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REVIEW

New insights on an old medical emergency: non-portal hypertension related upper gastrointestinal bleeding

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ABSTRACT

Upper gastrointestinal bleeding (UGIB) is a potentially life-threatening condition and the most common medical emergency managed by gastroenterologists. Despite being one of the most antique medical problems, recent studies have been slowly changing the management of these patients, which should nowadays include not only initial resuscitation, but also risk stratification, pre-endoscopic therapy, endoscopy treatment, and post-procedure care. The aim of this paper is to review the extended approach to the patient with non-portal hypertension related UGIB.

Key words: Upper gastrointestinal bleeding.

INTRODUCTION

Upper gastrointestinal bleeding (UGIB), defined as bleeding with origin proximal to the ampulla of Vater (1), is a common potentially life-threatening gastrointestinal emergency. The annual incidence is reported to be nearly 100 per 100,000 adults, representing approximately 400,000 hospitalizations per year in the United States (2). Regarding gender, while UGIB is two times more common in men than in women, the mortality rate is similar between groups (3). In hospitalized patients with UGIB, mortality can be as high as 4.5-8.2% (4). However, a mortality decrease within the last years has been reported in patients with either variceal or non-variceal UGIB, suggesting that the overall management of patients with UGIB has been improving (5).

The list of medical situations that can present with UGIB is broad, but few conditions account for the great majority of all cases. The most common causes of UGIB include gastroduodenal ulcers, esophageal or gastric varices, Mallory-Weiss syndrome, esophagitis, erosive gastritis or duodenitis, angiodysplasia, Dieulafoy's lesions, tumor-related bleeding and gastric antral vascular ectasia. Other uncommon causes of UGIB are Cameron's lesions, bleeding from anastomotic sites, aortoenteric fistula, hemobilia and hemosuccus pancreaticus.

Although being one of the most antique medical problems in gastroenterology, recent investigations have been slowly changing the management of patients with UGIB. In this article, we aim to review the extended approach to the patient with non-portal hypertension related UGIB, from resuscitation, general management and risk stratification to pre-endoscopic therapy, timing to endoscopy, endoscopy treatment, and post-procedure care.

RESUSCITATION AND GENERAL MANAGEMENT

As with any medical life-threatening condition, the first step in the management of a patient with UGIB should be resuscitation and it should begin at the same time as initial assessment in the emergency department (6,7). Adequate early resuscitation in patients with UGIB can minimize treatment-associated complications and decrease mortality (8).

Airway, vital signs, cardiac rhythm, urine output and mental status should be monitored. Supplementary oxygen should be given to patients, particularly in elderly, if concurrent cardiopulmonary disease is present or if oxygen saturation falls below 90%. The obtainment of two large bore intravenous lines (16 gauge or larger) should be also a priority and intravenous isotonic crystalloids should be administered in order to keep systolic blood pressure above 100 mmHg and pulse lower than 100 beats per min.

The decision to begin blood transfusions in patients with UGIB had suffered a major shift in the last few years. It is well established that blood transfusion can be life-saving in patients with massive UGIB but its benefits in less severe cases remain controversial. A study from Villanueva et al. compared a restrictive threshold for blood transfusion (hemoglobin lower than 7 g/dL) to a liberal transfusion strategy (hemoglobin lower than 9 g/dL) and found that a lower threshold for transfusion was associated with lower mortality at 6 weeks, less transfusion-re-

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lated or cardiac complications, shorter hospital stays, and lower rebleeding rates (9). A subsequent meta-analysis confirmed that a restrictive strategy was associated with lower incidence of death and shorter length of hospitalization (10). Blood transfusion should be therefore initiated if hemoglobin is < 7 g/dL for most patients, including those with stable coronary heart disease. For those patients with unstable coronary disease, a higher threshold of < 9 g/dL should trigger transfusion support (6).

When evaluating a patient with UGIB, platelet count and the use of antiplatelet agents should be assessed. Although currently there is no sufficient data to recommend an optimal therapeutic platelet count target in patients with UGIB, some experts suggest that platelet transfusion should be done to obtain a platelet count higher than 50,000/μL, particularly in those receiving aspirin or clopidogrel, in whom platelet function is expected to be impaired (11). Regarding the use of antiplatelet agents, it is consensual that they should be stopped until the hemostasis is achieved, except for those patients with a vascular stent placed less than a year before or those with an acute coronary syndrome, in which a cardiology consultation before stopping them is suggested (12).

The presence of coagulopathy (increased prothrombin time with INR > 1.5) as well as the use of anticoagulants should be also taken into account when assessing a patient with UGIB. In the past it was reported that endoscopy was safe in patients who were mildly or moderately anticoagulated, suggesting that strict anticoagulation correction would not be essential (13). However, a subsequent study found that mortality was higher in patients with INR above 1.5 (14). Although the target value of INR to allow a safe endoscopic hemostasis has not been defined, it is a common practice to give fresh frozen plasma to patients taking warfarin and having supratherapeutic INR (12). As with thrombocytopenia correction, the reversal of coagulopathy should never delay the endoscopic therapy. When feasible, anticoagulants should be stopped in patients with UGIB until hemostasis is achieved. Nonetheless, individualized assessment of the thrombotic risk of reversing anticoagulation and of the risk of continued bleeding without reversed should be done. Another item to be taken into account when treating a patient with UGIB is the increasing use of newer anticoagulants such as dabigatran, rivaroxaban or apixaban, whose effects, unlike warfarin, cannot be reversed. Literature on the management of patients with UGIB taking these newer anticoagulants is still scarce. A recent study comparing the management of patients taking dabigatran or warfarin in the setting of UGIB concluded that clinical outcomes and length of stay in hospital were comparable between groups (15). The authors also reinforced the need to promptly resume the drug when UGIB is suspected and the inability of fresh frozen plasma in reversing dabigatran's effect (15).

The nasogastric tube (NGT) in the setting of UGIB has been historically used not only with diagnostic purposes to confirm the upper gastrointestinal (GI) source of bleeding but also to aid clearing fresh blood and clots from the gastric cavity, thus theoretically allowing a better mucosa visualization at the time of the endoscopy. However, the indiscriminate use of NGT has been questioned, as it is one of the most painful procedures performed at the emergency department and its benefits in reducing mortality, surgery, need of blood transfusion, and length of hospitalization have not been consistently reported (16-18). Iwasaki et al. suggested that a fresh or dark red fluid from NGT associated with a high heart rate/systolic blood pressure ratio could be used to predict active bleeding and the need of urgent endoscopy in patients with nonvariceal UGIB (19), but until further benefits in clinical outcomes are confirmed, no recommendation for its extended use can be made.

RISK STRATIFICATION

As recommended by current guidelines, when patients with UGIB present at the emergency department, clinical, laboratorial and endoscopic features should be routinely used for risk stratification (6,7,20,21).

One of the most commonly used risk scores was the one proposed by Rockall in 1996, which identifies patients at risk of poor outcome following UGIB (22). The Rockall score uses age, presence of shock, comorbidities, diagnosis and endoscopic stigmata of recent hemorrhage to classify patients at low risk, intermediate risk and high risk (Table I). A ≤ 2 Rockall score is associated with a rebleeding rate of 3.5-5.3% and a mortality of 0.2%, while a ≥ 8 score is related with a rebleeding rate of 41.8% and a mortality rate of 41.1% (22). A subsequent study confirmed the ability of the Rockall score to predict mortality but not to predict rebleeding (23).

The Glasgow Blatchford Score (GBS) is another screening tool commonly used to stratify patients according to their need for intervention (blood transfusion or endoscopic therapy) (Table II). It is based upon hemoglobin, blood urea nitrogen, systolic blood pressure, pulse, and the presence of syncope, melena, liver disease and/or cardiac failure. This score ranges from 0 to 23 points and states that patients with 0 points have a low risk of requiring intervention and may be managed as outpatients, while patients with scores ≥ 6 are likely to require medical intervention and should be treated as inpatients (24). Recently, Laursen et al. suggested that changing the cut-off from 0 to ≤ 1 points would duplicate the number of low-risk patients, reducing hospital admissions in 15 to 20% (25). More, a modified GBS using only hemoglobin, blood urea nitrogen, systolic blood pressure and pulse and eliminating the subjective components of the original score, performed as good as GBS and outperformed Rockall Score in predicting mortality and rebleeding (26).

Table I. Rockall Score

Pre-endoscopic data	*Score*
Age	
< 60	0
60-79	1
≥ 80	2
Shock	
None: systolic blood pressure (SBP) > 100 mmHg; heart rate (HR) < 100 bpm	0
Tachycardia: SBP > 100 mmHg; HR > 100 bpm	1
Hypotension: SBP < 100 mmHg	2
Comorbidities	
None	0
Cardiac failure or ischemic heart disease	2
Renal failure, liver failure, disseminated malignancy	3
Post-endoscopic data	*Score*
Diagnosis	
No major lesion or Mallory-Weiss Tear	0
All other diagnoses	1
Upper gastrointestinal malignancy	2
Stigmata of recent hemorrhage	
None or dark spots	0
Blood, adherent clot, visible or spurting vessel	2

Table II. Glasgow Blatchford Score

Clinical and laboratory data	*Score*
Blood urea nitrogen (mmol/L)	
6.5-7.9	2
8.0-9.9	3
10.0-24.9	4
≥ 25	6
Hemoglobin (g/dL) for men	
12-12.9	1
10-11.9	3
< 10	6
Hemoglobin (g/dL) for women	
10-11.9	1
< 10	6
Systolic blood pressure (mmHg)	
100-109	1
90-99	2
< 90	3
Other markers	
Pulse ≥ 100/min	1
Presentation with melena	1
Presentation with syncope	2
Hepatic disease	2
Cardiac failure	2

Another more recent pre-endoscopic score that can be used in risk stratification of patients with UGIB is AIMS65 (Table III). This score uses five factors (albumin, INR, altered mental status, systolic blood pressure and age) that are deeply related to inpatient mortality: 0 risk factors are associated with a mortality rate of 0.3%, while 5 risk factors predict a mortality rate of 25% (27). Comparative studies between AIMS65 score and GBS have reached divergent conclusions. While some authors found that AIMS65 was superior to GBS in predicting inpatient mortality from UGIB but inferior in calculating the need of blood transfusion (28), others concluded that GBS has a superior sensitivity in recognizing patients who were not likely to need interventions (29). Finally, another study reports that the AIMS65 score has a low sensitivity in predicting clinical outcomes in patients with bleeding ulcer and thus it is suggested that this score might not be suitable in this group of patients (30).

Table III. AIMS65 Score

Clinical and laboratory data	*Score*
Albumin < 3.0 g/dL	1
INR > 1.5	1
Mental status (Glasgow Coma Scale < 14)	1
Systolic blood pressure < 90 mmHg	1
Age > 65 years	1

PRE-ENDOSCOPIC TREATMENT

The use of some classes of drugs has been studied in the setting of UGIB.

Proton-pump inhibitors (PPIs) should be considered as an intravenous bolus as soon as an UGIB is suspected (e.g., pantoprazole, omeprazole or esomeprazole) (7,21). PPIs can not only significantly reduce the proportion of patients with stigmata of recent hemorrhage (active bleeding, non-bleeding visible vessel, and adherent clot) at index endoscopy, but also decrease the number of patients needing endoscopic treatment (31). Those effects are thought to occur because platelet aggregation and clot formation are facilitated by a pH higher than 6.0 (32).

Moreover, when compared to H_2-receptors antagonists, PPIs act for a longer period and are more effective in suppressing the gastric acidic environment (33). Nonetheless, the use of PPIs before endoscopy in patients with UGIB showed no effects on mortality, rebleeding, surgery or blood transfusion necessity (31,34). Differences between high-dose PPI or intermittent dosing have been investigated but no increased risk of rebleeding, mortality, blood transfusion and hospital length of stay has been found, suggesting that an intermittent PPI scheme may be safe and cheaper (35).

The use of prokinetics among patients with UGIB with the intention of reducing blood in the gastric cavity and allowing improved mucosa visualization has been also studied. Barkun et al. reported in a meta-analysis that the use of erythromycin or metoclopramide 30 minutes before endoscopy could significantly reduce the need to repeat endoscopic procedures due to inconclusive previous examinations. However, positive effects on blood transfusion, surgery or hospital stay were not noted (36). On the contrary, a more recent study showed that the routine use of erythromycin before endoscopy could be beneficial in reducing the need of blood transfusion and also hospital stay (37). Erythromycin has been also compared to nasogastric tube with gastric lavage and associated with satisfactory endoscopic conditions (38). Contrarily, the benefit of using metoclopramide has been questioned by some authors who report no improvement in the visualization of the gastric mucosa (39). Taking these results into account, erythromycin (single dose, 250 mg given 30-120 minutes prior to endoscopy) seems to be the preferred prokinetic and should be used when a large amount of blood is expected in the stomach (7). As with PPIs, the use of prokinetics should never delay the endoscopic examination.

Tranexamic acid, an antifibrinolytic agent with potential to stop bleeding, was also studied in the setting of UGIB. Even though an initial analysis had suggested that tranexamic acid could possibly reduce mortality, a subsequent subgroup evaluation could not confirm this effect (40). No impact on mortality, rebleeding rate and transfusion requirements was noticed as well, and thus a formal recommendation for its use in patients with UGIB cannot be done (7).

TIMING OF ENDOSCOPY

It is generally accepted that all patients with suspected UGIB should receive an upper gastrointestinal endoscopic examination in the first 24 hours after presentation. However, division of patients requiring an upper endoscopy in the first 12 hours after presentation, particularly high-risk patients, is still a matter of debate. Some studies report that in high-risk patients (classified by authors as GBS $\geq$ 12) an upper endoscopy done before 12 hours is associated with a lower mortality (41). On the contrary, other authors reported higher mortality when upper endoscopy was done sooner than 12 hours even in high-risk patients. Possible explanations for a worse outcome in patients receiving an upper endoscopy before 12 hours include inappropriate resuscitation, delayed PPI administration or limited mucosa observation due to blood clots in the gastric cavity (42).

ENDOSCOPIC TREATMENT

When UGIB is suspected, upper endoscopy has the advantages of being a diagnostic procedure with a high sensitivity and specificity, being useful for risk stratification, and allowing therapeutic interventions for bleeding control.

Endoscopic strategies for bleeding control have evolved rapidly in the last years and nowadays several alternatives are available for gastroenterologists. Therapeutic options include injection therapy (i.e., epinephrine or sclerosant agent), thermal therapy (i.e., bipolar electrocoagulation, heater probe or hemostatic forceps), mechanical therapy (i.e., hemoclips, elastic band ligation, or over-the-scope clips [OTSC]), and more recently, topical agents (such as Hemospray®, Ankaferd BloodStopper® [ABS], or EndoClot®).

GASTRODUODENAL ULCER BLEEDING

In those patients with ulcer bleeding, the Forrest classification should be systematically used, and endoscopic treatment is recommended when there is active bleeding or non-bleeding visible vessel, and may be considered in patients with adherent clot (7). Patients presenting with a clean base ulcer or flat spot do not need any endoscopy intervention (6,21).

Currently, when the source of bleeding is an ulcer, the most commonly used strategy includes thermal coagulation or hemostatic clips, with or without injection therapy (21). It is now widely accepted that while injection of epinephrine is effective to stop bleeding, it is associated with an increased risk of rebleeding or surgery when used as monotherapy, and that when allied with a second hemostatic modality (e.g., clips, heater probe, sclerosant injection or bipolar electrocoagulation) it is associated with a lower risk of rebleeding or surgery (6,43).

Apart from the above-mentioned conventional strategies used for ulcer bleeding, other therapeutic options, namely mechanical therapies, are now being tested. Elastic band ligation, for example, traditionally used for variceal bleeding, has been recently proposed for the treatment of several non-variceal causes of UGIB, including gastric and duodenal ulcer bleeding, with a reported success rate of 96.5% (44). Similarly, and although comparative studies with conventional hemostatic clips are still lacking,

an increasing number of studies have been reporting the successful use of OTSC in the control of ulcer bleeding, including ulcers of difficult access such as posterior duodenal bulb wall or cases refractory to other hemostatic strategies (45-47).

The use of topical agents to control UGIB is still recent but promising results have been reported regarding it. TC-325 (Hemospray®, Cook Medical Inc, Winston-Salem, NC, United States) is until now the most studied agent. It is a powder of mineral origin, with no human or animal proteins, that is neither absorbed nor metabolized, thus it is considered by the manufacturer as metabolically inert and nontoxic. Although the exact mechanism of action is still unknown, it is believed that when in contact with moisture (e.g., blood or tissue) the powder not only becomes adhesive and acts as a mechanic tamponade, but also shortens clotting times and concentrates blood cells and clotting factors, sealing the tissue. After a period of 24 to 72 hours, the adherent coat sloughs off into the lumen and is completely eliminated from the GI tract (48,49). The use of Hemospray® as primary monotherapy for controlling active ulcer bleeding has been reported with a success rate of 95% (48). More recently, its use as a rescue therapy when other conventional treatments have failed has also been reported with a hemostasis rate of 100% (50).

ABS® is another hemostatic powder that may be used in UGIB, only available in Turkey, consisting of a mixture of plants (*Thymus vulgaris*, *Glycyrrhiza glabra*, *Vitis vinifera, Alpinia officinarum, Urtica dioica*). Its mechanism of action is not fully understood as well, but it is hypothesized that when applied to GI mucosa it forms an encapsulated protein network, providing focal points for erythrocyte and activated leukocyte aggregation. Additionally, ABS has also anti-infective, anti-neoplastic, and wound healing properties, which contribute to restore and maintain tissue homeostasis (51). Its success in the treatment of ulcer bleeding has been reported in small series of adults and children (52,53).

Endoclot® Polysaccharide Hemostatic System (EndoClot Plus Inc, Santa Clara, California, United States) is the most recent hemostatic powder, consisting on starch-derived absorbable hemostatic polysaccharides, which absorbs water and concentrates clotting factors, platelets and red blood cells at the bleeding site (54). Although some clinical trials are going on, there are no studies at the moment reporting its efficacy in ulcer bleeding.

MALLORY-WEISS SYNDROME

In the management of Mallory-Weiss syndrome (MWS), the use of different hemostatic tools such as injectable therapy (epinephrine, ethanol or other sclerosant agents), thermal therapy (bipolar or multipolar electrocoagulation) and mechanical treatments (clips or elastic band ligation) has been reported, and a specific endoscopic hemostasis modality cannot be recommended (7). Few studies comparing the different strategies have been published. While a study showed superiority of band ligation *versus* clips plus epinephrine (55), other studies found no differences between band ligation *versus* clips or epinephrine regarding rebleeding or immediate hemostasis rate (56,57). The use of Hemospray® and ABS® to control bleeding in patients with MWS has been reported as well (50,58).

DIEULAFOY'S LESION

As with MWS, Dieulafoy's lesions can be efficiently treated with mechanical therapies such as clipping or elastic band ligation (7,44,59,60), which are associated with a lower risk of bleeding than epinephrine injection (61). The success of other strategies such as argon plasma coagulation, cyanoacrylate injection, Hemospray®, and ABS® in stopping bleeding from Dieulafoy's lesion has been also reported (50,58,62,63).

TUMOR-RELATED BLEEDING

The endoscopic treatment of UGIB caused by tumors is particularly challenging because bleeding lesions tend to be large, with several oozing bleeds from fragile vessels (64). In such cases, endoscopic strategies may be only temporary, while a more definitive way of controlling bleeding such as surgery or radiotherapy is planned (65). Clips, epinephrine or ethanol injection and argon plasma coagulation have all been used to control tumor-related bleeding, but rebleeding is expected to occur in at least half of the patients (66). Regarding bleeding from upper GI tract tumors, the new hemostatic powders, namely Hemospray® and ABS®, have shown promising results, with hemostatic success rates up to 100% in small series (58,67,68), thus they have been suggested as the sole immediate hemostatic modality in these patients (49,54).

ANGIODYSPLASIA

Several endoscopic techniques have been described as effective in treating UGIB from angiodysplasia, with approaches using cautery being the most commonly used (69). Nevertheless, other interventions such as bipolar or heater probe electrocoagulation or band ligation have also been reported as successful in stopping bleeding from upper GI angiodysplasia (70,71). Although bleeding can be immediately controlled with endoscopic techniques in most cases of single or few lesions, their long term efficacy has been questioned. A recent meta-analysis has shown that approximately one third of patients rebleed during a

follow-up of about two years (72). In patients with recurrent or severe bleeding, as well as when endoscopic treatment is impossible (due to extensive involvement, difficult endoscopic access or comorbidities precluding invasive interventions), medical treatment of angiodysplasia should be considered. Regarding medical therapy of angiodysplasia, the use of somatostatin analogues, namely octreotide administered by subcutaneous, intramuscular or intravenous routes, has been shown to significantly reduce rebleeding rates and transfusional requirements (73-75). Thalidomide, which blocks the action of vascular endothelial growth factor, seems to be also effective in these patients but further studies are required to confirm its effects (72). Finally, regarding hormonal therapies for the treatment of angiodysplasia, current evidence does not support their use (72).

POST-ENDOSCOPIC PROCEDURE BLEEDING

Endoscopic therapeutic procedures are *per se* associated with a variable risk of bleeding. Those procedures include not only relatively simple techniques such as polypectomy, but also more complex interventions like endoscopic mucosal resection (EMR), endoscopic submucosal dissection (76), or endoscopic sphincterotomy. In the setting of post-endoscopic procedure bleeding, several authors have reported the efficiency of novel hemostatic agents. Hemospray®, for example, has been successfully used after esophageal or duodenal EMR, ampullectomy, endoscopic sphincterotomy or endoscopic ultrasound-guided pseudocyst drainage (68,77). Similarly, reports of ABS® efficiently controlling post-sphincterotomy and post-polypectomy bleeding have been published (78,79).

POST-PROCEDURAL CARE

Treatment of patients with UGIB should not end with the endoscopic procedure, and further post-procedural care must be taken into account.

The continuous infusion of PPI for 72 hours after initial bolus and successful endoscopic hemostasis is still recommended in patients whose upper endoscopy shows an ulcer with active bleeding, a non-bleeding visible vessel, or an adherent clot (21). After this period of time and in the remaining patients daily standard oral PPI therapy seems to be sufficient (21). Importantly, some recent studies have shown mind-changing results regarding PPI therapy after ulcer bleeding. A meta-analysis compared intermittent versus continuous PPI therapy for high-risk bleeding ulcers and found that the intermittent scheme was not inferior regarding rebleeding, urgent interventions, mortality or length of hospitalization (35). Additionally, other authors compared high dose (80 mg bolus, 8 mg per hour) with low dose (40 mg bolus, 4 mg per hour) intravenous pantoprazole after ulcer bleeding and found no differences in clinical outcomes, namely in hospital stay, rebleeding, surgery and mortality (80). Furthermore, it should be kept in mind that, although considered as globally safe, not only long-term use of PPI has been associated to osteoporosis, fractures, increased risk of pneumonia, diarrhea and iron and vitamin B12 deficiencies, but short-term PPI infusion has been also associated to reversible decrease in platelets counts (81).

In *H. pylori*-related ulcers, identification and eradication of the bacteria is an essential part of patients management (6). It is well known that the sensitivity for *H. pylori* identification may be decreased if biopsies are taken in the bleeding episode and thus a negative result should be always confirmed. Lee et al. proposed that sensitivity of the urease test in the bleeding episode could be increased to 74% or 73% if four biopsies from antrum or one biopsy from corpus, respectively, were done during upper endoscopy (82). Additionally, it has been also reported that early *H. pylori* eradication decreases the risk of complicated recurrent peptic ulcers (83).

The necessity to stop certain medications such as nonsteroidal anti-inflammatory drugs (NSAIDS), antiplatelet agents or anticoagulants until hemostasis is achieved and the optimal timing to resume them after bleeding control should be assessed in patients with UGIB.

The need for a continued use of NSAIDS should be evaluated after a bleeding event. Current guidelines recommend that, when possible, NSAIDS should be stopped after ulcer bleeding. Nonetheless, if a NSAID is required, a COX-2 selective NSAID at the lowest effective dose plus a PPI should be given (21).

When taken for secondary prophylaxis (patients with established cardiovascular disease), antiplatelet agents should be resumed 1 to 7 days after hemostasis is achieved and always associated with daily PPI. On the contrary, when used for primary prophylaxis, antiplatelet agents should preferably not be resumed (21).

Data is limited regarding the timing to resume anticoagulants in patients with UGIB. However, current data support that anticoagulants should be resumed as soon as bleeding has been controlled, as they are associated with a decreased risk of thrombosis and death (84,85). Recent guidelines suggest resuming anticoagulant therapy between 7 to 15 days after the bleeding episode, while earlier resumption, within the first 7 days, should be considered in high-risk patients (7). In addition, some authors argue that in patients in whom anticoagulants are to be resumed, a second-look endoscopy may be considered to exclude asymptomatic recurrent bleeding (86).

Second-look endoscopy is another topic that should be discussed regarding the post-procedure patients care. Although the need for a second-look endoscopy in patients with UGIB is not recommended by routine (6,7,20,21), it may be considered if rebleeding is suspected, if visualization of GI tract has been incomplete during the initial

endoscopy or if there is concern about suboptimal hemostatic therapy. It was previously reported that second-look endoscopy could decrease rebleeding or surgery rates but not mortality. However, when a secondary analysis was performed, that benefit was verified only before the routinely use of high-dose PPI. In the era of high-dose PPI the benefit of a second-look endoscopy remains unclear (87).

CONCLUSION

UGIB remains one of the most important medical emergencies, associated with significant morbidity and mortality, in which the gastroenterologist is expected to assume the leading role in the management of these patients. The classical causes of UGIB may be facilitated today by the increasing use of antithrombotic agents. While optimal early resuscitation is crucial to improve clinical outcomes, risk stratification and pre-endoscopic pharmacological therapy will optimize the following steps, namely endoscopic interventions. Endoscopic hemostatic modalities are still the mainstay in the treatment of bleeding from the upper GI tract and can provide long-lasting hemostasis in over than 85% of cases (88). New hemostatic agents and the use of different techniques may further increase this percentage. Finally, the idea that the treatment of a patient with UGIB ends after endoscopy should be refuted as post-procedure care has now a proven positive impact in patients' outcomes.

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