

Selection of patients for early discharge or outpatient care after acute upper gastrointestinal haemorrhage

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Summary

Background Acute upper gastrointestinal haemorrhage is a common medical emergency and hospital admission has usually been regarded as obligatory until the risk of further haemorrhage has receded. This policy means that some patients at low risk stay in hospital for longer than is necessary especially when diagnostic endoscopy is delayed. We attempted to identify patients who had negligible risk of further bleeding or death and for whom early discharge or even outpatient management would be possible with no adverse effect on standards of care.

Methods We used a validated risk scoring system based on age (score 0–2), presence of shock (0–2), comorbidity (0–3), diagnosis (0–2), and endoscopic stigmata of recent haemorrhage (0–2); the maximum possible score was 11. We studied patients identified through the UK National Audit of acute upper gastrointestinal haemorrhage; they had been admitted with upper gastrointestinal haemorrhage to hospitals in the UK during 4 months of 1993. This analysis was based on the 2531 patients from the national audit who underwent endoscopy after an acute admission.

Findings 744 (29.4%) of the 2531 patients scored 2 or less on the risk score. Of these patients only 32 (4.3% [95% CI 3.0–6.0]) rebled and only one (0.1% [0.006–0.75]) died). Thus, the risk score identifies patients at low risk of rebleeding or death. The median hospital stay for these patients was 4 days; duration of hospital stay increased with risk score. Within risk score categories of 5 or less, there was a trend of increasing hospital stay as the time between admission and endoscopy increased.

Interpretation Our risk score identifies a large proportion of patients with acute upper gastrointestinal haemorrhage who are at low risk of further bleeding or death. Early endoscopy and discharge of such patients could allow substantial resource savings.

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Introduction

The rate of emergency admissions for acute upper gastrointestinal haemorrhage in the UK is about 87 per 100 000 adults per year.¹ This rate is likely to increase as the proportion of elderly people in the population rises.¹

Acute upper gastrointestinal haemorrhage presents in various degrees of severity from the insignificant to the catastrophic. Hospital admission is widely regarded as compulsory, at least until the threat of further haemorrhage has passed. However, many patients remain in hospital beyond the high-risk period as a result of exacerbation of coexisting disorders and complications, rather than further haemorrhage. The average length of stay, even in patients at the very lowest risk is several days. A substantial proportion of patients presenting with acute upper gastrointestinal haemorrhage are at very low risk of further haemorrhage and mortality. The rapid identification and early discharge of this group could lead to major resource savings. We used a risk scoring system to identify low-risk patients. We also investigated the relation between risk score and length of hospital stay, and the effect of time between admission and endoscopy on the length of hospital stay.

Patients and methods

The data were taken from the first phase of the National Audit of acute upper gastrointestinal haemorrhage. We carried out a prospective audit of the management and outcome of 4201 cases from 74 hospitals in four health regions identified over a 4-month period during 1993. The participants for this analysis consisted of the 2531 patients who were admitted as emergencies with acute upper gastrointestinal haemorrhage and who subsequently underwent diagnostic endoscopy. Cases of bleeding in hospital and patients who did not undergo endoscopy (for any reason) were not included in this analysis. The methods of identification of patients and data collection as well as the definitions and entry criteria have been described previously.¹ Risk categorisation was done with a validated numerical scoring system which consisted of scores for each of five components—age, comorbidity, shock, diagnosis, and stigmata of recent haemorrhage such that the maximum score was 11 (table 1).^{2,3}

Kruskal-Wallis analysis was used to identify significant differences in the distribution of length of hospital stay in ordinal groups of data (time to endoscopy). Non-parametric analysis was used because of the skewed distribution of hospital stay. Because the average length of hospital stay is likely to be affected by the number of patients dying in each group, the analysis was also undertaken after exclusion of all in-hospital deaths.

Results

Table 2 shows the patients who score 0, 1, or 2 (29.4% of the total [95% CI 27.6–31.2]) have a low risk of further haemorrhage (32/744; 4.3% [3.0–6.0]) and a negligible risk of death (one patient; 0.1% [0.006–0.75]), even if further haemorrhage occurs. Length of hospital stay increased as the risk score increased (table 3). The

Component	Score			
	0	1	2	3
Age (years)	<60	60-79	≥80	..
Shock	No shock	Tachycardia	Hypotension	..
Pulse rate (beats per min)	<100	≥100
SBP (mmHg)	≥100	≥100	<100	..
Comorbidity	None	..	IHD, cardiac failure, any other major comorbidity	Renal failure, liver failure, or disseminated malignant disease
Diagnosis	Mallory-Weiss lesions or no lesion observed and no stigmata of recent haemorrhage	All other diagnoses	Malignant lesions of UGIT	..
Stigmata of recent haemorrhage	No stigmata or dark spot in ulcer base	..	Blood in UGIT, adherent clot, visible or spurting vessel	..

SBP=systolic blood pressure; IHD=ischemic heart disease; UGIT=upper gastrointestinal tract.

Table 1: Score components

distribution of length of stay is skewed to the right by small numbers of patients with very long stays. The median length of stay for patients with risk scores of 0, 1, and 2 together was 4 days.

Within risk score categories of 5 or less there was a clear trend of increasing length of hospital stay with increasing time between admission and endoscopy (table 4). However, in the higher risk score categories there was no significant difference in length of stay between categories of time to endoscopy. When the analysis was repeated after exclusion of patients who died in hospital the results were similar except that there was also a significant difference in the distribution of length of hospital stay in category ≥8 (table 5).

Discussion

The identification of low-risk cases of acute upper gastrointestinal haemorrhage was the subject of a small prospective study in the USA.⁴ After a retrospective

review of their practice, Longstreth and Feitelberg⁴ instituted outpatient management in selected cases. They established a policy of early referral to a gastroenterologist together with rapid laboratory investigation and endoscopy. Patients were required to satisfy certain endoscopic criteria for outpatient management. In a series of 141 patients, 34 met the criteria. Only one of 34 subsequently rebled and required readmission and none of the patients died. Our risk scoring method identifies a slightly larger proportion of low-risk cases than do Longstreth and Feitelberg's criteria within a much larger and more diverse data set. We found similarly low rates of further haemorrhage and negligible mortality. Sound

Score	Total number of patients (% of total)	Number of cases			
		Rebleeding*	Deaths without rebleeding†	Deaths with rebleeding‡	Total deaths
0	143 (5.6%)	7 (4.9%)	0	0	0
1	278 (11.0%)	9 (3.2%)	0	0	0
2	323 (12.8%)	16 (5.0%)	1 (0.3%)	0	1 (0.3%)
3	402 (15.9%)	49 (12.2%)	4 (1.1%)	4 (1.0%)	8 (2.0%)
4	450 (17.8%)	62 (13.8%)	10 (2.6%)	9 (1.4%)	19 (4.2%)
5	367 (14.5%)	62 (16.9%)	16 (5.2%)	13 (2.1%)	29 (7.9%)
6	238 (9.4%)	70 (29.4%)	16 (9.5%)	20 (28.6%)	36 (15.1%)
7	202 (8.0%)	80 (39.6%)	12 (9.8%)	28 (35.0%)	40 (19.8%)
≥8	128 (5.1%)	61 (47.7%)	18 (26.9%)	32 (52.5%)	50 (39.1%)
Total	2531	416 (16.4%)	77 (3.6%)	106 (25.5%)	183 (7.2%)

*% of total within score category. †% is deaths with no rebleeding as a % of all patients with no rebleeding within score category. ‡% is deaths with rebleeding as a % of all patients with no rebleeding within score category.

Table 2: Observed rebleeding and mortality by risk score

Risk score	Patients (n)	Patients with missing data	Hospital stay (days)	
			Mean	Median (IQR)
0	143	2	3.7	3 (2-4)
1	278	4	4.1	3 (2-5)
2	323	4	6.1	5 (3-7)
3	402	11	7.6	6 (3-9)
4	450	9	9.3	6 (4-11)
5	367	13	10.8	8 (5-14)
6	238	7	10.6	7 (5-14)
7	202	8	12.7	9 (6-16)
≥8	128	6	15.3	10 (6-21)
Total	2531	64 (2.5%)	8.6	6 (3-10)

IQR=interquartile range.

Table 3: Hospital stay by risk category

Risk score	Time to endoscopy (h)					p*
	<12	12-24	25-48	49-72	>72	
0						
Mean	2.9	3.4	4.4	3.4	6.6	0.0034
Median	2	2	3	3	5	
n	30	55	31	18	7	
1						
Mean	3.0	3.5	5.0	4.7	6.9	<0.0001
Median	3	3	4	5	6	
n	53	122	48	23	28	
2						
Mean	4.2	5.6	6.1	6.7	8.7	<0.0001
Median	3	4	5	5	7	
n	57	122	50	40	50	
3						
Mean	6.6	6.1	6.9	10.2	11.0	<0.0001
Median	6	5	5	6	9	
n	74	133	76	52	56	
4						
Mean	7.2	8.8	9.2	10.6	12.7	0.0061
Median	5	6	6	7	8	
n	82	174	78	47	60	
5						
Mean	8.8	11.3	9.8	11.2	12.9	0.0001
Median	7	7	7	10	11	
n	67	112	74	38	63	
6						
Mean	10.5	10.8	10.7	10.1	11.0	0.90
Median	8	7	9	9	6	
n	73	77	38	20	23	
7						
Mean	13.4	11.7	11.4	14.1	14.3	0.69
Median	9	9	8	12	12	
n	77	68	23	15	11	
≥8						
Mean	15.4	13.3	12.5	16.6	23.0	0.16
Median	9	10	10	12	24	
n	59	38	8	7	10	

*<0.05=significant difference in distribution of length of hospital stay between time to endoscopy categories (Kruskal Wallis test).

Table 4: Mean and median hospital stay by time between admission and first endoscopy, for each risk category

Risk score	Time to endoscopy (h)					p*
	<12	12-24	25-48	49-72	>72	
0						
Mean	2.9	3.4	4.4	3.4	6.6	0.0024
Median	2	2	3	3	5	
n	30	55	31	18	7	
1						
Mean	3.0	3.5	5.0	4.7	6.9	<0.0001
Median	3	3	4	5	6	
n	53	122	48	23	28	
2						
Mean	4.2	5.6	6.1	6.7	8.1	<0.0001
Median	3	4	5	5	7	
n	57	122	50	40	49	
3						
Mean	6.6	6.1	7.0	9.0	10.7	<0.0001
Median	6	5	5	6	8	
n	73	131	75	50	54	
4						
Mean	7.1	8.6	8.6	9.6	10.5	0.0128
Median	5	6	6	6	8	
n	79	170	74	44	55	
5						
Mean	8.3	9.3	9.8	10.3	12.7	0.0001
Median	7	7	7	8	11	
n	62	105	67	33	60	
6						
Mean	10.5	10.1	11.1	9.2	10.2	0.76
Median	9	7	9	7	6	
n	61	64	35	18	18	
7						
Mean	14.4	10.2	10.7	14.8	11.0	0.75
Median	9	9	8	13	8	
n	61	54	19	12	9	
≥8						
Mean	17.7	12.2	8.0	17.8	30.8	0.018
Median	9	9	9	14	28	
n	37	20	5	6	6	

* <0.05 =significant difference in distribution of length of hospital stay between time to endoscopy categories (Kruskall Wallis test).

Table 5: Repeat analysis excluding patients who die in hospital

clinical judgment will undoubtedly add to the discriminating power of any system used, and we would certainly not advocate separating the two.

Overall mortality among acute admissions who underwent endoscopy, was 7.2% compared with a mortality rate among all acute admissions of 11.0% (including patients who did not have endoscopy).¹ The difference is explained by the number of patients at high risk who died without recourse to endoscopy, or who were operated on without recourse to endoscopy and subsequently died. This system of identification of patients at low risk relies on endoscopic findings to differentiate high-risk and low-risk categories. A smaller proportion of the total number of cases in the audit might have been categorised to the low-risk group if all patients had undergone endoscopic examination. However, it seems that about a quarter of patients who meet our definition of acute upper gastrointestinal haemorrhage could be discharged early or even be managed on an outpatient basis if early diagnostic endoscopy is

undertaken. A reduction in the median length of stay in this low-risk group from 4 days to 2 days implies a saving of 20 000 bed days per year in the UK, which would have to be balanced against the extra cost of implementing a rapid endoscopy service in hospitals that currently cannot offer this service to all patients with acute upper gastrointestinal haemorrhage.

A full assessment of the risk attributable to any individual patient can be made only after endoscopic examination for a definitive diagnosis and the presence of stigmata of recent haemorrhage. The time from admission to endoscopy has a clear influence on the length of hospital stay; for patients scoring 5 or less on the risk score, the earlier the endoscopy, the sooner the patient is sent home. However, the group with negligible risk, even when endoscopy was undertaken rapidly, had a median hospital stay of several days. Even when patients who needed blood transfusion are excluded (220 [29.6%] of 744), the median length of stay was 4 days in this group. For patients at high risk (those scoring 6 or more), the length of stay was not related to the time from admission to endoscopy, which is not unexpected because of the longer stay in this group.

We conclude that hospitals that are able to institute a rapid endoscopic assessment and a policy of early discharge in patients at very low risk of further haemorrhage or death may benefit from resource savings without harming standards of patient care.

National Audit of Acute Upper Gastrointestinal Haemorrhage

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References

- 1 Rockall TA, Logan RFA, Devlin HB, Northfield TC. Incidence of and mortality from acute upper gastrointestinal haemorrhage in the United Kingdom. *BMJ* 1995; **311**: 222-26.
- 2 Rockall TA, Logan RFA, Devlin HB, Northfield TC. Variation in outcome after acute upper gastrointestinal haemorrhage. *Lancet* 1995; **346**: 346-50.
- 3 Rockall TA, Logan RFA, Devlin HB, Northfield TC. Risk assessment after acute upper gastrointestinal haemorrhage. *Gut* 1996; **38**: 316-21.
- 4 Longstreth GF, Feitelberg SP. Outpatient care of selected patients with acute non-variceal upper gastrointestinal haemorrhage. *Lancet* 1995; **345**: 108-11.