

Reprinted from January 2024

Gastroenterology
& Endoscopy News

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Advances in Hemostatic Management for Endoscopic Procedures: EndoClot Adhesive

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Introduction

Uncontrolled gastrointestinal (GI) bleeding in endoscopic procedures is associated with high morbidity and mortality,¹⁻³ and the American Gastroenterological Association recently noted that endoscopic mucosal resection (EMR) and endoscopic submucosal dissection (ESD) are associated with an increased risk for intra- or postoperative bleeding, indicating a need for innovative strategies to achieve effective hemostasis.^{4,5} The size, type, or location of a lesion can create difficulties even with established interventions, such as thermal ablation (eg, multipolar and bipolar probes and hemostatic forceps), and mechanical devices (eg, clips).^{1,4} These traditional methods require clear visualization to make direct contact with the lesion, which is technically challenging in cases of overt bleeding.⁴ “There is a chance of bleeding within 48 hours after a resection,” said Alanna Ebigbo, MD, a gastroenterologist at the University Hospital Augsburg in Augsburg, Germany. “So, the endoscopist or surgeon needs to take preventive measures, especially in high-risk patients.”^{6,7}

Fortunately, technology has progressed to optimize treatment of GI bleeding with topical devices, such as hemostatic agents.¹ Most hemostatic agents use a no-contact delivery method that does not require targeted application, allowing for use on wider surface areas and facilitating access to challenging locations.⁸ The European Society of Gastrointestinal Endoscopy recommends the use of a “topical hemostasis spray/powder when there is recurrent bleeding and standard endoscopic treatments fail to control the bleeding,” and notes a 95% success rate of primary hemostasis with topical hemostasis powder, according to registry and case

series data.⁹ In addition, hemostatic agents may play a key role in the treatment of lesions in various locations within the GI tract and of multiple bleeding lesions,¹⁰ providing clinicians an option for patients who are not amenable to traditional therapies.¹ According to Dr Ebigbo, only about half of post-EMR lesions are closed completely with clips.¹¹ “Therefore, the issue of using a hemostatic substance becomes relevant,” he said.

Available Hemostatic Agents

The currently available topical hemostatic agents in the United States and EMEA (Europe, Middle East, and Africa) markets are, in part, differentiated by their composition, which include inorganic, polysaccharide, and biological material.¹² In 2018, the FDA approved the first hemostatic spray, a mineral-based agent that absorbs water from blood to form a mechanical viscous barrier and is administered using carbon dioxide.^{1,13,14} A more recent market entrant is composed of a natural polymer, which forms an adhesive hydrogel on the bleeding or resection site.¹⁵

EndoClot Polysaccharide Hemostatic System

Absorbable modified polymer (AMP) technology underlies EndoClot Submucosal Injection Solution (SIS),¹⁶ designed for submucosal lift of GI mucosal lesions, including adenomas, polyps, and early-stage cancers before endoscopic resection,¹⁶ and the EndoClot Polysaccharide Hemostatic System (PHS), a starch-based hemostatic spray approved by the FDA in 2021.^{16,17} Via AMP technology, EndoClot PHS works by dehydrating the blood to accelerate the clotting process.¹⁸ EndoClot PHS can be combined with conventional modalities such as clips, and it is primarily intended for use during, instead of the end, of a procedure to control nonvariceal GI bleeding.¹⁶ EndoClot PHS shares a unique powder delivery system with EndoClot Adhesive,¹⁹ a hemostatic agent used to control bleeding in GI endoscopic procedures when conventional methods are ineffective or impractical and to seal lesions for wound protection.²⁰

EndoClot Adhesive

Adhesive Hemostatic Polymer

EndoClot Adhesive is an innovative hemostatic spray with a composition and mechanism of action that distinguish it from other available agents.¹⁹ Adhesive Hemostatic Polymer (AHP) particles, which are nonabsorbable, hydrophilic, and derived from synthetic polymer, comprise the basis of EndoClot Adhesive.²¹ When in contact with the mucosa and GI fluids, AHP particles create a gelled, adhesive matrix that acts as a mechanical barrier to seal the wound site and assist in clot formation.²¹⁻²³ This protective layer will stay on mucosa for up to 3 days.²⁴ Therefore, whereas EndoClot PHS targets intraprocedural acute bleeding,¹⁶ EndoClot Adhesive is intended to treat postprocedural bleeding when there is a large diffuse resection site.^{19,25} In fact, EndoClot Adhesive is ideal after ESD and EMR for prophylaxis and to reduce the possibility of postprocedural bleeding¹⁹; it is resistant to both acids and alkalis to protect the damaged mucosa and promote healing.^{22,23} “EndoClot Adhesive seems to stick very neatly onto the wound and doesn’t flow off. We see a long-lasting sticking onto the resection bed for effective prophylaxis effect,” Dr Ebigo said (Figure 1).^{19,21-24}



Figure 1. EndoClot Adhesive is a single-use medical device consisting of AHP, a durable hemostatic polymer. When in contact with the mucosa and gastrointestinal fluids, AHP particles create a gelled, adhesive matrix that acts as a mechanical barrier to seal the wound site and assist in clot formation.

AHP, Adhesive Hemostatic Polymer.
Based on references 19 and 21-24.

Ease of Use

EndoClot Adhesive has a unique delivery system that facilitates use in hard-to-reach areas.²⁶ The applicator consists of a powder/air mixing chamber, a catheter, and a connecting tube and has an anti-reflux design to prevent occlusion (Figure 2).¹⁹ “The anti-reflux design is important because you don’t want the powder to go backward,” Dr Ebigo said. “If it goes backward, it can clot within the application catheter. With EndoClot Adhesive, I have not experienced any relevant clogging of the endoscopic working channel.”

The EndoClot Air Compressor is small, portable, and operates on rechargeable batteries or AC power.¹⁹ It provides consistent air pressure for a controlled delivery of powder to the application site without stress to the lesion.¹⁹ “You don’t have that immediate spray of a huge amount of powder,” Dr Ebigo said. Of note, the consistent air pressure prevents the “whiteout” effect associated with delivery systems that use pressurized gas,¹⁹ which can obstruct the visual field and hinder the application of additional hemostatic devices if bleeding remains uncontrolled. “That’s like driving through a winter storm and your windshield wipers aren’t working,”



Figure 2. The EndoClot applicator consists of a powder/air mixing chamber, a catheter, and a connecting tube and has an anti-reflux design to prevent occlusion. The EndoClot Air Compressor provides consistent air pressure to avoid the “whiteout” effect associated with delivery systems that use pressurized gas.

Based on reference 19.

THE SCIENCE BEHIND POSITIVE PATIENT OUTCOMES

Dr Ebigbo said, and noted an additional advantage: “There is a mechanical motor with the EndoClot Air Compressor that drives the air into the catheter. You can reuse the compressor. It’s a one-time investment.”

Conclusion

The launch of EndoClot PHS represented an advance in intraprocedural GI bleeding management in endoscopic procedures.^{16,17} With the introduction of EndoClot Adhesive, physicians have an additional hemostatic agent specifically designed for use at the end of a procedure.¹⁹ The AHP technology underlying EndoClot Adhesive provides a unique mechanism to address limitations typically encountered with standard-of-care hemostatic options (eg, clips) and is ideally suited to prevent postprocedural bleeding

after EMR and ESD.^{11,19,21-23} “EndoClot Adhesive spreads powder onto the wound easily and with clear visibility,” Dr Ebigbo said. “It seems to seal and protect the resection site very nicely.”

Case Study: A 54-Year-Old Man Undergoing Endoscopic Submucosal Dissection of a Large Rectal Polyp

Alanna Ebigbo, MD

A 54-year-old man without relevant comorbidities presented for the assessment of a large rectal polyp. The initial sigmoidoscopy showed a 40-mm tumor about 5 cm proximal to the anal verge. The gross morphology indicated a Paris classification 0-IIa + Is laterally spreading tumor of the nodular mixed type. Further evaluation showed a regular surface and vascular architecture across most parts of the lesion consistent with JNET (Japan NBI Expert Team) 2A classification. However, there was a prominent central nodule with a reddish color and distorted surface and vessel structures (JNET 2B). Endoscopic submucosal dissection with the Olympus DualKnife J (1.5 mm) was performed. EndoClot Submucosal Injection Solution (SIS) was administered to guarantee prolonged lifting. In the small area of possible submucosal invasion, the dissection plane was held between the longitudinal and circular muscles (endoscopic intermuscular dissection). After en bloc resection, visible vessels were prophylactically coagulated with the tip of the dual knife. Finally, one portion of EndoClot Adhesive was evenly applied to the surface of the resection bed (Figure 3). The overall intervention time was 90 minutes. The final histology of the tumor showed submucosa-invasive adenocarcinoma with an invasion depth of 900 microns and without lymphovascular invasion (T1b, L0, V0, R0). The patient was discharged the following day after an uneventful hospital stay of 24 hours without any bleeding stigmata.

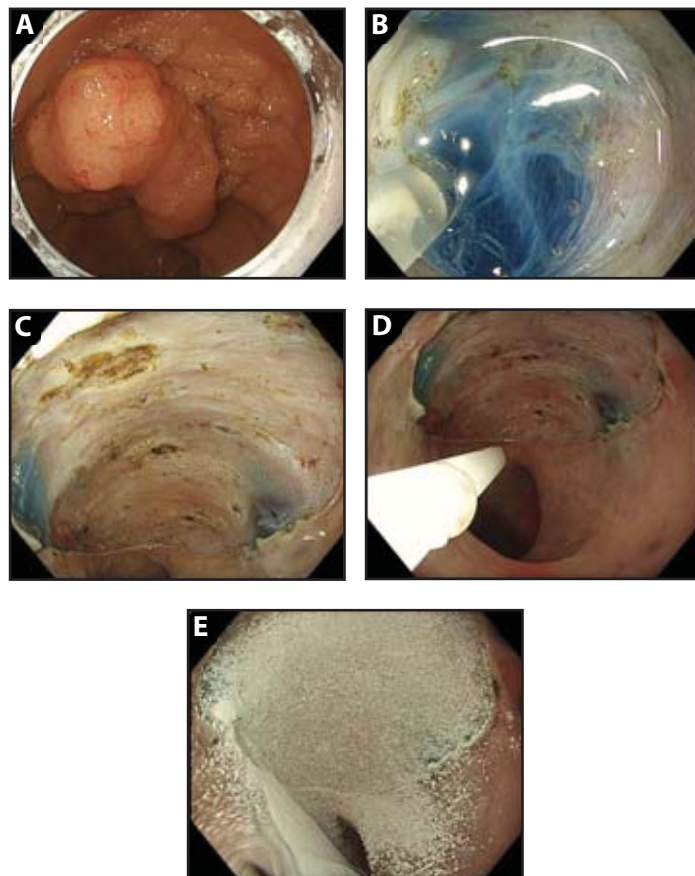


Figure 3. A laterally spreading rectal tumor with a prominent nodule (granular mixed type) (A) was resected using EndoClot SIS (B) to attain prolonged lifting during ESD/EID (C). EndoClot Adhesive was applied to the resection bed for bleeding prophylaxis (D and E).

EndoClot SIS, EndoClot Submucosal Injection Solution; **EID**, endoscopic intermuscular dissection; **ESD**, endoscopic submucosal dissection. Images courtesy of Alanna Ebigbo, MD.

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Disclosure: Dr Ebigo was compensated for his contributions to this article.

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EndoClot Adhesive is not currently available for sale in the United States.

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