a perennial question in acute upper gastrointestinal haemorrhage. This study demonstrates that there is a lack of consensus between physicians and surgeons.

Endoscopic injection of visible vessels with various agents has been shown to reduce further haemorrhage in several clinical trials[5,6]. The failure to endoscopically intervene in 78% of peptic ulcer patients who ultimately require an operation indicates that there may be potential for reducing the operative intervention rate further although lack of resources and skills may still be dictating the need for surgery in some cases. In patients who are endoscoped, the failure to recognize bleeding vessels or adherent clot may be a contributing factor since only 10% of peptic ulcers presenting with upper gastrointestinal haemorrhage had major stigmata of recent haemorrhage recorded, whereas research institutes have reported figures around 50%. Failure to visualize, recognize and treat eroded vessels may be a reason for operations that are potentially avoidable. Endoscopic therapy is not the whole answer, however, and cannot be used in all patients as a first-line treatment. Major haemorrhage can obscure the endoscopic view, or the lesion when identified may not be amenable to therapy for technical reasons. Even when the technical expertise is available to attempt such intervention there may not be faith in its efficacy if the bleeding vessel is large or if there is no immediate haemostatic effect. 22% of peptic ulcer patients coming to surgery in this study had at least one attempt at endoscopic haemostasis, though the outcome will have been related to the expertise of the endoscopist as well as the nature of the bleeding vessel.

The indication for surgery in acute upper gastrointestinal haemorrhage is failure to stop or prevent further life-threatening haemorrhage. It is not clear whether repeated endoscopic intervention should be attempted if it has failed once, although some units do practise this policy. Most upper gastrointestinal haemorrhage will stop spontaneously but how long to observe before surgical intervention will depend on the features of each individual case. Protocols for surgical intervention based upon rebleeding events or transfusion requirements are unsatisfactory and will always need the additional benefit of experienced assessment, which is why the national guidelines[7] stress the importance of consultant-based decisions on the need for surgery.

In the absence of any efficacious drug therapy and with the limitations of endoscopic therapy, the challenge to clinicians remains the identification of patients who would benefit from early surgical intervention. Patients who are referred late, after repeated endoscopy and perhaps repeated episodes of hypotension and having required large blood transfusions are probably being done a disservice; they would have been at their fittest for operation after the initial resuscitation. The current wisdom is based upon the evidence from only one small trial. Morris *et al.*[4] randomized patients to an aggressive early surgical intervention or to a conservative management plan. 60% of the aggressive group and 20% of the conservative group underwent surgery. The data, when analysed on the basis of treatment received, showed a 2% mortality in the surgical group compared with 13% in the conservative group. The authors also concluded that an aggressive policy in those under 60 was unjustified because the mortality was so low in both groups. However, their mode of analysis meant that the two groups were not necessarily comparable since the surgical patients were selected out in both groups; the high mortality in the conservative group might have been due to inclusion of very poor risk patients in whom surgery was deemed inappropriate. Unfortunately, any attempt at a controlled trial of surgery versus conservative management is difficult and is now complicated further by the advent of endoscopic therapy, which would have to be fitted into any trial design. As well as the difficulty in blinding and randomizing patients, there is an ethical dilemma, since the surgical arm will necessarily include patients who would have stopped bleeding without surgical intervention, and some of those randomized to conservative management will eventually require surgery.

Whilst surgery clearly still has a part to play in management of acute gastrointestinal haemorrhage, wider use of endoscopic treatments might further reduce the numbers needing an operation. However, failure to control bleeding endoscopically should not delay surgery when indicated, and close cooperation between endoscopist and surgeon is essential[8,9].

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