CASE REPORT

Delayed presentation of iatrogenic splenic injury 21 days after laparoscopic donor left nephrectomy

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SUMMARY

We report the case of a 46-year-old woman who had presented with left-sided abdominal pain 21 days after undergoing a left-sided laparoscopic nephrectomy for donation. Initial haemoglobin and haematocrit levels were within normal range, and vital signs on admission were unremarkable. Significant intra-abdominal pathology was not suspected; however, inpatient CT scan of the abdomen showed a posterolateral subcapsular splenic haematoma with free abdominal fluid. Initial trial of conservative management was not successful as the patient became hypotensive on the third day of admission with a sudden decrease in haemoglobin and haematocrit. The patient was immediately taken to theatre for laparotomy and splenectomy. Recovery was uneventful and was discharged home on the fifth postoperative day. In this article, we aim to discuss several important clinical lessons involving iatrogenic injury of the spleen, its management, and diagnosis of acute and severe haemorrhage.

BACKGROUND

In this case report, we present an example of the clinical rarity that is delayed presentation of iatrogenic splenic injury. To our knowledge, this case represents the longest interval between laparoscopic intervention and patient presentation reported in English-language literature. We strongly believe that this article highlights a number of important and relevant learning points that the vigilant clinician should be aware of.

CASE PRESENTATION DIFFERENTIAL DIAGNOSIS AND INVESTIGATIONS

A 46-year-old woman presented to us acutely with 2 days of left-sided abdominal pain 21 days after undergoing left-sided laparoscopic donor nephrectomy in the supine position. Other than some initial abdominal pain that was self-limiting in the immediate days following the operation, the patient had been completely well until the re-emergence of her abdominal pain. There was no additional history of trauma. Medical history included hypertension, previous excision of a carotid paraganglioma and the patient was not on any anticoagulant or antiplatelet medications. On examination, the abdomen was soft but tender over the left iliac fossa port site. No skin changes were evident and vital signs on admission were normal. Haemoglobin (122 g/L) and haematocrit (0.372) were within normal range, as were white blood cell count, liver

and renal function tests and amylase, although C reactive protein was elevated at 98.5 mg/L. Due to maximal tenderness over the left-sided port site, a collection or incisional hernia was suspected, and the patient was admitted for an ultrasound scan the next morning. To our surprise, this revealed fluid surrounding the spleen as well as free intra-abdominal fluid (figure 1). Therefore, an urgent contrast CT scan of the abdomen and pelvis was performed, demonstrating a large posterolateral subcapsular haematoma with a moderate amount of free abdominal fluid (figure 2). The attenuation of the free fluid was consistent with that of blood, measuring 45 and 70 Hounsfield units on non-contrast (figure 3) and contrast-enhanced CT scan, respectively. Vertical expansion of the haematoma can be appreciated on the coronal view (figure 4), extending to the level of the inferior margin of the L2 vertebral body. Moreover, no evidence of active bleeding was seen at this point. A trial of conservative management with close monitoring was initiated, but the patient became hypotensive on the third day of admission. Concurrently, blood tests had shown a significant drop in haemoglobin (64 g/L) and haematocrit (0.197) at this point. The patient was then taken immediately to theatre for laparotomy and splenectomy.

TREATMENT

At laparotomy, approximately 2 litres of fresh intra-peritoneal blood and clots was evacuated with the spleen removed in a piecemeal fashion following successful ligation of the splenic hilum and connecting short gastric vessels. Splenic capsular rupture was later confirmed by histopathological examination.

OUTCOME AND FOLLOW-UP

The patient recovered well postoperatively, spending 2 days on the intensive care unit and another day on the high dependency unit before moving to the ward. She was discharged on the fifth postoperative day with the necessary antimicrobial prophylaxis. She was discharged from general surgical follow-up after outpatient clinic review 2 months after the splenectomy.

DISCUSSION

Iatrogenic injury to the spleen is a recognised complication of a number of left-sided laparoscopic and open procedures, including that of the left kidney and adrenal gland, left colon as well as those

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Figure 1 Ultrasound scan demonstrating a fluid collection (*) surrounding the spleen (S).

of the stomach and oesophagus. In 2002, a systematic review by Cassar and Munro quantified risk of splenic injury as 1%–8% in left hemicolectomy, 3%–20% in anti-reflux procedures and 4%–13% in left nephrectomy.¹ In recent years, evidence has suggested that, at least for colonic surgery, the laparoscopic approach is associated with a lower risk of iatrogenic splenic injury compared with open surgery.² Specifically in respect to laparoscopic donor nephrectomy, in a series of 148 patients,³ short-term complications that were reported included intraoperative bleeding from the lumbar plexus, adrenal glands, common iliac vein and port sites (with three patients requiring conversion), iatrogenic injury to bowel (1%), wound infection (15.5%) and postoperative pneumonia (5%). Progression of the donor to end-stage renal failure is a long-term risk, particularly in those with hypertension and diabetes.

The vast majority of injuries are evident intraoperatively where definitive surgical haemostasis can be safely implemented. Very limited literature exists, however, on the topic of delayed presentation of iatrogenic splenic injury following laparoscopic or open surgery. Of note, Lai *et al*⁴ previously reported the delayed presentation of a splenic laceration sustained 17 days prior during a hand-assisted laparoscopic nephroureterectomy for carcinoma of the renal pelvis. This patient required an emergency splenectomy. Moot *et al*⁵ described a case of splenic injury

Figure 2 Axial contrast-enhanced CT scan demonstrating a large posterolateral subcapsular splenic haematoma (red arrow) with moderate amount of free abdominal fluid (yellow arrow). The free fluid attenuates at 70 Hounsfield units, consistent with blood.

Figure 3 Axial non-contrast CT scan. Free intraperitoneal fluid of 45 Hounsfield units can once again be appreciated (yellow arrow), with a subtle noticeable demarcation between the non-enhanced splenic parenchyma and haematoma (red arrow).

presenting 4 days after laparoscopic appendicectomy. Interestingly, for this case, the authors concluded that traction of the spleen from pneumoperitoneum alone was sufficient to cause injury.

Another important facet to this case is that of haemoglobin levels and haematocrit in acute haemorrhage, with the first instance of decreased haemoglobin and haematocrit occurring in our patient clearly after significant intraperitoneal bleeding had already taken place. Classically, it is taught to medical students that neither haemoglobin concentration nor haematocrit is reflective of bleeding in the acute setting, for the simple reason that *whole blood* is being lost. This basic tenet is often too easily forgotten, and indeed early *in vivo* human studies on the effect of haemorrhage on haematocrit demonstrated that 50% of the total decrease in haematocrit following an episode of acute haemorrhage occurred only after 8 hours owing to

Figure 4 Coronal section contrast-enhanced CT scan demonstrating vertical extension of the splenic haematoma (*) to the level of inferior margin of L2 vertebra.

the effects of plasma haemodilution.⁶ Therefore, subtle clinical signs found on careful clinical examination of the patient along with repeated full blood count are key to the early diagnosis of active haemorrhage.

Lastly, the decision between conservative management and emergency surgery in splenic injury is a key point of consideration for the clinician. Clearly, the spleen represents an essential part of humoral immunity and splenic preservation avoids the 0.5% risk of overwhelming post-splenectomy sepsis in trauma patients.⁷ In general, there is fairly strong consensus among authors that the only absolute indication for emergency splenectomy is haemodynamic instability in ongoing haemorrhage.^{8,9} However, factors such as anatomy and severity of the injury, patient age and comorbidities, clinical examination and indeed serial haemoglobin/haematocrit levels, as discussed, should all contribute to decision-making on a case-to-case basis.

Learning points

- ▶ Laparoscopic donor nephrectomy on the left side is a cause of iatrogenic injury to the spleen.
- ▶ Our case, along with a small number of other reports, demonstrates that delayed presentation of iatrogenic splenic injury leading to life-threatening haemorrhage, although very rare, is possible.
- ▶ Judicial use of imaging, either ultrasound or CT scan, should be considered when faced with clinical uncertainty or laboratory results, which are disproportionate to the clinical diagnosis. As in our case, this may on occasion yield major unexpected pathology.
- ▶ A reminder of the possibility of severe and acute ongoing bleeding in patients presenting initially with normal haemoglobin and haematocrit levels. Meticulous clinical examination of the patient and repeated full blood count samples are crucial.
- ▶ Haemodynamic instability remains the only absolute indication of emergency splenectomy. Nonetheless, patient-specific factors, clinical examination and serial laboratory results should all contribute to deciding between conservative and operative management.

Of note, on the background of 23 532 patients suffering blunt splenic injury, Smith *et al* concluded that for patients who are stable, a period of 3 to 5 days of observation is required in the context of conservative management, having found that in patients who failed conservative management, 95% did so in the first 72 hours of admission with a further 1.5% failing between days 3 and 5.¹⁰ As with patients with possible delayed presentation of iatrogenic injury to the spleen, a high index of suspicion is required when assessing the small percentage of remaining patients who decompensate, or re-present after a prolonged period of observation.

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