

Guidelines for good practice in and audit of the management of upper gastrointestinal haemorrhage

REPORT OF A JOINT WORKING GROUP OF THE BRITISH SOCIETY OF GASTROENTEROLOGY, THE RESEARCH UNIT OF THE ROYAL COLLEGE OF PHYSICIANS OF LONDON AND THE AUDIT UNIT OF THE ROYAL COLLEGE OF SURGEONS OF ENGLAND

At least one in two thousand of the adult population in the UK is admitted to hospital each year with an acute upper gastrointestinal haemorrhage. The overall mortality from upper gastrointestinal bleeding has been reported as about 10% in many studies, but in recent series a fall to about 4% [1,2] and even lower figures have been reported [3]. In view of this evidence, the Research Unit of the Royal College of Physicians, the British Society of Gastroenterology and the Audit Unit of the Royal College of Surgeons of England invited a working group to consider the problem and to prepare guidelines for good practice. As the preparation of guidelines alone does not necessarily influence practice [4], the working group also constructed a series of audit measures, presented here, by which it can be seen whether the recommendations have been followed.

Clinical guidelines aim to help doctors by providing an analytical framework within which audit and review of clinical practice can take place. They are not intended to replace a doctor's clinical judgement and are not necessarily the only way in which a particular condition can be managed, but reflect the consensus views of clinicians who attended the workshop and their interpretation of the literature. These guidelines relate to patients admitted to hospital with a presumptive diagnosis of acute upper gastrointestinal haemorrhage, or who bleed acutely from the upper gut while in hospital for treatment of some other condition. Patients with relatively minor bleeding managed at home, or those who die at home from a severe bleed, are not considered here.

Background data

District hospitals admit each year 50–80 cases of upper gastrointestinal (GI) bleeding per 100,000 of the population [2,5]; more than two-thirds of the patients are

aged over 60, a frequency in this age group at least twice that among younger members of the population. Mortality from such bleeding rises with age but the death rate has remained constant or decreased despite an increasing proportion of older patients treated [6]. Prognostic factors can be defined which are associated with a higher than average risk of death from the bleed [7–11]. Improved management of patients in this high risk group will have the greatest effect in reducing the overall mortality.

About half the bleeds in this country are due to peptic ulcer and about one-third of these patients have been taking nonsteroidal anti-inflammatory drugs, though the increased incidence of bleeding in older age groups cannot be entirely attributed to this factor [12]. Although oesophageal varices are the source of only 2–4% of bleeds (a proportion which may increase, judging by trends in other countries), such a patient stands a one in three chance of dying as a result of the bleed.

Standards of practice

The following guidelines, applicable to all hospitals which accept emergency admissions, aim to provide a minimum standard against which existing practice and outcome may be judged.

Staff, facilities, planning and records

Staff

Patients with acute upper gastrointestinal bleeding should be the responsibility of a consultant physician or surgeon who collaborates from the outset with a consultant in the other discipline whenever a patient has a bleed which threatens life.

Medical and surgical staffing at junior levels should be adequate to allow 24-hour observation and care.

Experienced nursing staff should be available for the care of severely ill patients at a staff/patient ratio appropriate to a high dependency unit.

See the end of this article for Members of the Joint Working Group

Admission arrangements

Patients with acute upper gastrointestinal bleeding should be admitted (or transferred) to a safe environment. In many hospitals this will be an acute general medical ward where the staff has experience of the problem. Severely ill patients are best admitted to a high dependency unit, defined as an area for patients who require more intensive observation and/or nursing than would be expected on a general ward. Critically ill patients, particularly those with very rapid bleeding, those with severe coincidental cardiorespiratory, hepatic or renal disease, and those with bleeding oesophageal varices, may require admission to an intensive care unit if they need invasive monitoring, mechanical ventilation or other treatment for organ failure.

Some hospitals admit all patients with upper GI bleeding to beds designated for treatment of gastroenterological disorders; such units are often jointly managed by medical and surgical staff with an interest in the specialty. A patient who needs surgical treatment is often best treated in the same ward before and after operation to preserve continuity and facilitate joint surgical and medical management.

Blood transfusion

A hospital which accepts patients with acute upper GI haemorrhage should provide a 24-hour blood transfusion service, preferably one which is part of the National Quality Control Scheme. The laboratory should keep a supply of Group O Rh- blood for emergency use.

Endoscopy

Facilities should be available for upper gastrointestinal endoscopy within 24 hours of admission. A rota should be maintained of endoscopists trained both in diagnosis and therapeutic measures to check bleeding. It may be possible in some circumstances for endoscopists in different but neighbouring hospitals to cover for one another, an arrangement which also permits interchange of experience. The procedure should be performed in a fully equipped endoscopy unit staffed by nurses trained in the care of ill patients during endoscopy and in the maintenance and use of the instruments and accessories [13]. The staff should be aware of the particular danger of pulmonary aspiration in these patients and trained to deal with unexpected vomiting. Facilities should be available for cardiorespiratory monitoring during and after endoscopy [14]. It is important to resuscitate adequately and in particular to correct hypovolaemia before endoscopy. Sedation may be hazardous in these ill patients [14]. In a patient whose consciousness is already impaired owing, for example, to hepatic encephalopathy, endotracheal intubation may be necessary to protect the

airway. Occasionally patients may need endoscopy out of normal working hours or in the operating theatre (or anaesthetic room); arrangements for such contingencies should be prepared.

Planning

Medical, surgical and nursing staff should together draw up an agreed protocol for the management of patients with upper gastrointestinal haemorrhage. Once prepared, copies of this protocol should be given to all medical and senior nursing staff who care for such patients, the admission department, all medical (including geriatric) and surgical wards, departments such as the laboratory and pharmacy, and the hospital management team.

Records

The system of hospital coding used should identify patients with acute upper gastrointestinal haemorrhage, whatever the cause, in all departments of the hospital. The code for bleeding peptic ulcer has been defined separately only in the 9th revision of the International Classification of Disease. The advent of ICD10 and the development of Read codes should make coding more specific. Endoscopy and theatre records, both of which are often computerised, may be used to 'flag' patients with bleeding. The protocol for management of bleeding should lay down the form of clinical record to be maintained.

Management

(See also flow charts)

The management of acute gastrointestinal haemorrhage is summarised in the accompanying flow charts (pp283 and 284). In addition, the admitting physician or surgeon can consider the following points.

Has a bleed occurred?

An upper gastrointestinal bleed is diagnosed if vomit has contained red blood (or coffee-ground-like material observed by a doctor or nurse)

and/or

The stools have been black or red-black (confirmed by observation or rectal examination)

If none of these features is present, acute upper GI bleeding is unlikely. (Red rectal bleeding in the absence of hypotension is likely to be arising from the lower GI tract.)

If there has been no bleed

The patient may return home immediately or after a brief admission to a general ward.

An elective endoscopy and a check measurement of haemoglobin (Hb) may be useful.

If there has been an upper gastrointestinal bleed

(a) *Is it of mild or moderate severity?*

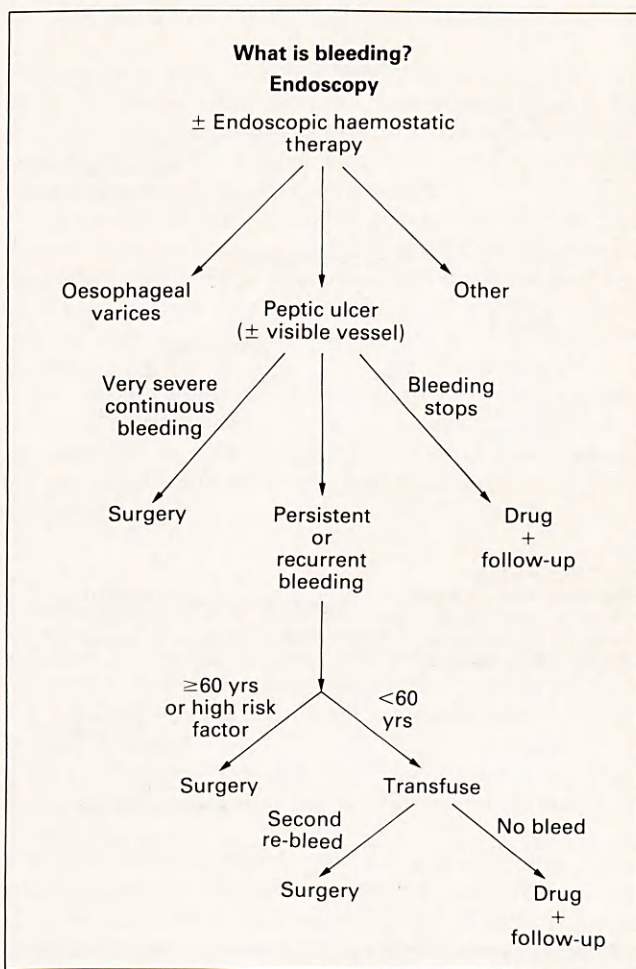
If patient is aged <60 years, and has previously been fit, with no evidence of hypovolaemia, Hb>10G:

- Admit to general medical ward
- Allow fluids by mouth on first day and food thereafter. Nil by mouth for 6 hours before endoscopy
- Observe for continued bleeding or re-bleeding as below
- Arrange endoscopy on next routine list
- Discharge from hospital within 5 days if there is no evidence of continued or recurrent bleeding and there is no other contraindication [9].

(b) *Is it life-threatening?*

If patient is aged >60 years, **or** hypovolaemic (systolic blood pressure <100mm Hg, **or** the diastolic blood pressure falls on sitting or standing), **or** Hb<10G, **or** there is severe disease (eg liver, cardiovascular, respiratory or renal), regard the bleed as dangerous and take the following action:

- Restore blood volume; consider using central venous pressure (CVP) as a guide
- Admit to high dependency ward
- Inform consultant physician **and** consultant surgeon
- Observe for continued bleeding or re-bleeding (ask nurses to report overt bleeding, fall of systolic blood pressure or rise in pulse rate or fall in CVP)
- Allow only sips of water until endoscopy, preferably done within 12 hours of bleed
- If liver disease is present, avoid sedation; clear bowel with magnesium sulphate mixture 10 ml three times a day or lactulose 20 ml three times a day or an enema; 20G protein per day diet.

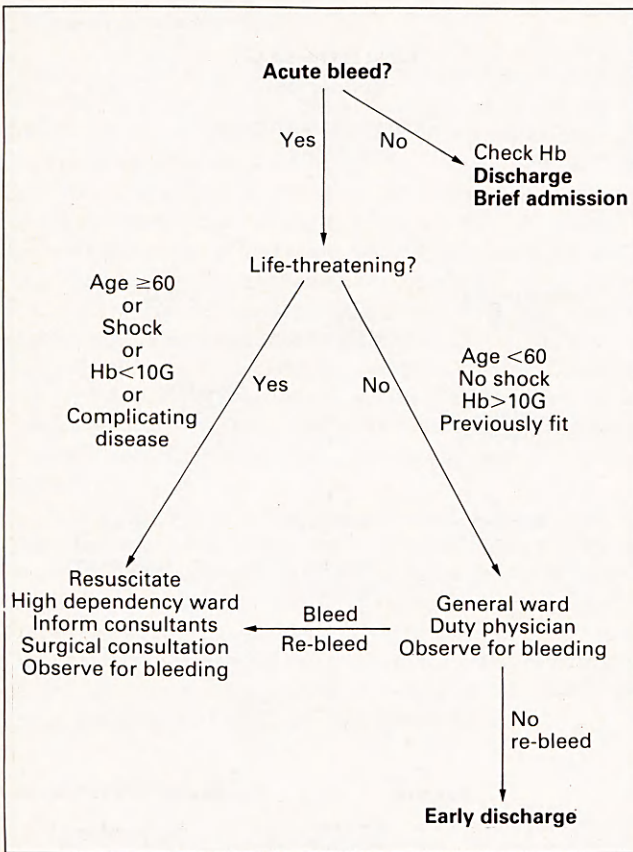


What laboratory tests should be requested after a bleed?

- Hb, blood urea
- Liver function tests, coagulation screen, HBsAg in liver disease
- Blood group and save serum (some laboratories like to cross-match) if Hb normal or if bleed is considered mild or moderate, as defined above
- Cross-match blood if Hb<10G, or with a life-threatening bleed, as defined above.

How should blood be replaced?

- If there is supine or postural hypotension and/or cutaneous vasoconstriction and tachycardia, a large bore intravenous cannula should be inserted to allow rapid fluid replacement. Whole blood should be given as soon as available, preceded if necessary by a plasma expander. A central line should be used as a guide to blood volume if there is severe haemorrhage, especial-



ly if there is complicating cardiorespiratory disease; it gives an early indication of a recurrent bleed, or fluid overload [15]. Packed red cells may be needed if there is anaemia but a normal or increased blood volume.

What is the source of bleeding?

- The likely source of bleeding may be suspected on clinical grounds, particularly if there is a history of peptic ulcer or evidence of liver disease. Upper GI endoscopy, performed within 24 hours of bleeding, can identify the site of bleeding in most cases. Patients with slight bleeding who are haemodynamically stable may be endoscoped within 48 hours on the next routine list, if necessary as outpatients, though this reduces the likelihood of making a diagnosis. If bleeding is severe, and especially if continued, then early endoscopy is indicated and the endoscopist should take an active part in clinical care. The endoscopist is responsible for assessing the possible hazards of the procedure for each patient and seeing that precautions are taken to avoid them as far as possible (see above).
- Diagnostic endoscopy without a therapeutic procedure does not affect mortality [16,17], though in most cases it is possible to define the source of bleeding. Detection of active bleeding or of a visible vessel with-

out bleeding gives information about the likelihood of continued or recurrent bleeding. A spurting arterial bleeding point indicates major continued bleeding. A visible vessel, defined as a red or blue spot elevated from the base of an ulcer, or a protruding clot in the base of an ulcer, are both associated with about double the usual risk of re-bleeding [10]. The combination of a visible vessel and hypotensive shock is associated with an 80% chance of re-bleeding [11]. Oozing of blood from the floor of an ulcer crater, or a red or black spot level with the floor of an ulcer are signs of recent haemorrhage but do not indicate an above average risk of re-bleeding. In the absence of any sign of recent bleeding from an ulcer, re-bleeding is most unlikely [10,11].

- The main reason for determining the site and activity of bleeding is to assess suitability for endoscopic treatment of a visible vessel in an ulcer or vascular malformation, or of a ruptured varix complicating portal hypertension. Information about the site of bleeding may also assist the surgeon if operation is required.

What medical or endoscopic measures should be taken to stop bleeding or reduce the risk of early recurrent bleeding?

- If a bleeding peptic ulcer is found on endoscopy, there is no unequivocal evidence that immediate drug therapy reduces mortality. Although meta-analysis has suggested that antifibrinolytic therapy and gastric anti-secretory drugs could reduce mortality [18,19], large scale clinical trials have failed to confirm the value of antiseccretory drugs [20,21], and antifibrinolysis requires similar study before it can be generally accepted.
- If an ulcer with a visible vessel in its base is found, two general methods of endoscopic haemostasis are available—thermal coagulation and direct injection of a vasoconstrictor and/or sclerosant. Since the mortality from bleeding peptic ulcer is low, only a few studies have shown a significant reduction in death rate [22]. However, a meta-analysis of 25 randomised controlled trials using different methods has suggested a significant reduction of about one-third in the death rate [23]. Several controlled trials have shown improvement as compared with a control group for such endpoints as frequency of re-bleeding or need for urgent surgery, transfusion requirement and number of days in hospital [24]. Trials are difficult to conduct and patients need to be stratified according to the nature and activity of the bleeding point. What the optimum method of treatment should be is not yet clear and may not be critical. Controlled trials are in progress of injection therapy with adrenaline, with or without a sclerosant, and of thermal treatment with or without injection therapy [25]. Repeat treatment may sometimes be indicated. It seems likely that endoscopic treatment of bleeding peptic ulcer, using generally

available techniques, will emerge as of proven benefit. All studies show that the success of each technique depends on the skill and experience of the endoscopist who should use a method with which he or she is familiar.

- If bleeding oesophageal varices are seen, immediate sclerotherapy [26] into the lumen of the vein [27] is the preferred option [28]. Temporary balloon tamponade or pharmacological regimes, according to the experience of the clinician, based on pitressin and nitroglycerine, or somatostatin, may provide control of bleeding for up to 24 hours. Where local expertise is not available for endoscopic sclerotherapy, transfer to a specialist unit is advisable as soon as the patient's condition is stable.

Action to be taken if bleeding continues or recurs

- If it is impossible to maintain or replace the blood volume owing to rapid and continuous bleeding, emergency endoscopy, preferably in the endoscopy unit, should be arranged with plans for immediate transfer to the operating theatre if indicated. Failing this, immediate transfer to the operating theatre for endoscopy, and usually operation, is needed.
- There is evidence from a controlled trial that a policy of early operation reduces mortality among patients over 60 years of age but that early surgery in younger patients leads to unnecessary operations [29] which may increase mortality in duodenal ulcer [30].
- If a patient aged ≥ 60 years or a younger patient with any high risk factor requires more than four units of whole blood to restore or maintain blood volume over 24 hours or continues to bleed or re-bleeds, operation is generally advised.
- If a patient aged ≥ 60 years without any high risk factor continues to bleed or shows evidence of two episodes of re-bleeding, operation is generally advised.

Surgery—when, by whom and what operation?

- A consultant surgeon should be informed about the possible need for surgery and make the decision to operate or to delegate the operation to another person. A consultant anaesthetist should also be informed, assess the patient's fitness for operation and decide whether the anaesthetic should be given by a consultant or delegated to someone else. Timing of an operation should avoid, if possible, the hours of midnight to 7am. The mortality after urgent surgery for bleeding peptic ulcer correlates with the pre-operative APACHE II score [31].
- If a patient with bleeding peptic ulcer has been previously fit, but with a history of recurrent ulcer-type dyspepsia, and is not severely ill from the bleed, a definitive operation for peptic ulcer may be indicated, usually Billroth I partial gastrectomy for gastric ulcer

or truncal vagotomy and pyloroplasty for duodenal ulcer.

- If a patient with bleeding peptic ulcer is elderly and in poor physical condition, the minimum operation to stop the bleeding should be undertaken, either by local excision or under-running of a gastric ulcer [32] or under-running of a duodenal ulcer.
- If variceal haemorrhage is uncontrollable by the means described above, and provided that liver function is adequate, distal oesophageal transection and re-anastomosis with ligation of veins around the distal oesophagus and gastric fundus is usually the best option.
- If a patient is bleeding from gastric carcinoma, the lesion is usually advanced. Polya gastrectomy may be appropriate for distal tumours but total gastrectomy for proximal tumours is not appropriate as an urgent procedure [33].

Follow-up and drug treatment

- If the patient is anaemic, oral iron should be given until the haemoglobin level returns to normal.
- If a peptic ulcer is found, treatment should be given to heal the ulcer.
- If the ulcer is in the stomach, repeat endoscopy with biopsy is indicated after 6–8 weeks to check that it is benign.
- If the patient is elderly and frail, re-bleeding from an ulcer could be fatal. The cumulative risk of another bleed is about 16% at 5 years [34,35]. There is some evidence that long-term H_2 blocker therapy reduces the rate of recurrent bleeding in patients with duodenal ulcer [36,37]. Long-term treatment of elderly patients with a gastric antisecretory drug should therefore be considered. If the patient is young and fit, long-term treatment is determined by the severity of ulcer symptoms. Patients with frequent recurrent ulcer dyspepsia require long-term maintenance therapy; those with infrequent mild symptoms can be treated intermittently with an H_2 blocker. In future, proton pump blockers and treatment to eliminate *Helicobacter pylori* may be used for some patients.
- If the patient has taken nonsteroidal anti-inflammatory drugs, this treatment should preferably be stopped. If they are essential, then addition of an H_2 blocker for duodenal ulcer [38] or synthetic prostaglandin for gastric ulcer [39] may be indicated. The only two trials published have suggested that the drugs reduce the incidence of uncomplicated ulcer in patients taking nonsteroidal anti-inflammatory drugs.

Consultation with patients and relatives

- The patient and relatives should be kept informed at all stages of management, especially if an operation may be needed.

Liaison with the general practitioner

- The general practitioner needs information about the diagnosis and treatment in hospital at least by the day on which the patient is discharged.
- If the general practitioner is asked to undertake responsibility for follow-up, repeat blood tests or drug treatment, a plan of management should be suggested.

Audit of structure, process and outcome

Medical care can be considered in terms of structure, process and outcome [40,41]. Structure is concerned with the amount and type of resources available. Process relates to the amount and type of activity expended in the care of the patient. Outcome in the case of upper gastrointestinal haemorrhage is concerned primarily with mortality and secondarily with patient satisfaction.

Audit questions on structure in a hospital (organisation and facilities)

- Have medical, surgical and nursing staff met to agree a protocol for the management of acute upper gastrointestinal haemorrhage?
- Has the written protocol been circulated to all the relevant departments and junior medical staff?
- Has the role of consultant medical and surgical staff with special experience in gastroenterology been defined?
- Is there a high dependency unit with appropriate monitoring and resuscitation equipment?
- Is a dedicated endoscopy unit available, and have arrangements been made for early and emergency endoscopy? Is there a rota of trained endoscopists? What arrangements have been made for skilled endoscopic nursing support out of normal working hours?
- Are coding facilities adequate to identify all patients with acute upper gastrointestinal bleeding, the cause, therapeutic procedures including surgery, and outcome? Can the notes be retrieved if required?
- Is there a regular audit meeting to review results and consider changes to the protocol?

Audit questions on process of care

Answering the following questions will reveal breaches of the protocol drawn up by the hospital staff, and its deficiencies. Revision of the protocol as a result of this analysis combined with an assessment of outcome, and regular re-evaluation with further change as necessary, closes the audit loop.

- If a patient was at high risk because aged ≥ 60 years, or systolic blood pressure < 100 mm Hg or postural fall, or Hb < 10 G, or complicating disease, was the protocol followed in the following respects?

- admission to high dependency ward or equivalent
- consultant physician and consultant surgeon informed
- early endoscopy (within 24 hours) performed
- If a patient was aged < 60 years, was physically fit, not shocked or anaemic, and did not re-bleed within 4 days, was admission to hospital < 5 days, was a diagnosis made, and was a plan for further management made?
- If a patient was shocked, was correction of circulating volume commenced without delay and was blood transfusion begun within 2 hours?
- If a patient was shocked or required transfusion in the presence of severe cardiorespiratory disease, was a central venous pressure line inserted, and was monitoring of venous pressure satisfactory?
- If a recently bleeding vessel in an ulcer base or if a bleeding oesophageal varix was found on endoscopy, was endoscopic treatment undertaken?
- If a patient at high risk (see above) required more than 4 units of blood in 24 hours to maintain blood volume or re-bleed, was surgery considered?
- If a patient aged < 60 years who was in previous good health showed evidence of continued bleeding or re-bleed twice, was surgery considered?
- Was the decision for surgery made by a consultant surgeon and was a consultant anaesthetist informed?
- If a patient required surgery, was pre-operative preparation and post-operative care satisfactory?
- Is there evidence, from the notes, of good communication with the patient, relatives and general practitioner?
- Is there evidence, from the clinical record, of an adequate follow-up plan?

Audit questions on outcome

(a) For a hospital

- What is the outcome for all patients treated in the hospital for acute upper GI haemorrhage?
 - total number treated
 - number discharged well
 - number discharged with residual complication (eg stroke) arising during admission
 - number who died (and certified cause of death)

If comparison between hospitals is made, then case-mix severity, including age, cause of bleeding and comorbidity, will need to be taken into account.

(b) For individual patients

- Complications during admission
- Days in hospital
- Discharge well or with residual complication
- Death
- Was any complication or death avoidable?
- Were the patient and relatives satisfied with the care received?

Possible national audit

A confidential enquiry into deaths from acute upper gastrointestinal haemorrhage could be set up along the lines of the CEPOD study [42]. Possible audit questions after a death are listed in Appendix B.

Possible multicentre therapeutic trials

Since overall mortality is 10% or less, controlled trials have to be large, about 2,000 patients, to have sufficient power to detect with confidence any change in death rate. Smaller numbers in a trial may give significant results without loss of power if a subset of patients (eg over 60 years, visible vessel in a peptic ulcer, oesophageal varices) with a relatively higher mortality is studied. A factorial design would increase the information gained.

Possible trials relevant to present management are:

- (a) An antifibrinolytic agent alone and in combination with an antisecretory drug, against placebo
- (b) Therapeutic endoscopy with and without drug therapy
- (c) Early versus later surgery in high-risk patients
- (d) Effect of limited (eg 3 months) versus indefinite anti-ulcer therapy in older high-risk patients.

APPENDIX A

Audit of the quality of the clinical record

The following items of information should be clearly stated in each clinical record. Their presence or absence is a measure of the quality of the record. Ideally, the information could be recorded during admission using a special proforma for use whenever a patient with upper gastrointestinal haemorrhage is treated, so that not only the presence or absence of the data but also the actual data are readily visible.

1. History

Evidence for an acute upper GI bleed detailed

Did the patient have:

- known peptic ulcer?
- previous bleed?
- bleeding disorder?

Liver disease

Alcohol intake

Consumption of aspirin or other non-steroidal anti-inflammatory drug

Presence or absence of any condition before the bleed which limited physical or mental capacity.

2. Admission data

Admission

- blood pressure, lying and erect (sitting)
- pulse rate
- peripheral vasoconstriction
- haemoglobin level
- general condition

Was the protocol followed regarding:

- type of admission ward?
- informing consultant physician?
- informing consultant surgeon?

3. Resuscitation

Reason for intravenous infusion

Date, time, amount and rate of any fluid or blood infused. Record number of each blood unit.

Instructions to nursing staff about observations and action to be taken at specified events.

4. Investigation and medical measures

Date and time of endoscopy. Endoscopist.

- lesion(s)
- bleeding or recently bled vessel
- therapeutic measure(s)

Drug(s) given to reduce bleeding or its recurrence.

5. Continued or recurrent bleeding

Evidence for continued or recurrent bleeding.

Was consultant surgeon/anaesthetist consulted?

Plan of action

- urgent surgery
- surgery if bleeding continues
- surgery if re-bleeds
- surgery if condition can be improved
- unfit for surgery

6. Surgery

Date and time

Reason for decision to operate

- Time interval between decision and operation
- Was protocol followed regarding indications for, and timing of, operation.

Surgeon. Anaesthetist. Findings. Procedure.

7. Outcome

Any complications during admission.

Days in hospital

Discharge well or with residual complications (eg stroke)/death

8. Consultations and follow-up

Date, time and substance of consultations with patient and relatives.

Letter to general practitioner (GP) including diagnosis, treatment and policy for follow-up and drug therapy, with clear guidance about GP's role.

APPENDIX B

Possible audit questions after a death from upper gastrointestinal haemorrhage

Was the admitting team aware of the potential danger of the patient's condition?

Were the appropriate consultants informed at an early stage?

Was there adequate surgical liaison?

Was resuscitation adequate?

Was monitoring adequate?

Were underlying conditions noted and treated?

Did endoscopy contribute?

Did it delay surgery or lead to complications?

Why was a decision made for or against surgery?

Was the interval to, and timing of, surgery a factor in the outcome?

Was the operation appropriate?

Were the surgeon and anaesthetist of appropriate grade and experience?

Were medical or surgical complications well treated?

Could life possibly have been saved or was death inevitable or the natural outcome?

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This report has been approved for publication by the Clinical Services Committee and Council of the British Society of Gastroenterology, and by the Clinical Audit and Quality Assurance Committee of the Royal College of Surgeons of England.

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The background papers submitted to the working group for use in preparing these guidelines are available from the Publications Department, Royal College of Physicians, 11 St Andrews Place, Regent's Park, London NW1 4LE, on payment of £8.00 for the set to cover costs of photocopying and postage.