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Diagnostic and Treatment Tactics for Bleeding from Upper Part of Gastrointestinal Tract

O`roqov Shuxrat To`xtayevich
Aftab Ahmad
Bukhara State medical Institute, Uzbekistan

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ABSTRACT

Upper gastrointestinal bleeding (UGIB) is a rather frequent and highly morbid type of gastrointestinal bleeding. It can be precisely defined as the intraluminal bleeding from intestinal origin to the ligament of Treitz. It is more common in men than women in West- ern countries. The causes of UGIB may include peptic ulcer disease (PUD), gastric arte- riovenous malformation, Mallory Weiss tears, aortoenteric fistula, Malignancies (SCC). UGIB accounts for 75% of all gastrointestinal bleeding cases and requires a great deal of careful diagnostic as well as treatment strategies. After clinical presentation, initial diagnostic procedures like complete blood count, liver function tests and international normalized ratio must be rapidly done. Risk of rebleeding should be assessed by using scoring systems such as Rockall and Blatchford scoring. After that, patients are recom- mended to undergo some procedures like endoscopy, multidetector computed tomography angiography, radionuclide scintigraphy and catheter arteriography. Treatment strategies for UGIB may include pre-endoscopy, endoscopy and post-endoscopy management. The diagnosis as well as treatment strategies are greatly dependent upon professional ex-pertise with highly integrated interventional radiology, internal medicine, emergency medicine, gastroenterology and general surgery. Herein this study we report, the diagnosis as well as treatment strategies are greatly dependent upon professional expertise with highly integrated interventional radiology, internal medicine, emergency medicine, gastroenterology and general surgery his review article is aimed at concise overview of diagnostic procedures as well as treatment strategies which may help the physicians and clinical practitioners to effectively manage UGIB patients.

An electronic search was made of all adult (N18 years of age) patients with acute GIB admitted to the emergency department (ED) of Chang Gung Memorial Hospital (Taoyuan County, Taiwan)—a tertiary care, university affiliated hospital—with an admission diagnosis of gastrointestinal (GI) bleeding (International Classification of Diseases, Ninth Revision codes 5780, 5781, and 5789). This search was made from our hospital's medical record database and began from January 2006 to July 2006. These patients were then further selected for the absence

of bleeding esophageal varices (International Classification of Diseases, Ninth Revision, Clinical Modification code 4650). Patients thus chosen for study had the diagnosis of UGIB without bleeding esophageal varices confirmed on endoscopy.

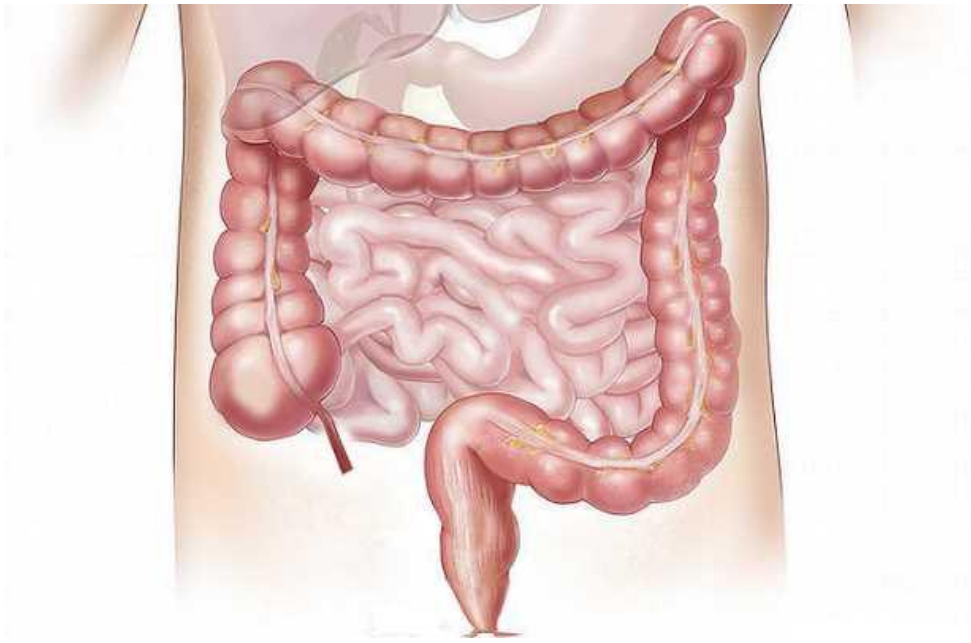


Fig.1: Upper gastrointestinal bleeding Information

Gastrointestinal (GI) bleeding refers to any bleeding that starts in the gastrointestinal tract as shown in figure 1. Bleeding may come from any site along the GI tract, but is often divided into:

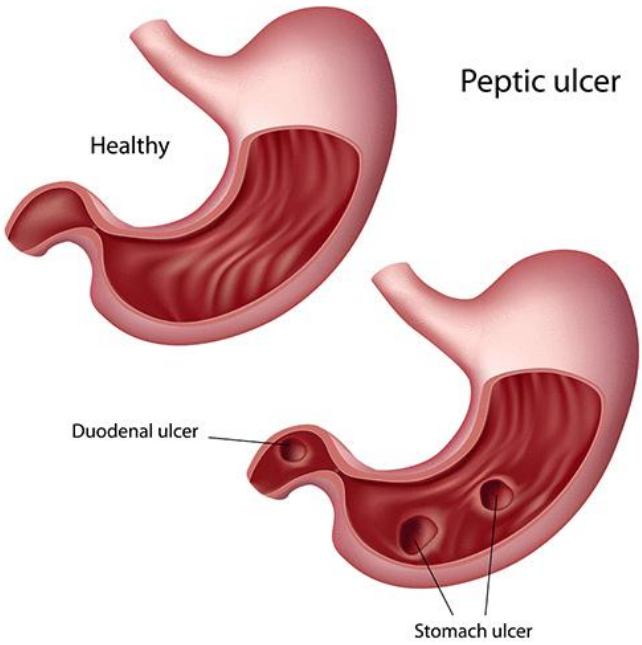
- Upper GI bleeding: The upper GI tract includes the esophagus (the tube from the mouth to the stomach), stomach, and first part of the small intestine.
- Lower GI bleeding: The lower GI tract includes much of the small intestine, large intestine or bowels, rectum, and anus

Before endoscopy, all patients were treated with intravenous proton pump inhibitors (ie, omeprazole, pantoprazole). Patients were excluded if they did not undergo endoscopy, were not treated with proton pump inhibitors, were 18 years old or younger, or bled from lower-GI source. A patient was considered to have developed recurrent bleeding if one of the following events occurred: repeated endoscopy before hospital discharge, surgery for control of UGIB, or readmission to the hospital within 30 days of discharge due to UGIB. Patients thus identified had their case records reviewed for their initial vital signs and their laboratory test results taken at the time of presentation to the ED with UGIB. Demographic information, clinical presentation, presence of comorbid medical conditions (as defined by the Charlson comorbidity index), findings of endoscopy, number of unit of blood transfusion, types of treatment of UGIB, and medication being taken at the time of admission were also reviewed. This review article is aimed

at the diagnostic as well as the treatment options regarding upper gastrointestinal bleeding.

1.1. Initial assessments

To evaluate the platelets, haemoglobin, and hematocrit, a complete blood count (CBC) should be included in the initial diagnostic test. Additionally, the international normalised ratio, type and cross matches, liver function tests, partial thromboplastin time, and prothrombin time are also examined. Depending on the patient's circumstances, such as coagulopathy and thrombocytopenia, frozen fresh plasma and platelets must be transfused. In order to maintain the haemoglobin level at 9 g/dL, haemoglobin levels below 7 g/dL may be taken into consideration for blood transfusions. Blood pressure and pulse rate can be monitored to prevent conditions like hypotension and tachycardia. For surgical scars, chronic liver illness, and occult blood testing, respectively, a physical examination and rectal examination may also be performed. The patient's medical history must be obtained, and current medications must be taken into consideration, particularly any history of aspirin, NSAIDs, coumadin, Plavix, and corticosteroids use. Other factors to take into account include history of surgery, peptic ulcer disease, or alcohol usage in the past. [12].



1.1. Analysis of assessments and risks

In patients with acute and severe bleeding, diagnostic investigations should be immediately followed by swift assessment and resuscitation [13]. By using a bleeding score like the Glasgow Blatchford Score or the Rockall Score, complications and rebleeding should be assessed [3,14]. The Glasgow Blatchford Score is based on patient clinical symptoms such as pulse rate, melena, systolic blood pressure, heart failure, and liver illness as well as laboratory values such as haemoglobin and blood urea nitrogen. The Rockall Score is based on endoscopic data. Studies using meta-analysis show that the Blatchford Score at level zero lowers the likelihood of urgent intervention; as a result, this scoring system is better advised in cases of first assessment of potentially acute UGIB as seen in emergency departments. [3].

Rockall Scoring System				
Variable	**Score=0**	**Score =1**	**Score =2**	**Score =3**
Age (years)	<60	60-79	>80	
Comorbidity			Congestive heart failure, ischemic heart disease	Renal failure, liver disease, metastatic disease
Shock	No shock	Pulse > 100 bpm	Systolic BP <100 mmHg	
Source of bleeding	Mallory-Weiss Tear	All other diagnoses: e.g., esophagitis, gastritis, peptic ulcer disease, varices	Malignancy	
Stigmata of recent bleeding	None		Adherent clot or spurting vessel	

Table.1: *Rockall scoring systems in upper gastrointestinal bleeding*

1.2. Endoscopy

Endoscopy is thought to be an important diagnostic and treatment tool for UGIB. This method might help reduce the likelihood of active bleeding, which would reduce the need for surgery, the length of hospital stay, and the number of packed erythrocyte units required for blood transfusions. The primary method of diagnosis for UGIB is esophagogastroduodenoscopy. Stigmata of recent haemorrhage (SRH) is the primary factor driving the effectiveness of endoscopic therapy [15]. When determining the requirement for endoscopic therapy, SGH denotes the prediction values on the risk of further bleeding. They have received a great deal of attention in the setting of bleeding ulcers, which may eventually result in UGIB [16]. It is recommended that early upper endoscopy should be performed with 24 hours of presentation in the patients with UGIB to confirm the diagnosis. Endoscopy is thought to be an important diagnostic and treatment tool for UGIB. This method might help reduce the likelihood of active bleeding, which would reduce the need for surgery, the length of hospital stay, and the number of packed erythrocyte units required for blood transfusions. The primary method of diagnosis for UGIB is esophagogastroduodenoscopy. Stigmata of recent haemorrhage (SRH) is the primary factor driving the effectiveness of endoscopic therapy [15]. When determining the requirement for endoscopic therapy, SGH denotes the prediction values on the risk of further bleeding. They have received a great deal of attention in the setting of bleeding ulcers, which may eventually result in UGIB [16].

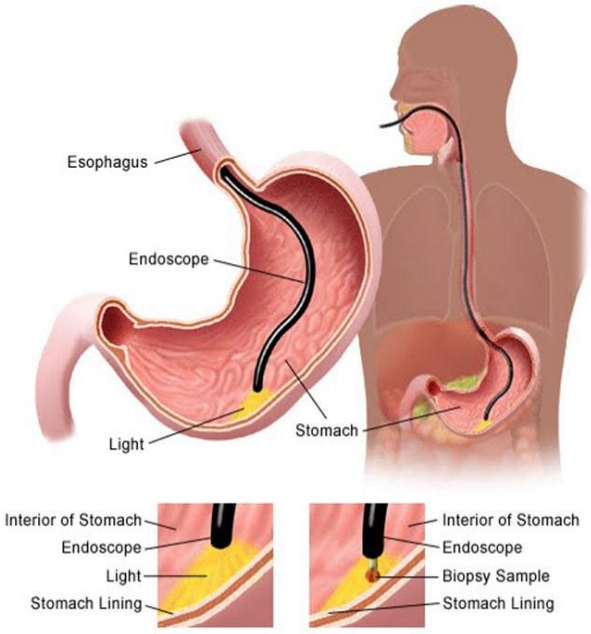


Fig .2: Significant diagnostic as well as therapeutic tool for UGIB.

sis and to gain maximum benefits of targeted endoscopic treatments. How- ever, studies regarding the optimal time for endoscopy conclude that very early endoscopy has no relation with reduction in the risk of rebleeding as well as improved survival [13, 17]. The risks associated with upper endos- copy might be increased bleeding while treatment, aspiration, perforation and side effects due to sedation [3].

1.4. Radionuclide scanning

Nuclear medicine techniques are the efficient diagnostic approaches that may accurately detect the bleeding locations in patients whose initial diagnostics are either negative or equivocal [18]. The most sensitive imaging method for identifying the site of gastrointestinal bleeding, bleeding scintigraphy, was originally developed in the late 1990s and is essential to patient management. In order to localize acute gastrointestinal bleeding, two radioactive tracers—Technetium-99m-labeled Sulphur colloid (SC) and Technetium-99m-labeled red blood cells—are generally used [18–20]. The use of these radionuclides allows for the non-invasive detection of pathological and physiological issues. For instance, Meckel's diverticulum can be evaluated with technetium-99m partechnetate. [20].

 MDCT angiography, or multidetector computed tomography

For providing visual structural resolutions of pathological conformities, such as inflammation and infection, modern imaging techniques have significantly contributed to the detection of illnesses [21]. Radiation-based computed tomography (CT) is used to identify diseases in the colon, cortical bone, lung parenchyma, and airways [22]. Due to its ease of acquisition and accessibility, it has also played a distinctive role in the identification of hemodynamically stable gastro-intestinal haemorrhage. It is possible to employ CT angiography to guide the next clinical operations. Additionally, it can identify disorders such haemobilia that do not affect the gastrointestinal tract [23]. The drawbacks of CT angiography may include high

radiation exposure, radionuclide imaging insensitivity, and a lack of specificity in many pictures [21, 23].

1.5. Catheter angiography

For the diagnosis of both upper and lower gastrointestinal bleeding, this specific approach might be used. It is especially helpful for patients who experience therapeutic endoscopic failure. Acute UGIB and LGIB that cannot be controlled by endoscopy or surgery are treated with catheter angiography as the first-line modality due to the availability of micro-catheters and embolic materials with super-selective embolization. When patients are at risk for surgery, transcatheter arteriography may be the first course of treatment. This treatment offers less negative effects and a 65% patient success rate in a clinical setting. It is a safe treatment option for people who have severe gastrointestinal bleeding in the case of lower gastrointestinal bleeding. Transcatheter angiography has few restrictions, however rebleeding can happen when gastrointestinal bleeding originates in the jejunum, ileum, or cecum [24]. Catheter angiography can detect the bleeding rate of as low as 0.5 mL/min and is highly sensitive as well as specific in nature, hence, can be employed as the primary imaging, as well as treatment modality in the patients encoun- tering gastrointestinal bleeding [23].

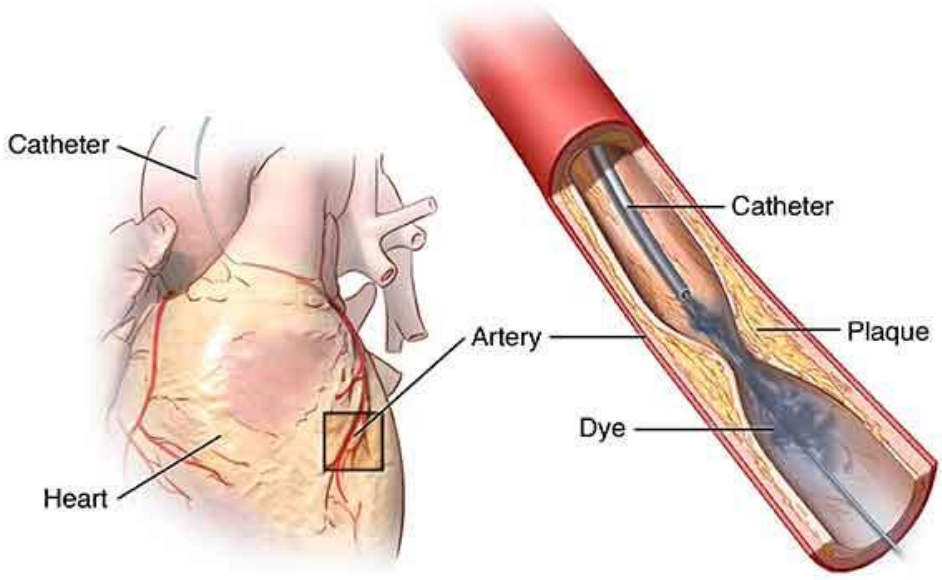


Fig.4: Catheter angiography modality for Acute UGIB and LGIB.

2. Management of upper digestive haemorrhage

UGIB is a highly fatal emergency condition with high mortality and morbidity. Nowadays, a decline in the mortality rate has been noticed i.e.,

2.1 percent from 4.5%. This ameliorated rate of mortality can be attributed to recent advancements especially endoscopic therapy and decline in peptic ulcer disease [25]. The patients suffering from UGIB must undergo step-wise approach in order to avoid some serious consequences [5]. The overall strategy to handle UGIB patients in emergency set ups can be di-

vided into three stages namely; pre-endoscopy, endoscopic and post endo- scopic management [25, 26].

2.1. Pre endoscopic management

As an initial step, hemodynamic status of the patient and primary re- suscitative efforts is required, which may include fluids as well as blood transfusion. After that, patient should be stratified on the basis of initial presentation, age, preliminary lab tests, comorbidities and hemodynamic status [5]. This can be done using scoring systems (Rockall and Blatchford scores) as described in the above sections. In different clinical contexts, UGIB can be managed by using vasoactive agents, prophylactic antibiot- ics and proton pump inhibitors (PPI) [25].

2.2. Endoscopic therapy

Clinical recommendations advocate performing endoscopies within 24 hours, but in high-risk circumstances including variceal haemorrhage, unstable hemodynamics, and extensive hematesmesis, endoscopies should be performed as soon as the patient is stable [27]. In order to classify endoscopic findings in patients with bleeding ulcers and predict the likelihood of rebleeding, J.A. Forrest established the Forrest Classification in 1974. According to predictions, ulcers with flat bases have a 5% chance of rebleeding, stigmatised ulcers have a 10-43% chance, and active bleeding ulcers have a 55% chance [28].

In addition to the implantation of hemoclips and bipolar electrocoagulation, the endoscopic therapy with high risk stigmata requires the injection of epinephrine in order to improve blood vessel constriction and pressure blockage [29].

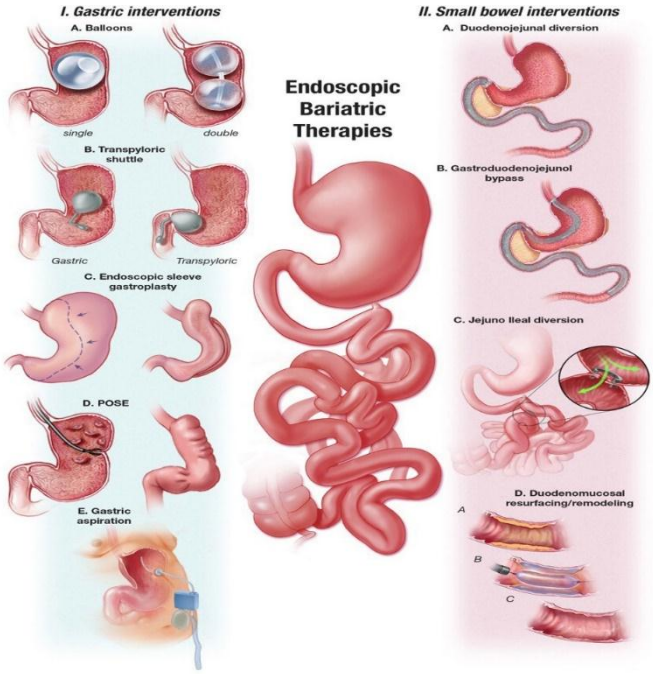


Fig. 3: Endoscopic treatment patients with bleeding ulcers

2.3. Post-endoscopy management

Endoscopic evaluation is normally followed by reduced risk of re- bleeding in the patients with stable vital signs such as normal level of hemoglobin, minimal or no comorbidities and an endoscopic lesion with low risk of rebleeding. PPI therapy should be continued till 72 hours of

endoscopy in the patients with high risk stigmata of recent bleeding. Such patients are

required to prescribe a clear liquid diet followed by the diet as tolerated. Contrary to that, patients with low risk of rebleeding should be advanced to oral PPI once a day and initiated on a regular diet. In case of idiopathtic ulcers, endoscopy is performed after intervals in order to reduce the risk of any malignancy, moreover, in case of severe esophagitis repeated endoscopy reduces the risk of Barrett esophagus [28].

System integration for healthcare

A state-of-the-art interprofessional team composed of an emergency department physician, a surgeon, an internist, and a gastroenterologist is considered to be necessary for the diagnosis and therapy of UGIB. Advanced trauma life support (ATLS) protocol should be the foundation for the initial course of treatment. The two most widely used scoring systems are Rockall and Glasgow Blatchford scores. Additionally, an upper endoscopy must be scheduled within 24 hours of admission to the emergency room in order to diagnose the cause of the bleeding and implement additional management techniques [5].

There is an estimated success rate of 80% to 90% of endoscopic therapy in the patients, as investigated by the natural history of patients, who may completely stop rebleeding after treatment. It is however, recommended that a second endoscopic procedure should be offered to 10-20% of pa- tients who continue to bleed even after endoscopic procedure. If bleeding continues to occur, other modalities like angiography or surgery should also be considered [5, 30, 31].

Conclusions

Upper gastrointestinal bleeding is a serious condition that frequently presents in emergency rooms with a high mortality rate. Advanced therapy techniques like endoscopy have helped to lower the number of death cases in recent years. The type of gastrointestinal bleeding, risk assessment, and clinical manifestations, which reveal the form and cause of bleeding, are all important factors in determining the accurate diagnosis. Because the underlying causes and coexisting conditions can vary greatly, so can the diagnostic procedures and therapeutic approaches. The primary suggested procedure for the initial examination is an upper endoscopy, but angiography and radionuclide imaging are more accurate for the diagnosis of acute overt gastrointestinal bleeding. It is necessary to fully understand gastroenterology, general surgery, and nuclear medicine understand the nature and cause of UGIB ensuring the best possible management of this deadly situation.

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