

Splenic Injury Following Colonoscopy: A Case Report and Literature Review

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Citation

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Abstract

Since the advent of the flexible fiberoptic colonoscopy used for routine investigation, diagnosis, and treatment of colonic diseases, few complications have been reported and fortunately serious complications are extremely rare. The two most frequent complications following colonoscopy are hemorrhage (1%) and perforation (0.1%). Injuries to intra-abdominal organs, like the liver and spleen, are even more uncommon. Awareness of this potential complication may lead to early recognition and in turn to optimal outcome. Persistent abdominal pain following colonoscopy should alert the endoscopist to the possibility of mayor colonoscopic complication, including splenic injury. We report a case of post-colonoscopy splenic injury that was treated by emergent splenectomy.

INTRODUCTION

Since the advent of the flexible fiberoptic colonoscopy used for routine investigation, diagnosis, and treatment of colonic diseases few complications have been reported and fortunately serious complications are extremely rare. The two most frequent complications following colonoscopy are hemorrhage (1%) and perforation (0.1%) [123]. Injuries to intra-abdominal organs, like the liver and spleen, are even more uncommon. [34]. We report a case of post-colonoscopy splenic injury that was treated by emergent splenectomy.

CASE REPORT

A 59-year-old white woman presented to the emergency department on the day following a seemingly uncomplicated screening colonoscopy. The colonoscopic procedure was performed with conscious sedation using midazolam, it took between 8 and 10 minutes to reach the cecum, minimal sigmoid pressure was used when trying to pass the colonoscope through the splenic flexure. Anatomically, the colon had a relative non-tortuous course and was clean of any macroscopic lesions.

In the emergency room (ER), she reported the abrupt onset of diffuse, poorly localized abdominal pain that started a few hours after the colonoscopy. The pain had become more severe and when seen in the emergency department was characterized as sharp, (9 out of 10 in intensity), exacerbated by movement, and radiating to the anterior chest wall and

left shoulder. Associated symptoms were nausea, and bilious vomiting that started just after the onset of the abdominal pain.

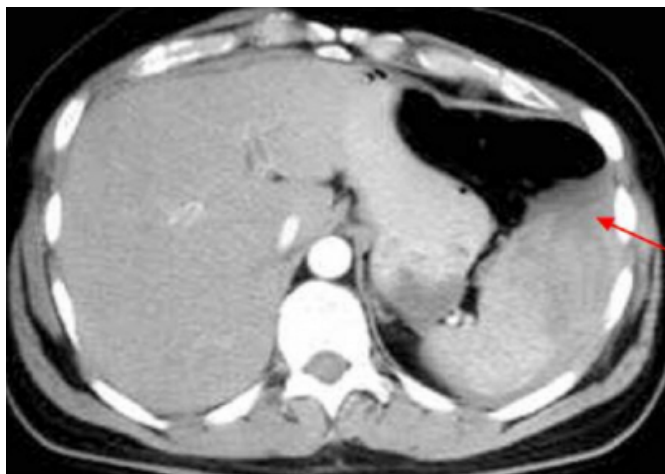
The patient did not report a history of blunt abdominal trauma after her colonoscopic procedure. She had no significant past medical or surgical history (no previous abdominal operations). The patient was not consuming any medications including aspirin, clopidogrel, and warfarin. Initial evaluation revealed an alert, anxious female. Her body mass index was 26 kg/m², heart rate was 109 beats per minute, her respiratory rate 25 breaths per minute, her blood pressure 100/65 mmHg, and her peripheral oxygen saturation 92% on room air. She was dehydrated as evidenced by dry mucus membranes. Examination of her abdomen revealed diffuse rebound tenderness and decreased peristalsis. A rectal examination was normal, including a negative guaiac test. Initial laboratory tests included a white blood cell count of 16,400 per mm³, hemoglobin of 6.0g/dl, platelet count of 250,000 per mm³, creatinine 2.3mg/dl, and blood urea nitrogen 31mg/dl. Her electrolytes were: sodium 133mEq/L, potassium 4.6mEq/L, and chloride 106mEq/L. Plain roentgenograms of the abdomen revealed no evidence of air within the peritoneal cavity. Computed tomography of the abdomen and pelvis demonstrated hemoperitoneum, and heterogeneous enlargement of the spleen consistent with peri-splenic hematoma with no extravasation of contrast.

The patient was resuscitated with crystalloid solutions, blood

products (two units of packed red blood cells), and underwent urgent laparotomy and splenectomy. During the surgery, she was found to have a hemoperitoneum and a splenic capsular laceration. We inferred that the lienocolic ligament was displaced during the colonoscopic procedure, shearing the splenic capsule. Following an uneventful recovery she was administered vaccinations for encapsulated organisms and discharged home on postoperative day number 5 (Figure 1).

Figure 1

Figure 1: CT scan of the abdomen shows hemoperitoneum and a splenic hematoma with contrast extravasation.



DISCUSSION

Many complications following colonoscopy have been reported, including perforation [123], hemorrhage [2], ileus [23], electrocardiographic abnormalities [13], bacteremia [13], septicemia [13], volvulus [14], pneumothorax [15], pneumomediastinum [16], retroperitoneal emphysema [16], pneumoscotum [17], incarceration of hernia [18], liver injury [19], vasovagal problems [20], colonic mucosal tears [20], pneumatosis coli [20], pneumatic ileal perforation [20], postcolonoscopy distention [20], transmural burns [20], electrical ileal perforation [20], snare wire entrapment [20], postpolypectomy coagulation syndrome [20] and retroperitoneal abscess [21], among others.

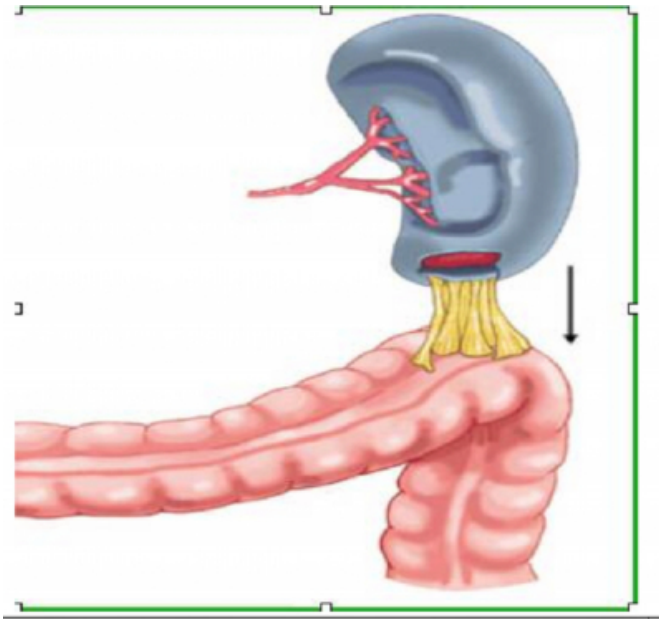
Splenic injury as a consequence of colonoscopy is particularly unusual. Wherry and Zehner first reported this type of complication in 1974, when they reported one case of splenic trauma out of 247 colonoscopies performed by Hedberg [3]. Smith, in 1975, reported a single case of splenic rupture in a survey of 20,139 colonoscopies [4]. In this study, they did not specify age or gender of the patient, they also only referred to diagnostic colonoscopies but did not specify

it they had performed any therapeutic procedures. Macrae et al., in 1983, reviewed 5000 colonoscopies performed by their group and reported no cases of splenic injury [6]. Ong et al., in 1991, reported one case of splenic injury among 6387 colonoscopies [7]. Volchok et al., in a recent review of the topic, found only 17 reported cases and they added two more additional cases. [8]. After an extensive literature review, we have found 25 cases reported in the American literature and 11 more cases reported in the foreign literature [12345678910111213141516171819202122].

The exact mechanism of splenic rupture after colonoscopy is not well defined, proposed mechanisms include excessive traction of the splenocolic ligament during manipulation of the colonoscope (Figure 2), abdominal adhesions, and/or reduced mobility between the colon and the spleen [2022]. Associated factors that have been reported in the literature include patient dependent factors like previous abdominal surgery, splenomegaly, underlying splenic disease, inflammation, pancreatitis, inflammatory bowel disease, colon cancer, and anticoagulation [23]. Operator dependent factors include the experience of the colonoscopist, use of rotational maneuvers such as the “alpha” and the “slide-by”, use of excessive traction, and the use of electrocautery, polypectomy, and excessive sedation. A higher incidence of splenic rupture has been reported in therapeutic colonoscopies where biopsies or polypectomies were performed [22]. The incidence of perforation during diagnostic colonoscopy was 0.06% to 0.57%, with an overall risk of 0.17%. After polypectomy the incidence of perforation was 0.4% to 2.7%, with an overall complication rate of 1.40% [20].

Figure 2

Figure 2: Etiological mechanism of splenic injury: Excessive traction of the splenicocolic ligament during manipulation of the colonoscope.



Several clinical points are important in order to diagnose and appropriately manage a patient with splenic injury following colonoscopy. Symptoms generally develop within 24 hours of the procedure, but may be delayed for up to 3 days; they consist of abdominal pain, often diffuse, but more commonly located to the left upper quadrant. Any patient with persistent or worsening abdominal pain after colonoscopy should alert the physician of a possible complication. Signs of peritoneal irritation may be present, as in this case. Left-sided pleuritic chest pain or pain radiating to the left shoulder (Kher's sign) may also be an important clue to the diagnosis. Tachycardia, orthostatic changes in blood pressure or frank hypotension, and a falling hemoglobin and hematocrit are also very common [4820]. Asymptomatic cases also do occur [7]. Computed tomography is highly accurate for evaluating abdominal injuries, especially for determining the size and extent of splenic injuries and hemoperitoneum [9].

The management of splenic injury following colonoscopy may be either operative or non-operative. The key determining factor for non-operative management is identifying that no active extravasation is occurring. If no active extravasation is seen on contrast enhanced CT scan of the abdomen and the patient remains hemodynamically stable after initial resuscitation with no further bleeding, no further treatment is required [24]. One option in the management of splenic injury after colonoscopy is selective

splenic artery embolization [25]. This procedure has been shown to be safe and cost effective.

Positioning of the patient plays an important role in preventing splenic injury during a colonoscopy. In the left lateral position, both the spleen and the splenic flexure fall to the left side. Any adhesion between them will be lax, and the risk of splenic injury is low [26].

CONCLUSION

Splenic injury is extremely rare following colonoscopy. Awareness of this potential complication may lead to early recognition and in turn to optimal outcome. Persistent abdominal pain following colonoscopy should alert the endoscopist to the possibility of mayor colonoscopic complication, including splenic injury.

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References

1. Macrae FA, Tan KG, Williams CB. Towards safer colonoscopy: a report on the complications of 5000 diagnostic or therapeutic colonoscopies. *GUT* 1983;24:376-83.
2. Ghazi A, Grossman M. Complications of colonoscopy and polypectomy. *Surg Clin North Am* 1982;62:889-96.
3. Wayne JD, Kahn O, Auerback ME. Complications of colonoscopy and flexible sigmoidoscopy. *GI Endo Clin NA* 1996;6:343-77.
4. Smith JE, Nivatvongs S. Complications in colonoscopy. *Dis Colon Rectum* 1975;18:214220.
5. Wherry DC, Zehner H Jr. Colonoscopic fiberoptic endoscopic approach to the colon and polypectomy. *Med Ann DC* 1974;43:189-192.
6. Macrae FA, Tan KG, Williams CB. Towards safer colonoscopy: a report on the complications of 5000 diagnostic or therapeutic colonoscopies. *GUT* 1983;24:376-83
7. Ong E, Bohmler U, Wurbs D. Splenic injury as a complication of endoscopy: Two case reports and a literature review. *Endoscopy* 1991;23:302-304.
8. Volchok J, Cohn M. Rare complications following colonoscopy: case reports of splenic rupture and appendicitis. *JSLS* 2006;10:114-6.
9. Brick SH, Taylor GA, Potter BM, et al. Hepatic and splenic injury in children: Role of CT in the decision for laparotomy. *Radiology* 1987;165:643-6.
10. Gores F, Simso L. Splenic injury during colonoscopy. *Arch Surg* 1989;124:1342.
11. Levine E, LH. Splenic trauma during colonoscopy. *AJR* 1987;149:939-40.
12. Federle MP, Griffiths B, Minagi H, et al. Splenic Trauma: Evaluation with CT. *Radiology* 1987;162:69-71.
13. Vawter M, Ruiz R, Alaama A, et al. Electrocardiographic monitoring during colonoscopy. *Am J Gastroenterol* 1975;63:155-7.

14. Tregoning D, Britton DC. Hazards of coloscopy. *Lancet* 1977;1:544.
15. Thomas J, Pierce G, MacArthur R. Bilateral pneumothoraces secondary to colonoscopic perforation with pneumoperitoneum. *Gastrointest Endosc* 1978;24:124.
16. Lezak M, Goldhammer M. Retroperitoneal emphysema after colonoscopy. *Gastroenterology* 1974;66:118.
17. Fisman EK, Goldman SM. Pneumoperitoneum after colonoscopy. *Urology* 1981;18:171-172.
18. Rees BI, Williams CA. Incarceration of hernia after colonoscopy. *Lancet* 1977;1:371.
19. Libermann TR. Bacteremia and fiberoptic endoscopy. *Gastrointest Endosc* 1976;23:36-37.
20. Viamonte, M, Wulkan M, Irini H. Splenic Trauma as a complication of colonoscopy. *Surg Laparosc Endosc* 1992;2:154-157.
21. Ostyn B, Bercoff E, Manchon ND, et al. Retroperitoneal abscess complicating colonoscopy and polypectomy. *Dis Colon Rectum* 1987;30:201-3.
22. Tsoraides SS, Samir BS, Gupta K, Estes CE. Splenic rupture after colonoscopy: Case report and literature review. *J Trauma* 2007;62:255-257.
23. Moses RE, Leskowitz SC. Splenic rupture after colonoscopy. *J Clin Gastroenterol* 1997;24:257-258.
24. Koksai N, Uzun MA, Muftuoglu T. Hemodynamic stability is the important factor in nonoperative management of blunt splenic trauma. *Ulus Trauma Derg* 2000;6:275-280.
25. Stein D, Myaing M, Guillaume C. Splenic rupture after colonoscopy treated with splenic artery embolization. *Gastrointest Endosc* 2002;55:946-948.
26. Espinal EA, Hoak T, Slezak FA. Splenic rupture from colonoscopy. *Surg Endosc* 1997; 11:71-3.

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