

## Effectiveness of endoscopic Doppler probe ultrasonography for identifying the source of colonic diverticular bleeding

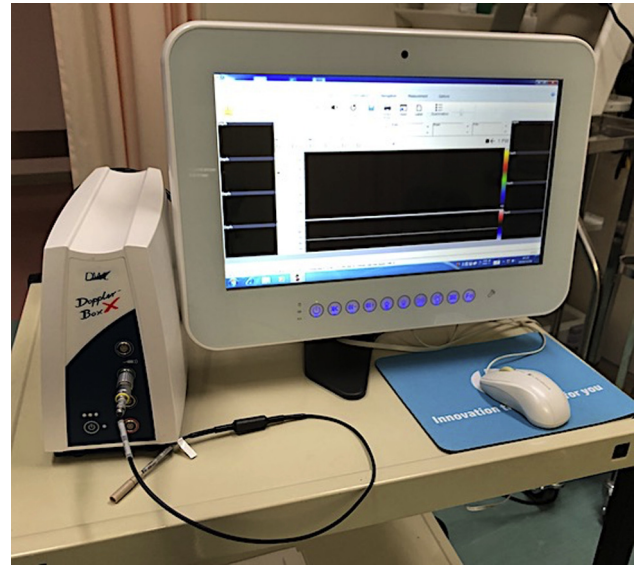
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Colonic diverticular bleeding (CDB) is the most common cause of acute lower GI bleeding. The diagnosis of CDB is made through detection of the stigmata of recent hemorrhage (SRH).<sup>1,2</sup> To increase the rate of SRH identification, bowel preparation, water-jet endoscope, and transparent hood have been recommended.<sup>3</sup> Despite the use of these methods, the rate of SRH identification is only 15% to 40%.<sup>1</sup> Even if blood or blood clots are present in the diverticulum, these areas are not always the source of bleeding; in some cases, blood from the bleeding diverticulum flows into other areas. To identify the source of bleeding, detailed observation using the washing tube of each diverticulum is required; however, this is a time-consuming procedure, and it is not always possible to evaluate the interior of the diverticulum.

Doppler probe ultrasonography (DOP) has recently been reported as a useful method in the field of endoscopy.<sup>4</sup> DOP detects blood flow that feeds potential sources of bleeding. The usefulness of DOP in increasing the detection rate of SRH of diverticular hemorrhage has not been proposed. Because DOP detects blood flow toward the probe, we hypothesized that it would be easier to detect blood flow when the vertical artery in the diverticulum collapses. Here, we report a case of CDB in which DOP was used, with new systems<sup>5</sup> for effective identification of SRH (Video 1, available online at [www.VideoGIE.org](http://www.VideoGIE.org)).

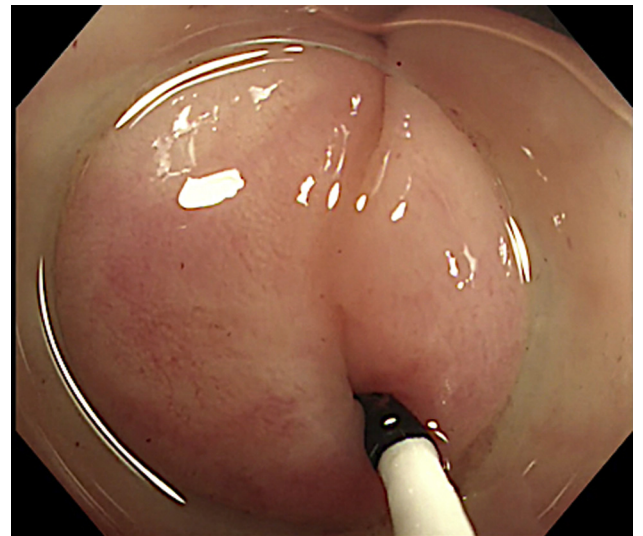
An 89-year-old man was admitted for treatment of hemorrhage. Contrast-enhanced CT revealed extravasation from the ascending colon (Fig. 1). Although the patient



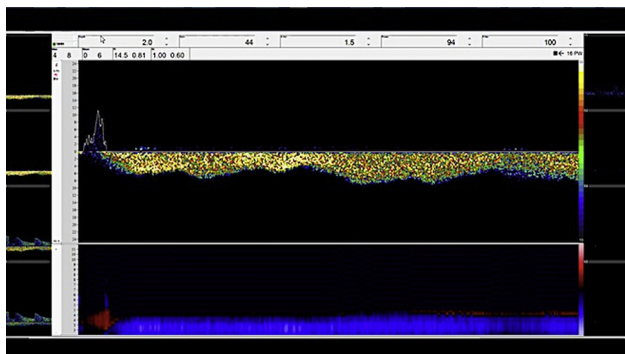
**Figure 2.** Doppler probe ultrasonography system with Doppler probe (Doppler-BOX and monitor, 16-MHz pulse-wave). Printed with permission from Compumedics, Inc.



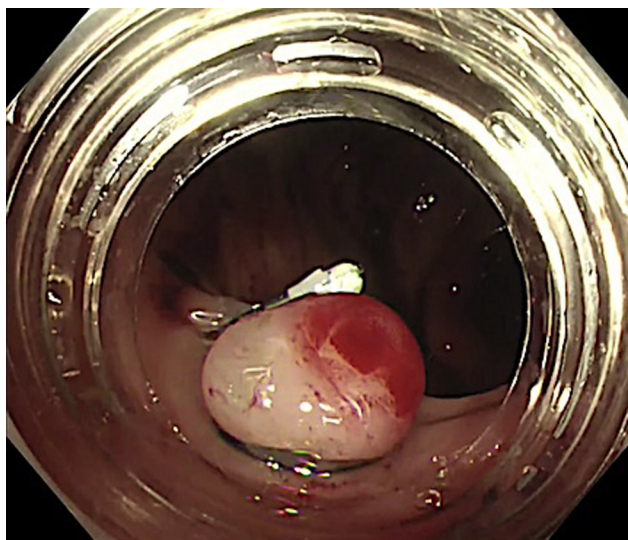
**Figure 1.** Contrast-enhanced CT revealed extravasation in the ascending colon.



**Figure 3.** Doppler probe applied to each diverticulum.

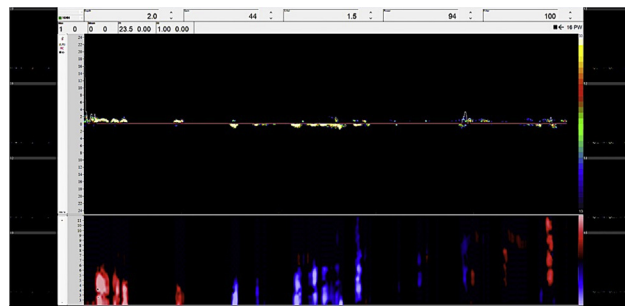


**Figure 4.** Visual graphic display of the corresponding positive Doppler waves. The y-axis denotes the speed of blood flow (cm/s), and the x-axis denotes time (seconds).



**Figure 5.** Endoscopic band ligation performed at the site of the positive Doppler wave.

had already undergone colonoscopy 3 times in the preceding week, the source of the bleeding had not yet been identified, and recurrent bleeding was observed. To identify the source of the bleeding, we prepared a DOP system (16 MHz; Compumedics, DWL, Germany; Fig. 2)<sup>5</sup> and performed colonoscopy. Although there was no sign of active bleeding, we checked the diverticula one by one using DOP (Fig. 3). During the procedure, we detected the DOP-positive artery in one diverticulum (Fig. 4). The Doppler wave shifts depended on the speed and direction of the blood flow relative to the Doppler probe. We identified the diverticulum as the origin of the CDB. Endoscopic band ligation was performed on the DOP-positive diverticula (Fig. 5), and disappearance of the Doppler wave was confirmed (Fig. 6). The DOP examination took 12 minutes. There was no recurrent



**Figure 6.** After endoscopic band ligation, the Doppler wave disappeared.

bleeding for 6 months thereafter. CT extravasation was positive in this case; when it is negative, the range of colon to be examined using the DOP method is expanded, and the procedure may take more time.

From the obtained results, we conclude that this DOP method has the potential to increase the rate of identification of the source of bleeding in CDB.

## DISCLOSURE

*All authors disclosed no financial relationships.*

*Abbreviations: CBD, colonic diverticular bleeding; DOP, Doppler probe ultrasonography; SRH, stigmata of recent hemorrhage.*

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