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Importance of risk assessment, endoscopic hemostasis, and recent advancements in the management of acute non-variceal upper gastrointestinal bleeding

Maity R *et al.* ANVUGIB: Management, prognostication, and recent developments

Abstract

Acute non-variceal upper gastrointestinal bleeding (ANVUGIB) is a common medical emergency in clinical practice. While the incidence has significantly reduced, the mortality rates have not undergone a similar reduction in the last few decades, thus presenting a significant challenge. This editorial outlines the key causes and risk factors of ANVUGIB and explores the current standards and recent updates in risk assessment scoring systems for predicting mortality and endoscopic treatments for achieving hemostasis. Since ANVUGIB predominantly affects the elderly population, the impact of comorbidities may be responsible for the poor outcomes. A thorough drug history is important due to the increasing use of antiplatelet agents and anticoagulants in the elderly. Early risk stratification plays a crucial role in deciding the line of management and predicting mortality. Emerging scoring systems such as the ABC (age, blood tests, co-morbidities) score show promise in predicting mortality and guiding clinical decisions. While conventional endoscopic therapies remain cornerstone approaches, novel techniques like hemostatic powders and over-the-scope clips offer promising alternatives, particularly in cases refractory to traditional modalities. By integrating validated scoring systems and leveraging novel therapeutic modalities, clinicians can enhance patient care and mitigate the substantial morbidity and mortality associated with ANVUGIB.

Key words: Non-variceal upper gastrointestinal bleeding; Upper gastrointestinal bleeding; Gastrointestinal bleeding; Risk stratification; Risk assessment scores; Prognostication; Endoscopy; Esophagogastroduodenoscopy; Endoscopic hemostasis

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Core tip: Acute non-variceal upper gastrointestinal bleeding (ANVUGIB) presents a significant medical challenge. Despite advancements in management, mortality remains high in the context of an increasingly elderly, comorbid population. While early risk stratification using established scoring systems ensure targeted management, newer scoring systems show promise in predicting mortality and should be integrated into medical practice after proper validation. Novel endoscopic techniques offer promising alternatives, especially in cases where conventional modalities are ineffective. By integrating validated scoring systems and adopting innovative therapeutic modalities, clinicians can enhance patient care and mitigate the substantial mortality associated with ANVUGIB.

INTRODUCTION

Acute upper gastrointestinal bleeding (UGIB), defined as any bleeding originating above the ligament of Treitz in the duodenum, is a medical emergency commonly encountered in clinical practice ^[1,2]. According to their etiology, upper gastrointestinal hemorrhage is further subdivided into variceal and non-variceal UGIB (NVUGIB). Acute non-variceal UGIB (ANVUGIB) has an annual incidence of 67 per 100,000 individuals and accounts for 80% of all cases of UGIB ^[3,4]. In the recent issue of the *World Journal of Clinical Cases* (2024;12(9): 1597-1605), we read with interest an article that elucidated the clinical characteristics of ANVUGIB by retrospectively analyzing patient data from a tertiary-care hospital in China ^[5]. The high mortality rates and the effectiveness of endoscopic hemostasis in the management of ANVUGIB particularly piqued our interest. Despite the advances in

diagnostic and treatment modalities, NVUGIB remains a common medical problem owing to its sudden onset and rapid progression, prevalence of risk factors such as cardiovascular disease, increasing use of blood-thinning medications (such as aspirin, anticoagulants and antiplatelet agents) and non-steroidal anti-inflammatory drugs (NSAIDs), and high morbidity and mortality [6,7]. The current guidelines recommend esophagogastroduodenoscopy (EGD) as the procedure of choice for both the diagnosis and management of NVUGIB, and transcatheter angiographic embolization or surgery in cases of refractory bleeding [8-11]. Various risk assessment scores, such as the Glasgow-Blatchford score and the Rockall score, are routinely used for risk stratification in UGIB and may have a role in predicting the risk of mortality due to re-bleeding [12]. Thus, risk stratification and endoscopic interventions are key tools in deciding the line of management and determining morbidity and mortality. This editorial reviews the current demographics, etiologies, and risk factors associated with ANVUGIB and highlights the crucial role of early risk stratification in reducing mortality and endoscopic therapies in achieving hemostasis. It also discusses the emerging scoring systems and novel endoscopic technologies that show promise in guiding clinical decisions and reducing mortality.

DEMOGRAPHICS, ETIOLOGIES, AND RISK FACTORS OF NVUGIB

Males are affected more compared to females, with the majority of patients being older than 65 years [13,14]. Peptic ulcer disease (PUD) is the most common cause of ANVUGIB, followed by upper gastrointestinal malignancy, Mallory-Weiss syndrome, and gastric angiodysplasia [4,13]. The key causes of NVUGIB are enumerated in Table 1.

Significant advancements in medicine have caused a reduction in ulcer-related bleeding over time due to the decreased incidence of PUD itself [13]. However, the mortality rates have not changed much, owing to the impact of co-morbidities in an aging population [2]. Cardiovascular disease (congestive heart failure, ischemic heart disease) is the most frequent comorbidity encountered in such patients, followed by diabetes mellitus, chronic liver disease, and chronic kidney disease [13,14].

Besides co-morbidities, there are other factors that increase the chances of mortality from NVUGIB. Particular attention must be paid to the patient's drug history. NSAIDs and aspirin (acetyl-salicylic acid) are recognized risk factors in increasing the chance of bleeding from peptic ulcers and severe erosive gastritis. These drugs can cause NVUGIB by reducing prostaglandins in the gastric mucosa and increasing the susceptibility to mucosal damage [16,17]. The use of anticoagulants and antiplatelet drugs in an aging population with multiple co-morbidities may be associated with an increased risk of bleeding in NVUGIB [17,18]. *Helicobacter pylori* infection represents the single most common cause of PUD, which is in turn the leading cause of NVUGIB [19]. *H. pylori* status should be assessed in cases of NVUGIB due to PUD and reassessed after four weeks if the results are negative [10]. Yin *et al* [17] described a risk prediction model and concluded six independent risk factors for NVUGIB by analyzing two years' worth of clinical data retrospectively. The risk factors for NVUGIB are summarized in Table 2.

RISK ASSESSMENT SCORES AS PREDICTORS OF INTERVENTIONS AND MORTALITY

Following successful initial resuscitation, patients should be stratified as ³ low- and high-risk using risk assessment scoring systems to ensure appropriate patient disposition. These scoring systems act as clinical prediction guides and can be used to predict the line of treatment and mortality [20]. Getting timely endoscopic hemostatic treatment is crucial for improving the chances of survival, especially in high-risk groups. Proper evaluation of the patient's hemodynamic status and accurate risk assessment can lead to successful treatments. This is why a highly efficient scoring system is needed to help predict the prognosis and guide appropriate management [21]. There are a variety of scoring systems, each with different goals, like assessing the type of intervention, mortality, length of hospital stay, need for blood transfusions, *etc.* Some utilize only clinical data (pre-endoscopy scoring systems), while others require additional endoscopic findings (post-endoscopy scoring systems) [22]. A compilation of scoring systems is provided in Table 3.

Some well-established pre-endoscopy scoring systems are the ¹ Glasgow-Blatchford Score (GBS), pre-endoscopic Rockall Score (pRS) and AIMS65 (albumin, international normalized ratio [INR], ² mental status, systolic blood pressure, age ≥ 65 years) [23–25]. Initially developed to predict the need for intervention, the GBS has been found to possess the highest accuracy in predicting the need for hospital-based intervention and mortality [26]. As such, guidelines recommend the use of GBS for risk stratification in UGIB and state that patients with GBS ≤ 1 have a low risk of mortality and can be managed as an outpatient [10,11,27].

The ABC (age, blood tests, co-morbidities) score and INBS (international bleeding score) are newly-developed pre-endoscopy scoring systems that can accurately predict the 30-day mortality in patients with NVUGIB [21,28]. The ABC score appeals as a clinical tool in terms of simplicity and ease of assessment at the bedside and has outperformed the traditional prognostic scores (which include scores like the GBS) in predicting mortality in patients with UGIB [29]. Studies have shown that the ABC score works better on younger patients compared to older patients [29]. The INBS is a novel prognostic score that is computed using medical history and biochemical results. It has been found to be superior to the traditional scoring systems in predicting mortality and can estimate the chances of re-bleeding, endoscopic hemostasis failure and the duration of hospitalization [21]. These scoring systems need validation from large-scale studies before they can be incorporated into clinical practice.

Since post-endoscopy scores require endoscopy findings, it may delay risk assessment in setups where endoscopy is the limiting factor in UGIB management. Early risk stratification allows for early identification of high-risk patients, thereby ensuring targeted management of low- and high-risk patients [11,27]. Therefore, much of the focus should be on pre-endoscopy scoring systems, which can be calculated soon after patient presentation. Pre-endoscopy scores like the ABC score and INBS can be useful as quick and effective tools in predicting the outcomes of ANVUGIB, shortening hospital stays, and guiding clinical decisions to reduce mortality by increasing the chances of successful endoscopic hemostasis.

ENDOSCOPIC INTERVENTIONS FOR ACHIEVING HEMOSTASIS

After initial resuscitation and hemodynamic stabilization, patients with UGIB should undergo endoscopy within 24 hours of admission. Endoscopy is the procedure of choice for the diagnosis and management of ANVUGIB [8-11]. Current guidelines recommend early endoscopy (within 24 hours) in both high- and low-risk patients since early endoscopies result in early discharges, reduced length of hospital stay, and improved outcomes [2]. However, the optimal timing of endoscopy in high-risk patients remains controversial. While some studies found no significant difference in mortality rates between urgent and early endoscopies, other studies reported a reduction in hospital stay and mortality after urgent endoscopies in patients with ANVUGIB [30,31].

The advancement of endoscopic therapy has brought down the hospitalization rate and mortality of UGIB over the last decade [32]. Therapeutic upper gastrointestinal endoscopy *via* EGD has been effective in achieving hemostasis [9,15]. Traditionally, endoscopic therapies achieving hemostasis have been classified into three categories: injection therapy (involving injection of epinephrine, sclerosant, and thrombin), thermal therapy (with contact or non-contact probes causing electrocoagulation), and mechanical therapy (with clips, loops, and ligation) [15]. These modalities form the mainstay of standard endoscopic management. However, the advancement of newer endoscopic devices has the potential to improve outcomes in cases where conventional therapies fail to achieve hemostasis [15].

Several new hemostatic techniques have emerged over the past decade, which have been summarized in Table 4 [15]. These novel techniques have diverse approaches, ranging from upgrading current techniques to creating new technologies. Some of them have been incorporated into the current guidelines and are recommended as rescue or salvage therapies, while others should be considered when conventional interventions have failed [9]. For instance, hemostatic powders (non-absorbable mineral powders) can achieve immediate hemostasis by forming an adhesive mechanical barrier on contact with water and may be considered in ANVUGIB due

to malignancy [9,20,27]. Current guidelines recommend over-the-scope clips (large-caliber clips that allow full circumferential tissue closure of large lesions) in select NVUGIB cases (especially cases of recurrent and persistent bleeding) where standard endoscopic modalities failed to achieve hemostasis [9,20,27]. Over-the-scope clipping (OTSC) systems are fast gaining prominence as possible first-line endoscopic treatments since they are shown to outperform standard endoscopic modalities in reducing the bleeding risk and mortality in high-risk cases of NVUGIB [15,20]. These advancements have the potential to plug the loopholes of conventional therapies, but they are not without their fair share of limitations [15,20]. Further large-scale studies are needed to identify their indications and validate their effects on morbidity and mortality before they can be fully incorporated into clinical practice.

CONCLUSION

ANVUGIB is a common medical emergency that has a high mortality rate despite its declining incidence. As the majority of the patients are elderly, the increasing burden of comorbidities and the prevalence of risk factors in the geriatric population increase the likelihood of poor outcomes in high-risk groups. The increasing use of drugs such as NSAIDs, antiplatelet agents, and anticoagulants (especially in the elderly population) underscores the significance of obtaining a thorough drug history. Early risk stratification with validated scoring systems is the key to determining the line of management. Newly developed scores (like the ABC score and INBS), which are superior to the traditional scores in predicting outcomes, should be incorporated into clinical guidelines after obtaining good quality evidence. Upper gastrointestinal endoscopies have both diagnostic and therapeutic applications and should be performed within 24 hours of patient admission. Novel advancements in endoscopic therapies like hemostatic powder, over-the-scope clips have the potential to become first-line treatments in cases where standard endoscopic therapies are ineffective. Clinicians should be aware of the recent advances in risk stratification and endoscopic interventions in order to make informed decisions about targeted management for low- and high-risk patients. By integrating validated scoring systems and leveraging cutting-edge therapeutic

modalities, clinicians can enhance patient care and mitigate the substantial morbidity and mortality associated with this critical condition.

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