Title: Recurrent bacteraemia following variceal haemorrhage

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Disclosure Statement: Nothing to declare

Acknowledgements: Dr Benjamin Mullish is the recipient of an MRC Clinical Research Training Fellowship (grant reference: MR/R000875/1).

Word Count: 444
Clinical presentation:

A 43-year-old man presented to hospital with septic shock. Eight weeks prior, he had experienced recurrent gastric variceal bleeding (Figure 1), treated initially with cyanoacrylate glue injection. Abdominal computerised tomography scan suggested features of chronic liver disease, with non-alcoholic fatty liver disease being the presumed aetiology. Despite endoscopic therapy, he had further variceal haemorrhage, and was treated successfully with insertion of a transjugular intrahepatic portosystemic stent shunt (TIPSS) (covered stent). Other past medical history included ulcerative colitis, antiphospholipid syndrome (treated with warfarin) and splenectomy.

On physical examination, there was no obvious source of infection. Laboratory investigations demonstrated a white blood cell count of $18.4 \times 10^9/l$, haemoglobin of 106 g/l, C-reactive protein of 195 mg/l, and international normalised ratio of 2.1 (measured while on warfarin). Blood cultures grew *Escherichia coli*, and intravenous antibiotics were administered; he made a good recovery.

Six weeks later, following a second admission with *Escherichia coli* sepsis, six weeks of oral antibiotic therapy was prescribed. Further investigations - including ultrasonography, whole body computerised tomography, transoesophageal echocardiography and colonoscopy – failed to identify an infection source.

After a third similar hospitalisation, a positron emission tomography (PET) scan was performed within 24 hours of admission (Figure 2a and 2b), which helped to diagnose the cause of his sepsis.

Question:

What is the source of this man’s recurrent bacteraemia?

Answer:

The PET scan revealed increased signal uptake at the site of the TIPSS, indicative of this being the site of infection (Figure 2a and 2b). Whilst infected cyanoacrylate glue had been considered as a differential diagnosis, there was no PET signal uptake at the sites of glue deposition, excluding this as a possibility. TIPSS blockade was carried out with a 14mm type II Amplatzer plug, as a strategy to prevent further bacterial distribution from the portal to the
systemic circulation. Oral antibiotics were prescribed for four further weeks, and the patient made a complete recovery. In the following 12 months, no further infectious episodes occurred, nor any recurrent gastrointestinal bleeding.

Tipsitis (also known as endotipsitis), infection of TIPSS, may occur from weeks to months after insertion with little known about the pathogenesis. It is a rare but serious complication of this procedure. 55 cases have been reported with 32% associated mortality. There are no uniform diagnostic criteria for the condition, but tipsitis should be considered as a possible diagnosis in patients who have undergone TIPSS insertion and who present with unexplained bacteraemia. Targeted antibiotic therapy is the mainstay of treatment, although there are high rates of treatment failure and relapse. Furthermore, antibiotic therapy alone may not fully decolonise the TIPSS; as demonstrated here, TIPSS blockade may play a role in preventing bacteria transiting into the systemic circulation. TIPSS removal and liver transplantation is the only definitive treatment and may be appropriate in refractory cases.

**Figure Legends:**

- Figure 1: Gastroscopy demonstrating gastric varices
- Figure 2a: PET scan during episode of bacteraemia – axial view
- Figure 2b: PET scan during episode of bacteraemia – sagittal view

**References:**

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Figure 2a: PET scan during episode of bacteraemia – axial view
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