CASE REPORT

Varicella zoster virus infection is an unusual cause of splenic rupture

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Accepted 28 July 2015

SUMMARY

A 22-year-old man presented with a 1-day history of severe abdominal pain. He developed a generalised vesicular rash 12 h prior to admission. On examination, he was maximally tender with peritonism in the lower abdomen. Working diagnosis was perforated appendix and a decision to investigate with CT was made, which showed intra-abdominal haemorrhage likely arising from a ruptured spleen. After a period of observation, he subsequently underwent laparotomy and emergency splenectomy. Viral PCR from vesicular fluid was positive for varicella zoster virus. Viral serology was otherwise negative.

BACKGROUND

Atraumatic splenic rupture (ASR) is uncommon, however, a pathological cause is identified in 92% of cases.¹ Splenic rupture is a potentially fatal but often unrecognised cause of acute abdomen and there is a risk of missed or delayed diagnosis, especially in the absence of a history of trauma.¹ Varicella is uncommon in immunocompetent adults. Abdominal pain is unusual in varicella; we present one such case. This case demonstrates a rare but potentially fatal complication of varicella zoster virus (VZV) infection causing ASR.

CASE PRESENTATION

A 22-year-old Caucasian man presented acutely with a 1-day history of severe lower abdominal pain on a history of feeling generally unwell and lethargic for 2 weeks. He developed a generalised vesicular rash covering his torso, face and limbs overnight prior to admission and reported feeling dizzy coinciding with the onset of pain. He was normally fit and well. There was no recent history of trauma or foreign travel.

On examination, the patient had generalised abdominal pain, maximally tender in the lower abdomen, with peritonism. Observations on admission were: blood pressure 150/90 mm Hg, heart rate 95 bpm and fever 38.7°C. The differential diagnosis was of perforated appendicitis due to the patient's age, presentation and the distribution of pain, with concurrent varicella rash. A CT scan was requested.

INVESTIGATIONS

Admission haemoglobin (Hb) was 121 g/L, platelets $97 \times 10^9/L$, C reactive protein 67 mg/L and lactate 2.35 mmol/L. CT scan demonstrated high-attenuation intraperitoneal free fluid predominantly in the pelvis, around the spleen and in both paracolic gutters, in keeping with haemorrhage.

Splenomegaly and irregularity of the anterior tip of the spleen was demonstrated, which indicated likely splenic rupture as the cause of haemorrhage (figure 1).

DIFFERENTIAL DIAGNOSIS

As aforementioned in case presentation section.

TREATMENT

Initial management consisted of fluid resuscitation and analgesia. Over the next few hours, the patient's clinical status deteriorated. His pain became more severe and he developed a persistent tachycardia >100 bpm. A repeat of the patient's blood tests showed deterioration with Hb 102 g/L and platelets $86 \times 10^9/L$, so the decision was made for emergency laparotomy and splenectomy.

The patient received 3 units of packed red cells and 1 unit of platelets intraoperatively. Operative findings were active bleeding from a ruptured spleen and free intraperitoneal blood; estimated blood loss was 3000 mL. The rest of the laparotomy findings were negative. Liver and other organs did not show any abnormality.

Splenic histology showed splenomegaly measuring 16 cm with a 5 cm area of rupture on the anterior aspect demonstrated macroscopically and microscopically. Microscopic sections demonstrated a reactive follicular hyperplasia and a considerable number of medium to large lymphoid cells within the tissue. Immunostains supported the diagnosis of a reactive follicular hyperplasia in the splenic tissue (figures 2 and 3). Although requested for by one of the author (s), subsequent immunostaining for VZV in splenic tissue was declined by the laboratory.

OUTCOME AND FOLLOW-UP

Postoperatively, the patient made an uncomplicated recovery. He was treated with 5 days oral aciclovir. Viral PCR from vesicular fluid was positive for VZV DNA, and VZV IgG was negative, confirming he had not previously been infected with VZV. The patient did not have VZV IgM tested during the acute phase. Viral serology was negative for HIV, cytomegalovirus and Epstein-Barr virus.

The patient was discharged on day 5 postoperatively, and received appropriate post-splenectomy antibiotic prophylaxis and vaccinations. He was scheduled for routine postoperative follow-up and his Hb had normalised by the 6-week assessment.

DISCUSSION

This case demonstrates an unusual cause of splenic rupture in a patient with VZV infection.

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To cite: Clifton LJ, Dhaliwal KS, Saif D, et al. *BMJ Case Rep* Published online: [please include Day Month Year] doi:10.1136/bcr-2015-210909

Figure 1 Axial CT showing splenomegaly, rupture on anterior aspect of the spleen and intraperitoneal haemorrhage.

Two recent reviews report the incidence and aetiology of ASR.^{1 2} In a systematic review of 845 cases of ASR, 93% of cases were associated with a pathologically abnormal spleen. The three commonest causes were: neoplastic, infectious and local inflammatory disorders, 27.3% cases were due to infection.¹ Infectious mononucleosis is a commonly reported infectious cause of ASR, which is reported to occur 0.1–0.5% of acute cases of EBV.³ In contrast, VZV is a rare cause of ASR in adults and few cases have previously been reported. A literature search identified three previously reported cases of varicella-related ASR in adult patients,^{4–6} as summarised in [table 1](#).

The previous reports of varicella-related ASR all involved young men (aged 21–25), as with our patient, who was 22 years

Figure 2 H&E stain—spleen showing lymphoid follicles (A: at $\times 4$ magnification, B: at $\times 10$ magnification).

Figure 3 Special stains, $\times 10$ magnification (A: CD3, B: CD20).

old. In these cases, the diagnosis of VZV-related ASR was made because the typical rash was present in all cases, preceding the onset of abdominal pain, and additional viral serological tests were negative. In addition, Tapp⁴ confirmed the diagnosis by the presence of vesicles and pustules on the serosal surface of abdominal viscera and their presence on splenic histological sections. Harris and Boland⁵ confirmed the diagnosis by positive viral serology for VZV IgM and IgG, and splenic histological sections, demonstrating reactive follicular hyperplasia and infiltration of lymphocytes, as with our case ([figures 2 and 3](#)). Vial *et al*⁶ diagnosed splenic rupture at laparoscopy, with subcapsular haematoma without active bleeding. In this case, the patient did not undergo splenectomy, so histology was unavailable. They confirmed the diagnosis by identifying VZV IgM and IgG. In our patient, the presence of typical rash and VZV positive PCR confirmed the diagnosis. Histology specimens showed a reactive follicular hyperplasia, as previously reported by Harris and Boland.⁵ Our patient did not have VZV IgM tested in the acute phase, but his VZV IgG was negative, indicating no previous infection.

The pain of splenic rupture usually begins on the left side and spreads throughout the abdomen. The patient may be peritonitic and hypovolaemic. Irritation of the diaphragm with referred pain to the left shoulder (Kehr's sign)⁷ was absent in our patient. The diagnosis of splenic rupture is most often made by CT or ultrasound scan (USS), with splenomegaly, subcapsular haematoma and free intraperitoneal haemorrhage being the usual findings.^{1 7} CT is the most sensitive imaging investigation for detecting urgent conditions in patients with abdominal pain; more sensitive than USS ($p < 0.001$).⁸ Splenomegaly is common in cases of ASR,¹ as demonstrated by this patient.

Table 1 Case reports of splenic rupture secondary to VZV infection

	Sex/age	VZV diagnosis method	Abdominal pathology	Treatment	Histology
Tapp ⁴	M, 25	Typical rash	Splenic rupture, intraperitoneal haemorrhage	Splenectomy	Vesicles and pustules on spleen
Harris and Boland ⁵	M, 23	Typical rash, VZV IgM & IgG	Splenic rupture, intraperitoneal haemorrhage	Splenectomy	Reactive follicular hyperplasia
Vial <i>et al</i> ⁶	M, 21	Typical rash, VZV IgM & IgG	Splenic rupture, subcapsular haematoma	Laparoscopy, conservative	Not applicable

M, male; VZV, varicella zoster virus.

There is sparse guidance available to inform the best management of ASR. Renzulli *et al*, in their systematic review, reported 85% of patients (n=660) underwent total splenectomy <24 h after diagnosis, as was the case with our patient. The remaining patients (n=114) were treated conservatively, with one-fifth requiring delayed splenectomy due to ongoing bleeding or haemodynamic instability. Delayed splenectomy in this subgroup was associated with increased ASR-related mortality in comparison to patients successfully treated conservatively ($p<0.001$).¹

Some reports suggest that non-operative management may be appropriate in selected cases if the patient remains haemodynamically stable.^{6–7} However, non-operative management may leave the patient at increased risk of further haemorrhage and progressive splenomegaly. Others advocate splenectomy as the treatment of choice in ASR due to the low likelihood of cessation of bleeding in a diseased pathological spleen.¹

The large heterogeneity of cases of ASR makes it difficult to determine which cases may benefit from non-operative versus operative management. In recent years, the management of traumatic splenic rupture from blunt abdominal injury has moved towards spleen preserving and non-operative management as the gold standard for minor splenic trauma,⁹ recognising the important immunological function of the spleen. In cases of severe splenic trauma, the expertise of the operative team and patient status should contribute towards a careful risk-benefit analysis when determining between operative and non-operative management.¹⁰ There are no specific guidelines to advise best practice for management of ASR and there are limited examples of conservative management.

Learning points

- Splenic rupture can be a rare complication of varicella zoster infection.
- Left upper quadrant pain may be due to splenic rupture and this should be considered in patients presenting with acute abdominal pain.
- Early and accurate diagnosis of splenic rupture is necessary to prevent morbidity and mortality.
- Atraumatic splenic rupture usually occurs in a pathologically abnormal spleen. If patients are haemodynamically compromised, they should undergo emergency splenectomy.

Oral aciclovir (800 mg, 4 or 5 times daily) is recommended for adults with varicella, if started early.¹¹ The benefit of treatment is greatest if initiated early, <24 h following onset of rash, and has been shown to reduce the total number of lesions and duration of fever.¹² In our case, 5 days of treatment was started following positive PCR results postoperatively.

In summary, we present a case of a rare cause of ASR. Prompt diagnosis and management is essential to reduce morbidity and mortality. Varicella has rarely been implicated in this disease process and we report another case of VZV-related splenic rupture. The management of ASR remains contentious, but emergency splenectomy is indicated if the patient is haemodynamically unstable or has evidence of ongoing active bleeding.

Acknowledgements The authors would like to acknowledge Mr A Goede, consultant colorectal surgeon and operating surgeon for this case, for his advice and permission to write up the case.

Contributors LJC drafted and revised the case report as well as performing the literature search and analysis. KSD and PM revised the draft paper. DS processed the histology specimen and provided histology images.

Competing interests None declared.

Patient consent Obtained.

Provenance and peer review Not commissioned; externally peer reviewed.

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