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CASE REPORT | ENDOSCOPY

Hemostatic Hold-Up: A Rare Case of Endoscopic Retention After Hemostatic Powder Application

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ABSTRACT

Hemospray (TC-325), a powder-based hemostatic spray, is increasingly used for upper gastrointestinal bleeding but can rarely cause endoscope retention. A 74-year-old woman with chronic kidney disease, atrial fibrillation on warfarin, mechanical heart valves, and prior gastric ulcers presented with melena and large-volume hematemesis causing hemodynamic instability. Laboratory findings revealed hemoglobin 7.3 g/dL and international normalized ratio 7. Esophagogastroduodenoscopy showed multiple bleeding arteriovenous malformations in the cardia and fundus, treated with a synthetic self-assembling peptide gel and subsequently with hemospray applied in retroflexion. Withdrawal of the endoscope was initially unsuccessful due to powder adhesion, but aggressive water irrigation enabled removal after 90 minutes. The patient stabilized with transfusions and octreotide, with no recurrent bleeding. This case underscores the risk of endoscope retention when Hemospray is applied retroflexed and suggests aggressive irrigation as a potential remedy. Further studies are needed to optimize Hemospray dosing and evaluate self-assembling peptide-powder interactions.

KEYWORDS: hemospray (TC-325); hemostatic powder; endoscope retention/retained endoscope; retroflexion; upper gastrointestinal bleeding; gastric arteriovenous malformation; puraStat/self-assembling peptide gel; adverse event/endoscopic complication

ABBREVIATIONS: AVM, arteriovenous malformation; EGD, esophagogastroduodenoscopy; FDA, U.S. Food and Drug Administration; GEJ, gastroesophageal junction; GI, gastrointestinal; ICU, intensive care unit; INR, international normalized ratio; IV, intravenous; TC-325, hemospray (TC-325) hemostatic powder; UGI, upper gastrointestinal; US, United States; 510(k), U.S. Food and Drug Administration 510(k) clearance pathway

INTRODUCTION

Hemospray is a bentonite powder-based hemostatic spray that has emerged as an effective tool for achieving hemostasis in acute gastrointestinal hemorrhages with relatively low risk for adverse events postapplication. Literature detailing the risk profile specific to the combined use of Hemospray with hemostatic self-assembling peptide-based gels like PuraStat is scarce. Notably, only 2 cases have been reported detailing failed endoscope withdrawal after Hemospray use. Here, we present a unique case of delayed endoscopic withdrawal after the combined use of Hemospray and PuraStat gel on bleeding gastric arteriovenous malformations (AVMs) where timely removal of the endoscope was facilitated by aggressive irrigation with water.

CASE REPORT

A 74-year-old woman with chronic kidney disease, atrial fibrillation, mechanical aortic and mitral valves on warfarin, and a history of gastric ulcers presented to the emergency department with melena and large volume hematemesis with hemodynamic instability. Laboratory findings were notable for a hemoglobin of 7.3 and an international normalized ratio (INR) of 7 requiring transfusion of 2 units of red blood cells in addition to 2 doses of 10 mg IV vitamin K with subsequent improvement of INR to 2.6. No fresh frozen plasma or additional blood products were administered. Esophagogastroduodenoscopy (EGD) revealed multiple actively bleeding AVMs in the cardia and fundus (Figure 1). The AVMs were first treated with PuraStat gel. Given residual oozing and persistent coagulopathy, Hemospray was subsequently applied from a retroflexed position as a contact-free adjunct immediately after PuraStat placement. On attempted withdrawal, the scope tip and distal shaft were noted to be coated with powder, and resistance was encountered. Without further attempts at physical manipulation, a prolonged period of copious irrigation with water (~90 minutes

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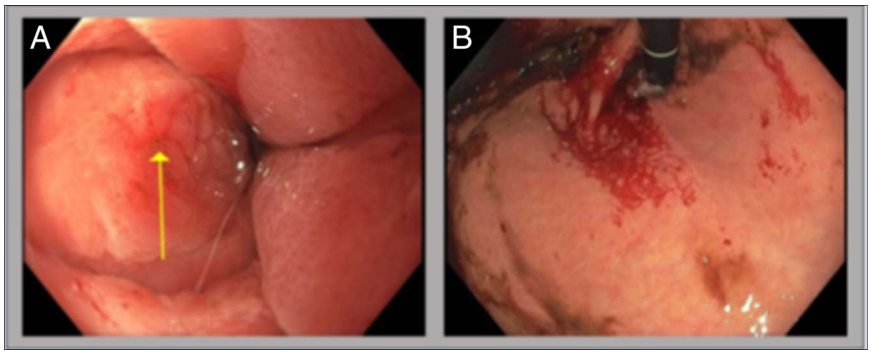


Figure 1. (A) AVM in the gastric cardia before therapy (arrow), not actively bleeding at time of visualization. (B) A separate, oozing AVM near the gastroesophageal junction on retroflexed view, before placement of PuraStat and subsequent Hemospray. AVM, arteriovenous malformation.

from the time resistance was first encountered to final withdrawal) ultimately mobilized the adherent material, permitting safe removal. Alternative strategies beyond irrigation were not documented, and no surgical consultation was obtained. After the procedure, the patient remained intubated in the ICU where she received 1 additional unit of red blood cells and octreotide given her multiple AVMs. No overt gastrointestinal bleeds were noted postoperatively. Warfarin was resumed 5 days after the procedure with INR goal of 2.5–3.5. The immediate post-procedure course was uncomplicated, with no recurrent intraprocedural bleeding after scope removal. The hospitalization was subsequently prolonged by 2 episodes of intracerebral hemorrhage related to anticoagulation, without further gastrointestinal bleeding. The patient was ultimately lost to outpatient follow-up, limiting assessment of long-term outcomes.

DISCUSSION

Hemospray has become an increasingly utilized method for achieving hemostasis in upper gastrointestinal (UGI) bleeds. A meta-analysis performed by Shah et al[1] demonstrated superiority of Hemospray in primary hemostasis for nonvariceal UGI bleeds compared to endoscopic clipping with epinephrine injection with no significant difference in rebleeding rate, need for surgery, or overall mortality. To our knowledge, only 2 cases of a retained endoscope after Hemospray use have been reported. One case reported by Yii et al,[2] describes an instance of failed endoscopic withdrawal after Hemospray application with the endoscope in a retroflexed position to a gastric cardial tumor in a patient with diffuse large B-cell lymphoma where the endoscope could not be removed until 48 hours after the sentinel EGD. After initial hemostasis, the endoscope was caught at the gastroesophageal junction (GEJ), which was subsequently entirely occluded. To minimize further bleeding events related to attempts to withdraw the endoscope, the patient was intubated and observed in a stable condition before endoscope withdrawal was successfully reattempted in 48 hours. Another case described by Shaikh et al involves retention of the endoscope after retroflexed Hemospray application to active bleeding at the cardia and fundus in a patient with a history of alcohol use.[3] Similarly, the endoscope adhered to gastric mucosa resulting in an inability to withdraw the scope at the level of the GEJ. Attempts to visualize and irrigate the areas of adherence were limited by restricted endoscope mobility. After intubation and transfer to a tertiary care hospital, the endoscope was successfully withdrawn using traction 6 hours after the sentinel EGD.

PuraStat is comprised of the self-assembling peptide acetyl-[arginyl-alanyl-aspartyl-alanyl]$_4$-amide tetrahydrochloride, which forms a collagen-like fibrous network upon exposure to physiological conditions and can be applied before or after most other hemostatic methods.[4,5] Achieving US FDA 510(k) clearance in 2021, there remains a need for prospective studies further clarifying the role of PuraStat gel in gastrointestinal hemostasis. Available literature suggests that it has a low rebleeding rate after prophylactic use and that it is efficient and safe for use during active intraprocedural bleeding.[6] Although self-assembling peptide-based hemostatic methods allow for flexibility in the adjunct hemostatic method to employ, and despite Hemospray's overall safety in UGI bleeds, there is a scarcity of literature available evaluating the adverse effect profile of these 2 hemostatic methods used in tandem for UGI bleeds.

Published reports have shown that hemostatic powders such as Hemospray achieve immediate hemostasis in most nonvariceal upper gastrointestinal bleeding cases (~85%–90%), with early rebleeding rates of roughly 10%–20%. Similarly, early data on PuraStat demonstrate high initial hemostasis rates (around 70%–90%) and a favorable safety profile, particularly in diffuse oozing lesions. The 2025 European Society of Gastrointestinal Endoscopy position statement by Gralnek et al[7] supports the use of both Hemospray and PuraStat agents as important adjunctive hemostatic tools, although evidence on sequential or combined application is minimal. In this case, although PuraStat was applied initially, oozing persisted. Hemospray was subsequently used as a rescue modality to achieve hemostasis, consistent with its reported utility in managing diffuse or refractory upper gastrointestinal bleeding. The decision to use Hemospray in the retroflexed position reflected the endoscopist's attempt to maximize visualization and coverage of the lesion at the gastroesophageal junction.

The mechanism of scope adherence in this case is likely multifactorial. The combination of PuraStat, which polymerizes on mucosal contact, and Hemospray, a bentonite-based powder that absorbs water and concentrates clotting factors, may have created an adhesive matrix binding to the endoscope tip. The retroflexed position in the gastric cardia/fundus increased mucosal contact with the coated shaft, plausibly contributing to resistance on withdrawal. Further studies are warranted to explore the interaction between these materials and their combined impact on adhesion in clinical applications.

Noteworthy similarities exist between the 2 prior cases of delayed endoscope withdrawal after hemospray application and our case. In all 3, the areas treated involved the gastric cardia and/or fundus, and endoscopic withdrawal was restricted at the level of the GEJ. Notably, Hemospray application occurred with the endoscope in a retroflexed position, resulting in inadvertent coating of the endoscopic shaft surface, likely precipitating adhesion of the endoscope to the gastric mucosa. Smith et al[8] also reported 2 cases of transient endoscope adherence to the esophageal mucosa after use of Hemospray, supporting the potential for this rare but serious complication. The fact that Hemospray was applied in a retroflexed manner in each instance of failed withdrawal suggests retroflexed positioning may have contributed to endoscope retention. This warrants further guidance on the role and upper limits of powder-based hemostatic sprays in treating UGI bleeds in areas requiring retroflexion, like the gastric cardia and fundus.

In our case, the endoscope was successfully removed in 90 minutes as opposed to 6 or 48 hours after sentinel EGD as in previous reports.[2,3] The most likely explanation for this relates to the fact that we were not as limited by the mobility of the endoscope to aggressively irrigate the areas of adhesion caused by hemostatic powder. Sung et al[9] demonstrated that Hemospray could be completely eliminated from the gastrointestinal tract without intervention within 48–72 hours. Thus, eventual withdrawal of a lodged endoscope may still be achieved even without aggressive irrigation, as evidenced in the 2 prior reports. Importantly, irrigation with water did not precipitate new bleeding events in our patient with AVMs, reflecting the efficacy of hemostatic powder as a primary hemostatic approach.

This report has several limitations. As a single case, it cannot establish causality between the sequential use of PuraStat and Hemospray and the subsequent scope-retention event. AVMs can bleed intermittently, and the absence of active bleeding in 1 image (e.g., Figure 1) does not exclude their clinical relevance. Retroflexion was chosen to optimize visualization, which may also explain the atypical appearance of the submitted images, whereas deep retroflexion itself may have increased mucosal contact and contributed to adhesion. Although immediate hemostasis was achieved and no further gastrointestinal bleeding occurred, the patient's subsequent course was complicated by intracerebral hemorrhage related to anticoagulation, and she was ultimately lost to outpatient gastroenterology follow-up. These factors limit assessment of the long-term durability of hemostasis.

In summary, we report a case of failed endoscopic withdrawal after the application of Hemospray powder in a retroflexed position to bleeding gastric AVMs where the time of endoscope retention was minimized through aggressive irrigation.

DISCLOSURES

Author contributions: C. Echeverria authored the manuscript. J. Farha and ME Zoghbi performed the endoscopic procedure described in the case report. All authors contributed to critical revisions and editing of the manuscript. C. Echeverria is the article guarantor.

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