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CASE REPORT | COLON

Presence of Portomesenteric Venous Gas and Pneumatosis Intestinalis in Nonocclusive Mesenteric Ischemia as a Complication of Transrectal Ultrasound-Guided Prostate Biopsy

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ABSTRACT

A 58-year-old man with a history of mechanical aortic valve replacement, on anticoagulation with warfarin, presented to the emergency department with hematochezia 1 day after undergoing transrectal ultrasound-guided prostate biopsy. On presentation, he was found to have hemorrhagic shock. Fluid resuscitation, packed red blood cell transfusion, and empiric antibiotic therapy were initiated, and the patient was admitted to an intensive care unit. Abdominal-pelvic computed tomography demonstrated portomesenteric venous gas and pneumatosis intestinalis. Colonoscopy showed ischemic ulcers at the ascending colon and stigmata of recent bleeding at the site of biopsy in the rectum, which was treated endoscopically. The patient was discharged after continued improvement during hospitalization. On follow-up, the patient continued to be symptom-free, and a repeat colonoscopy demonstrated healing colonic ulcers.

KEYWORDS: ischemic colitis; nonocclusive mesenteric ischemia; pneumatosis intestinalis

INTRODUCTION

Pneumatosis intestinalis (PI) is the presence of gas in intestinal submucosal/mucosal wall, and portomesenteric venous gas (PMVG) is the presence of gas in portal and mesenteric veins on imaging.[1,2] PI and PMVG are nonspecific radiologic findings that can be seen in both benign and life-threatening conditions.[3,4] Computed tomography (CT) findings of concomitant PI and PMVG are usually seen in the setting of mesenteric infarction, although both findings can also be seen in nonischemic conditions such as infection, inflammation, or bowel distention. Transrectal ultrasound (TRUS)-guided prostate biopsy is a relatively common and safe procedure, and postbiopsy complications are often mild or self-limiting. In this case, we report a patient developing hemorrhagic shock and mesenteric ischemia with CT imaging findings of PI and PMVG after TRUS-guided prostate biopsy.

CASE REPORT

A 58-year-old man presented to the emergency department with bright red blood per rectum, fatigue, and lightheadedness. He had a medical history significant for mechanical aortic valve replacement and was on warfarin. Remarkably, 1 day before his presentation, he had undergone a TRUS-guided prostate biopsy for concerns of prostate cancer. Warfarin was stopped 4 days earlier in preparation for prostate biopsy, and the patient was switched to low-molecular-weight heparin, which was maintained until 12 hours before the procedure. He was told to take warfarin 24 hours after the procedure, which he had not yet taken before presentation. He presented to the emergency department 1 day after the procedure with hypotension at 95/55 mm Hg and tachycardia at 116 beats per minute. Physical examination was notable for pale mucosa. The abdomen was soft, and no tenderness, guarding, or rebound was present. Laboratory workup on presentation was remarkable for hemoglobin at 11.9 g/dL (14–17 g/dL), white blood cells at 11.2 $\times 10^9$/L

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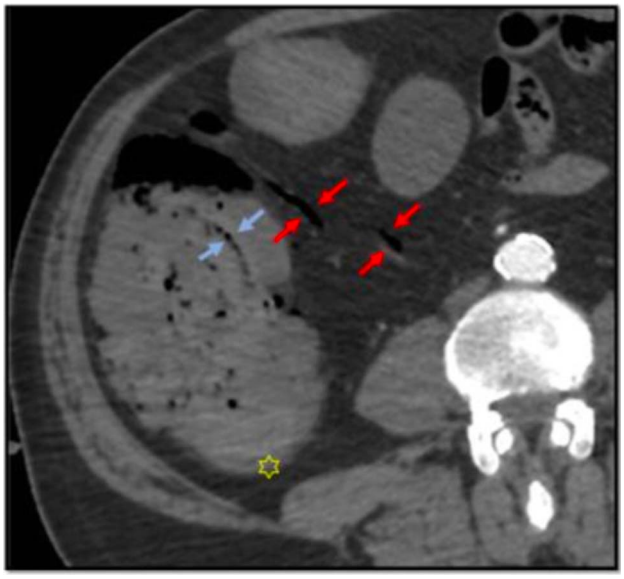

Figure 1. Axial slice of contrast-enhanced abdominopelvic computed tomography demonstrates ascending colon wall thickening (yellow star), portomesenteric venous gas (red arrows), and pneumatosis intestinalis (blue arrows).

(4.5–11.0 $\times 10^9$/L), platelets at 247 $\times 10^9$/L (150–450 $\times 10^9$/L), and international normalized ratio at 1.07. Large-volume fluid resuscitation and empiric broad-spectrum intravenous antibiotic therapy were initiated. Because the patient was having active hematochezia and a repeat laboratory workup within the next hour revealed hemoglobin at 6.6 g/dL, white blood cells at 14.6 $\times 10^9$/L, and platelets at 143 $\times 10^9$/L; packed red blood cell transfusion was initiated. The patient was admitted to the intensive care unit for the management of hemorrhagic shock. Contrast-enhanced CT scan demonstrated ascending colon wall thickening, PMVG, and PI (Figure 1). The patient continued to have hematochezia, although the volume had decreased, until the colonoscopy was performed. Colonoscopy showed circular ischemic ulcers at the ascending colon (Figure 2) and stigmata of recent bleeding at the former biopsy site in the rectum (Figure 2). Endoscopic sclerotherapy was performed, and hemoclips were placed at the site of bleeding in the rectum. Histopathological analysis of ulcers in the ascending colon reported nonspecific inflammatory changes. A total of 6 packed red blood cell units were transfused while the patient was admitted, and the patient's hemoglobin level was increased to 11.1 g/dL in the following days. The patient was discharged home after continued improvement during hospitalization. A follow-up colonoscopy at week 8 demonstrated one 8–9 mm clean-based ulcer and one healing ulcer at the ascending colon. The patient continued to be symptom-free and did not have recurrent bleeding.

DISCUSSION

TRUS-guided prostate biopsy is a common and relatively safe outpatient procedure used in prostate cancer diagnosis, with often self-limiting postprocedure complications such as hematuria, mild rectal bleeding, fever, and chills.[5] Infection and massive rectal bleeding, although rare, have also been reported and can be life-threatening.[5] Severe rectal bleeding has been reported in up to 1% of patients undergoing TRUS-guided prostate biopsy according to a study performed in 550 patients.[6] Nonocclusive mesenteric ischemia (NOMI), or ischemic colitis if only the colon is involved, is seen due to intestinal hypoperfusion and is usually due to spasm of the superior mesenteric artery in response to severe sepsis or shock of any type including hemorrhagic shock or vasoconstrictive medication use. In most cases, ischemic colitis develops after an episode of transient nonocclusive ischemia and perfusion is often restored to normal flow by the time of presentation.[7] In our patient, hematochezia occurred after a TRUS-guided prostate biopsy, leading to subsequent hypotension and splanchnic vasoconstriction. This vasoconstriction, in turn, resulted in colonic wall hypoperfusion, leading to ischemic colitis, and was seen in colonoscopy as circular ulcers at the ascending colon.

Ischemic colitis most commonly presents with abdominal pain, diarrhea, and hematochezia. Severity of ischemia can range from localized and transient ischemia to transmural necrosis necessitating emergent surgery.[8] Management of NOMI or ischemic colitis focuses on management of the primary insult, and hemodynamic support with resuscitation according to advanced life support protocols. Isolated right colon ischemia has been reported to have worse outcomes and may require surgical intervention. Prognosis of NOMI or ischemic colitis depends on the severity and extent of the disease. Surgical intervention may be required in cases with peritonitis, hemodynamic instability, or failure of conservative management.[7]

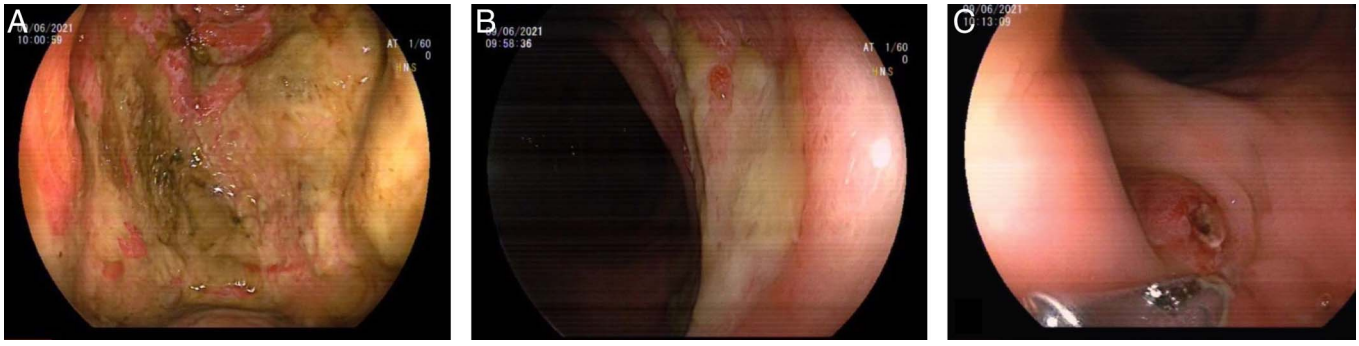

Figure 2. Colonoscopy images show ascending colon ulcers (A and B) and transrectal ultrasound-guided biopsy site in the rectum (C).

CT findings of concomitant PI and PMVG are usually seen in the setting of mesenteric infarction, although both findings also can be seen in nonischemic conditions such as infection, inflammation, or bowel distention.[4] A previous study reported mortality rates for concomitant PI and PMVG at approximately 68%, compared with 54% for PI alone.[2] Another study reported 30% overall mortality for PI and 50% for PI and PMVG.[9] Despite reported rates, it should be noted that the mortality rate is associated with the severity and extent of the underlying disease, and imaging findings of PI and PMVG might be seen in both transmural and partial ischemic bowel injuries.[4] In our patient with NOMI, both PMVG and PI were observed in the CT scan on admission.

There are no defined diagnostic CT criteria for ischemic colitis.[7] A study that reported the CT findings of 14 patients who underwent colectomy for ischemic colitis and had transmural ischemia demonstrated 79% colonic wall thickening, 72% right colon involvement, 71% PI, 36% PMVG, and 100% fat stranding.[10] Of note, none of these signs are specific. In suspected ischemic colitis, contrast-enhanced CT is recommended within the first few hours of admission and colonoscopy to evaluate bowel mucosa within 48 hours.[11] Complications of mesenteric ischemia may include necrosis and/or perforation of the intestinal tissue and can lead to death if not treated timely. Early endoscopy is important in the management of rectal bleeding when conservative measures, such as tamponade or compression, are not sufficient to control the bleeding. Endoscopic injection of adrenaline or polidocanol essentially achieves hemostasis in all cases.[5] Up to 20% of patients with acute ischemic colitis may require surgery.[12] Resolution of endoscopic and radiologic signs of ischemic colitis may take 1–6 months.[12] In our patient, a repeat colonoscopy at week 8 showed healing ulcers.

NOMI can be associated with ulcers, most commonly in the left hemicolon.[13] In our patient, ulcers were located in the ascending colon, and he had no recurrent symptoms after endoscopic management. Our patient's clinical history of mechanical valve repair and being on warfarin might have a role of his hematochezia; however, he was bridged to low-molecular-heparin weight before the procedure, and his international normalized ratio on presentation was minimally elevated, making this assumption unlikely. In addition, before his presentation with hematochezia, he was not yet resumed his home dose of warfarin. It should be noted that both PI and PMVG may or may not be present in NOMI.[14] Because these signs can be seen in benign conditions, they should not always be interpreted as ominous signs, rather should be interpreted within appropriate clinical context.[4]

DISCLOSURES

Author contributions: NB Ozturk contributed to the study design and the analysis and interpretation of data for this project. A. Kutlu contributed to the analysis and interpretation of data for this project. R. Iliaz contributed to the study design; acquisition, analysis, and interpretation of data for this project; and is the article guarantor. All authors contributed to the drafting of the manuscript and reviewed it critically for important intellectual content. Furthermore, all authors approved the final version to be published and agreed to be accountable for all aspects of the work, ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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Informed consent was obtained for this case report.

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