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Initial management of nonvariceal upper gastrointestinal bleeding and timing of endoscopy

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ABSTRACT

Acute nonvariceal upper gastrointestinal bleeding is a common cause of hospital admission with significant associated health care expenditures and a significant but improving mortality rate. Initial management includes proper resuscitation with close hemodynamic monitoring, a blood transfusion threshold of 7 g/dL in most patients, early risk stratification using validated prognostic scores, and timely upper endoscopy. Current guidelines recommend that upper endoscopy be performed within 24 hours of presentation, except for patients at very low risk of adverse outcomes who may undergo more elective upper endoscopy. The role of urgent endoscopy for patients at higher risk for adverse outcomes remains controversial.

1. Introduction

Nonvariceal upper gastrointestinal bleeding (UGIB) remains a common cause of hospitalization, with nearly 300,000 cases occurring annually in the United States with a mortality rate of 2%-14% [1-5]. The economic burden from UGIB is substantial with estimates of in-hospital nationwide expenditures of $7.6 billion in 2009 [2]. Patients with UGIB typically present with hematemesis, melena, or hematochezia in the setting of brisk bleeding. The initial steps in management involve resuscitation with close hemodynamic monitoring, risk stratification based on validated prognostic scores, and prompt upper endoscopy.

After the patient is adequately resuscitated, the next step in management is for the patient to undergo an upper endoscopy. However, when to best perform the endoscopy remains controversial. Current guidelines recommend that upper endoscopy be performed within 24 hours of presentation in UGIB [6-10]. More urgent endoscopy (< 12 hours) has overall been shown to identify more high-risk lesions and lead to an increase in endoscopic therapy without any benefit in clinical outcomes such as rebleeding rates or mortality. Recent studies have also assessed the effect of timing of endoscopy based on prognostic scores. We review the existing literature on initial management of nonvariceal UGIB and when to perform endoscopy.

2. Fluid resuscitation

In patients with UGIB, the first step in management is fluid resuscitation to correct hypovolemia. Venous access should be obtained immediately to allow for prompt infusion of isotonic intravenous (IV) fluid (eg, normal saline) to restore intravascular volume. An important consideration is the type of percutaneous IV catheter, which should be optimized for an adequate flow rate in the setting of resuscitation. The 2 catheter-based factors that influence flow rate are catheter length and diameter, with shorter and wider catheters allowing for increased flow [11]. Peripheral vein catheters, which are shorter in length, have been demonstrated to have up to a 164% increase in flow rate when compared to central vein catheters of the same gauge or diameter [12]. Large-bore peripheral venous catheters (16 or 18 gauge) are thus preferred for fluid resuscitation, although in cases where peripheral venous access is challenging, a central venous catheter with a large diameter and short length (ie, cordis line) is a reasonable option. Figure 1 shows a comparison of the flow rates based on type of IV catheter [13].

3. Blood transfusion

Transfusion of packed red blood cells in acute UGIB can replace ongoing blood loss, restore oxygen delivery, and maintain tissue perfusion. Transfusion is clearly indicated in exsanguinating bleeding, as evidenced by hypovolemic shock, tissue underperfusion (eg, cardiac demand ischemia), or significant active bleeding.

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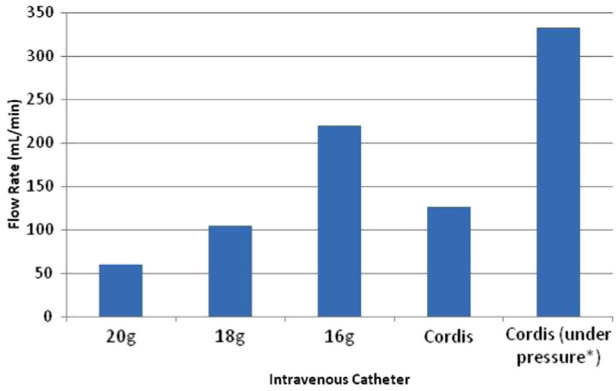

Fig. 1. Maximum flow rates of various intravenous (IV) catheters [13]. * Pressure defined as pressure bag inflated to 300 mm Hg. (Color version of figure is available online.)

Notably, the hemoglobin level on presentation in rapidly bleeding patients may not reflect the true degree of blood loss, as additional time is needed for equilibration. However, blood transfusions do have risks, including allergic reactions, transfusion-related acute lung injury, and volume overload. Thus, the decision to transfuse a patient with more stable bleeding is complex, and the risks of blood transfusion must be weighed against the potential benefits.

Guidelines traditionally have favored a transfusion threshold of hemoglobin (9-10 g/dL) for patients with UGIB [14]. However, observational studies increasingly showed worse outcomes with increased rates of blood transfusion in UGIB [15,16]. A retrospective study of 4441 patients with UGIB found that early blood transfusion (within 12 hours of admission) was associated with a 2-fold increased odds of rebleeding (OR = 2.26, 95% CI: 1.76-2.90) after adjusting for individual Rockall score and initial hemoglobin level [16]. Studies from animal models showed that blood transfusion impairs coagulation and increases portal pressure, which could explain the worse outcomes in UGIB with early and liberal blood transfusion [17,18].

Villanueva et al [19] reported in 2013 the results of a randomized controlled trial (RCT) performed in 921 patients with UGIB directly comparing a restrictive (transfuse for hemoglobin <7 g/dL) vs liberal (transfuse for hemoglobin <9 g/dL) transfusion strategy. Patients who had massive exsanguinating bleeding, blood transfusion within the past 90 days, recent acute coronary syndrome or stroke or transient ischemic attack were excluded. Of note, patients with portal hypertension were not excluded. Consistent with prior observational studies, patients with restrictive transfusions had improved outcomes as compared to patients with liberal transfusions. Specifically, the restrictive transfusion strategy had significantly increased survival at 6 weeks, decreased need for rescue therapy, decreased rate of rebleeding, and fewer adverse events compared with the liberal strategy (Figure 2).

A restrictive transfusion strategy in UGIB, with a hemoglobin threshold of 7 g/dL is currently recommended for most patients. However, the decision to transfuse should be individualized for each patient. The restrictive strategy does not apply to patients with massive exsanguinating bleeding or significant cardiovascular comorbidities. A hemoglobin threshold of 10 g/dL is often used for patients with cardiovascular comorbidities, but further research is needed in this area.

4. Nasogastric lavage

Nasogastric lavage (NGL) traditionally has been part of the initial management of UGIB, under the belief that it provided both diagnostic and prognostic information. However, the placement of a nasogastric tube is not without risk and has been cited as the most painful of commonly performed procedures in the emergency department [20]. Further, in a large retrospective study of 632 patients with UGIB, NGL was not found to change patient outcomes including 30-day mortality, length of stay, or need for surgery or transfusion [21]. In addition to not improving clinical outcomes, NGL was also not superior to erythromycin infusion in achieving adequate stomach visualization on upper endoscopy based on results from a multicenter RCT [22]. For these reasons, current guidelines do not recommend the routine use of NGL in the initial management of UGIB [7-10].

5. Video capsule endoscopy

With the ability to noninvasively capture images of the upper gastrointestinal tract, video capsule endoscopy (VCE) has been studied as a tool for risk stratification in UGIB. In a prospective study of 49 patients with UGIB, VCE administered in the emergency department detected blood in the stomach at a significantly

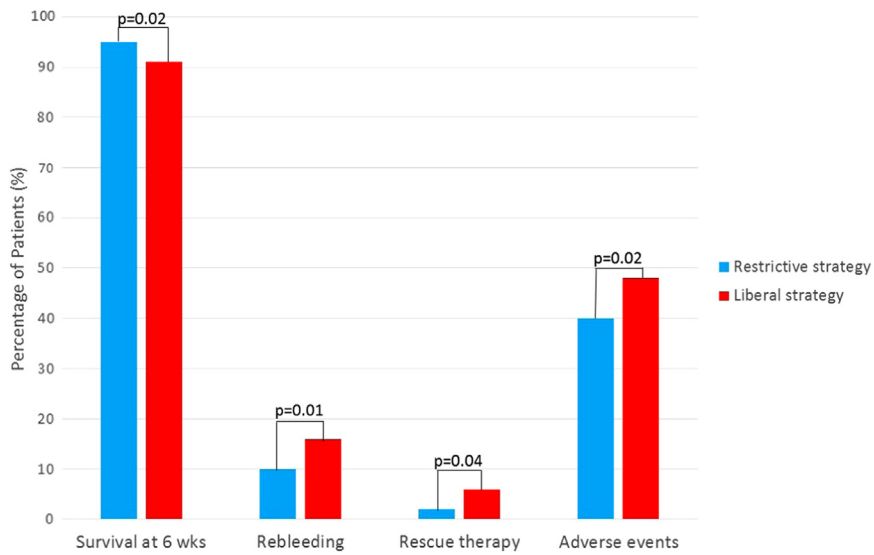

Fig. 2. Outcomes of restrictive vs. liberal transfusion strategy for UGIB [19]. (Color version of figure is available online.)