

Splenic laceration after routine colonoscopy, a case report of a rare iatrogenic complication

Shuo Li¹, Nishant Gupta², Yogesh Kumar¹, Frank Mele¹

¹Department of Radiology, Yale New Haven Health at Bridgeport Hospital, Bridgeport, Connecticut 06610, USA; ²Department of Radiology, St. Vincent's Medical Center, Bridgeport, Connecticut 06606, USA

Correspondence to: Shuo Li, MD. Department of Radiology, Yale New Haven Health at Bridgeport Hospital, 267 Grant Street, Bridgeport, Connecticut 06610, USA. Email: topher3001@gmail.com.

Abstract: Colonoscopy is a common and routine procedure performed in the United States, most commonly performed for screening of colorectal cancer. Although colonoscopy is considered a safe procedure, it is associated with complications including intestinal hemorrhage and perforation. Splenic trauma, such as laceration or even complete rupture is a rarely reported, but potentially fatal complication if undetected. We present a case of splenic laceration with subcapsular hematoma status post routine colonoscopy. Fortunately, patient was able to be managed medically, without further operative intervention. We will also review the available literature related to this rare iatrogenic complication.

Keywords: Colonoscopy; radiology; splenic laceration

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Case presentation

A 65-year-old Caucasian female with a history of colon polyps presented to her gastroenterologist for routine screening colonoscopy. Usual colonic preparations were followed. Findings include sigmoid diverticular disease. A 5 mm sessile polyp (pathology proven hyperplastic polyp) was removed 30 centimeter from the anal verge without initial complication (*Figure 1*). Immediately post procedure, the patient complained of epigastric discomfort and excessive gas. Vital signs were within normal limits. The patient's pain improved slightly and she was discharged to home care after two hours of observation.

After discharge, the patient experienced persistent, severe left upper quadrant pain for two weeks, at which point the patient presented to the emergency department (ED). A prompt Computer Tomography (CT) scan of the abdomen and pelvis with intravenous and oral contrast was performed. The CT demonstrated a subcapsular hypodense collection (size 8.1×3.7×7.8 cm) in the spleen, without hemoperitoneum. A thin 1.8 cm splenic laceration was noted at the lateral aspect of the spleen (*Figure 2*). This was

classified as a grade II splenic injury using the Organ Injury Scale from the American Association for the Surgery of Trauma (AAST). The patient remained hemodynamically stable during the ED visit. After 6 hours of observation, she was discharged with oral analgesic pain control and short-term follow-up.

An outpatient abdominal ultrasound performed 7 days after the ED visit demonstrated a slight retraction of the subcapsular hematoma (*Figure 3*, size 8.1×5.5×5.3 cm). Continued follow-up ultrasound 14 days after ED visit showed continued retraction of the subcapsular hematoma (*Figure 3*, size 6.1×4.5×5.2 cm). Given continued hemodynamic stability and decreased pain, no further imaging follow-up was obtained. To date, patient remains healthy without further complication.

Discussion

Colonoscopy is a common procedure, with a CDC survey estimating that 22.4 million colonoscopies were performed in the United States in 2004 (1). Approximately 65% of US adults undergo colonoscopy for screening and surveillance

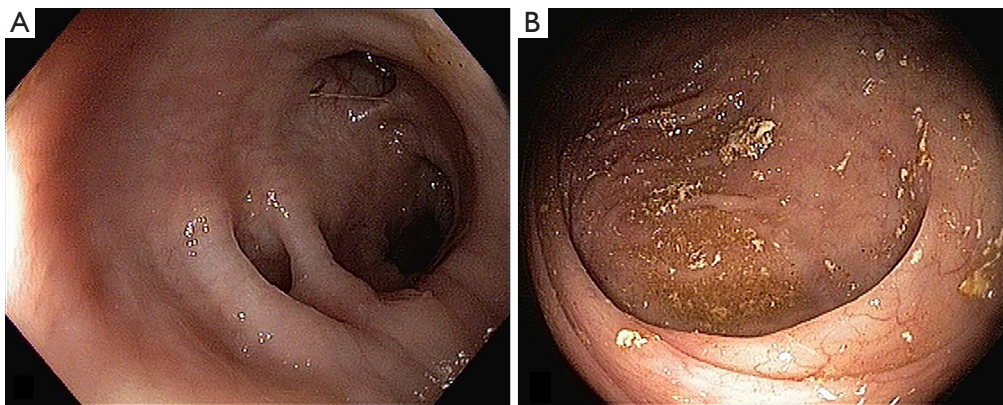


Figure 1 Colonoscopic images showing sigmoid diverticula (A) and a 5 mm sessile polyp at 30 cm (B) from the anal verge.

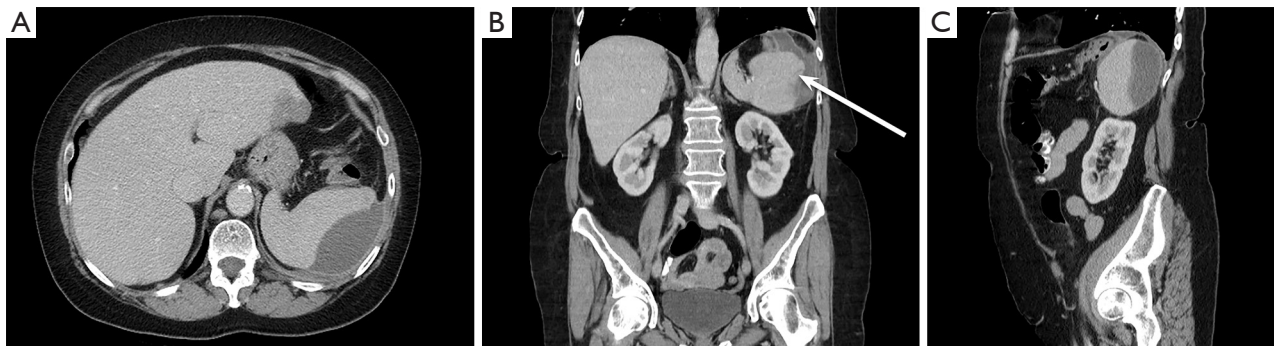


Figure 2 Contrast-enhanced CT performed in the ED two weeks after the colonoscopy. Axial as well as coronal and sagittal reformatted images showing a grade II splenic injury. A 1.8 cm, linear hypodense line is seen at the lateral aspect of the spleen on the coronal reformatted image (arrow). There is no evidence of extracapsular hemorrhage, such as fluid in the left paracolic gutter.



Figure 3 Follow up imaging of the spleen 7 days after patient discharged from the ED using color Doppler ultrasound (A) demonstrating a hypoechoic subcapsular splenic hematoma (marked by calipers) without evidence of active extravasation. Further follow up imaging of the spleen 14 days after patient discharge from the ED using grayscale ultrasound showing continued retraction of the subcapsular hematoma. Again, there is no evidence of extravasation into the hematoma on color Doppler (not shown).

of colorectal cancer (2). The overall serious adverse event rate is estimated to be 2.8 per 1,000 procedures (3). Common serious complications include cardiopulmonary complications related to sedation, intestinal perforation,

hemorrhage, post-polypectomy electrocoagulation syndrome, infection, and combustion of intestinal gases (4). Polypectomy during a colonoscopy is associated with a 7-fold increase risk of adverse events (5).

Splenic injury is a rare iatrogenic injury from colonoscopy, with reported injuries ranging from splenic laceration to capsular rupture with hemoperitoneum. According to Jehangir *et al.*, 172 cases were reported prior to 2015 (6). Previous reports estimated an incidence rates of splenic injury ranging from 1 in 100,000 to 1 in 6,387 colonoscopies (7). Although rare, this complication is significant. A traumatic splenic injury requiring splenectomy have been reported to have a mortality rate of 25% (8). With increasing average age of the American population as baby boomers enter retirement, there will be an increasing number of colonoscopy performed. Given the estimated colonoscopy performed, this extrapolates to an annual incidence of at least 224 cases of splenic injury in the United States alone if we assume an incidence rate of 1 in 100,000. Yet, only 172 cases have been reported in the medical literature to date. This suggests the majority of splenic injuries resulting from colonoscopy may be undetected or not reported. The possible reasons for this includes misattribution of pain to gas discomfort, particularly in hemodynamically stable patients. As a case in point, our index case was detected two week post colonoscopy and would have been missed if not for the prompt investigation in the ED. Authors from previous publications also share the opinion that splenic injury from a colonoscopy is likely under-reported and under-detected (9-11).

Overall, splenic injury from colonoscopy is more prevalent in women with a near 3 to 1 ratio for unknown reasons (10).

Advanced age is proposed to be a possible risk factor for splenic injury, with average age of occurrence of 63.0 years (10). However, this may be less of a risk factor, but rather an indicator of the patient population undergoing colonoscopies. The use of anticoagulants has been reported in some of the previous cases, but does not correlate with splenic injury (12). Approximately half of the patients with splenic injury were reported to have undergone previous abdominal surgery (13). Overall, it is our opinion that no definitely conclusions regarding risk factor(s) can be drawn from the current number of cases.

The mechanisms of injury are proposed to be traction on the splenocolic ligament and/or due to adhesions between the splenic flexure and the spleen in patients with prior abdominal surgery. Other factors associated with injury includes instrument looping and presence of mass and/or polyp at the splenic flexure (14). Direct force exerted on the spleen during colonoscopy is also a possible mechanism of injury (10). Additionally, excess traction on the ligaments

from external pressure during straightening of the scope on the left hypochondrium may simulate a blunt abdominal trauma (13).

Clinically, patients often present with pain after colonoscopy. Typically, the onset of pain is immediate post procedure, though, in a portion of patients, abdominal pain may be delayed for up to 24 hours after the procedure. Kehr's sign refers to left shoulder pain upon bimanual palpation of the left upper quadrant was reported in 34% of the patients. Patients may or may not present with a drop in hematocrit and hemodynamic instability, depending on the degree of splenic injury (14). In our index case, the pain was immediate post procedure and persisted for nearly two weeks prior to diagnosis. Endoscopists and other clinical providers involved in patient care should have a high index of suspicion for splenic injury, particularly with a constellation of left upper quadrant pain and hemodynamic instability (15).

Contrast-enhanced CT is the ideal test for diagnosis of splenic trauma (16). This modality is readily available in most hospital settings and allows for rapid diagnosis and grading of splenic injury. Furthermore, CT can evaluate for other possible complications from colonoscopy that have similar clinical presentations, including perforation or infection. The Organ Injury Scale from the American Association for Surgeries of Trauma (AAST) is often used to classify the degree of splenic trauma as seen on <http://www.aast.org> (17). A contrast blush, if seen during CT can be predictive of non-operative management failures (18). Ultrasound is a helpful adjunct method of evaluation; this modality can visualize free fluid within the abdomen and potential hematoma adjacent the spleen. A Focused Assessment with Sonography for Trauma (FAST) is used in the emergent setting as FAST is easily performed at the bedside, and able to provide a rapid diagnosis of intra-abdominal fluid (19). A plain radiograph is of limited utility, as it does not allow for easy evaluation of the spleen, and would only yield a positive result in cases associated with hollow organ perforation.

Treatment depends on the severity of the splenic injury. Patients with normal blood pressure and hematocrit, a lower grade of splenic injury and low quantity of hemoperitoneum perform better with conservative non-operative/non-interventional approach (20,21). Conservative management includes maintaining hemodynamic status by fluid resuscitation or blood product replacement and careful observation. In appropriate cases, close follow-up as an outpatient can be attempted. Conversely, there is a higher

failure rate of non-operative management with subsequent surgical repair in cases of a higher grade of injury. Splenic artery angiography with embolization is a viable alternative to surgical intervention in patients who are hemodynamically capable of tolerating the angiography (22). Although one previous publication found a 93% success rate in patients with traumatic spleen injury with angiography, results of angiography in colonoscopically induced injury has been mixed (9,23). Hemodynamically unstable patient should be taken for operative management. Ultimately, treatment option will likely be interdisciplinary, depending on the clinician's preference, availability of treatment modality and operator technical proficiency.

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Footnote

Conflicts of Interest: The authors have no conflicts of interest to declare.

Informed Consent: Written informed consent was obtained from the patient for publication of this case report and any accompanying images.

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