



# The use of water immersion technique during device-assisted (single-balloon) enteroscopy to treat actively bleeding jejunal Dieulafoy's lesion

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## INTRODUCTION

Dieulafoy's lesion (DL) is an uncommon but potentially life-threatening condition, which can result in sudden, massive gastrointestinal bleeding. The water immersion technique can be helpful in localizing the source of active bleeding during an endoscopy. Herein, we present a case of gastrointestinal bleeding due to jejunal DL found on a video capsule endoscopy (VCE). We describe the use of the water immersion technique in localization and treatment of actively bleeding DL during single-balloon enteroscopy.

## CASE PRESENTATION

The patient is a 66-year-old man with iron-deficiency anemia and a notable medical history of coronary artery disease on dual antiplatelet therapy (DAPT) and atrial fibrillation post-Watchman device (Boston Scientific Corporation, Minn) implementation. He presented to our hospital for evaluation of black tarry stool, which he had experienced for 1 week. He described 2 previous episodes of melanic stool in the last 12 months, and he was evaluated with EGD, colonoscopy, and VCE with unrevealing results.

On admission, he was hemodynamically stable, and his hemoglobin level was 7.3 mg/dL. He underwent repeated EGD, colonoscopy, and tagged red blood cell nuclear scan with unrevealing results. He had multiple melanic stools during the admission, and inpatient VCE revealed active bleeding in the mid-jejunum (Fig. 1). An antegrade device-assisted single-balloon enteroscopy was performed and revealed fresh bleeding in the mid-jejunum (Fig. 2). Careful examination with carbon dioxide insufflation localized an area with active bleeding; however, hemostasis was not achieved with a Gold Probe Bipolar (Boston Scientific Corporation, Natick, Mass) and argon plasma coagulation (APC) because of limited visualization of the exact source of the bleeding. The endoscope was advanced until old blood was encountered, and water immersion started with filling the small-bowel loop with sterile water followed by suction until clearance of all the old blood was achieved.

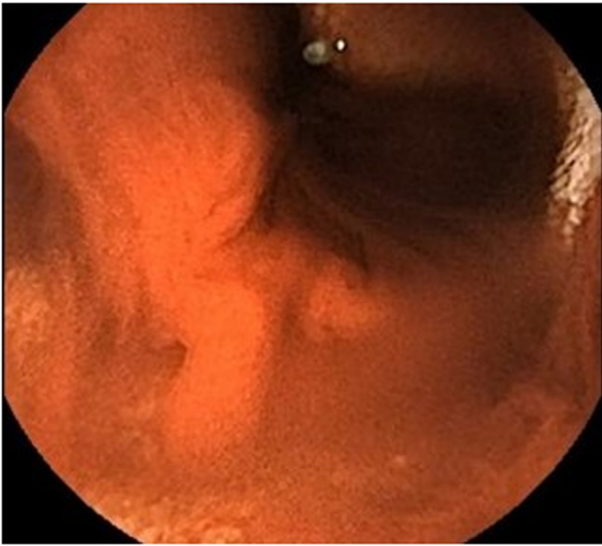
A pulsatile, actively bleeding lesion was seen in the mid-jejunum consistent with DL at the site of initial interventions with ongoing blood oozing (Fig. 3). The water immersion significantly improved the visualization of the exact source of bleeding, and hemostasis was achieved using a total of 3 through-the-scope hemostatic clips to ensure encompassing of any feeding blood vessels (Fig. 4). A tattoo was placed 2 folds proximal to the DL for localization in case of recurrent or life-threatening bleeding that would require surgical intervention (Video 1, available online at [www.gjejournal.org](http://www.gjejournal.org)).

The patient was monitored after resuming his DAPT and anticoagulation. The melanic stool resolved and his hemoglobin stabilized.

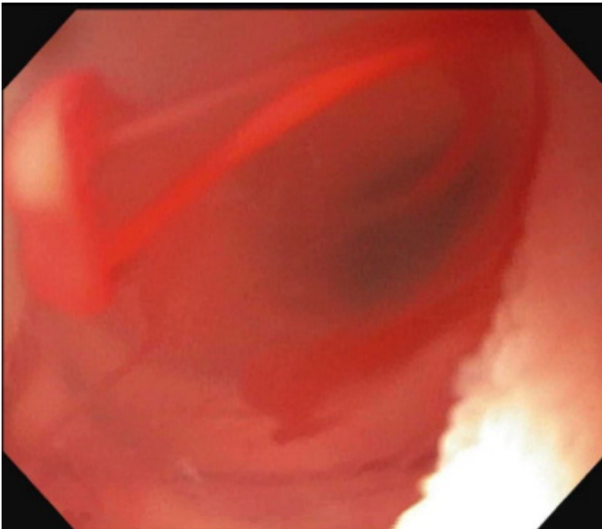
## DISCUSSION

Dieulafoy's lesion is a dilated aberrant submucosal vessel that can cause massive GI bleeding by eroding the overlying epithelium in the absence of a primary ulcer.<sup>1,2</sup> The localization of the source of active GI bleeding can be challenging, especially in the small bowel where endoscope instability and mucosal folds can preclude visualization of the exact source of bleeding. In this case, we illustrated the use of the water immersion technique as a valuable tool for the endoscopist to localize and treat active bleeding during small-bowel enteroscopy. The use of the underwater technique has been reported as successful during different therapeutic endoscopic procedures, such as endoscopic mucosal resection, as water immersion can enhance endoscopic visualization by the optical "zoom" effect that magnifies the mucosal architecture,<sup>3</sup> localize and treat GI bleeding, increase the odds of successful hemostasis, reduce procedure time,<sup>4,5</sup> and enable deeper intubation of the small bowel during enteroscopy by preventing loop formation and promoting loop reduction.<sup>6</sup>

The use of a clear distal attachment cap placed at the tip of the endoscope can help improve endoscopic treatment of active GI bleeding. The cap can stabilize the tip of the endoscope, straighten the mucosal fold, improve visualization of the source of bleeding, and tamponade the bleeding source until definite treatment can be applied.<sup>5</sup>

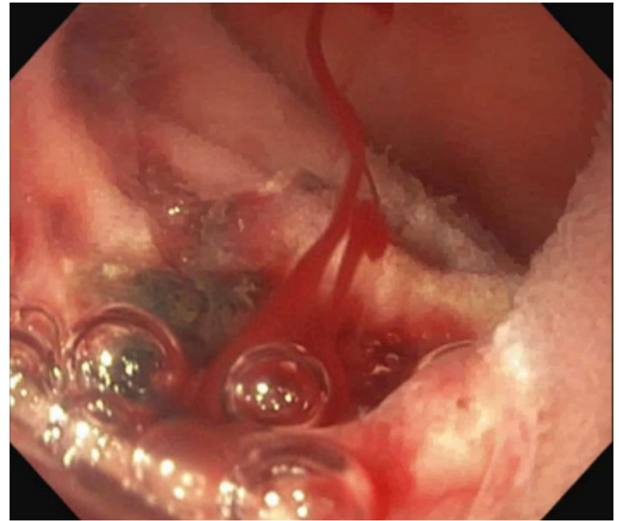


**Figure 1.** Video capsule endoscopy reveals active bleeding in mid-jejunum.

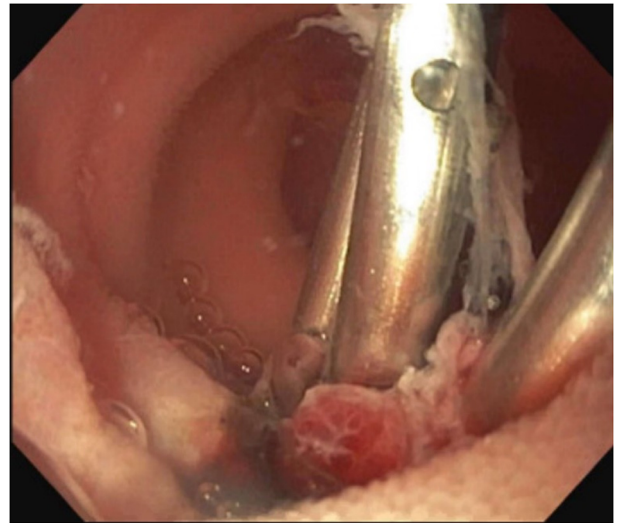


**Figure 2.** Device-assisted (single-balloon) enteroscopy with active bleeding lesion in mid-jejunum.

Continuous water irrigation can overcome the effect of blood in limiting the visualization during the procedure. There is controversy around the use of thermal hemostatic methods while performing underwater endoscopy. Some reported that thermal hemostatic methods are disrupted in areas where saline solution is used because it dissipates electric current and decreases electric current and thermal hemostasis effectiveness.<sup>5</sup> Others postulated the heat-sink effect of water immersion can generate a targeted location and protect deeper muscle injury.<sup>3</sup> The use of a bipolar probe and APC in our case provided partial hemostasis, and the mechanical method with hemostatic clips eventually provided successful hemostasis.



**Figure 3.** Device-assisted (single-balloon) enteroscopy with partial hemostasis of the bleeding lesion after thermal methods (bipolar probe and argon plasma coagulation).



**Figure 4.** Device-assisted (single-balloon) enteroscopy with achievement of complete hemostasis using the water immersion technique and mechanical method using 3 through-the-scope hemoclips.

## CONCLUSION

The water immersion technique can be of paramount importance in localizing and treating a bleeding small-bowel DL during single-balloon enteroscopy after an unsuccessful complete hemostasis using conventional carbon dioxide insufflation.

## DISCLOSURE

*All authors disclosed no financial relationships.*

*Abbreviations: APC, argon plasma coagulation; DAPT, dual antiplatelets therapy; DL, Dieulafoy's lesion; VCE, video capsule endoscopy.*

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