

The management of acute upper gastrointestinal bleeding

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ABSTRACT Smith, G.D. The management of upper gastrointestinal bleeding. *Nursing Times*; 100: 26, 40-43.

Acute upper gastrointestinal (GI) bleeding is one of the most common medical emergencies and most cases require urgent medical assessment. Half of all cases are due to peptic ulcer and this article focuses on non-variceal bleeding. The priority, following emergency hospital admission, is to support the circulation of the shocked patient rather than to identify the source of bleeding. After resuscitation the patient can have an endoscopy procedure. It is important that all nurses are fully aware of the signs, symptoms, and management of acute upper GI bleeding, issues that are all addressed in this article.

Gastrointestinal haemorrhage may be associated with an underlying disease state or trauma, or it may arise as a rare complication of investigative procedures such as diagnostic endoscopy. Acute upper GI bleeding accounts for 8 per cent of emergency hospital admissions (Higham et al, 2002). In the UK, the incidence is between 47 and 116 per 100,000 of the population and is higher in areas where there is socioeconomic deprivation (Dallal and Palmer, 2002).

Indications of upper GI bleeding include:

- Haematemesis (vomiting blood);
- Hypotension;
- Tachycardia;
- Melaena (passing of liquid, foul-smelling black stools).

Although there are multiple causes of upper GI bleeding, peptic ulcer remains the most common and clinically the most significant. Half of all upper GI bleeding is related to peptic ulcer disease – in up to 80 per cent of these cases bleeding will stop spontaneously; the remaining 20 per cent are at risk of death and will require interventions to achieve haemostasis. Other causes of upper GI bleeding include Mallory-Weiss tear, gastritis, oesophagitis, and neoplasm.

Peptic ulceration often results from a history of consumption of aspirin or other non-steroidal anti-inflammatory drugs (NSAIDs), such as ibuprofen. Unlike uncomplicated ulcers, infection with *Helicobacter pylori* is relatively unusual in peptic ulcers. Bleeding from peptic ulcers is due to the erosion of an artery by the ulcer. The severity of the bleed relates to the size of the ulcer and the size of the arterial defect.

Bleeding resulting from Mallory-Weiss syndrome usually follows violent retching. This is particularly common after drinking large volumes of alcohol. The degree of

bleeding can range from very small to torrential amounts. The majority of patients stop bleeding spontaneously but occasionally blood loss can be sufficiently prolonged to require endoscopic or surgical intervention.

Oesophageal varices are dilated veins at the junction of the oesophagus and the stomach. They protrude into the lumen of the oesophagus and are clearly visible under endoscopy. Massive bleeding results if a varix bursts, resulting in haematemesis, which may be rapid and fatal. Variceal bleeding is common in countries with a high incidence of alcoholic cirrhosis and is on the rise in the UK (Kumar and Clark, 2002).

Assessment

A rapid clinical assessment must be made in a patient with an acute upper GI bleed. Attempts to resuscitate patients with severe shock should begin immediately. It is extremely important to gain early venous access as there is a potential risk of peripheral shutdown. If the patient is conscious, she or he should be questioned about previous episodes of bleeding, dyspepsia and jaundice, and intake of alcohol and drugs.

Pulse, blood pressure, respiratory rate, and state of peripheral circulation should be noted and recorded by the nurse. A blood sample should be taken for cross-matching and to determine haemoglobin, haematocrit, platelet count, and prothrombin time.

A risk assessment score (Rockall score) has been developed for patients with acute GI bleeding. A series of independent risk factors (Box 1) is scored and the total score predicts clinical outcome (Rockall, 1996).

Investigations

A number of simple tests are available to confirm the severity of a patient's condition on arrival in hospital and to prepare her or him for treatment. These include:

- Haemoglobin concentration;
- Urea and electrolytes;
- Cross-match for blood transfusion;
- Liver function tests.

Shock related to GI bleed

Shock is a condition of acute peripheral circulatory failure caused by loss of circulatory fluid. In cases of acute upper GI bleeding, hypovolaemic shock can result from loss of blood or plasma. Hypovolaemia causes the body to use vasoconstriction and decreased urinary output to adapt to the loss of fluid. Glycogen breakdown increases, insulin is suppressed, and hyperglycaemia may result. The common signs and symptoms of hypovolaemic shock are listed in Box 2.

BOX 1. RISK FACTORS FOR DEATH AFTER ADMISSION FOR ACUTE UPPER GI BLEED

- Co-morbidity
- Age
- Presence of endoscopic findings
- Shock on admission (pulse rate >100 beats per minute/systolic blood pressure <100mmHg)

Patients with co-morbidity, such as hepatic failure or disseminated malignancy have a poor prognosis. Patients who develop upper GI bleeding following hospitalisation for other serious illness have a poorer prognosis than those who are admitted to hospital with a GI bleed. Those who present with haematemesis tend to have more severe bleeding than those who present only with melaena. Individuals under the age of 40 have a relatively low mortality rate but the risk of death from upper GI bleed increases steeply with age.

The presence of endoscopic findings is often associated with a high risk of re-bleeding. Spurting bleeding, a non-bleeding blood vessel visible within an ulcer, and large oesophageal varices with red spots are all associated with re-bleeding. Precipitating factors for upper GI bleeding are listed in Box 3.

Management of upper GI bleeds

Management of GI bleeding is limited in primary care and immediate hospital admission is usually required. Once hospitalised, initial priorities relate to the support of the patient's circulation as opposed to the identification of the source of the bleed. Endoscopy is usually performed only once resuscitation has been achieved.

Intravenous access should be obtained and oxygen therapy started. Patients in hypovolaemic shock, which is usually indicated by a pulse in excess of 100 beats per minute or a systolic blood pressure of less than 100mmHg, require intravenous infusion. The infusion of choice is normal saline (with the exception of patients with liver disease), and the rate of infusion relates to the severity of the shock.

Normal saline is not recommended in patients with liver disease as it may lead to the development of ascites (an abnormal collection of fluid in the peritoneal cavity). Blood transfusion may be required to restore haemoglobin levels if the bleeding is extreme.

Interventions

Optimum management of an acute upper GI bleed relies upon a team approach with the appropriate use of endoscopic therapy, drug therapy, and surgical interventions.

In recent years specially designed 'bleeding units' have emerged in order to optimise patient management by using agreed protocols and guidelines. These lead to the best management decisions based upon both endoscopic and surgical opinions. In all cases an intravenous line is set up immediately.

BOX 2. SIGNS AND SYMPTOMS OF HYPOVOLAEMIC SHOCK RELATED TO GI BLEED:

- Tachycardia (>100 beats per minute)
- Reduced systolic blood pressure (<100mmHg)
- Restlessness
- Pale, cool and clammy skin
- Increased anxiety

Endoscopy therapy

It is important first to confirm the location of the bleed before planning endoscopy therapy for a patient with an upper GI bleed. Most of the causes of upper GI bleeding are amenable to endoscopic therapy, unless the patient has not been adequately resuscitated.

The timing of the endoscopy is important and the endoscopist must be able to get a clear view of the bleeding site. Endoscopy is required to define the cause of bleeding, provide prognostic information and to apply haemostatic treatments.

At the time of diagnosis it is important for the physician to be prepared to treat the site of the bleed. With the development of nurse endoscopists this may be a role that trained nurse endoscopists will perform in the future. There are three basic endoscopic therapy approaches in upper GI bleeding – thermal, injection, and mechanical – none of which have been convincingly shown to have advantages over the others (Palmer and Church, 1999).

Thermal endoscopic therapy

The thermal method involves heater probe therapy that transmits preset amounts of heat energy to the source of the bleeding via a Teflon-tipped catheter. Haemostasis is achieved through a combination of tamponade and the application of heat.

Another form of thermal treatment is electrocoagulation, which is conducted using a bipolar electrode probe. This haemostatic probe is inserted through an endoscope channel to control GI bleeding. There is no need for a grounding pad because with a bipolar probe coagulation only takes place between two points. One point delivers the current and the other closes the circuit, which returns the current to a generator. This way electrical energy is converted into thermal energy on contact with tissue.

Other forms of thermal endoscopic techniques used for managing acute upper GI bleeds are laser photocoagulation and plasma coagulation.

Endoscopic injection therapy

Endoscopic injection therapy involves the injection of a chemical agent through a needle injector into or around a bleeding site to stop the haemorrhage. The mechanism by which endoscopic injection stops bleeding and prevents rebleeding remains largely speculative. A number of injection agents are available, including:

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This article has been double-blind peer-reviewed.

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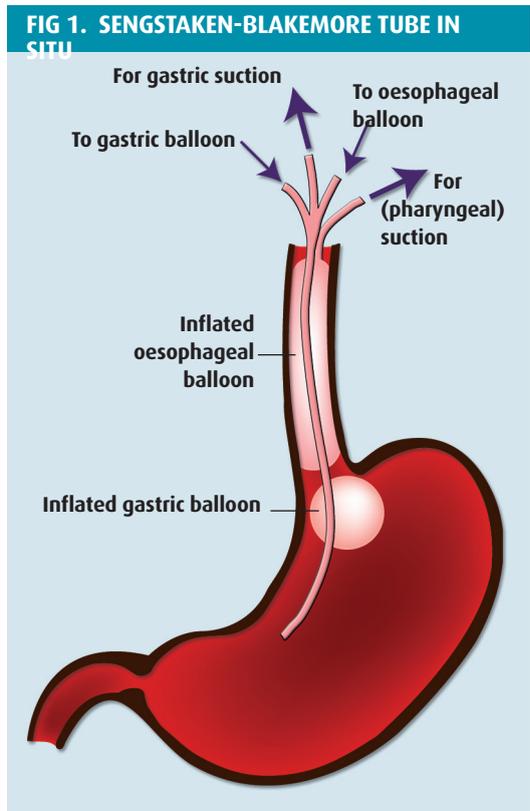
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- Sclerosing agents (5 per cent ethanolamine oleate in a base solution);
- Dilute adrenalin;
- Alcohol;
- Fibrin glue and thrombin.

Dilute adrenalin causes vasoconstriction. Alcohol works by dehydrating and fixing the exposed blood vessel and the surrounding tissue. The resulting local vasoconstriction and vascular wall degeneration leads to thrombosis. Palmer and Church (1999), in their review of therapeutic endoscopy for GI bleeding, believed either fibrin glue or thrombin to be the best injection material because these work by stimulating the formation of a stable clot at the site of an arterial defect.

Combination therapy using heater probe and adrenalin injection is currently recommended for non-variceal bleeding. This combined approach to treatment requires further investigation.

Mechanical methods

Although not used as commonly as the thermal or injection method, mechanical devices can also play a role in managing upper GI bleeding. There are several of these, including haemoclips and staples.

The application techniques for these devices are demanding, which appears to be the main drawback for their use. The role of mechanical haemostatic devices is still being studied.

The Sengstaken-Blakemore tube has four lumen with oesophageal and gastric balloons (Fig 1). It provides a

gastric aspiration port to allow drainage of fluids from below the gastric balloon (Christensen, 2004). It also provides for oesophageal aspiration, which is achieved by a secondary tube. A manometer is used to measure pressure in the balloons and to allow for insufflation. Nurses have a central role to play both in the insertion and observation of these tubes.

Before insertion, balloons need to be inflated and checked for defects. The following steps are then followed when inserting the Sengstaken-Blakemore tube via a patient's nose or mouth:

- The gastric balloon is inflated with 300ml of air and pulled until resistance is felt at the oesophageal-gastric junction. If the patient complains of sudden chest pain or if the insufflation of air is not audible over the epigastric region during insertion, then inflation should be discontinued immediately;
- If the patient is sufficiently stable, the gastric balloon's position is confirmed by X-ray. The balloon must be kept in place by tape or splinting, to anchor the tube and to put pressure on the lower oesophageal varices. This balloon can remain inflated for up to 48 hours but ideally the tube should not be inserted for more than 12 hours;
- If bleeding continues after inflation of the gastric balloon, the oesophageal balloon is inflated to 40mmHg (no more than 30ml of air). It must be deflated for 10 minutes every 4-6 hours or every five minutes per hour as directed.

Gastric aspiration should be carried out regularly to assess for continued bleeding. Oesophageal aspiration reduces the risk of pulmonary aspiration. Medications may be administered via the gastric aspiration lumen.

The nurse should monitor the inflation pressures and times with great care. The tube should be moved regularly to different sides of the mouth. Potential complications of oesophageal-gastric tamponade include:

- Rupture of oesophagus, related to a misplaced balloon;
- Aspiration;
- Tissue necrosis (arising from excessive pressure or prolonged balloon inflation time);
- Airway obstruction (secondary to dislodgement of the oesophageal tube).

Emergency removal of the tube may be required at any time. This can be achieved by cutting the tube, thereby deflating the balloons.

Close observation of vital signs, aspirate, urine output, and potential melaena will enable the nurse to assess the patient's haemodynamic status. Nausea and vomiting could increase variceal pressure and antiemetics should be administered as necessary.

This is a distressing procedure, and the patient may be anxious and agitated. This can be relieved by small intravenous doses of a benzodiazepine.

The patient's communication will be impaired and the nurse must be sensitive to cues that the patient is in discomfort due to problems such as ascites, itching or even alcohol withdrawal, all of which may be related to the underlying condition. The patient must be given psychological support during the procedure.

Drug therapies

Medical therapy for non-variceal bleeding should be examined separately from that for variceal bleeding.

The use of intravenous proton pump inhibitors (PPI) to deliver pharmacological agents for non-variceal upper GI bleeding following endoscopy therapy for bleeding peptic ulcer has generated great interest. Hb intravenous omeprazole has been shown to reduce the risk of rebleeding and reduce the need for surgical procedures. If a patient is infected with *Helicobacter pylori* they should receive triple-therapy eradication once haemostasis has been achieved to reduce the possibility of ulcer complications.

Drug therapy for variceal bleeding includes the use of vasoactive drugs (such as terlipressin), which have little effect on patient survival but reduce the chance of a bleed recurring.

Surgical intervention for non-variceal bleeds

Surgery is usually reserved for cases where endoscopic therapy has been unsuccessful. It is the best way of stopping active bleeding but carries with it higher mortality and morbidity rates (Dallal and Palmer, 2002). The main reasons for surgical intervention in cases of non-variceal upper GI bleeding include:

- Active bleeding – unresponsive to endoscopic therapy;
- Perfuse bleeding – prevents endoscopic visualisation;
- Continuous re-bleeding – despite technically successful endoscopic treatment;
- Patients at low risk of death who have experienced unsuccessful attempts at endoscopy.

Surgical treatment for acute variceal bleeding is rarely performed because of the high risk of mortality (Lau et al, 1999). Patients with acute variceal bleeds require transjugular intrahepatic portosystemic shunt (TIPPS), which carries a risk of encephalopathy.

Complications

Complications of GI bleeding may include the following:

- Anaemia from blood loss;
- Hypovolaemic shock from severe volume loss;
- Exsanguination from massive rapid intravascular

TABLE 1. NORMAL VALUES FOR HAEMOGLOBIN AND HAEMATOCRIT

Red blood cell (RBC)	Men 4.5–6.5 x 10 ¹² /l Women 3.9–5.6 x 10 ¹² /l
Haemoglobin (Hb)	Men 13.5– 7.5g/dl Women 11.5–15.5g/dl
Haematocrit (Ht)	Men 40–52% Women 36–48%
Mean cell haemoglobin concentration (MCHC)	20–35g/dl
Critical values haemoglobin	<7.0g/dl or >20.0g/dl

BOX 3. PRECIPITATING FACTORS FOR UPPER GI BLEEDING

- Duodenal and gastric ulceration
- Oesophagitis
- Gastritis
- Oesophageal varices
- Mallory-Weiss syndrome
- Carcinoma in the upper GI tract
- Less common causes of upper GI bleeding include Boerhaave's syndrome

blood loss;

- Aspiration from massive upper GI bleed;
- Disseminated intravascular coagulation from shock and clotting-factor loss.

It is essential that patients with bleeding be managed aggressively due to the increased mortality associated with continued bleeding.

Nursing considerations

The role of the nurse in managing a patient with an acute upper GI bleed requires specific attention. In the first instance, the nurse will have a specific role in the nursing care that assists a patient in hypovolaemic shock. Patient comfort can be maintained by assessing the need for analgesia. The nurse, who should be confident in ABC (airway, breathing, circulation) resuscitation, will also be required to undertake ongoing assessment the patient's fluid and electrolyte status.

Nurses should be aware that GI bleeds can often disguise another, less obvious problem. Therefore, nursing assessment of patients is of primary importance. It is essential to gain as much information as possible about a patient's health problems, use of medication, and alcohol intake. GI bleeds can often arise from alcohol abuse or the misuse of NSAIDs.

Physical assessment should focus on weight, skin condition and muscle wastage, and other signs of liver disease. Psychological well-being should be examined to determine whether a patient is unduly anxious because of the uncertainty of their prognosis or the multiple diagnostic and treatment procedures they may have endured. Patients need to be given sufficient time to discuss and explore the emotional aspects of their illness. Nurses should actively involve patients in education regarding diagnosis, drug therapy and causal factors. Appropriate primary care referrals may be required to provide adequate support.

Acute upper GI bleeding is the most common emergency managed by gastroenterologists. It has a major impact on health care resources, and the best management requires close cooperation between medical and surgical staff and nurses. ■