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EMERGENCY MANAGEMENT OF ACUTE HEMORRHAGE; A REVIEW OF RECENT LITERATURE

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Abstract:

Introduction: *Bleeding from the digestive tract is a serious and potentially fatal problem that is responsible for more than 1,000,000 hospital admissions in the US every year. Gastrointestinal bleeding is considered to be one of the most common causes of mortality and long-term complications in the emergency department.*

Aim of work: *In this paper, we will review the most recent evidence emergency management of acute bleeding.*

Methodology: *We did a systematic search for the management of Gastrointestinal Bleeding in the emergency department using PubMed search engine (http://www.ncbi.nlm.nih.gov/) and Google Scholar search engine (https://scholar.google.com). Our search also looked for presentation, and treatment of gastrointestinal bleeding. All relevant studies were retrieved and discussed. We only included full articles.*

Conclusions: *Acute gastrointestinal bleeding is considered to be one of the most commonly encountered presentations in the emergency departments that is associated with significant morbidity and mortality. Therefore, physicians should be properly trained for the detection and management of gastrointestinal bleeding to decrease the risk of developing long term complications. Generally, patients who present with a gastrointestinal bleeding are categorized into high or low risk patients according to their risk of mortality or developing severe complications from the bleeding. The first most important step in the management of a patients with suspected gastrointestinal bleeding is the insertion of two large IV cannulas. In severe bleeding, immediate blood transfusions may be required to compensate for the lost blood. Endoscope remains to be the most important investigation that provides both diagnosis and possible therapy in patients with gastrointestinal bleeding.*

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INTRODUCTION:

Bleeding from the digestive tract is a serious and potentially fatal problem that is responsible for more than 1,000,000 hospital admissions in the US every year [1,2]. Gastrointestinal bleeding is considered to be one of the most common causes of mortality and long-term complications in the emergency department. Therefore, it is essential for physicians to be trained to manage it properly, accurately and early diagnose its cause, estimate associated risk, and immediately resuscitate the patient. In addition, physicians have to be experienced enough to assess and decide when the patient will be able to be discharged safely from the hospital and be continued on outpatient treatment.

The term 'gastrointestinal bleeding' refer to any hemorrhage that originates from any site of the digestive tract between the mouth and the anus. Gastrointestinal bleeding is generally grouped according to the exact site in the gastrointestinal tract; any bleeding above the ligament of Treitz is considered an upper GI bleeding, while any bleeding below it is considered to be a lower GI bleeding. Upper and lower GI bleedings are known to have different causes, management, and prognosis.

In this paper, we will review the most recent evidence emergency management of acute bleeding.

METHODOLOGY:

We did a systematic search for the management of Gastrointestinal Bleeding in the emergency department using PubMed search engine (http://www.ncbi.nlm.nih.gov/) and Google Scholar search engine (https://scholar.google.com). Our search also looked for presentation, and treatment of gastrointestinal bleeding. All relevant studies were retrieved and discussed. We only included full articles.

The terms used in the search were: Gastrointestinal bleeding, Hemorrhage, Upper gastrointestinal bleeding, lower gastrointestinal bleeding, and Transfusion.

Epidemiology:

In the United States alone, the occurrence of upper gastrointestinal bleedings has been reported to be as high as 160 per 100,000 every year [3].Males and older individuals have a significantly higher risk of developing gastrointestinal bleeding in general [3]. Peptic ulcer is still considered to be the commonest etiology of an upper gastrointestinal bleeding, and has been estimated to be responsible for more than 65% of presentations to the emergency department [3,4]. Recently, the incidence of hospital admissions due to an upper GI bleeding has significantly decrease with about 25% rate, which was also associated with an over 35% reduction in the rates of developing peptic ulcers [5]. Rates of rebleeding following stopping an upper gastrointestinal bleeding are relatively high and can reach 30% or 20% in bleeding due to esophageal varices or peptic ulcers, respectively [6]. Unfortunately, rebleeding is associated with significantly higher mortality rates that can reach 38% in some population [7].

Many risk factors have been linked to the development of an upper gastrointestinal bleeding. These factors include H. Pylori infection, the excessive use of non-steroidal anti-inflammatory drugs, the use of anti-platelet agents, and the use of anti-coagulation drugs. Some studies have also suggested that the use of SSRIs can also be linked with the development of upper gastrointestinal bleedings. A recent meta-analysis that included over twenty studies and more than 1,000,000 participants, SSRIs were associated with double the risk of developing an upper gastrointestinal bleeding [8].

Etiologies of gastrointestinal bleeding:

Upper GI bleeding can be associated with many etiologies including bleeding peptic ulcer, acute gastritis, bleeding esophageal/gastric varices, vascular malformations, bleeding esophageal ulcer, gastrointestinal cancer, esophageal tear, gastropathy due to portal hypertension, fistula between the aorta and the digestive tract, inflammatory bowel diseases, and pancreatitis. On the other hand, causes of a lower GI bleeding can include diverticulosis, colorectal cancer, ulcerative colitis and crohn's disease, ischemic colitis, infectious colitis, angiodysplasia, colon polyps, fissures, intestinal ulcers, bleeding rectal varices, and an upper GI bleeding.

Risk stratification of gastrointestinal bleeding

In u p to 80% of cases, gastrointestinal bleeding stops spontaneously without medical intervention, while the other patients will require intervention for the bleeding to stop [9], generally, clinicians categorize gastrointestinal bleeding patients into two categories: high risk patients and low risk patients. This categorization is made in the emergency department based on assessment by physicians, and will affect further management, treatment, and admission decision.

In high risk GI bleeding patients, bleeding continues and fails to stop requiring the use of interventions like upper endoscopy, or surgery to stop it, along

with blood transfusion to resuscitate the patient. low risk patients who have rebleeding risk may also need the use of these interventions due their higher mortality risk. On the other hand, when dealing with low risk gastrointestinal bleeding patients, admission may be required to perform diagnostic tests and to assure safety of the patients before discharge.

Prognosis:

Many factors affect the incidence rates of gastrointestinal bleeding and these include older age and the presence of other comorbidities, which will also increase associated mortality. Several previous papers have concluded that most patients who present with a gastrointestinal bleeding do not die from the bleeding itself, but from multi-organ failure, decompensation, or blood transfusion associated injuries and complications. In a previous study that included more than ten thousand peptic ulcer cases, more than 80% of them died from causes that were not directly related to the bleeding, like organs failure, cardiovascular and pulmonary diseases, and cancers.[10] Therefore, prognosis and survival following a gastrointestinal bleeding is strongly associated with the presence of other underlying conditions that will categorize patients as high risk patients, and make them vulnerable for the development of organ injuries. The identification of this patients is essential to properly manage them and prevent the progression of the disease, especially in patients with one of the following comorbidities: malignancies, liver cirrhosis, alcoholism, angina, and chronic kidney disease. The presence of a prior vascular surgery in the abdomen, aortoenteric fistula, warfarin use, non-steroidal anti-inflammatory drugs use, and aspirin use have also been linked with worse outcomes of a gastrointestinal bleeding [11].

In a previous study on patients with lower gastrointestinal bleeding, older age, having a history of bowel ischemia, and having other comorbidities, were all associated with significantly higher risk of mortality in patients [12]. On the other hand, the severity of the bleeding itself did not seem to play a role in determining the prognosis of patients, unless the bleeding becomes extremely severe with the development of shock or hematocrit levels lower then 6%. These cases have mortality rates that can be as high as 39% [13,14]. A massive gastrointestinal bleeding that causes instable hemodynamics is most likely to be originating from the upper GI. Factors that have been associated with a severe upper GI tract bleeding include the presence of RBCs in nasal aspirate, increased blood rate, and hemoglobin levels less than 8 mg/L [1]. On the other hand, factors that have been associated with a severe lower GI tract bleeding include elevated heart rates (more than 100 beats/minute), decreased blood pressure, and developing syncope, abdominal examination showing no tenderness, bleeding per rectum within the first four hours, aspirin use, and the presence of two or more comorbidities. Patients who present with a lower GI bleeding and meet three or more of these criteria have a risk that is more than 80% of developing a severe, possibly fatal, bleeding [12].

Historical Features and Physical Examination Findings:

The status of the patient can be initially assessed by measuring the amount of lost blood and determining the state of the patient hemodynamically. Usually, the patient is not able to accurately provide an estimate of lost blood. Therefore, lost blood is better estimated by assessing functionality. Signs and symptoms that suggest significant blood loss and hypovolemia include lightheadedness, loss of consciousness, altered mental status, weakness, and syncope.

The presence of chest pain or dyspnea in a patient who initially presented with a gastrointestinal bleeding may suggest the presence of ischemic myocardiocytes and myocardial infarction. On the other hand, the presence of red fresh blood is indicative of active esophageal bleeding, or a recent bleeding from either the stomach or the duodenum, while bleeding with coffee ground blood is indicative that bleeding is relatively old. Melena can sometimes be found in cases of significant bleeding [15].

When assessing a patient with gastrointestinal bleeding, it is important to perform a thorough physical examination as it can reveal important findings that help making an accurate diagnosis. generally, findings on physical examination that are suggestive of severe blood loss include changes in the color of the conjunctiva of the lower eyelid, nails, and palmer creases [16]. The presence of any abnormality during physical examination should be followed strictly. One of the most accurate and important findings is the presence of supine tachycardia which is a strong indicator of significant hypovolemia [17].

Laboratory Studies:

Laboratory investigations are also important in assessing the severity of the bleeding and determining the amount of resuscitation needed for patients who present with a gastrointestinal bleeding. Generally, any patient who I found to have hemoglobin levels < 10 g/dl is considered a high risk

patient with higher mortality rates [18] On the other hand, the presence of normal hemoglobin levels cannot be an accurate indicator of low-risk of mortality as sometimes the decline in hemoglobin levels can occur late in the course of the bleeding, and thus does not accurately reflect the amount of blood lost. Other available laboratory investigations include coagulation profiles, number of platelets, AST, and ALT, as these may help detect the presence of an underlying coagulopathy. The presence of cardiac ischemia may be detected by performing an ECG or measuring troponin levels. This is important in all patients with gastrointestinal bleeding, as these may develop cardiac ischemia and myocardial infarction silently and without experiencing chest pain or other symptoms. Moreover, the development of gastrointestinal bleeding in a patient who already is diagnosed with a coronary artery disease is associated with higher mortality and complications rates [19].

Prediction Scores:

Many scores have been created to assess and predict the risk of complications and mortality in patients with gastrointestinal bleeding. In the BLEED study, authors were able to develop a score that stratifies patients with GI bleeding according to their risk of complications, rebleeding, and mortality, into high or low risk patients [20]. Additionally, authors were able to prove that the presence of gross bleeding, decreased blood pressure, increased prothrombin time, altered mental status, hemodynamic instability, or other comorbidities were associated with increased rates of complications and mortality. These previously mentioned criteria were later tested in another study that concluded that the BLEED score can sometimes lead to unnecessary hospital additions [21].

Currently, the most commonly used scores for determining the severity and management of a patient with a gastrointestinal bleeding are the Glasgow Blatchford Score and the Clinical Rockall Score. The Rockall score was first introduced in 1996 and predicted mortality using only the following criteria: age, presence of comorbidities, and shock. This is score neglects endoscopic findings or laboratory investigations which are present in the other full Rockall score [22]. The Blatchford score, on the other hand, was first introduced in the year 2000, and has been used to determine the need for patients with bleeding to get blood transfusion or surgical interventions. Both the Rockall score and the Blatchford score have been successfully used for the prediction of rebleeding and mortality in patient with gastrointestinal bleeding, with the Blatchford score showing more accurate results especially when estimating the need of surgery and hospital admission [23,24].

Examination of Stool:

Stool examination is considered important in patients with gastrointestinal bleeding as it may help determine the cause and etiology of the bleeding. For example, the detection of melena is suggestive of the presence of an upper gastrointestinal bleeding, and has a sensitivity that can be as high as 80%.[25] On the other hand, the detection of occult blood in stool can be highly suggestive of the presence of a lower gastrointestinal bleeding, with the probability of an upper source still present [26].

Nasogastric Tube Aspiration:

The use of a nasogastric tube in patients who are suspected to have an upper gastrointestinal bleeding is still debatable, especially in patients who do not show clear hematemesis [27]. A previously published study has concluded that in patients with existing gastrointestinal bleeding but no clear hematemesis, placing a nasogastric tube can have high accuracy in detecting occult upper GI bleeding [28]. However, negative results by a nasogastric tube still cannot fully rule out the presence of a bleeding throughout the digestive tract.

Another important finding is BUN levels, which have been suggested to be elevated in patients with upper GI bleeding [29]. Generally,, the use of BUN/creatinine ratio has been found by many studies to be helpful in distinguishing between upper and lower gastrointestinal bleeding [30]. In a previously published systematic review, authors were able to conclude that when the BUN/cr ratio is higher than 30%, upper GI bleeding is most likely present with a specificity of over 93%. However, the sensitivity of this ratio remains to be relatively low, and thus cannot be used to rule out an upper GI bleeding.

Age

Most studies suggest that older age is correlated with higher incidence and prevalence of lower gastrointestinal bleeding, while younger age is correlated with higher incidence and prevalence of upper gastrointestinal bleeding.[7] In a previous study, authors were able to confirm that individuals younger than 50 years who present with gastrointestinal bleeding will most likely be diagnosed with an upper GI bleeding [31].

Treatment

Treatment and management of patients who present with active gastrointestinal bleeding must be initiated immediately in the emergency department as these patients have a higher risk of complications and mortality. First, two large IV cannulas must be inserted. Additionally, patients with severe bleeding may need airway protection and endotracheal intubation.

Red Blood Cell Transfusion

Patients who present with severe bleeding and significant blood loss must immediately receive packed RBCs transfusions as this loss will impair the capacity of oxygen binding and cause ischemic injuries. However, the strategy of transfusion is considered challenging to avoid related adverse events that can follow transfusion [32].

When dealing with a euvolemic patient with an upper GI bleeding, the use of transfusion is recommended in those who have a history of prior coronary disease when their hemoglobin levels are below 7 g/dl.58 This recommendation came after the publication of a study that showed that the administration of blood transfusion to all patients regardless of hemoglobin levels was associated with higher mortality rates and worse survival outcomes [33].

Despite the harmful effects of antiplatelets (like aspirin) in patients with upper gastrointestinal bleeding, the use of platelets transfusion has not been proven to have significant efficacy yet, with unclear evidence, and controversy surrounding this topic[34]. However, physicians still recommend that the count of platelets in patients with gastrointestinal bleeding should better be maintained higher than 50,000 Ml [35].

Generally, the use of anticoagulation drugs (like warfarin) has been associated with significantly higher risk of developing gastrointestinal bleeding. Therefore, reversing anticoagulation is considered to be one of the essential steps in managing patients with an active bleeding. This can be achieved using vitamin K and fresh frozen plasma.

Balloon Tamponade

The use of Balloon tamponade is generally accepted in patients with severe active upper GI bleeding, but it is considered a temporary method until a definitive treatment is achieved. These measures can be sometimes associated with severe adverse events like rupture of the esophagus, aspiration pneumonia, and necrosis [36].

Endoscopy

For any patient who presents with an upper GI bleeding, upper endoscope is considered to be the most important investigation as it provides both confirmation of the diagnosis and therapy with bleeding control. The early use of upper endoscope has been proven to be safe in all patients with great efficacy. Moreover, patients with high-risk of developing complications and who have high risk of mortality, were shown to significantly benefit and get improved outcomes with the use of early upper endoscope within less than twelve hours of presentation. Colonoscopy, on the other hand is generally recommended for the diagnosis and management of patients who present with a lower gastrointestinal bleeding [37].

CONCLUSIONS:

Acute gastrointestinal bleeding is considered to be one of the most commonly encountered presentations in the emergency departments that is associated with significant morbidity and mortality. Therefore, physicians should be properly trained for the detection and management of gastrointestinal bleeding to decrease the risk of developing long term complications. Generally, patients who present with a gastrointestinal bleeding are categorized into high or low risk patients according to their risk of mortality or developing severe complications from the bleeding. The first most important step in the management of a patient with suspected gastrointestinal bleeding is the insertion of two large IV cannulas. In severe bleeding, immediate blood transfusions may be required to compensate for the lost blood. Endoscope remains to be the most important investigation that provides both diagnosis and possible therapy in patients with gastrointestinal bleeding.

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