CASE REPORT

Shared drink and a soft punch: an almost deadly combination

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Accepted 14 November 2016

SUMMARY

Injuries of the spleen in blunt abdominal trauma are common and can lead to fatal bleeding. The diagnostic of choice to determine severity and treatment is usually made in contrast-enhanced CT. In our case we used contrast-enhanced ultrasound to identify the origin of an intra-abdominal bleeding following a minor trauma in a patient with splenomegaly due to an Epstein-Barr virus infection.

BACKGROUND

In blunt abdominal trauma the spleen is one of the most commonly injured organs.¹

The standard approach to blunt abdominal trauma in the emergency department (ED) is Advanced Trauma Life Support (ATLS) assessment with the goal to confirm or rule out intra-abdominal organ injury.²

The usefulness of focused assessment with sonography for trauma (FAST) to detect free intra-abdominal fluid as an indirect sign of organ injury is now widely adopted.³

With point-of-care ultrasound (POCUS), the provider has a portable, rapid and reliable tool to exclude intraperitoneal fluid without interrupting resuscitation measures even in unstable patients.

Despite its unclear impact on mortality due to its limitations (examiner dependent, difficult body habitus, abdominal injuries without haemoperitoneum) FAST provides an important step for risk stratification without radiation.^{4 5}

One big disadvantage remains the uncertainty of the origin of free fluids as well as the severity of the causing organ injury and CT with contrast enhancement remains the standard diagnostic tool in most cases.³

Techniques such as contrast-enhanced ultrasound (CEUS) still remain a less common examination tool due to relatively small clinical indications and limited examiner experience.

Despite these facts, CEUS might have the potential to reveal solid organ injury as an extension of commonly available POCUS without the need for further imaging in the ED.⁶

In our case a traumatic splenic rupture was diagnosed using this technique in a case of splenomegaly caused by an acute Epstein-Barr virus (EBV) infection.

Infectious mononucleosis is a benign lymphoproliferative disorder caused by EBV.^{7 8} Commonly known as 'kissing disease' it is transmitted via saliva and has its peak incidence in adolescents with a seroprevalence of about 95% in adults. The

incubation period of 14–50 days is followed by typical clinical symptoms of viral infection. Confirmation can be made, if necessary, with serological tests and as the term says with a rise of mononuclear cells such as lymphocytes in the peripheral blood.⁸ The detection of at least 10% atypical lymphocytes has a sensitivity of 75% and a specificity of 92% for the diagnosis of infectious mononucleosis if clinically suspected.⁹

It is associated with splenomegaly in about 15–65% of cases which is commonly seen as an increased risk for traumatic rupture.^{10 11} Therefore recommendations are usually made to avoid contact sport for the duration of 8 weeks.¹¹

Rare cases of spontaneous splenic ruptures due to IM have been described.¹¹

CASE PRESENTATION

An 18-year-old male patient presented with abdominal pain as a walk-in patient to our ED.

He stated that he suffered from acute onset of abdominal pain directly after receiving a soft punch to his left abdomen by a friend.

His medical history was unremarkable, but the patient described painful cervical lymph node swelling several days before his consultation in our ED.

Primary and secondary survey remained unobtrusive but for slight rigidity in the left upper quadrant of the abdomen. The examiner confirmed the mentioned cervical lymph node swelling.

Blood pressure was 145/70 mm Hg with a heart rate of 80 bpm, oxygen saturation was 97% breathing ambient air.

INVESTIGATIONS

As an adjunct bedside haemoglobin tests are little useful as they probably remain within the normal range (NR).¹² In our case the haemoglobin level was 142 g/L.

FAST was performed as part of the standard operating procedure for blunt abdominal trauma and revealed free abdominal fluid especially in Morison's pouch and the lower abdomen (figures 1 and 2) in absence of pneumothorax or pericardial effusion.

As the patient remained stable without signs of shock the POCUS scan was extended to investigate the origin of the free fluid.

The POCUS showed a splenomegaly with nearly 16 cm (patients height 179 cm) and a suspected splenic laceration (figure 3); therefore we decided to perform a CEUS scan.

After injection of 2.4 mL contrast agent (SonoVue (Bracco, Milan, Italy)) splenic injury grade 2–3 was

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To cite: Klingberg K, Srivastava D, Bosbach S, et al. *BMJ Case Rep* Published online: [please include Day Month Year] doi:10.1136/bcr-2016-216424

Figure 1 Focused assessment with sonography for trauma free abdominal fluid in Morison's pouch.

Figure 3 Splenomegaly.

identified based on the classification of the American Association for the Surgery of Trauma (AAST) (figure 4).¹³

To confirm this higher grade splenic injury and evaluate therapeutic options a CT scan of the abdomen was performed.

Figure 5 shows coronal reconstruction of grade 3 splenic injury.

During the examination the aetiology of his splenomegaly was investigated and in the patients history a prior exposition to an acute EBV infection was found: a shared soft drink bottle with a friend who had a proven acute EBV infection.

Also his routine blood tests remained within NR. White cell count was high normal with 10.4 G/L. The full blood count showed lymphocytosis of 63% (NR 15–43%) with atypical lymphocytes of 14%. Finally, serological tests confirmed the diagnosis of an acute EBV infection in our patient during his hospitalisation (IgM EBV positive). Other serological tests for virus infections causing splenomegaly (HIV, cytomegalovirus) remained negative.

TREATMENT/FOLLOW-UP

The patient remained stable and no blood or coagulation products were given. He was transmitted to the intensive care unit for further continuous monitoring and two ultrasound follow-ups. Neither an angiographic nor a surgical intervention was needed and the patient was discharged from hospital on the fifth day.

Figure 2 Focused assessment with sonography for trauma, free abdominal fluid in the lower abdomen.

DISCUSSION

In this case the rare coincidence of acute EBV infection causing splenomegaly and a minor abdominal trauma lead to a splenic injury grade 3.

Splenic rupture can be a life-threatening condition which often needs therapeutic interventions including angiography with coiling of the splenic artery or laparotomy with whole or partial organ resection depending on the severity of the injury.¹⁴

The grading of traumatic splenic injuries according to the AAST is based on the anatomic injury identified on CT scan (table 1).¹³ Therapeutic options are usually based on this grading and on local expertise.

FAST can significantly improve the delivery of care in patients with abdominal trauma and provides an economical, legitimate and rapid assessment option without radiation.

During the previous decade it has become an internationally accepted standard of care in emergency medicine and has been integrated into many trauma pathways including ATLS.²

CEUS as any sonographic examination is strongly operator dependent and missing skills are probably the main reasons that this diagnostic tool is not used widely.

On the other hand, it has several advantages, such as its portability, the safety of the contrast agent, the lack of ionising radiation exposure and therefore its repeatability, which allows close

Figure 4 Contrast-enhanced ultrasound splenic injury grade 2–3, lack of perfusion due to devascularisation.

Figure 5 CT scan coronal reconstruction confirming splenic injury grade 3.

Table 1 Organ injury scale for spleen according to the American Association for the Surgery of Trauma¹³

I	Haematoma	Subcapsular, <10% surface area
	Laceration	Capsular tear, <1 cm parenchymal depth
II	Haematoma	Subcapsular, 10–50% surface area; intraparenchymal, <5 cm in diameter
	Laceration	Capsular tear, 1–3 cm parenchymal depth that does not involve a trabecular vessel
III	Haematoma	Subcapsular, >50% surface area or expanding; ruptured subcapsular or parenchymal haematoma; intraparenchymal haematoma ≥5 cm or expanding
	Laceration	>3 cm parenchymal depth or involving trabecular vessels
IV	Laceration	Laceration involving segmental or hilar vessels producing major devascularisation (>25% of spleen)
V	Haematoma	Completely shattered spleen
	Laceration	Hilar vascular injury devascularises spleen

follow-ups of conservatively managed patients, especially in paediatric cases.⁶

Further limitations are the cost of contrast agent, lack of panoramacity, the difficulty to explore deeper regions and the poor ability to detect injuries to the distal urinary tract.⁶

The CT scan remains the gold standard but neither sonography nor CT scan should delay the therapy of an acute intra-abdominal bleeding in unstable patients.

There are controversies in the non-operative treatment of severe splenic injuries (AAST grades 3–4).¹³ The decision depends on an individual risk–benefit analysis for each patient. Owing to the possibility of sudden delayed haemorrhage, the patient must be carefully clinically observed and constantly monitored.¹⁴

Learning points

- ▶ FAST is an essential diagnostic tool for the emergency department management of abdominal injuries.
- ▶ CEUS has the potential to identify solid organ lesions and might replace CT scan under certain circumstances.
- ▶ For now there is not enough data supporting the use of CEUS as a standard in trauma management but it might play a major role in the future.

Acknowledgements The authors thank their Radiology Department and Professor A Exadaktylos for their support.

Contributors KK, DS, SB and BL contributed to the conception and planning of the work. KK and DS participated in the conduct and reporting of the work described in the article. KK, DS, SB and BL gave final approval of the version published. KK was responsible for the overall content as guarantor.

Competing interests None declared.

Patient consent Obtained.

Provenance and peer review Not commissioned; externally peer reviewed.

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