Computed tomography colonography: a new threat to the spleen?

R Sehgal¹, T Whitehead-Clarke¹, V Tudyka¹, S Evans²

¹Department of Emergency Surgery, Kingston Hospital NHS Foundation Trust, Kingston upon Thames, UK

²Radiology Department, Kingston Hospital NHS Foundation Trust, Kingston upon Thames, UK

ABSTRACT

We present a rare and previously undocumented potential complication of computed tomography (CT) colonography. CT colonography is a commonly performed investigation with a relatively low risk of complications. While splenic injury is a well-documented complication after colonoscopy, it has never been reported following CT colonography. A 64-year-old man presented with severe abdominal pain four hours after CT colonography. CT of his abdomen and pelvis revealed appearances consistent with intra-abdominal bleeding secondary to splenic injury. The patient immediately underwent an emergency laparotomy and splenectomy, revealing a grade III splenic capsular tear. Histological evaluation of splenic tissue showed normal morphology with no evidence of malignancy. While the aetiology of the patient's splenic injury remains uncertain, normal histopathology and the chronology of events represents an almost certain link to CT colonography.

KEYWORDS

CT colonography – Pneumocolon – Spleen – Splenectomy – Colonoscopy

Accepted 13 July 2018

CORRESPONDENCE TO

Radha Sehgal, E: radhasehgal16@googlemail.com

Introduction

Computed tomography (CT) colonography is a safe, routinely performed procedure for the investigation of bowel cancer, with a relatively low risk of complications.^{1,2} Although splenic injury is a recognised complication of colonoscopy,⁵ the authors have found no reports of splenic injury following CT colonography. Splenic injury is a potentially life-threatening condition and can be misdiagnosed, particularly in patients with no history of trauma or existing splenic disease. Our case highlights the need to consider splenic rupture as a differential diagnosis in patients with an acute abdomen following CT colonography. Earlier recognition ensures that patients can be managed appropriately, minimising morbidity and mortality. With increasing use of CT colonography, rarer sequelae of the procedure may emerge.

Case history

Following a previous failed colonoscopy, a 64-year-old man underwent CT colonography for investigation of iron deficiency anaemia. The CT scan revealed scattered diverticulae and polyps in the descending and sigmoid colon, with no other lesions detected. There were no complications during the procedure and the patient was discharged home the same day.

The same evening, the patient developed left-sided abdominal pain and vomiting. There was no history of trauma. He was brought to the emergency department by ambulance; on arrival, he was hypotensive, tachycardic and hypothermic. He was profoundly acidotic (pH 7.13), with a lactate of 15 mmol/l. Blood tests revealed a haemoglobin of 80 g/dl with no coagulopathy. On examination, his abdomen was globally tender, with significant guarding throughout. An ultrasound scan performed in the emergency department demonstrated a large volume of free fluid in the abdomen.

Urgent CT of the abdomen and pelvis was requested to investigate a potential bowel perforation. It showed a large amount of free fluid throughout, particularly around an ill-defined spleen, raising the likelihood of splenic injury and subsequent catastrophic haemorrhage (Fig 1). The contrast from the previous day's CT colonography was contained in the bowel with no signs of intraperitoneal gas, making colonic perforation unlikely (Fig 2). On comparing the successive CT appearances, the earlier CT colonography image showed an absence of free fluid and normal splenic anatomy, although of note is the medial displacement secondary to proximal tracking of insufflated gas (Fig 3). This suggested that the bleeding developed in the time following the CT colonography.

After discussion with the consultant radiologist on call, this injury was deemed inappropriate for arterial embolization and the patient would need an urgent laparotomy.

Figure 1 Computed tomography image showing ill-defined spleen, with free fluid around spleen and liver.

Figure 3 Computed tomography colonography image from previous day showing a normal spleen and absence of free fluid.

Figure 2 Computed tomography image showing contrast contained within bowel.

Figure 4 Appearance of spleen (right) and haematoma (left).

Intraoperatively, the abdomen contained approximately three litres of blood, mostly organised in large clots around the left upper quadrant. An actively bleeding grade III splenic capsular tear was identified. Splenectomy was performed with washout of all four quadrants.

Postoperatively, the patient spent one day in intensive care, followed by four days on the ward prior to discharge home. He was treated with routine prophylactic antibiotics, and post-splenectomy vaccinations were organised.

Macroscopic histopathology results revealed the spleen weighing 106 grams with a detached capsule and a separate blood clot weighing 311 grams (Fig 4). Microscopic

analysis followed: 'sections of spleen show normal morphology, without evidence of primary involvement by lymphoma or secondary involvement by metastatic malignancy'.

Discussion

Splenic injury is usually associated with blunt or penetrating trauma, with atraumatic splenic rupture normally secondary to an infectious or malignant process.⁴ However, there are documented cases of spontaneous splenic rupture where a disease process has not been identified; this has been reported in 0.1–0.5% of patients with splenic injury.⁴

Spontaneous splenic injury is potentially fatal and can be misdiagnosed or overlooked in the absence of trauma or existing splenic pathology. The reported patient was a

healthy 64-year-old man with no significant comorbidities, existing splenic disease or history of trauma. A potential point of interest is the patient's CT colonography, which took place hours before the onset of his presenting complaint.

CT colonography is an accurate and minimally invasive radiological investigation for the detection of colorectal cancer and colonic polyps. It involves pre-procedure bowel preparation, insufflation of the colon with gas (carbon dioxide) and uses high resolution CT images to visualise the bowel.¹ CT colonography is better tolerated by patients than colonoscopy due to lighter bowel preparation, its less invasive approach and the avoidance of sedation risk.^{2,5} In the UK, patients in the NHS Bowel Cancer Screening Programme undergo CT colonography as the first-line alternative to colonoscopy.¹ It is indicated in those who are unsuitable candidates for colonoscopy and for those who have had an incomplete colonoscopy. Its use has gained widespread acceptance and its use is increasing in the UK.

The reported risks of CT colonography are limited to colonic perforation and radiation exposure.⁵ A meta-analysis found the overall rate of CT colonography-related colorectal perforation to be 0.04%, with a mortality rate of 0%.² There have been no reported cases of splenic injury following CT colonography in the literature. There have, however, been almost 100 documented cases of splenic injury post-colonoscopy, published internationally. In 2011, Shankar and Rowe reviewed 95 cases of splenic injury following colonoscopy.⁵ Some 71% of patients presented within 24 hours, most commonly with abdominal pain associated with hypotension, mirroring the clinical features of any splenic injury and those of the reported patient. The

aetiology of splenic injury post-colonoscopy is thought to be due to disruption of peritoneal ligaments supporting the spleen.

Conclusion

Although extremely rare, spontaneous splenic rupture can be fatal. Clinicians should have a high index of suspicion in patients with abdominal pain and haemodynamic instability. Although theories have been postulated, the true aetiology is unknown. We postulate that a potential cause of splenic injury following CT colonography could be colonic insufflation causing displacement of the spleen. While there have been no reports in the literature of splenic rupture following CT colonography, the increasing use of this investigation may reveal rarer, yet unidentified complications.

References

1. British Society of Gastrointestinal and Abdominal Radiology; Royal College of Radiologists. *Guidance on the Use of CT Colonography for Suspected Colorectal Cancer*. London: Royal College of Radiologists; 2014.
2. Bellini D, Rengo M, De Cecco CN *et al*. Perforation rate in CT colonography: a systematic review of the literature and meta-analysis. *Eur Radiol* 2014; **24**(7): 1,487–1,496.
3. Shankar S, Rowe S. Splenic injury after colonoscopy: case report and review of literature. *Ochsner J* 2011; **11**(3): 276–281.
4. Abbadi SE, Rhouni FZ, Jroundi L. Spontaneous rupture of the spleen: about a case and review of the literature. *Pan Afr Med J* 2017; **27**: 62.
5. De Gonzalez AB, Kim KP, Yee J. CT colonography: perforation rates and potential radiation risks. *Gastrointest Endosc Clin N Am* 2010; **20**(2): 279–291.