Reports have been submitted to PA-PSRS of a rare but potentially fatal complication of colonoscopy requiring immediate intervention. The report involves a splenic capsule avulsion in which the patient complained of gas pain after colonoscopy. Approximately three hours later, the patient had a syncopal episode. The patient was placed in a monitored bed and continued to complain of recurrent, crampy abdominal pain. Abdominal x-rays indicated no free air. Repeat testing indicated a reduction in hemoglobin and hematocrit. A CT of the abdomen revealed hemoperitoneum. The patient was taken to the operating room for an exploratory laparotomy and a splenorrhaphy to repair an inch-long avulsion of the splenic lateral capsule. The patient progressed well thereafter and was later discharged.

This report indicates a success story. This rare complication was identified and resolved in a timely manner, resulting in a good patient outcome.

Splenic injury associated with colonoscopy is extremely rare but can be fatal, especially in patients with late onset of symptoms and treatment. Only 33 such events have been reported in the clinical literature since the complication was first reported in 1974. As the population ages, the use of colonoscopy for diagnosis and screening is increasing. In addition, as individuals live longer, they are likely to have multiple colonoscopies in their lifetimes. Both factors may result in splenic injury complications becoming more frequent.

Causes of splenic injury include: 1) tugging of adhesions between the spleen and splenic flexure of the colon; 2) excessive traction upon the splenocolic ligament; 3) extensive movement of the colon during difficult pass through of the colonoscope through the splenic flexure. As the report submitted to PA-PSRS indicates, this complication can occur without colon perforation.

Splenic injuries after colonoscopy may include not only an avulsion of the splenic capsule, as described in the PA-PSRS report and in the literature, splenic injuries such as laceration or hematoma have also been reported. More extensive injuries have also occurred, such as splenic rupture, perisplenic clots, and hemoperitoneum.

Certain patients are at increased risk for this complication. Those with a history of prior abdominal surgery or of difficult colonoscopic or therapeutic procedures are more likely to develop splenic injury. Repeated traction during multiple prior colonoscopies may be associated with the formation of adhesions in the area of the splenocolic ligament. Certain medical diagnoses may also be associated with increased risk.

Previous trauma/injury to the spleen, splenomegaly, left colonic inflammatory bowel disease, and pancreatitis all may promote adhesions between the splenic flexure of the colon and the spleen. Patients with portal hypertension or those receiving anticoagulation therapy are also at risk. Therefore, a careful patient history prior to colonoscopy is an important method of identifying which patients are at risk for splenic injury. Females are slightly more likely to incur this complication than males. Polypectomy does not appear to increase the risk of splenic injury.

Symptoms of this complication include acute abdominal pain after colonoscopy particularly in the upper quadrants or upper left quadrant of the abdomen. Sometimes, the acute abdominal pain radiates to the left shoulder (Kehr sign). Other symptoms include nausea, vomiting, and weakness. As the PA-PSRS report describes, syncope may occur. Hypotension, shock, decreased hemoglobin, and leukocytosis also may occur.

In most cases, the onset of these symptoms occurs within 24 hours of the procedure. However, some patients remain asymptomatic for 36 to 60 hours following the colonoscopy. Definitive diagnosis can be delayed by a few hours to as long as 10 days.
Diagnosing this complication can be a challenge. Because splenic injury is a rare event, and some patients present with mild or late symptoms, pain may initially be attributed to the gaseous distension of the colon.\textsuperscript{3,4} Sedation routinely used during colonoscopy may hamper accurate interpretation of the patient’s complaints.\textsuperscript{7} Most cases are relatively asymptomatic immediately following the procedure.\textsuperscript{3} As a result, the knowledge of splenic complication is the best aid to early diagnosis of this condition.\textsuperscript{3,8}

Diagnosing splenic injury involves first ruling out colon perforation and mucosal hemorrhage.\textsuperscript{3} Clinical examination can indicate hemodynamic instability. X-rays of the abdomen can reveal the presence of a large hematoma (Ballance sign) and rule out perforation.\textsuperscript{4} Laboratory testing can document anemia over time and rule out mucosal hemorrhage.\textsuperscript{7} Abdominal ultrasonography, angiography, paracentesis, and laparotomy have been utilized to document intra-abdominal bleeding.\textsuperscript{3,5} CT examination of the abdomen, however, determines whether conservative treatment (for well-contained splenic lesions)\textsuperscript{4,5} or surgical treatment (for extravasating hemorrhage)\textsuperscript{3,4,9} is indicated.

Treatment depends upon the hemodynamic status of the patient and the nature of and size of the injury, as with splenic injuries from more conventional causes.\textsuperscript{5} Conservative treatments include hemodynamic correction, monitoring, and bedrest.\textsuperscript{4} Surgical treatments include splenectomy, splenorrhaphy, or splenic artery embolization.\textsuperscript{5}

Prevention of a lethal outcome involves early identification of splenic injury. Early recognition of symptoms and prompt/proper management of this complication are more likely to result in a favorable patient outcome.\textsuperscript{3,4} The clinical literature indicates the following measures:

- Identification and close monitoring of high-risk patients after colonoscopy.\textsuperscript{3}

- Considering hospital admission/extended observation of patients at high risk or who have gone through a difficult colonoscopic procedure, for closer observation.\textsuperscript{3}

- Placing the high-risk patient in the left lateral position (rather than in the supine position), which reduces the risk of splenic injury.\textsuperscript{3,4,9}

- Educating patients to return/contact the physician if abdominal discomfort or fever develops within a few days of the colonoscopy.\textsuperscript{3}

If the healthcare team has a high index of suspicion of splenic injury in patients who develop abdominal symptoms after colonoscopy, successful outcomes from this rare complication are more likely to occur, as in the report submitted to PA-PSRS.\textsuperscript{3,5}

**Notes**

The Patient Safety Authority is an independent state agency created by Act 13 of 2002, the Medical Care Availability and Reduction of Error (“Mcare”) Act. Consistent with Act 13, ECRI, as contractor for the PA-PSRS program, is issuing this newsletter to advise medical facilities of immediate changes that can be instituted to reduce serious events and incidents. For more information about the PA-PSRS program or the Patient Safety Authority, see the Authority’s website at www.psa.state.pa.us.

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The Institute for Safe Medication Practices (ISMP) is an independent, nonprofit organization dedicated solely to medication error prevention and safe medication use. ISMP provides recommendations for the safe use of medications to the healthcare community including healthcare professionals, government agencies, accrediting organizations, and consumers. ISMP’s efforts are built on a non-punitive approach and systems-based solutions.