Received: 12 November 2023 | Revised: 7 February 2024 | Accepted: 21 February 2024

DOI: 10.1002/ccr3.8588

CASE REPORT

Clinical Case Reports Open Access WILEY

# Management of an undetectable Diverticular Bleed: A Case Report and Literature review

**Zubir S. Rentiya**[1,2] | **Lokeshwar Raaju Addi Palle**[3] | **Sanni Emmanuel**[4] | **Heeya Shah**[5] | **Abiodun Adegbite**[6] | **Carlo Kristian Chu Carredo**[7] | **Ronald Mauricio Blanco Montecino**[8] | **Ummul Z. Asfeen**[9] | **Akbar Hussain**[10] | **Ogbonnaya Akuma**[11] | **Aadil Mahmood Khan**[12] | **Anasonye Emmanuel Kelechi**[13]

[1]Department of Radiation Oncology & Radiology, University of Virginia, Charlottesville, Virginia, USA

[2]Department of Surgery, MedStar Georgetown University, Washington, District of Columbia, USA

[3]Department of Surgery, Kamala Children's Hospital, Chennai, India

[4]Department of Surgery, National Hospital Abuja, Abuja, Nigeria

[5]Medical University of South Carolina, Lancaster, Pennsylvania, USA

[6]University of Ibadan, Ibadan, Nigeria

[7]Cebu Institute of Medicine, Cebu, Philippines

[8]Universidad de El Salvador, San Salvador, El Salvador

[9]New York Medical College, Newark, New Jersey, USA

[10]Jinnah Sindh Medical University, Karachi, Pakistan

[11]Ebonyi State University, Abakaliki, Nigeria

[12]Department of Cardiology, University of Illinois, Chicago, Illinois, USA

[13]Texila American University, Georgetown, Guyana

**Correspondence**
Anasonye Emmanuel Kelechi, Texila American University, Georgetown, Guyana, Lot 24-42, Plantation, Providence, East Bank Demerara, Georgetown, Guyana.
Email: emmanuelanasonye@yahoo.com

**Key Clinical Message**

Diverticular bleeding is the most common cause of lower gastrointestinal bleeding and accounts for 20.8%–41.6% of cases in the Western world. Management involves initial resuscitation followed by diagnostic assessment. Colonoscopy is the investigation of choice as it localizes the bleed and has the potential to effectively deliver therapeutic interventions. Other diagnostic modalities include flexible sigmoidoscopy, a tagged red blood cell scan, or angiography. In cases where the bleeding source cannot be identified, intraoperative enteroscopy has emerged as a valuable tool for investigating obscure gastroenterology bleeds in specific patients. In this case report, we describe the management of a 77-year-old male with recently diagnosed pan-colonic diverticulosis who presented with multiple episodes of rectal bleeding and syncope. Due to his declining hemodynamic status and failed endoscopy and embolization, he was taken to surgery for a colectomy. Intraoperative colonoscopy was utilized to facilitate accurate identification of the pathology,

assessment of anastomotic patency, and detection of surgical complications. This case report attempts to portray how the incorporation of endo-videoscopy into surgical planning has the potential to enhance patient outcomes and represent a significant advancement in the field of minimally invasive surgery.

**KEYWORDS**

colectomy, colonic diverticula, flexible sigmoidoscopy, gastrointestinal bleed, intraoperative enteroscopy, red blood cell scan

## 1 | INTRODUCTION

Small bowel bleeding accounts for 5%–10% of gastrointestinal (GI) bleeding events, originating between the ligament of Treitz and the ileocecal valve.[1] However, diagnosing the course of bleeding in the small bowel has shown to be challenging due to limited access to standard endoscopic evaluation. Standard evaluations, such as upper GI endoscopy and colonoscopy, fail to identify the source of bleeding in approximately 5% of patients with GI hemorrhage, posing a difficult diagnostic challenge.[2] Unexplained GI bleeding is frequently attributed to small bowel origin in 45%–75% of cases.[3] However, the small bowel's inaccessibility makes it difficult to reach and identify sources of small intestine hemorrhage. Intraoperative enteroscopy has emerged as a valuable tool for exploring obscure GI bleeds in selected patients.[4,5]

Intraoperative enteroscopy allows the identification of a bleeding source in approximately 80% of cases.[4] It is the most suitable method for identifying the source of small bowel bleeding as it enables comprehensive exploration of the entire small bowel mucosa. Moreover, when a lesion is found, intraoperative enteroscopy facilitates successful and recurrence-free management of GI bleeding in 76% of cases.[4]

With the recent development of deep enteroscopy techniques, intraoperative enteroscopy remains the standard of care in specific situations where small bowel lesions have been identified by preoperative work-up, cannot be definitively managed by other methods (e.g., angiographic embolization or endoscopic treatment), or when surgery is required, and the lesion cannot be localized externally during surgical explorations.[6]

We present a case of 77-year-old male with a history of prostate cancer, hypertension, and diverticulosis who presented with hematochezia and syncope. Despite multiple investigations, the source of GI bleeding remained elusive. The patient underwent a colectomy, emesis, and was discharged home with wound and ostomy care. This case report aims to evaluate the diagnostic and therapeutic yield of intraoperative enteroscopy in patients with obscure GI bleeding. Examining a specific case, it contributes to the understanding of the benefits and outcomes associated with this approach. The case highlights the importance of alternative diagnostic techniques for the effective management of unexplained small bowel bleeding cases that remain unresolved after standard evaluations.

## 2 | CASE PRESENTATION

### 2.1 | Case history

We present a case of a 77-year-old male with a past medical history of low-grade prostate cancer, hypertension, and diverticulosis, who presented to the emergency department with a chief complaint of blood per rectum. The patient, accompanied by his wife, reported two episodes of dark blood per rectum followed by one episode of bright red blood per rectum during his bowel movements.

On the day of the presentation, he experienced a similar episode, which was accompanied by syncope, alarming the patient and his wife. The patient's wife recalled that during the syncopal episode, he was sitting on the couch, and his eyes rolled back, followed by generalized shaking movements, however, no incontinence or tongue biting was observed. The patient did not have any recollection of the episode but endorsed feeling fatigued throughout the episode. Similar episodes occurred while the patient was in transport with emergency medical services on his way to the hospital.

The patient has never experienced a GI bleed before, but he had a recent diagnosis of diverticulosis during his screening colonoscopy last year and denied any recent nonsteroidal anti-inflammatory drug (NSAID) use or knowledge of his baseline hemoglobin level. The patient's wife did not notice any pallor in her husband. The patient had a history of tobacco use from ages 16 to 56, smoking 78 packs per year, occasional alcohol use, approximately three drinks a month, and no history of recreational drug use. His family history was notable for gallbladder carcinoma and throat cancer in his mother and father respectively.

## 2.2 | Examination and investigation

Upon presentation to the emergency department, the patient's vital signs were recorded, revealing a blood pressure of 130/80 mmHg, a heart rate of 90 beats per min, a respiratory rate of 18 breaths per min, and a temperature of 98.6°F (37°C). Physical examinations, including abdominal assessment, identified mild tenderness in the lower left quadrant without signs of rebound or guarding. The digital rectal examination (DRE) unveiled melena, consistent with active lower GI bleeding. The patient exhibited pale skin, and slightly dry mucous membranes hinted at potential blood loss. Neurological examinations revealed no focal deficits. Baseline laboratory tests on admission disclosed a hemoglobin level of 10 g/dL, indicative of anemia, with a decreased hematocrit of 30% as revealed by the complete blood count. Blood urea nitrogen levels were within the normal range, and the coagulation profile and electrolyte levels remained within normal limits.

On admission, the patient had a colonoscopy done and was diagnosed with pan colonic diverticulosis with evidence of bleeding throughout the colon as shown in Figure 1.

Despite receiving multiple blood transfusions, his hemoglobin levels continued to decrease, however, multiple computed tomography angiography (CTA), endoscopy, and colonoscopies failed to localize a source despite suspected ongoing bleeding. The CTA in Figure 2 demonstrated numerous colonic diverticula, no dilation of the appendix, and no focal inflammatory changes present. Additionally, no evidence of active GI bleeding was seen in the CTA (Figure 2). Further evaluation with a tagged red blood cell (RBC) scan was needed and identified an active bleed, which was likely originating from the distal descending colon/sigmoid region as shown in Figure 3.

## 2.3 | Treatment

The decision was made to take the patient to surgery for a colectomy. The surgical procedure included flexible sigmoidoscopy, sigmoid colectomy, colostomy creation, and an open abdominal dressing placement, followed by a complete colectomy, ileostomy creation, and abdominal closure. The pathological assessment following the colectomy revealed extensive diverticulosis throughout the colon, consistent with the preoperative findings. Microscopic examination demonstrated areas of acute and chronic inflammation within the diverticular sacs, confirming the source of GI bleeding. No evidence of malignancy or other significant pathologies was observed in the examined tissue.

## 2.4 | Follow-up

In the postoperative period following the colectomy patient exhibited a favorable recovery. Hemoglobin levels stabilized, and there were no further instances of bleeding or syncopal episodes. The patient successfully transitioned to a regular diet after managing postoperative emesis, and amlodipine effectively controlled his hypertension. Wound and ostomy education facilitated the patient's adaptation to the colostomy and ileostomy. Home health care support ensured a smooth transition to home, and at the latest follow-up, the patient reported improved overall well-being with no signs of recurrent bleeding or surgical complications. Regular monitoring and follow-up appointments are ongoing to assess the long-term success of the intervention and the patient's continued health improvement.

# 3 | DISCUSSION

Colonic diverticula are the most common anatomic alteration of the colon, affecting up to one-third of the population by age 50 and three-quarters over 75 years old worldwide.[7,8] Although primarily asymptomatic, in the appropriate scenario, a minority of patients can develop a subset of clinical presentations known collectively as a diverticular disease.[7] We presented a case of acute diverticular bleed in which an active source was not detectable or controlled.

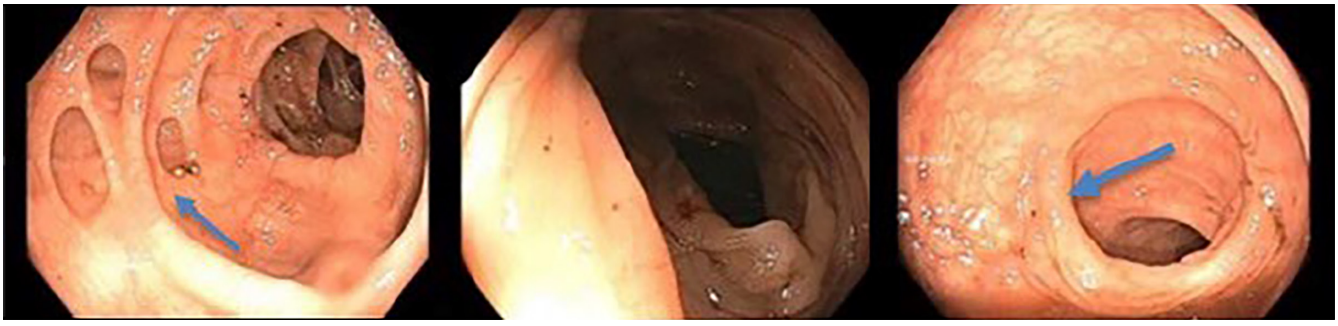

FIGURE 1 Colonoscopy showing diverticulosis (arrows) and evidence of a bleed (arrow).

Diverticular bleeding is caused by the rupture of the underlying vasa rectum into the lumen. Independent risk factors for diverticular bleeding include hypertension, NSAIDs, and anticoagulants, including aspirin.[8,9] In the current case, the patient had a pertinent medical history of hypertension and low-grade prostate cancer and denied using NSAIDs. The typical clinical presentation is painless, intermittent, and significantly lower GI bleeding. Color will vary according to intensity and location, with right-sided diverticular bleeding ranging between dark, maroon-colored blood to melena appearance.[10] The differential diagnosis include internal hemorrhoids, angiodysplasia, colon cancer, inflammatory bowel disease, infectious colitis, ischemic colitis, and radiation proctitis. Small bowel as a source is found in around 5% of patients.[11]

**FIGURE 2** Computed tomography scan showing presence of numerous colonic diverticula (arrows).

As mentioned above, the patient presented to the emergency department with dark rectal bleeding followed by an episode of bright red blood during his bowel movements. This was accompanied by syncope, generalized shaking movements, and eyes rolling back without incontinence or tongue biting. Although seizures have been reported because of GI bleeding,[11] the patient's clinical presentation suggested convulsive syncope, for which tilt testing and further studies would be valuable.[11,12]

The severity of patients with lower GI bleeding will guide management, as patients with severe bleeding are at higher risk of adverse outcomes (recurrent bleeding, blood transfusion, intensive care unit admission, and overall longer length of stay, among others).[13] Several tools have been developed to identify those with a higher risk. Tapaskar et al. identified albumin and hemoglobin as independent factors for severe bleeding, and Oakland score was reported as the most discriminative. The Oakland Score, derived from data from 2336 patients with lower GI bleed (LGIB) in 2015, aimed to identify those at low risk of adverse outcomes. The score consisted of seven variables, including age, sex, previous hospital admission, DRE results, heart rate, systolic blood pressure, and hemoglobin concentration. It ranged from 0 to 35 points, with higher scores indicating a greater risk of adverse outcomes. Data on the Oakland score variables were extracted from patient records, and DRE findings were omitted from the score calculations. Hemoglobin concentration and systolic blood pressure were assigned the highest point weightings, while DRE results were assigned 1 point if blood is present or 0 points if absent. The remaining variables were used to calculate the Oakland score for each patient

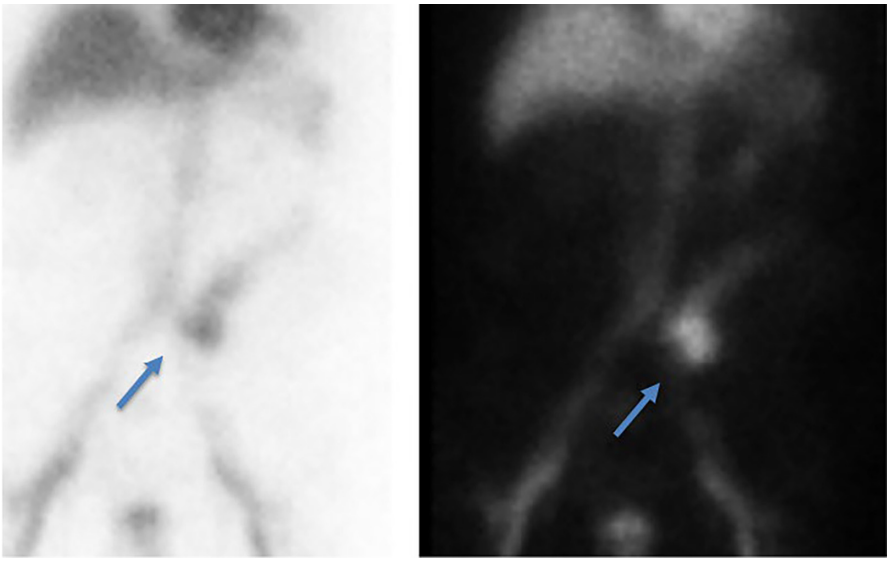

**FIGURE 3** Tagged red blood cell scan suggesting active gastrointestinal hemorrhage from the distal descending colon & sigmoid (arrow).

with LGIB.[14] The patient's hemoglobin on arrival was 9.8, dropping to 6.3 during hospitalization, and his calculated Oakland score was 22.

Diverticular bleeding management is based on four general goals: resuscitation, diagnosis, hemostasis, and prevention of recurrent bleeding.[4] Patients with high-volume blood loss require immediate resuscitation and bleeding control. A threshold of less than 7 g/dL for transfusion has been associated with improved survival and decreased re-bleeding.[15] However, it is essential to consider the individual on a case-by-case basis, be permissive, and consider a higher threshold in those with other comorbidities and ongoing massive bleeding.[10]

Diagnosis can be achieved with different methods, which include colonoscopy, flexible sigmoidoscopy, tagged RBC scanning, cross-sectional imaging techniques, and angiography radionuclide scintigraphy.[10] While some studies and guidelines recommend the initial use of CTA to localize the bleeding source in hemodynamically unstable patients,[7] it is essential to note that colonoscopy remains the primary method for lower GI bleeding patients.[10] Colonoscopy not only detects the source of bleeding but also treats it. In this specific case, despite a colonoscopy being performed after CTA failed to show active bleeding, the bleeding source was not resolved, let alone revealed. As a result, a tagged RBC scan was conducted, successfully identifying the source in the distal descending & sigmoid colons.

Accurate location of pathology is essential to achieve a successful colonic resection, supposing a challenge for the laparoscopic approach, as not only the tactile sensation is lost, but the visualization of the serosal surface during minimally invasive colorectal resection makes it challenging to see those lesions limiting to mucosa and submucosa.[16] Thereby, assessment of pathology, anastomotic patency, and completeness makes endoscopic evaluation a valuable component.[16] Intraoperative endoscopy is expected to improve safety in GI procedures, where immediate identification of complications can be corrected.[17] Furthermore, incorporating endoscopic approaches into operative planning allows the potential to minimize invasiveness and improve surgical patient outcomes across various interventions.[17]

Many considerations must be made regarding intraoperative endoscopy use, such as surgeon training, which must follow uniform institutional standards, as well as operating room staff, who has to be trained at an optimal level required not only to assist the surgeon but to setup, use and maintain the endoscopic equipment and adjunctive tools.[17] Among the surgeries where intraoperative endoscopy is convenient, we have a segmental colectomy, anterior rectal resection, colostomy reversal, and procedures where intraoperative localization of pathologic lesions is beneficial.[17] Although planned use of intraoperative endoscopy should be preceded by mechanical bowel preparation in every patient, in emergency settings, this may not be feasible; in these cases, administration of tap water enemas preoperative, if they are not contraindicated, has been suggested to facilitate intraoperative endoscopy.[17]

Most intraoperative colonoscopies are performed to assess the created anastomoses for mucosal integrity, ischemia, hemostasis, and leaks across staple lines and sutures.[17] Several risk factors have been reported for anastomotic leakage, including male sex, high body mass index, steroid use, smoking habit, preoperative nutritional condition, and, in the case of colon cancer, tumor variables, such as large size, location, high stage and use of neoadjuvant therapy.[18] Diminished anastomotic leak rates have been reported in those patients where intraoperative colonoscopy is used in conjunction with other reliable intraoperative tests to diagnose incomplete anastomoses.[18]

In summary, intraoperative colonoscopy can be of great help during laparoscopic surgery, enabling the surgeon to see different aspects of the colon, which would not be feasible without it. Appropriate and standardized training for the surgeon and the operating team should be guaranteed for better outcomes.

## 4 | CONCLUSION

Colonic diverticular bleeding is a common clinical presentation and requires prompt and thorough management. The diagnosis and treatment of diverticular bleeding involve resuscitation, identification of the bleeding source, and hemostasis, with the ultimate goal of preventing recurrent bleeding. Intraoperative colonoscopy represents a valuable tool in colorectal surgery, facilitating the accurate localization of pathology, assessment of anastomotic patency, and completeness. While intraoperative colonoscopy is convenient, it should be reserved for procedures that benefit directly from it, and standardized institutional training is essential. Surgical teams should ensure that intraoperative colonoscopy is safe and reliable and use appropriate diagnostic methods to identify any surgical complications, such as incomplete anastomoses. Through timely diagnosis, appropriate management, and minimal invasiveness, patients with diverticular disease and diverticular bleeding can achieve optimal outcomes. The integration of endovideoscopic approaches into operative planning signifies the future of minimally invasive surgical procedures with better surgical patient outcomes across various interventions.

## AUTHOR CONTRIBUTIONS

**Zubir S. Rentiya:** Writing- original draft; writing – review and editing. **Lokeshwar Raaju Addi Palle:** Writing – original draft. **Sanni Emmanuel:** Software; supervision. **Heeya Shah:** Formal analysis; funding acquisition. **Abiodun Adegbite:** Data curation. **Carlo Kristian Chu Carredo:** Writing – original draft. **Ronald Mauricio Blanco Montecino:** Visualization; writing – original draft. **Ummul Z. Asfeen:** Visualization; writing – review and editing. **Akbar Hussain:** Supervision; writing – review and editing. **Ogbonnaya Akuma:** Visualization; writing – original draft. **Aadil Mahmood Khan:** Validation. **Anasonye Emmanuel Kelechi:** Validation; visualization.

## ACKNOWLEDGMENTS

We thank and give full credit for the contributions of Drs. Archit and Zahoor, whose efforts are comparable in conducting this publication. All authors have seen and approved the case report submitted. No part of the submitted work has been published or is under consideration for publication elsewhere. Signed consent for a case report was obtained from the patient's legally authorized representative (LAR).

## FUNDING INFORMATION

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

## CONFLICT OF INTEREST STATEMENT

The authors declare no competing interests.

## DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

## ETHICS STATEMENT

This case report was conducted with adherence to the ethical principles outlined in the Declaration of Helsinki. Informed consent was obtained from the patient, and all identifiable information was anonymized to protect confidentiality and privacy.

## CONSENT

Written informed consent was obtained from the patient to publish this report in accordance with the journal's patient consent policy.

## ORCID

*Carlo Kristian Chu Carredo* https://orcid.org/0009-0001-7938-4769
*Ummul Z. Asfeen* https://orcid.org/0000-0002-4981-5644
*Aadil Mahmood Khan* https://orcid.org/0000-0001-7607-3431
*Anasonye Emmanuel Kelechi* https://orcid.org/0009-0002-9278-4713

## REFERENCES

1. Douard R, Wind P, Berger A, et al. Role of intraoperative enteroscopy in the management of obscure gastointestinal bleeding at the time of video-capsule endoscopy. *Am J Surg*. 2009;198(1):6-11. doi:10.1016/j.amjsurg.2008.06.036
2. Szold A, Katz L, Lewis BS. Surgical approach to occult gastrointestinal bleeding. *Am J Surg*. 1992;163:90-93.
3. Chong J, Tagle M, Barkin J, Reiner DK. Small bowel push-type fiberoptic enteroscopy for patients with occult gastrointestinal bleeding or suspected small bowel pathology. *Am J Gastroenterol*. 1994;89:2143-2146.
4. Bonnet S, Douard R, Malamut G, Cellier C, Wind P. Intraoperative enteroscopy in the management of obscure gastrointestinal bleeding. *Dig Liver Dis*. 2013;45(4):277-284. doi:10.1016/j.dld.2012.07.003
5. Douard R, Wind P, Panis Y, et al. Intraoperative enteroscopy for diagnosis and management of unexplained gastrointestinal bleeding. *Am J Surg*. 2000;180(3):181-184. doi:10.1016/s0002-9610(00)00447-5
6. Morris A, Mokhashi M, Straiton M, et al. Push enteroscopy and heater probe therapy for small bowel bleeding. *Gastrointest Endosc*. 1996;44:394-397.
7. Wan D, Krisko T. Diverticulosis, diverticulitis, and diverticular bleeding. *Clin Geriatr Med*. 2021;37(1):141-154. doi:10.1016/j.cger.2020.08.011
8. Lewis M; NDSG. Bleeding colonic diverticula. *J Clin Gastroenterol*. 2008;42(10):1156-1158. doi:10.1097/MCG.0b013e3181862ad1
9. Yamada A, Sugimoto T, Kondo S, et al. Assessment of the risk factors for colonic diverticular hemorrhage. *Dis Colon Rectum*. 2008;51(1):116-120. doi:10.1007/s10350-007-9137-8
10. Mohammed Ilyas MI, Szilagy EJ. Management of diverticular bleeding: evaluation, stabilization, intervention, and recurrence of bleeding and indications for resection after control of bleeding. *Clin Colon Rectal Surg*. 2018;31(4):243-250. doi:10.1055/s-0037-1607963
11. Watari T, Tokuda Y. Bleeding from a gut lesion as a cause of seizure. *BMJ Case Rep*. 2015;14(2015):bcr2014205619. doi:10.1136/bcr-2014-205619
12. Sheldon R. How to differentiate syncope from seizure. *Cardiol Clin*. 2015;33(3):377-385. doi:10.1016/j.ccl.2015.04.006
13. Tapaskar N, Jones B, Mei S, Sengupta N. Comparison of clinical prediction tools and identification of risk factors for adverse outcomes in acute lower GI bleeding. *Gastrointest Endosc*. 2019;89(5):1005-1013. doi:10.1016/j.gie.2018.12.011
14. Oakland K, Kothiwale S, Forehand T, et al. External validation of the Oakland score to assess safe hospital discharge among adult patients with acute lower gastrointestinal bleeding in the US. *JAMA Netw Open*. 2020;3(7):e209630. doi:10.1001/jamanetworkopen.2020.9630
15. Franchini M, Marano G, Mengoli C, et al. Red blood cell transfusion policy: a critical literature review. *Blood Transfus*. 2017;15(4):307-317. doi:10.2450/2017.0059-17

16. Liu ZH, Liu JW, Chan FS, Li MK, Fan JK. Intraoperative colonoscopy in laparoscopic colorectal surgery: a review of recent publications. *Asian J Endosc Surg*. 2020;13(1):19-24. doi:10.1111/ases.12704
17. Fanelli RD. Intraoperative endoscopy: an important adjunct to gastrointestinal surgery. *Tech Gastrointest Endosc*. 2013;15(4):184-190. doi:10.1016/j.tgie.2013.08.003
18. Kishiki T, Kojima K, Aso N, et al. Intraoperative colonoscopy in laparoscopic rectal cancer surgery reduces anastomotic leakage. *J Anus Rectum Colon*. 2022;6(3):159-167. doi:10.23922/jarc.2022-003

**How to cite this article:** Rentiya ZS, Palle LRA, Emmanuel S, et al. Management of an undetectable Diverticular Bleed: A Case Report and Literature review. *Clin Case Rep*. 2024;12:e8588. doi:10.1002/ccr3.8588