

## Novel application of Hemospray to achieve hemostasis in post-variceal banding esophageal ulcers that are actively bleeding

Esophageal variceal band ligation (EVL) has been described as the best treatment option for esophageal variceal bleeding (EVB) [1]. Following EVL, a local ulcer is commonly found that heals within 2–3 weeks, allowing the development of fibrosis in the submucosa. If the rubber band detaches prematurely, before variceal thrombosis has occurred, massive bleeding may occur at the site of the detached band [2]. This complication is rare but difficult to manage and is associated with mortality of up to 52% [3–5]. Management is based on endoscopic injection of cyanoacrylate when available, or balloon tamponade as a bridge to a rescue transjugular intrahepatic portosystemic shunt (TIPS) procedure [5].

We report two cases of effective hemostasis using the novel hemostatic powder Hemospray (Cook Medical, Winston-Salem, North Carolina, USA). The nonabsorbable nanopowder is propelled to the area of bleeding by means of a carbon dioxide-containing cartridge with a positive outflow pressure; the noncontact technique allows the diffuse spray of the powder.

The first patient was a 56-year-old man who was admitted for hematemesis 13 days after endoscopy and EVL for EVB. Resuscitation was started and emergency endoscopy confirmed an actively bleeding post-banding esophageal ulcer (PBEU). Four injections of 1 ml of cyanoacrylate into the bleeding ulcer were done, with temporary hemostasis. However during the next 12 hours, the patient experienced exteriorized blood loss and transfusion of 2 units of red blood cells was required. The second patient, a 53-year-old woman with hepatitis C cirrhosis, was transferred to our institution because of hematemesis 7 days after endoscopy and band ligation for acute variceal bleeding

in another institution. Endoscopy was performed in both patients confirming the actively bleeding PBEU. In each patient treatment with one kit of the hemostatic powder was applied until hemostasis was confirmed (Fig. 1, Video 1). Both patients were kept under surveillance for 24 hours. A follow-up endoscopy 24 hours later disclosed fibrinous deposits on the ulcer with no active bleeding. This technique may offer a convenient treatment method for controlling hemorrhage in this potentially life-threatening situation.

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**Competing interests:** None

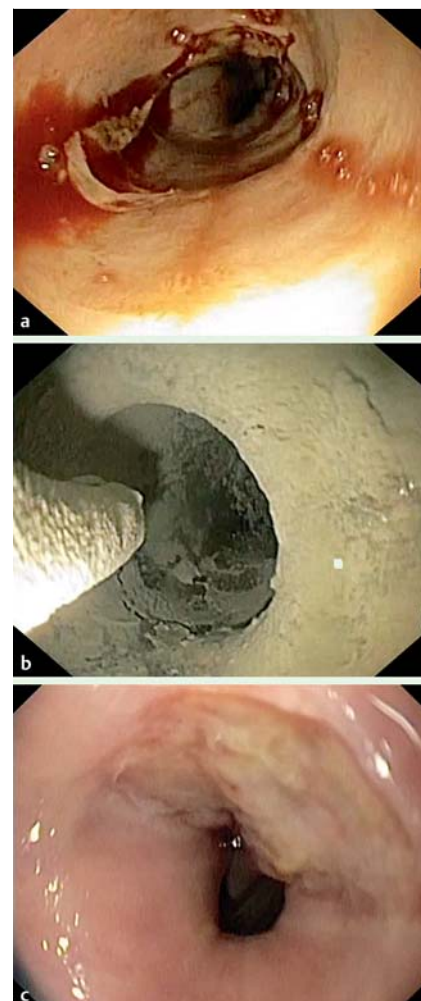
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**Fig. 1** a Actively bleeding ulcer following esophageal variceal band ligation (EVL). b Application of hemostatic powder. c Appearance at 24-hour follow-up endoscopy.

### Bibliography

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### Video 1

Use of hemostatic nanopowder for hemostasis of an actively bleeding post-variceal banding esophageal ulcer.