Emerging Endoscopic Treatments for Nonvariceal Upper Gastrointestinal Hemorrhage

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KEYWORDS

• Nonvariceal upper gastrointestinal bleeding • Over-the-scope clip • Ovesco
• Hemospray • Radiofrequency ablation • Cryotherapy • Endoscopic suturing devices
• Cellulose

KEY POINTS

- There is a large number of emerging devices for treating nonvariceal upper gastrointestinal hemorrhage.
- Most devices will never enter clinical practice.
- The few devices that have proven efficacy and effectiveness are the over-the-scope clip and hemostatic sprays, both of which are currently being used routinely in many endoscopic units.

INTRODUCTION

Upper gastrointestinal (GI) hemorrhage (UGIH) remains a common clinical problem caused by a broad spectrum of etiologic factors (**Table 1**). Although this article focuses on emerging endoscopic therapies for dealing with nonvariceal UGIH (NVUGIH), it emphasizes that whenever treating a patient with UGIH a structured approach should be followed.[1–3] The classic ABCDE approach is still current, in which A stands for airways (securing and protecting), B for breathing (eg, supplying oxygen, consider mechanical ventilation), C for circulation (placement of 2 large-bore intravenous lines and resuscitation with intravenous crystalloids and, if necessary, blood and plasma), D for drugs (eg, use of erythromycin to clear clots from the stomach, intravenous proton pump inhibitors for peptic ulcer bleeding, vasoactive medications; eg, terlipressin or

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Table 1
Important causes of upper gastrointestinal hemorrhage

Variceal bleeding	Esophageal varices	Portal hypertension or hepatic disease
	Gastric varices	Hepatic disease or prehepatic thrombosis
Nonvariceal bleeding	Peptic ulcer disease	Stomach and gastric ulcers, induced by *Helicobacter pylori* and nonsteroidal antiinflammatory drugs
	Erosive esophagitis	
	Gastric antral vascular ectasias	
	Erosive gastritis and/or duodenitis	
	Anastomotic ulcers	
Neoplastic lesions	Tumors of the oropharynx, esophagus, and stomach	Cancer, lipomas, gastrointestinal stromal tumors
Vascular malformations	Dieulafoy lesions	
	Angiodysplasias	
	Hemophilia, aortoenteric fistula	
Others	Mallory-Weiss lesions	
	Cameron ulcers	
Iatrogenic lesions	Postendoscopic resection (endoscopic mucosal resection or endoscopic submucosal dissection)	

octreotide for variceal bleeding), and E for endoscopy (used for diagnostic; ie, risk stratification, and therapeutic purposes). Unfortunately, it is very common for treating physicians to call in the endoscopy team before any of the initial critical steps of the ABCD have been accomplished. When the endoscopist receives the call, the ABCD should have been accomplished so that endoscopy can proceed in a properly monitored and hemodynamically resuscitated patient, either in the emergency room, intermediate care, or intensive care unit.[1]

Despite major improvements in endoscopic devices and therapeutic endoscopy, rebleeding rates and mortality have remained the same for several decades.[1–5] Often, rebleeding occurs in ulcers with a visible vessel and complex or large fibrotic lesions (**Figs. 1** and **2**). Therefore, much interest has been paid to emerging therapeutic devices, such as the over-the-scope clip (OTSC) and hemostatic sprays[6–30] (**Fig. 3**). Other emerging technologies, such as radiofrequency ablation (RFA), endoscopic suturing devices, ultrasound-guided angiotherapy, and oxidized cellulose, are also being investigated to improve therapeutic outcomes in specific situations[30–47] (**Fig. 4**). **Table 2** summarizes the most important emerging endoscopic devices currently in clinical use.[6–48]

OVER-THE-SCOPE CLIP

The OTSC (Ovesco, Tübingen, Germany), which is also referred to as the bear claw, is an endoscopic clipping device designed for tissue approximation.[6–8] The device, which is made of nitinol, was originally used for the closure of fistulae and endoscopic perforations.[6,9] However, its uses have been expanded to include therapy for bleeding lesions, resection of submucosal tumors, and even esophageal stent fixation.[6–10] Currently, a main use is the treatment of NVUGIH[11,12] (see **Figs. 2–4**; **Fig. 5**). Indeed, the OTSC device may become a better device to treat bleeding ulcers located in