Management of acute haemorrhage from the upper gastrointestinal tract

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One of the major challenges for the physician and surgeon of today is the successful treatment of the patient with acute haemorrhage from the upper gastrointestinal tract. Newer diagnostic procedures have become available, blood transfusion techniques have become more refined, and surgical and anaesthetic skills have reached a new level of excellence.

The optimal management of the individual with upper gastrointestinal bleeding involves a series of decisions, some based on sound physiological or epidemiological principles. Other decisions, however, are based more on the art of medicine than on hard scientific evidence. Significant advances have been made over the past five years in the management of the patient with upper gastrointestinal haemorrhage, and we shall focus our attention on the role of diagnostic and therapeutic endoscopy.

If the patient presents with haematemesis, then the bleeding has occurred from a point proximal to the ligament of Treitz. The nature of the blood appearing in the stools will depend upon the rate and amount of haemorrhage from the upper intestinal tract: a massive bleed may become manifest by both haematochezia and haematemesis, whereas the patient with melena has usually lost much smaller amounts of blood from the upper tract. The patient who presents with the passage of bright or dark red blood per rectum may also be bleeding from the colon; similarly, a melena stool may also arise from a bleeding lesion in the terminal ileum or colon. From the patient's history alone, it is often not possible to assess the amount of blood lost, but even if the conservative estimate is that of a minor haemorrhage, one must still respect the potential seriousness of the condition, since a small haematemesis or the passage of a melena stool may simply be the first indication of an underlying lesion which may rebleed more catastrophically.

Clinical assessment

The condition of the patient is rapidly assessed, and initial resuscitation is accomplished. Then, certain key historical points and physical findings are sought which may sharpen our clinical suspicion of the aetiology of the haemorrhage. A history of periodic indigestion and antacid consumption suggests acid-peptic disease. Gastritis should be suspected in any patient with an upper gastrointestinal bleed which occurs in association with a recent episode of heavy ingestion of alcohol or salicylates, or in the patient who is severely ill, such as an individual in the intensive care unit for multiple trauma, sepsis, burns, cerebral lesions or hepatic encephalopathy. A history of prolonged alcohol intake also raises suspicions of bleeding from oesophageal or gastric varices due to portal hypertension and chronic liver disease; do not be surprised, however, if the patient minimizes the extent of his ethanol abuse. A history of repeated retching or vomiting followed by haematemesis is suggestive of the Mallory-Weiss syndrome, although an acute oesophageal tear may occur without this presenting history. The Rendu-Osler-Weber syndromes, haemophilia and von Willebrand's disease should be suspected if there is a history of a bleeding disorder such as nose-bleeds, or cutaneous and joint haemorrhages. Although carcinoma of the stomach is a rare cause of acute gastrointestinal bleeding, this possibility should be suspected in the older individual who has experienced pain, mass loss, early satiety and aversion to meat.

The physical examination is crucial in evaluating the circulatory state of the patient and in raising the suspicion of chronic liver disease predisposing to bleeding oesophageal varices. Is there hepatomegaly, splenomegaly, ascites, jaundice, dilated abdominal wall veins, spider angioma, palmar erythema, leukonychia, gynaecomastia, testicular atrophy or parotid enlargement? Pigmentation of the lips and mucocutaneous junction suggests the Peutz-Jeghers syndrome. Epigastric tenderness or succussion splash suggests peptic ulcer disease and gastroduodenal outlet obstruction. In the older person with evidence of atherosclerosis, cardiac arrhythmias, abdominal or femoral bruits and a pulsatile mass in the abdomen, be on your guard for a leaking abdominal aneurysm. If the abdomen is silent on auscultation and if a perforated viscus can be excluded, suspect a mesenteric vascular occlusion.

There are a number of rare conditions associated with gastrointestinal haemorrhage and which can be readily suspected from the physical examination. Hereditary haemorrhagic telangiectasia (Rendu-Osler-Weber disease) should be suspected in the patient with the tell-tale lesions in the mucous membranes; remember to recheck for these lesions after blood transfusion, for sometimes it becomes possible only then to recognise the telangiectasia. Pseudoxanthoma elasticum should be suspected if the patient has Moro orocutaneous membranes; remember to recheck for these lesions after blood transfusion, for sometimes it becomes possible only then to recognise the telangiectasia. Ehlers-Danlos syndrome is suspected if there is abnormal skin elasticity and hyperextensible joints.
Diagnostic procedures
While the history and physical examination will heighten your awareness of the aetiological possibilities, more definitive measures are needed. Endoscopy has become the most popular diagnostic method and offers several advantages over radiology; surface lesions are seen, and it can be established whether a given lesion is the cause of the haemorrhage and whether the bleeding is continuing. Finally, the future holds some promise for therapeutic endoscopy in the bleeding patient. The cause of bleeding can be established by endoscopy in about 90% of patients; failures are usually due to profuse bleeding which obscures the view. This difficulty can usually be minimised by inserting a large nasogastric or Salem tube, and alternately aspirating and lavaging the stomach with cold water or saline. Once the returns of the gastric lavage are clear, an endoscopy can be performed. If the lavage remains bloodtinged, or if the nasogastric tube becomes blocked by a clot, the stomach can often be emptied with the aid of parenteral metaclopramide. There is no role for leaving the tube in place, since there are better ways to assess recurrent bleeding, and since the tube may itself cause harm by producing lesions in the oesophagus or stomach which may themselves bleed.

There are few contra-indications to endoscopy in the bleeding patient; they include acute myocardial infarction or acute arrhythmias, acute respiratory failure, recent abdominal surgery or perforation, and an uncooperative patient or one in delirium tremens. Endoscopy is also safe in children. When endoscopy is performed at an appropriate time in the patient’s illness, the complication rate is low, but emergency endoscopy does carry greater hazards than routine examinations. However, it is optimal to perform endoscopy early in the course of the admission, as soon as the patient’s cardiopulmonary status is stable, since the diagnostic yield of endoscopy decreases with increasing time between the bleeding episode and the examination, falling from about 90% when performed in the first 24 hours to 32% in those examined more than 48 hours later. For this reason, most experts would recommend endoscopy within 24 hours of admission.

Cause of bleeding
There are considerable differences in the spectrum of conditions causing bleeding, depending on clinical and radiological diagnoses, compared with those depending upon fibre-optic endoscopy. The marked discrepancies between the results obtained in endoscopy-controlled series may be due to differences in patient selection, timing of endoscopy and the use of nasogastric suction, which may be misinterpreted as gastritis. The proportion of patients bleeding from diagnosed lesions in the oesophagus, stomach and duodenum is about 15%, 50%, and 35% respectively (figure 1). The common oesophageal lesions include oesophagitis, oesophageal ulcer, tear, and varices; common gastric lesions include gastritis, gastric ulcer, gastric carcinoma and stomal ulcer. Acute superficial mucosal lesion are responsible for about 25% of upper gastrointestinal bleeds, while carcinoma of the stomach accounts for about 2%. Duodenal ulcer is the single most common cause of bleeding, and overt haemorrhage is a common complication of peptic ulcer disease, with an annual incidence of 1%.

In five series involving over 1 500 endoscopically-examined patients with upper gastrointestinal bleeding, chronic peptic ulcers were present in approximately 35% with a usual duodenal to gastric ulcer ratio of about 2:1. A word of caution: while duodenal ulcers may be common in the bleeding patient, emergency endoscopy had demonstrated duodenal ulcers in many patients who are bleeding from another source. Indeed, multiple lesions have been reported in 4 to 51% of all bleeding patients. Note the importance of oesophageal lesions and the need to emphasize that several endoscopic studies have shown that approximately 50% of patients known to have oesophageal varices are bleeding from other lesions.

The critical value of endoscopy
While it is well accepted that early endoscopy in the patient with an upper gastro-intestinal haemorrhage will likely provide the diagnosis of the aetiology of the bleed, one must critically challenge whether knowledge of the bleeding site influences the decision-making process, and whether the patient derives some ultimate or substantial benefit. Does endoscopy affect mortality trends? Between 1973 and 1977, seven studies reported an average mortality rate of 10% in over
2,000 patients on whom endoscopy was performed. However, despite improvements in anaesthesia, surgery, intensive care and diagnostic procedures, the over-all mortality rate for acute upper gastrointestinal bleeding has altered little over recent years. However, the reported mortality rates have remained fairly constant despite a steadily aging patient population associated as it is per se with a higher mortality rate.

The only significant prospective trial of the influence of early fibre-optic endoscopy was initiated by Dronfield et al. The diagnostic yield was higher in the endoscopy as compared with the radiology group, but the length of hospital stay and mortality rates were comparable. This remains a controversial issue, but perhaps the apparent failure of endoscopy to improve prognosis may be related at least in part to a number of factors such as the age of a patient, as well as the proportion of patients with bleeding varices, associated as they are with a high mortality rate. A definitive, controlled clinical trial would be of merit, but the call for such a study will likely go unanswered.

An accurate diagnosis is only helpful if effective and selective treatments are available. Perhaps the prospective trials on the efficacy of cimetidine (Tagamet®) in the patient with the upper gastrointestinal bleeding will prove beneficial. Perhaps selective coeliac vessel catheterisation and Pitressin® infusion will prove to be beneficial in selected patients. Only with correct diagnosis of bleeding varices can efforts be made to correctly manage this life threat. Indeed, what surgeon would forgo the knowledge of the source of bleeding before opening the abdomen or chest? This is particularly pertinent in the cirrhotic patient who may well have varices, but has an equal chance of bleeding from some other source. “Only by providing an accurate diagnosis can these different groups be separated and some attempt made to improve management.” Thus, the jury is undecided, and I continue to perform early endoscopy for the peace of mind derived from knowing the site of bleeding, and the hope that my therapeutic decisions will be more logical and sound. Finally, perhaps the prognosis for the bleeding patient will improve with the advent of therapeutic endoscopy.

**Therapeutic endoscopy for upper gastrointestinal bleeding**

Since the topic of gastrointestinal haemorrhage was last reviewed in depth, there have been a number of advances, including therapeutic endoscopy. The ideal endoscopic treatment for acutely bleeding upper gastrointestinal lesions would be safe, convenient and effective. A variety of techniques are in the developmental stage, including electrocoagulation, lasers, heater probes, haemostatic clips, injection techniques and tissue glue; these are experimental but may show some clinical promise.

a) **Oesophageal varices**

Sclerotherapy of oesophageal varices is feasible via a fibre-optic endoscope; yielding an encouraging success rate in patients in whom other non-surgical methods failed to control acute variceal haemorrhage. Mortality rates following sclerotherapy vary between 15 to 47% for early and 9 to 19% for late follow-up. The prevalence of recurrent haemorrhage varies from 11 to 55%, and when bleeding does occur from recurrent or persistent varices, they are resclerosed as appropriate. Local application of tissue adhesions or clips is still experimental; local electrocoagulation is appropriate for small surface lesions, but hazardous for ulcers or larger vessels.

b) **Laser photocoagulation**

An exciting new approach to the non-operative treatment of upper gastrointestinal haemorrhage is laser photocoagulation. Laser beams (an acronym for light amplification by stimulated emission of radiation) are an intense form of light energy which is converted to thermal energy when the beam hits a suitable absorptive surface. When the appropriate beams strike the mucosa, and sufficient thermal energy is delivered to the bleeding site, the tissue proteins are denatured and a coagulum is formed. In the argon gas laser, a high voltage is applied to the trapped gas, a high energy level is achieved, and the excited gas emits electromagnetic radiation. The principle is similar in the solid state crystalline neodymium YAG (Nd:YAG) lasers: an optical flash lamp excites atoms within a solid rod, and the emitted light energy oscillates between mirrors, interacts with other atoms which emit light energy which then is controlled to leave the laser cavity and be transmitted down a filament...
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...ment waveguide in the fibre-endoscope, where the beam can be appropriately directed and focused on the source of bleeding (Figure 2).

Animal studies and potential future clinical application

The argon laser photocoagulation has been used in acute and chronic experiments in animals in which low to moderate power was applied to intact oesophagus, stomach, duodenum and colon without danger of excessive tissue injury of perforation; uncontrolled studies in dogs with experimental bleeding gastric ulcers have demonstrated the haemostatic potential of photocoagulation with low-power argon lasers. Using a reproducible model of a massively bleeding acute gastric ulcer in the heparinised dog, Silverstein and co-workers demonstrated a significantly higher rate of haemostasis in lesions treated with high-power (seven watts) argon laser photocoagulation, as compared with control animals or those treated with low-power photocoagulation (one watt); the addition of a coaxial jet of carbon dioxide to the argon laser catheter removes overlying blood, transiently prevents further bleeding from the lesion, thereby allowing more accurate deposition of laser energy onto the bleeding vessels, and markedly increases the efficacy of argon laser photocoagulation. The Nd:YAG laser compares favourably with the haemostatic results obtained with the argon laser in animal studies.

Clinical experience is as yet incomplete, and the few studies are uncontrolled, and thus the expected rate of spontaneous cessation of bleeding is unknown. Nonetheless, the available data does suggest some potential clinical use for argon and Nd:YAG laser photocoagulation in arresting bleeding from the gastro-intestinal tract, although the potential complications have not yet been fully elucidated. The technique is not yet available for general use, but extensive clinical experience has been achieved by Kiefhaber in Munich with impressive results using the Nd:YAG laser in over 500 patients.

Major decisions

The most important decision in any patient with gastrointestinal bleeding is whether the treatment is to continue to be medical, or whether surgical intervention is necessary. The decision will depend upon the answer to several questions:

1. Which patient bears the greatest mortality risk from the bleed?
2. Which patient is the greatest surgical risk?
3. Which bleeding lesion is most likely to continue to bleed?

The answers to these questions and the decisions based upon them require a team approach by a surgically oriented internist and a conservative surgeon. Because of this need for close cooperation, it is best to involve both members of the team at the very outset. Emergency surgery may be necessary in patients bleeding from the upper gastrointestinal tract, but while usually being of benefit, surgery may, of course, also contribute to the high mortality rate. Thus, patient selection is critical. Factors determining an adverse prognosis in bleeding patients include increasing age over 60 years, haematemesis rather than melena, or a low blood pressure and haemoglobin concentration on admission. The mortality rate is higher for bleeding varices, gastric carcinoma or benign gastric ulcer. Most reports suggest that a history of previous haemorrhage from a peptic ulcer does not necessarily affect the prognosis for the patient in a subsequent bleeding episode, since it appears to be the age of the patient rather than the age of the ulcer that affects prognosis. About 20% of patients continue to bleed or have a recurrent haemorrhage, usually within the first two days after admission.

Using endoscopy, are there any criteria with value in predicting which lesion will continue to bleed or is likely to rebleed? When fresh bleeding, adherent clot or slough, or a protruding vessel are seen, the patient has a high probability of requiring surgery. How does one best suspect recurrent bleeding?

Recurrence of bleeding should be suspected when a patient whose vital signs have been stabilised again complains of abdominal discomfort and thirst, becomes anxious, or has a fall in blood pressure, a rise in pulse rate and active bowel sounds. If the stomach has previously been lavaged clean of blood, or if endoscopy has previously shown no active bleeding, and if the patient subsequently vomits blood some hours later, then the diagnosis of recurrent haemorrhage is clear. The value of gastric aspirations in detecting rebleeding is unconvincing, and the continued presence of occult blood in the stool does not necessarily indicate persistent haemorrhage.

Feeding the patient

There is no general agreement on whether patients presenting with an upper gastrointestinal bleed should be fasted or fed in the first days of admission. Certainly medications, including antacids, should be given by mouth; there is no evidence that food causes rebleeding. It is likely acceptable to feed the patient on an ordinary ward diet once he has stopped vomiting, when he is hungry and expresses the desire to eat, and when there is no immediate prospect of surgery.

Summary

The patient with an upper gastrointestinal haemorrhage must be enthusiastically resuscitated, carefully followed by both an internist and a surgeon, and submitted to early endoscopy. When bleeding continues or recurs, the patient will likely require surgery, especially if he is over 60 years of age. Therapeutic endoscopy may provide a future promise for non-surgical management.

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References are available upon request from the editor.