

Post-operative Bleeding and its Management

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ABSTRACT

Background: one of the most feared complications of surgery is bleeding. Substantial gastrointestinal bleeding in the postoperative time is an unusual complication of both GI and non-GI surgery. If not managed properly and promptly, the patient can suffer from hypovolemic shock and so it is considered a life-threatening emergency until proven otherwise. **Aim of the work:** In this review, we aimed to study post-operative bleeding with special reference to gastrointestinal surgery and also to understand the major causes and explore the approach to its management. **Methodology:** we conducted this review by using a comprehensive search of MEDLINE, PubMed and EMBASE, January 2001, through February 2017. The following search terms were used: post-operative bleeding, gastrointestinal surgical hemorrhage, gastrointestinal bleeding, hypotensive shock and bleeding management. **Results:** immediate surgery must be performed to save the patient in case of bleeding after surgery. **Conclusion:** to prevent postoperative hemorrhage, thorough evaluation must be done. When bleeding occurs, it is essential to recognize it immediately as prognosis and survival are significantly affected with delayed proper management. If needed, immediate surgery must be performed to save the patient.

Keywords: post-surgical bleeding, gastrointestinal hemorrhage, bleeding management, surgical complications

INTRODUCTION

Substantial gastrointestinal (GI) bleeding in the postoperative time is an unusual complication of both GI and non-GI surgery. Even though not as common, its management in the postoperative period is more intricate than that occurring beyond the perioperative period due to a larger possibility for the source of bleeding and a more complicated risk vs. benefit analysis. There are not many published literatures concerning management of postoperative GI bleeding, and the rarity, complexity and unpredictability of the clinical setting of this complication confuse understanding of its cause and treatment ^[1]. Postoperative GI bleeding can occur secondary to three situations ^[2]: 1) when surgery or complications of the surgery prevail the pathophysiologic cause of bleeding, 2) bleeding that happens due to causes unrelated to surgery and that usually occur rarely in the postoperative period and 3) surgical complication or surgical stress contribute to the exacerbation of a previous GI bleeding source.

GI bleeding in the early or immediate postoperative period is more commonly the result of the first situation outlined, especially when the patient has a serious illness or has other severe postoperative complications. Therefore, this article emphasizes on scenarios in which the GI bleeding happens secondary to surgery or other complications of

surgery and plans a systematic evaluation for the patient, management options, and evaluation of risk/benefit ratio for several treatment options ^[3]. Even though most incidents of postoperative GI bleeding are self-limiting, decisions of whether or not bleeding describes another unrecognized postoperative complication is supreme to permit appropriate treatment. Minor postoperative bleeding can occur commonly and without complication. Significant bleeding, often defined as overt bleeding, where nasogastric drainage showed coffee-ground presence or gross blood, hematochezia, hematemesis or melena, complicates hemodynamic instability, or lead to a decrease in hemoglobin by greater than 2 g/dL, or transfusion of blood products is needed, or those that require invasive therapeutic intervention, happens much less commonly but is related with noteworthy morbidity and mortality. In case of severe bleeding that demand therapeutic intervention, the risks and benefits of different therapeutic interventions must be measured in each postoperative setting ^[4].

METHODOLOGY

• Data Sources and Search terms

We conducted this review by using a comprehensive search of MEDLINE, PubMed and EMBASE, January 2001, through February 2017.

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The following search terms were used: post-operative bleeding, gastrointestinal surgical hemorrhage, gastrointestinal bleeding, hypotensive shock, bleeding management.

• Data Extraction

Two reviewers have independently reviewed the studies, abstracted data and disagreements were resolved by consensus. Studies were evaluated for quality and a review protocol was followed throughout.

The study was done after approval of ethical board of King Abdullah Medical Complex.

CAUSES

GI bleeding in the postoperative time was largely related to 3 categories based on causes and included [5].

- 1) Stress-induced mucosal damage in the upper GI tract;
- 2) Bleeding at suture-line; and
- 3) Inflammatory, infectious, or ischemic complications.

During the postoperative period, some sources can cause GI bleeding. However, the number of these cases is small when compared to other causes. The most common site where significant GI bleeding which can occur in the upper gastrointestinal tract. This applies for both enteric and nonenteric surgeries. In fact, bleeding from the upper tract constitutes more than 80% of postoperative GI bleeding with mortality that can reach 30% and causes a 4-folds increase in postoperative death when compared to postoperative patients who did not have bleeding. Mucosal damage can occur due to stress from operation, causing significant bleeding from the duodenum, stomach and/or esophagus. Other important causes included bleeding from a suture line, which usually occurs within two days following surgery, infection or ischemia disturbing suture lines and bleeding from a previously present peptic ulcer.

The latter two usually occur after more than two days following surgery. Liver injury can cause hemobilia and thus GI bleeding. Excessive vomiting following surgery can also cause a bleeding Mallory-Weiss tear. Exacerbated gastric or esophageal varices are important sources of bleeding [6].

Less commonly, postoperative bleeding can occur from lower gastrointestinal sources. Colocolonic, enterocolonic, and/or enteroenteric anastomoses can cause early bleeding from suture lines. However, this bleeding is usually mild and resolves spontaneously. If anastomoses-related bleeding occurs following the initial postoperative period, it was likely caused by disrupted anastomoses due to ischemia or infection. Intervention in these cases is obligatory to confirm the source and treat accordingly. Colonic ischemia can be the cause of postoperative lower GI bleeding. These cases are strongly associated with cardiovascular surgeries and fistulas involved the lower gastrointestinal tract. Lower GI bleeding may also be caused by rectal ulcers, varices, diverticulosis and/or arteriovenous malformations [7].

General approach to postoperative GI bleeding

Overt postoperative gastrointestinal bleeding is considered a life-threatening emergency until proven otherwise. Many factors can make the proper detection of the disease harder. These include concomitant anemia, tachycardia from pain or systemic response, masked proper cardiac response to volume loss due to the indication of B-blockers before the surgery, and volume shifts. The degree of hemorrhage cannot be determined by measuring hematocrit, as acute bleeding causes a constant loss of both plasma and RBCs. Hematemesis, hematochezia, or melena can be delayed when gastric or intestinal ileus are present. These reasons make a proper accurate diagnosis a difficult mission that requires a highly suspicious physician, and necessitate the management of these patients in the ICU settings in an attempt to decrease mortality rates. Infection and sepsis must also be considered in acute postoperative GI bleeding as potential causes [8].

The maintenance of airways and the exclusion of hypoxia or hypercarbia necessitate the vast evaluation of all postoperative patients. Intravenous access establishment is also essential with continuous monitoring. In cases of hemodynamic instability, significant hematemesis, altered mental status and/or inability to undergo necessary procedures, endotracheal tube placement should be considered to avoid acute airway compromise. These cases have a relatively high risk of acute desaturation, aspiration, or hypotension during

intubation, therefore, highly experienced physicians should perform the procedure. Intravenous catheter larger than 18-gauge must be inserted with the continuous measurement of blood pressure ^[9].

Electrocardiogram, heart rate and urine output should also be continuously monitored. Arterial catheter and a central venous catheter should be placed in elderly, sepsis, or the presence of end organ dysfunctions. The assessment of lactate in the serum is important as its increase can be linked with ischemic organs even if the patient is hemodynamically stable. In the presence of depleted volume or hemodynamic instability, it is important to resuscitate patients using isotonic crystalloid solutions. The volume used initially in these cases can reach 2 L. In cases of inadequate response, transfusion of packed RBCs can be considered, with a rate that depends on the hemodynamic response of the patient ^[10].

Other factors that affect transfusion are hemoglobin levels, active hemorrhage and the presence of cardiovascular diseases. In cases of severe hypotension, where there are more than 30% loss of blood volume, transfusion must be considered immediately as soon as the diagnosis of hemorrhage is confirmed. In the presence of cardiovascular diseases, the transfusion goal is to reach 10 g/dL hemoglobin, whereas normal patients have a goal of 6-7 g/dL. However, in real-life settings, transfusion is indicated in high levels usually, as the accurate approximation of bleeding rate is very difficult. To avoid the development or the exacerbation of coagulopathy, it is important to keep the body normothermic when resuscitating the patient, with continuous monitoring of coagulation and clotting factors, with immediate fresh frozen plasma, platelet, or vitamin K administration in cases of any abnormality. It is also important to consider using devices that warm blood especially in cases of significant volume loss and resuscitation ^[11].

Localization of the bleeding source

When patients stabilize, the next step is to determine the source of bleeding. Approaches in cases of postoperative GI bleeding are similar to those applied in nonpostoperative settings. However, several differences still exist, mainly due to the consideration of suture-line related bleedings, infections and sepsis. Most cases of postoperative GI bleeding originate from an upper GI source.

Bleeding due to stress-related damage is the most important cause of early postoperative GI bleeding in cases of non-GI surgeries. To confirm the source of bleeding, the best and most commonly used technique is endoscopy, which can also achieve treatment in many low-risk cases. Whether to perform an upper or lower endoscopy first depends on the most likely site of bleeding ^[12].

Control of hemorrhage

Endoscopy, surgery and arteriography constitute the most important modalities in postoperative GI bleeding control. The previously mentioned modalities can be applied together or solely to achieve sufficient control of bleeding and to determine the presence/absence of other disorders. For localization and treatment of low risk bleeding, endoscopy is the best method. Treating hemorrhages with endoscopy involves epinephrine injection, laser coagulation, heater probe, electrocoagulation, banding, and/or clip application ^[13]. Usually, endoscopy achieves sufficient safe treatment especially in discrete wounds or suture-line bleedings. However, when hemorrhage occurs later after the postoperative period, underlying cause of bleeding may not be adequately managed with endoscopy. In these cases, the use of angiography is warranted taking ischemic risk and contrast nephropathy into consideration. The rates of morbidity and mortality proportionally correlate with lost blood volume, which also must be considered when putting management plan ^[14].

Identification of disorder contributing to the bleeding source

Determination of an underlying cause that lead to late hemorrhage must always be considered. In cases of late stress-related bleeding -for example- the delay of symptoms appearance is associated with different possible outcomes like pneumonia or cardiomyopathies. Thus, the accurate determination of bleeding source is an essential issue to plan proper therapy, and all efforts must be made to achieve this. Other important causes that must be considered in cases of late postoperative GI bleeding include ischemia, inflammation, and/or infection ^[10].

CONCLUSION

When talking about abdominal surgery, one of the most important (and maybe fatal) complications

is hemorrhage. To prevent postoperative hemorrhage, thorough evaluation must be done. When bleeding occurs, it is essential to recognize it immediately as prognosis and survival are significantly affected with delayed proper management. When needed immediate surgery is done to save the patient.

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