BRIEF REPORT

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Warm water irrigation is useful for the identification of a bleeding colonic diverticulum

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Colonic diverticular bleeding (CDB) is the most common cause of lower gastrointestinal tract hemorrhage, with an incidence of 24 per 100,000 persons in the United States.[1] Although diverticular bleeding stops spontaneously in 80% of cases, rebleeding commonly occurs in more than a third of the patients within 2 years.[2,3] Persistent, recurrent, or massive bleeding can result in prolonged hospital stay, emergency surgery, and increased risks of morbidity and mortality. In recent years, endoscopic hemostasis has emerged as the first-line therapy for CDB.[3-5] Various endoscopic methods include band ligation, clipping, or coagulation of the bleeding diverticulum, which can prevent the need for transarterial embolization or surgery.[6]

The greatest challenge of treatment is the identification of the offending diverticulum, often in the setting of multiple diverticulosis. Moreover, the redeeming characteristics of CDB are also the main contributors to diagnostic and therapeutic difficulty: the spontaneous resolution and intermittent nature of rebleeding. Despite substantial studies, the mechanisms underlying CDB remain unclear.[5]

Radiological localization of the bleeding site may be performed using computed tomography mesenteric angiography or red blood cell scintigraphy. These have several limitations including highly variable accuracy in confirming the site of bleeding and the inability to allow performance of hemostatic therapy.[7] Endoscopic evaluation is expedient and offers good hemostatic options with low rebleeding risks. However, the success of the procedure is dependent on the endoscopist's skill and often hampered by the inability to detect the bleeding diverticulum.

Endoscopic detection rates of stigmata of recent hemorrhage (SRH) in the colon, namely active bleeding, visible vessels or an adherent clot, range widely from 11% to 51%.[3] Niikura et al.[8] identified that for urgent colonoscopy (performed within 24 hours of onset of hematochezia), expert colonoscopists can use a transparent cap or water jet scope for identifying SRH.[9] However, only 9.4% (n=37) of the 393 study patients who were diagnosed with or presumed to have diverticular hemorrhage showed endoscopic SRH. This was despite the fact that 40% of the colonoscopies were performed urgently.[8] It is paramount to improve the techniques for SRH detection to improve CDB management.

In this report, we describe a simple novel endoscopic technique used to detect SRH in patients with CDB. Five consecutive patients with massive diverticular bleeding were admitted to our hospital under the care of a single endoscopist between August 2019 and August 2020. All the patients presented with altered rectal bleeding. All patients underwent urgent colonoscopy within 24 hours from the bleeding onset and were administered 2 L of oral polyethylene as bowel preparation prior to the procedure. One patient had active arterial spurting from the diverticulum on index colonoscopy that was endoscopically clipped. The demographic, disease, and endoscopic characteristics of the remaining four patients are shown in Table 1. Institutional review board approval was waived for this retrospective case series.

The first patient in the series, Patient A, had a right-sided

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Table 1. Demographic, disease, and endoscopic characteristics of patients who underwent warm water irrigation for colonic diverticular bleeding

Patient	Age (yr)	Sex	Initial Hb (g/dL)	Endoscopic SRH	Location of colonic diverticuli	Total blood transfusion (pints)	Pre-discharge Hb (g/dL)	Follow-up (mo)
A	76	Male	8.4	Active oozing AC diverticulum	Right colon	6	10.5	36
B	80	Male	6.8	Active oozing AC diverticulum	Pancolonic	3	11.2	22
C	85	Male	8.2	Active spurting DC diverticulum	Pancolonic	3	10.1	9
D	65	Male	7.4	Active oozing AC diverticulum	Pancolonic	5	9.9	2

Hb, hemoglobin; SRH, stigmata of recent hemorrhage; AC, ascending colon; DC, descending colon.

diverticulosis without SRH on the index colonoscopy. A second colonoscopy was performed after rebleeding occurred in the ward 12 hours later; no SRH was visualized despite meticulous water jet flushing of each individual diverticuli. Rebleeding again occurred two days later, prompting a third procedure. No SRH was observed, although residual blood was observed in the right colon. Warm saline (38–39 °C) was then infused intraluminally via the colonoscope up and down in the right colon. During this process, active oozing was noted in the ascending colonic diverticulum.

The index colonoscopy for Patient B also revealed no SRH despite careful evaluation. Active oozing was subsequently observed from the right-sided diverticulum following several passes using the warm saline infusion method. In Patient C, 1 L of warm saline was introduced directly into the cecum via the scope and allowed to flow distally. The abdomen was gently massaged for a few minutes to allow fluid to reach all parts of the colon prior to slow withdrawal of the colonoscope. Active spurting from the ascending colon diverticulum was observed, which was not evident on entry. Patient D had three colonoscopies and one computed tomography mesenteric angiography performed during the week prior, under the care of another specialist. Finally, active diverticular oozing was detected during a fourth colonoscopy by our specialist; warm saline had been infused into the cecum with abdominal massage, just as with Patient C. This method was less tedious than flushing each diverticulum individually.

All initial endoscopic assessments for the four consecutive patients who presented with massive CDB showed diverticuli without SRH. All patients were recorded as having good to very good bowel preparation scores. Following warm saline infusion, active bleeding was documented in 100% of the patients, allowing successful hemostasis with endoscopic clipping in all cases. There were no instances of rebleeding during the follow-up period. We postulate that the increased temperature of the infused fluid results in vasodilation and reactivation of the diverticular bleeding. Room temperature or cold water infusion or flushing dislodge clots or fecal material; however, they produce vasoconstriction, which potentially masks SRH. This may explain the poor SRH detection rate reported in published literature.

This simple method of warm water irrigation allowed accurate identification of the CDB site, enabled immediate endoscopic management of the culprit diverticulum, thereby avoiding prolonged hospitalization and repeated examinations. To our knowledge, this technique has not been previously described. Although highly effective in our limited series, further studies with larger sample sizes are warranted to draw definitive conclusions.

Conflicts of Interest

The authors have no potential conflicts of interest.

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Author Contributions

Conceptualization: FSC; Data curation: ISE, FSC; Formal analysis: ISE, FSC; Investigation: ISE, FSC; Methodology: ISE, FSC; Project administration: FSC; Resources: FSC; Software: ISE; Supervision: FSC; Validation: ISE, FSC; Visualization: ISE, FSC; Writing–original draft: ISE, FSC; Writing–review & editing: ISE, FSC.

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