

Splenic injury during colonoscopy: modern treatment approach and splenic salvage

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Splenic injury is a rare complication of colonoscopy, estimated to occur in 0.020 to 0.034% of procedures, with a 30-day mortality of 3.6% (1-3). Of the three major severe adverse events during colonoscopy (perforation, bleeding, and splenic injury), splenic injury has the highest mortality but is rarest (1). The spleen is attached to the colonic splenic flexure by the splenocolic ligament, suggesting that manipulation of the colon during colonoscopy may cause direct tension or impaction on the spleen and splenic hilum as the mechanism of injury (2,3). Patients typically present within 24 hours of colonoscopy with severe abdominal pain and peritonism, and may be haemodynamically unstable (2).

The majority of published cases of high-grade splenic injury due to colonoscopy have been managed with splenectomy (2,3), however smaller numbers have been managed with embolization and conservative measures (3). Modern treatment options for splenic injury due to colonoscopy can be classified into conservative, endovascular, and surgical management (3). Conservative management involves inpatient monitoring, with analgesia, intravenous fluids, and blood transfusion (2,3). Endovascular treatment is splenic artery embolization, typically with deployment of coils into the splenic artery proximal to the splenic hilum or into a single splenic artery branch in cases with an isolated focal injury (2-4). Surgical management is principally laparotomic splenectomy (2,3). In modern treatment protocols, splenectomy is usually reserved for unstable patients who require emergent laparotomy (4). Given the similarity in mechanism between splenic injuries due to blunt trauma and those due to colonoscopy, it may be helpful to conceptualize splenic injuries due to colonoscopy according to the American Association for the Surgery of Trauma (AAST) grading system (5).

After institutional ethical approval, electronic medical records over a 10-year period (2012-2022) were searched to identify all patients treated for splenic injury due to colonoscopy, with the following inclusion criteria:

- Splenic laceration diagnosed on computed tomography (CT).

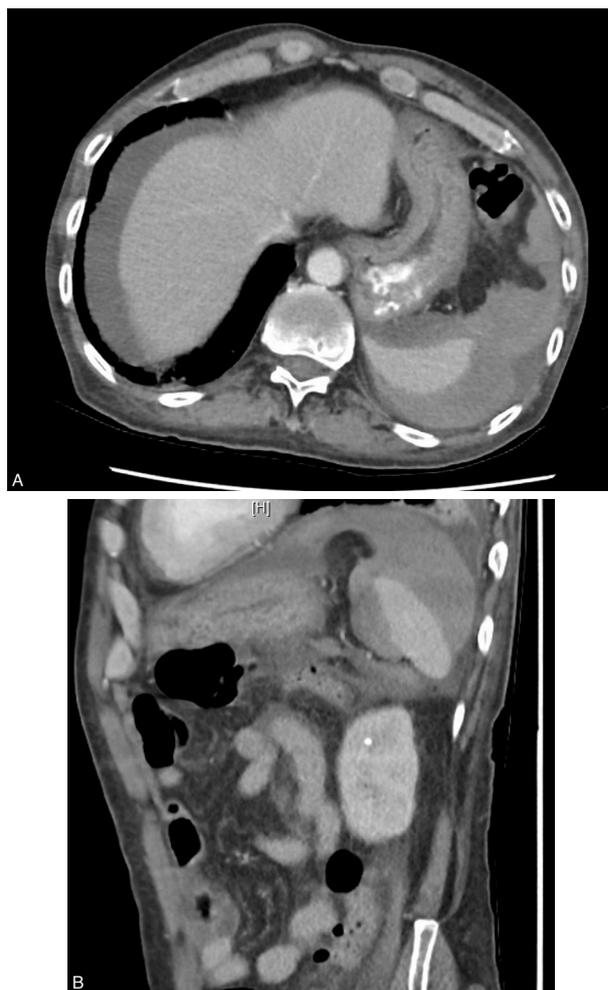


Figure 1. — Axial (A) and Sagittal (B) CT images showing splenic injury due to colonoscopy with laceration at the anterior parenchyma and splenic hilum, with mixed-density surrounding haematoma and haemoperitoneum.

- Colonoscopy within 72 hours of CT diagnosis.
- Absence of blunt external traumatic incident between colonoscopy and diagnosis.

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Table 1. — Patient data of splenic injury during colonoscopy

Patient	Age	Sex	Past Surgical History	Colonoscopy Indication	AAST Injury Grade	Primary Treatment	Secondary Treatment	Outcome
1	66	F	Nil	Polyp monitoring	V	Splenic artery embolization (proximal); 1 day after colonoscopy	-	Survival with Splenic Salvage
2	63	F	Hysterectomy	Anaemia investigation	III	Conservative management	Splenectomy; 6 days after colonoscopy	Survival with Splenectomy
3	40	M	Lung and renal transplants	Polyp monitoring	II	Conservative management	-	Survival with Splenic Salvage
4	72	F	Inguinal hernia repair, hysterectomy	Cancer screening	V	Splenic artery embolization (proximal); 1 day after colonoscopy	Splenectomy; 2 weeks after colonoscopy	Survival with Splenectomy
5	60	M	Lung transplant	Cancer screening	III	Splenic artery embolization (proximal); 1 day after colonoscopy	-	Survival with Splenic Salvage

Patient demographic information, past surgical history, colonoscopy indication, splenic injury grading, treatment and outcome data were analysed.

Two males and 3 females were included, with median age of 63 years (range: 40-72), and four had undergone previous abdominal surgery (Table 1) (Figure 1). AAST injury grades were II to V. One patient with an AAST II injury was treated conservatively without requiring embolization or splenectomy. Three patients with AAST III-V injuries were treated primarily with splenic artery embolization, with one patient undergoing splenectomy 2 weeks later due to increased haematoma on CT. One patient with AAST III injury was treated conservatively but then underwent splenectomy 6 days later due to clinical rebleeding. All patients in the cohort survived, and 3 of 5 achieved splenic salvage.

The spleen has important immune and non-immune functions, as the main filter of blood-borne pathogens, antigens, and red blood cells and patients post-splenectomy have increased life-long risk of infection(6). Embolization preserves splenic function via collateral arterial supply and splenectomy may therefore be best reserved for patients who require emergent laparotomy or where conservative and endovascular management have failed. In the present cohort, 3 of 5 patients were able to avoid splenectomy, higher than in previous published reports (47-69% splenectomy rate) (2,3). The higher splenectomy and mortality rates in previous reports may be due to publication bias favouring severe cases.

As a rare complication of colonoscopy, splenic injury requires prompt diagnosis and management to minimize

mortality. All patients in the present cohort survived, 3 of 5 with splenic salvage. A treatment protocol utilizing conservative management for low-grade injuries and embolization for high-grade injuries may optimise rates of splenic salvage with long-term public health benefits.

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References

1. LAANANI M, COSTE J, BLOTIERE PO, CARBONNEL F, WEILL A. Patient, Procedure, and Endoscopist Risk Factors for Perforation, Bleeding, and Splenic Injury After Colonoscopies. *Clin Gastroenterol Hepatol.* 2019;**17**(4):719-27 e13.
2. CORTES P, CORRAL JE, UMAR S, BILAL M, BRAHMBHATT B, FARRAYE FA, *et al.* Splenic injury is an under-recognized adverse event of in-patient colonoscopy: a nationwide analysis. *Endosc Int Open.* 2022;**10**(2):E178-E82.
3. ULLAH W, RASHID MU, MEHMOOD A, ZAFAR Y, HUSSAIN I, SARVEPALLI D, *et al.* Splenic injuries secondary to colonoscopy: Rare but serious complication. *World J Gastrointest Surg.* 2020;**12**(2):55-67.
4. CLEMENTS W, JOSEPH T, KOUKOUNARAS J, GOH GS, MORIARTY HK, MATHEW J, *et al.* SPLEnic salvage and complications after splenic artery Embolization for blunt abdominal trauma: the SPLEEN-IN study. *CVIR Endovasc.* 2020;**3**(1):92.
5. KOZAR RA, CRANDALL M, SHANMUGANATHAN K, ZARZAUR BL, COBURN M, CRIBARI C, *et al.* Organ injury scaling 2018 update: Spleen, liver, and kidney. *J Trauma Acute Care Surg.* 2018;**85**(6):1119-22.
6. SLATER SJ, LUKIES M, KAVNOUDIAS H, ZIA A, LEE R, BOSCO JJ, *et al.* Immune function and the role of vaccination after splenic artery embolization for blunt splenic injury. *Injury.* 2022;**53**(1):112-5.