

“HOW I DO IT”

Management of upper gastrointestinal bleeding



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How I do it: Management of upper gastrointestinal bleeding

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How I Do It

Joseph JY Sung

Introduction

The management of patients with upper GI hemorrhage requires a multidisciplinary approach mandating cooperation among medical and surgical gastroenterologists with access to skills in endoscopic and surgical hemostasis. Endoscopic therapy is often the first treatment in most management algorithms. Institution-specific protocols should be in place for the care of such patients. Approximately 80%–85% of upper GI bleeding stops spontaneously and supportive therapy only is required [1]. In the remaining 15%–20% of cases bleeding continues or recurrent bleeding develops, and these patients constitute the high-risk group with substantially increased morbidity and mortality. Early risk stratification of patients with upper gastrointestinal bleeding, based on clinical and endoscopic criteria, facilitates the delivery of the appropriate level of care to patients, thereby conferring important resource implications.

Initial management

Patients with acute bleeding should be evaluated immediately on presentation. A rapid assessment should be performed to establish whether: 1) the airway is compromised, 2) there is active bleeding, and 3) the patient is hypovolemic. Orthostatic vital signs can help in the determination of lesser degrees of intravascular volume depletion. Postural hypotension is often present and indicates a 10%–20% reduction in blood volume. Fluid resuscitation takes priority in the presence of any of the above signs, and venous access via one or more wide-bore cannulas is essential.

Patients with severe acute bleeding require admission to a high-dependency or intensive care unit. Those with significant cardiopulmonary disease are fragile patients and may require intense monitoring that includes central venous pressure measurements. Intravascular volume should be promptly replenished with crystalloid solutions to maintain organ perfusion, and supplemental oxygen should be administered to augment oxygen-carrying capacity of blood.



Is a nasogastric tube required?

The routine insertion of a nasogastric tube prior to endoscopy may not be necessary. Nasogastric tube placement with lavage prior to endoscopy is often ineffective, as blood tends to form clots and may thus be difficult to aspirate. Bleeding lesions are often sited at the lesser gastric curvature, angular notch, gastric antrum, or bulbar duodenum while blood generally pools in the gastric fundus and corpus. An endoscopic examination is often possible and adequate with suction aspiration and patient positioning. The insertion of a nasogastric tube is associated with a small risk of aspiration, in particular among obtunded patients. On occasions when the source of GI bleeding is uncertain, the insertion of a nasogastric tube can help to confirm an upper GI bleeding source, with the presence of gross blood or coffee ground-like substances in the gastric aspirate. In contrast, a clear nasogastric aspirate does not exclude upper GI bleeding inasmuch as bleeding may be episodic or the lesion might be located distal to the stomach in the presence of a competent pylorus, preventing retrograde reflux of blood from the duodenum. Nevertheless, the nature of nasogastric aspirates can serve as a prognostic indicator.

How early should endoscopy be arranged?

Early endoscopy is usually defined as performance of the examination within 24 hours of the patient's admission. This procedure allows risk classification and hence safe and early discharge of patients classified as low-risk. In high-risk patients, it is logical to believe that the early control of bleeding reduces transfusion requirements and organ dysfunction and generally improves patient outcome. Those with signs of ongoing bleeding after initial resuscitation, such as fresh hematemesis or fresh hematochezia and hypovolemic shock, should undergo urgent endoscopy to locate the source of bleeding and for possible endoscopic therapy. Otherwise, endoscopy within 24 hours is reasonable.

When should we apply endoscopic hemostasis?

The endoscopic features of an ulcer are important prognostic indicators. The presence of stigmata of recent bleeding in an ulcer confirms the source of bleeding. Three decades ago, Forrest & Finlayson categorized ulcers into those that were actively bleeding, those that showed stigmata of recent bleeding, and those that had a clean base [2]. The nomenclature has since been in widespread use. Forrest class I ulcers are those with active bleeding, which can be either spurting (Forrest class IA) or oozing (Forrest class IB). Stigmata of recent bleeding belong to Forrest class II: non-bleeding visible vessel, IIA; adherent clots, IIB; and flat pigmented spots, IIC. Ulcers with a clean base belong to Forrest III. Endoscopic treatment should be applied to both actively bleeding ulcers and ulcers with a visible vessel.



Ulcers with flat pigmented spots and clean bases are associated with low risks of recurrent bleeding. Endoscopic therapy in these cases is not warranted. There were some controversies about what to do with an ulcer with an adherent clot or protuberant vessel. Several randomized studies and a recent meta-analysis indicated that these ulcers should not be left to be managed with medical therapy only. Endoscopic hemostasis may reduce the risk of recurrent bleeding [3].

Endoscopic stigmata should be interpreted along with clinical factors as well as other endoscopic features, including the size and the site of bleeding ulcers. Ulcers at the lesser curvature of the stomach or the posterior duodenal bulb belong to the high-risk category because of their proximity to the left gastric artery and the gastroduodenal artery complex, respectively.

Which endoscopic therapy?

Endoscopic hemostatic therapy is now widely accepted as the first-line therapy for upper GI bleeding. Numerous clinical trials have been published confirming the efficacy of endoscopic therapy. The majority of these clinical trials demonstrated a reduction in recurrent bleeding and the need for surgical intervention with the use of endoscopic therapy. Endoscopic therapy can be broadly categorized into injection therapy, thermal coagulation, and mechanical hemostasis. Thermal devices can be further divided into contact and non-contact types. In spite of the large volume of published literature, no single solution for endoscopic injection has been established to be superior to another for achieving hemostasis. Similarly, no single method of endoscopic coaptive therapy is superior to others. Mechanical hemostasis is as good as thermal approaches, if it can be applied successfully. Combined treatment with injection followed by thermal coagulation or hemoclips may provide the best results [4,5].

When should proton pump inhibitors be used?

Proton pump inhibitors (PPIs), when given at high doses, can shut down acid secretion in the stomach and help to stabilize blood clotting on peptic ulcers. A randomized study has shown that when intravenous PPIs are combined with endoscopic therapy, the rebleeding rate can be reduced to a minimal level [6]. In a systematic review including 9 trials (1829 patients) with either placebo or H₂-receptor antagonists as control, the use of PPIs was associated with 50% reductions in the rate of recurrent bleeding and the need for surgery [7]. The use of PPIs also led to a trend of reduction in mortality. However, no study has compared high-dose PPI infusion with oral PPIs after endoscopic hemostasis. Intra-gastric pH control with oral PPI is suboptimal since the oral absorption of a PPI is not always reliable in critically ill patients. Based on the above studies, it would appear that the optimal approach to the management of bleeding peptic ulcer should include early endoscopic treatment for patients with high-risk ulcers, followed by a high-dose PPI infusion to prevent recurrent bleeding.

PPIs given prior to endoscopy have been found to reduce the occurrence of active ulcer bleeding and therefore reduce the need for endoscopic therapy [8]. In settings where 24-hour emergency therapeutic



endoscopy is not available, this should be considered as a stopgap treatment.

Is routine second-look endoscopy necessary?

Some endoscopists would routinely schedule patients for a second-look endoscopic examination the next morning, followed by the re-treatment of remaining stigmata of bleeding. A meta-analysis pooling several randomized trials showed that recurrent bleeding can be partially prevented [9]. However, the use of second-look endoscopy in a routine fashion cannot be recommended for the following reasons. First, the gain from a second-look endoscopy appears modest as shown from the pooled analysis. Second, most trials used epinephrine injection alone, which may represent a suboptimal index treatment; with an improved index therapy, the yield from a second treatment may diminish further. Third, repeat endoscopic treatment, especially with thermocoagulation, increases the risk of perforation. Finally, the use of adjunctive PPI infusion may obviate repeat endoscopy after endoscopic control. Nevertheless, it may be logical to consider selective re-endoscopy and re-treatment in cases in which the index endoscopic therapy may have been difficult and suboptimal and in patients with subtle signs of recurrent bleeding.

Is there a role for surgery?

Although endoscopic therapy has clearly reduced the need for surgical intervention, surgery retains an important role. Indications for emergency surgery include: (i) failure to secure active bleeding by endoscopic or angiographic means, (ii) inability to access a bleeding source due to anatomical reasons, (iii) rapid exsanguination and the inability to identify a bleeding lesion, and (iv) an endoscopic treatment complication, such as a perforation. Many would also recommend surgery after two episodes of recurrent bleeding after initial endoscopic control.

At the time of recurrent bleeding, the dilemma often faced by the managing physician is whether to once again attempt endoscopic treatment or to refer the patient directly to surgery. A randomized trial involving patients who re-bled after initial endoscopic control of their bleeding ulcers suggested that surgery is more successful in securing hemostasis, but at the cost of post-surgical complication [10]. A second attempt at endoscopic therapy may be a sensible option when the surgical risk is high.

What if endoscopy fails to stop bleeding and surgery is too risky?

Angiographic transcatheter embolization is a therapeutic option in patients who do not respond to endoscopic hemostasis and are otherwise poor candidates for surgery. Catheter and guideline technology have evolved significantly in recent decades. Superselective cannulation using 3- to 5-Fr catheters and micro-coils is now the standard for transcatheter embolization, with more durable hemostasis and reduced ischemic complications. Considerable skill and expertise are required. Angiographic embolization of a posterior bulbar duodenal ulcer, for instance, requires selective cannulation to the gastroduodenal artery via the celiac trunk and branches of the superior mesenteric artery. Retrograde filling via the inferior pancreaticoduodenal branch through confluence of the superior and inferior arterial arcades becomes



possible if the ulcer is approached via the celiac axis alone. Endoscopic clipping of the bleeding point may help location of feeding vessels in upper gastrointestinal bleeding.

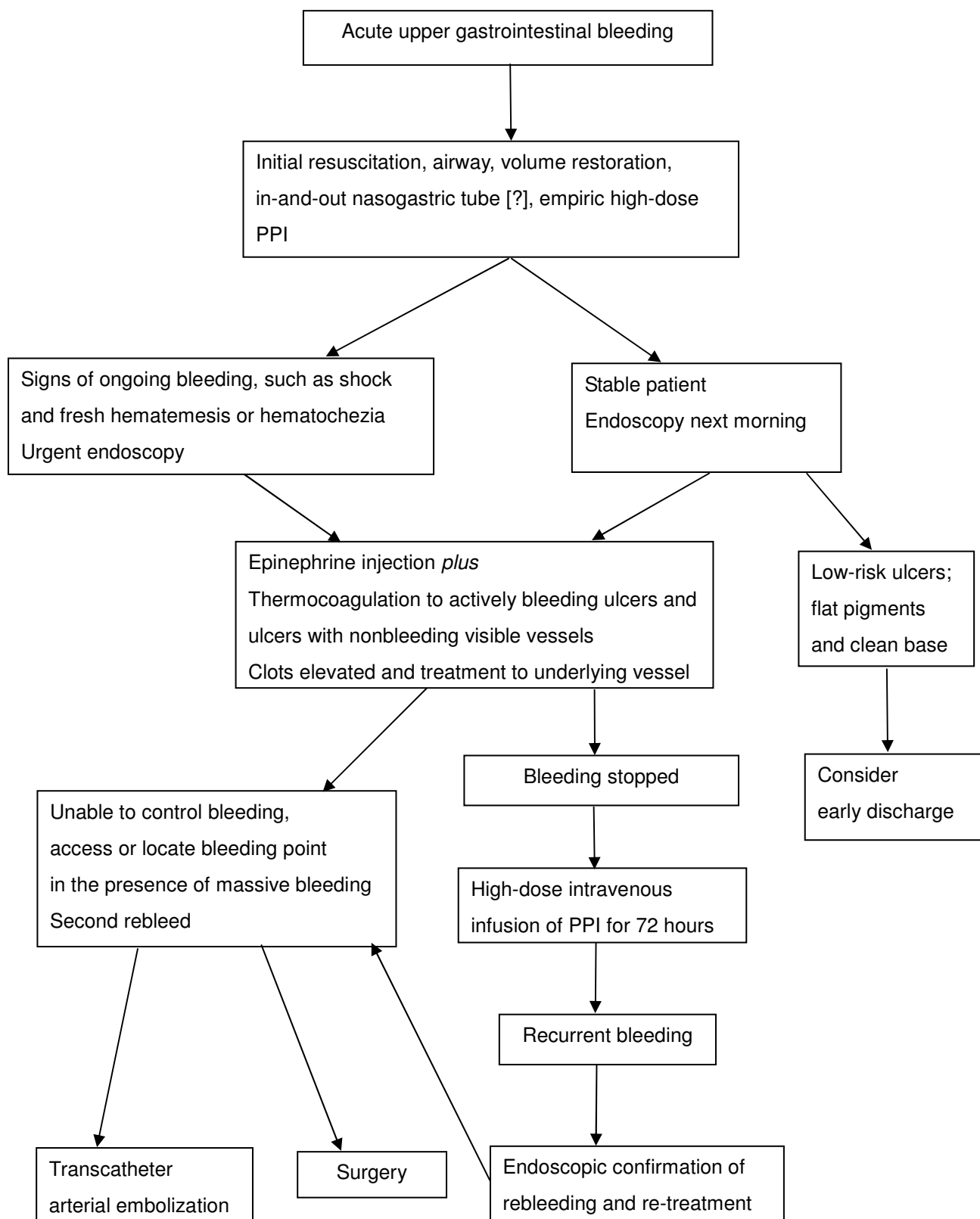
The management algorithm for upper gastrointestinal bleeding is shown in **Figure 1**.

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Figure 1. Management algorithm for upper gastrointestinal bleeding.



“HOW I DO IT”

Management of upper gastrointestinal bleeding: *Comment*

David J. Bjorkman

Introduction

Dr. Sung has provided an excellent and comprehensive outline of the clinical approach to nonvariceal upper gastrointestinal bleeding. He has provided an excellent flow chart to illustrate the appropriate approach. There is little that I can add to his description, but I will endeavor to highlight some points that Dr. Sung has made that we find particularly important.

Initial management

As Dr. Sung has noted, the majority of nonvariceal upper gastrointestinal bleeding (80%) ceases spontaneously. The clinical outcome for these patients is determined by the volume of blood lost and their underlying illnesses. This makes the initial focus on the hemodynamic status of the patient the most important clinical activity for all patients with upper GI bleeding. Other diagnostic and therapeutic activities should not interfere with immediate assessment of the hemodynamic status of the patient and the replacement of intravascular volume. In patients who have had bleeding significant enough to produce tachycardia or orthostatic hypotension, intravenous access should be established promptly in two locations. The size of the intravenous catheter should be large enough to replace volume quickly and transfuse blood products, if clinically indicated.

Preparation for endoscopy

Early endoscopy is indicated in all patients with clinically significant acute upper gastrointestinal bleeding. Preparation for endoscopy should include hemodynamic stabilization and assessment of the patient's airway. If there is concern about possible airway compromise, an endotracheal tube should be placed prior to endoscopy. This may also help avoid aspiration in patients with vigorous ongoing bleeding.

Nasogastric aspiration can confirm that the bleeding lesion is in the upper GI tract and identify persistent bleeding. While a negative aspirate does not rule out an upper GI bleeding source, the presence of large amounts of fresh blood or clots suggests that more vigorous lavage of the stomach using an orogastric tube may be needed to allow adequate visualization of the entire gastric and duodenal mucosa. Some endoscopists have recommended that intravenous erythromycin should be given to patients with large clots in the stomach, to stimulate gastric activity and move the clots distally. It may not be possible to remove all blood from the stomach prior to endoscopy. Spraying dilute



hydrogen peroxide through a catheter at the time of endoscopy may cause the blood to blanch and aid visualization.

Timing of endoscopy

There have been multiple studies of different scoring systems to predict the rebleeding rate and mortality for patients with nonvariceal upper GI bleeding. All have demonstrated that the best predictor for rebleeding is the endoscopic appearance of the ulcer or other lesion. The presence of active bleeding, a visible vessel or an adherent clot increases the likelihood of rebleeding. Endoscopic therapy is indicated in patients with these stigmata. On the other hand, patients with clean-base ulcers or flat pigmented spots are unlikely to have subsequent bleeding and do not require endoscopic therapy. Scoring systems without endoscopy may identify some patients with small volume bleeds who are at very low risk. Ultimately all patients with upper GI bleeding should have endoscopic evaluation and possible treatment.

The decision on the optimal timing for endoscopy is based upon the ability of endoscopy to identify high-risk lesions that will benefit from immediate therapy and aggressive medical care in the hospital and also to identify low-risk patients who have a very low risk of rebleeding who may be treated as outpatients. In order for this triage to occur, endoscopy should ideally be performed prior to a decision for admission to the hospital. This is not possible in some institutions for logistical reasons, but efforts should be made to have endoscopy performed at the earliest possible time (within 24 hours) to allow prompt discharge of low-risk patients and more aggressive care for high-risk patients.

Recent data suggest that intravenous proton pump inhibitor therapy may be indicated in all patients with nonvariceal upper GI bleeding while they are waiting for endoscopy, as it may decrease the prevalence of high-risk lesions on the endoscopic examination. The intravenous therapy can be discontinued in low-risk patients and should be continued in patients with high-risk stigmata. As Dr. Sung points out, rebleeding rates are decreased by PPI therapy in the latter group of patients, but not in the low-risk group.

Endoscopic therapy

Dr. Sung has provided an excellent overview of the options for endoscopic therapy. It is important to emphasize that injection of large volumes of saline or dilute epinephrine can provide temporary tamponade of bleeding lesions to aid subsequent therapy, but is not adequate to provide definitive hemostasis. Thermal (electrocautery, heater probe) or mechanical (clips) therapy should always follow injection therapy. Thermal treatment and clips are equally effective with and without simultaneous injection therapy. The selection of a specific technique should be based upon the endoscopist's experience and the specific clinical situation.

In the setting of an adherent clot, which cannot be removed by vigorous flushing, injection of saline or



dilute epinephrine around the base of the clot should be performed prior to clot removal. It is possible to precipitate significant bleeding by dislodging the clot. Pretreatment with injection therapy may partially mitigate this bleeding and facilitate subsequent definitive endoscopic therapy.

When rebleeding occurs, a second application of endoscopic therapy may prevent further bleeding and avoid emergency surgery. Routine second-look endoscopy with repeated therapy has been advocated by some, but appears to have only a small marginal benefit in the reduction of bleeding. Most experienced endoscopists will have a sense of how effective a session of endoscopic therapy is likely to be. In some situations the therapy is performed easily with good effect on the bleeding lesions. In other situations the location of the lesion or retained blood may make the therapy technically more difficult. In situations where the initial therapy was felt to be suboptimal there may be a role for a scheduled second therapeutic endoscopy to make sure that the lesion has been adequately treated.

Failure of endoscopy and pharmacologic therapy

Some patients may not respond to vigorous medical and endoscopic therapy. If repeated endoscopic therapy fails to control the bleeding, other modalities must be considered. Surgery is the most common approach to uncontrolled bleeding, as even large bleeding vessels can be directly visualized and ligated. In situations where severe co-morbid illness prevents surgery, angiographic therapy may be possible.

Therapy after bleeding

After the initial bleeding episode has been treated, a full course of oral PPI therapy should be completed to aid hemostasis and heal the ulcer. A search for the cause of the ulcer (*Helicobacter pylori*, nonsteroidal anti-inflammatory drugs [NSAIDs]) should identify ways to prevent the ulcer from recurring. *H. pylori* should be treated, and NSAIDs should be discontinued. If NSAIDs or aspirin must be continued, chronic PPI therapy is indicated to reduce the risk of rebleeding. There are no data to support routine endoscopic examination after healing of a bleeding ulcer. Recurrent symptoms or evidence of recurrent bleeding, however, should prompt another endoscopic examination.



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Management of upper gastrointestinal bleeding:

Summary

K. R. Palmer

Drs Sung and Bjorkman agree on the treatment algorithm for nonvariceal upper gastrointestinal bleeding and their comments are consistent with published guidelines.

Hematemesis and melena has become the province of the therapeutic endoscopist; surgery and interventional radiological procedures are now rescue therapies in patients not responding to endotherapy.

Deaths are almost entirely restricted to patients who have significant medical co-morbidities; bleeding may decompensate critical diseases affecting major organ systems leading to life-threatening events. This is reflected in the observation that the mortality of acute bleeding amongst patients who are hospitalized for other medical or surgical diseases is much higher than that of patients who are admitted because of bleeding. A recent UK audit for example recorded a mortality of 26% for inpatients who bled compared to 7% amongst patients admitted because of bleeding. It follows that active management of co-morbidity is crucial to best outcome and that when individual patients present with acute gastrointestinal hemorrhage, co-morbidity is recognised and actively treated. We should for example be involving the acute physician, high-dependency unit doctors, and colleagues in other medical specialties in our initial assessment in order to get the patients into the best possible condition prior to endoscopy. If we are to significantly to improve outcome, it is clear that managing co-morbidity is crucial.

It is interesting to observe different approaches to management in the USA, Asia, and Europe. In the UK for example there has been a movement away from passage of a nasogastric tube in patients presenting with acute GI bleeding, for the reasons outlined by Dr Sung. Nasogastric tubes are unpleasant for patients and in my opinion have little diagnostic utility since all patients with major active bleeding will come to endoscopy; furthermore there is an impression that nasogastric tubes may confuse the diagnosis by causing erosions in the esophagus and could worsen variceal bleeding. There is no evidence that they improve outcome.

The timing of endoscopy sometimes presents logistic problems, since (at least in the UK) not all units are in a position to provide optimal out-of-hours endoscopy. As both authors indicate, an endoscopy is no longer voyeurism, rather it is an important therapeutic modality and as such requires not only an expert endoscopist and optimal equipment but assistants who are familiar with endoscopic therapy. For the majority of patients it is clear that endoscopy within 24 hours is optimal since the procedure will be done in an appropriate environment and by the right team. Clearly however, actively bleeding shocked patients will require emergency out-of-hours endoscopy following appropriate resuscitation.



When this is done, in my personal view, it should be supported by anesthetic cover and in many patients this will entail endotracheal intubation at the time of the endoscopy. This facilitates what is often the most difficult of all endoscopic procedures – in the actively bleeding patient in whom access is difficult and in whom support of medical co-morbidity is absolutely crucial to best outcome.

It is very clear that dual endoscopic therapy is now standard of care and that in many cases second-look endoscopy within 24 hours is required, particularly if endotherapy at the first session was less than satisfactory.

Both authors recommend administration of proton pump inhibitor drugs prior to endoscopy, yet this is something that I believe should be questioned. In 80% of cases bleeding stops spontaneously and there is no evidence to show that outcome is improved by acid suppression in this group. Whilst we know that major endoscopic stigmata are less evident in patients receiving PPIs prior to endoscopy, this has not translated into better rebleeding rates or mortality in those receiving these drugs. More important, however, is the message that endoscopic therapy, not acid-suppressant drugs, is the first-line requirement for patients with major GI bleeding; using PPIs as a stopgap or substitute is wrong. British guidelines have stated that PPIs are only required following endoscopic identification of major endoscopic stigmata, and we do not support their use prior to endoscopy.

Finally the message that the management of acute GI bleeding remains a multidisciplinary process is as cogent now as it was forty years ago when the primary treatment of such patients was surgical. Liaison between physicians and surgeons remains important but in addition we should now have greater liaison with other medical specialists. A very good example relates to the group of patients admitted with GI bleeding whilst taking aspirin and clopidogrel for severe vascular disease. Gastroenterologists tend to recommend stopping these drugs because of their adverse effects upon bleeding, yet whilst this may reduce the incidence of rebleeding, such a policy could actually increase overall mortality as more patients die from cardiac events. It is therefore important to discuss management with relevant expert colleagues to try to best define the risk–benefit balance of continuing or stopping antiplatelet drugs in individual bleeding patients.

