Pseudomonas aeruginosa bacteraemia: the role of ultrasound to confirm vascular access infection

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DESCRIPTION

A 68-year-old woman presented to the emergency department complaining of both lumbar and left shoulder inflammatory pain, during the past 2 weeks. She had a previous history of chronic kidney disease on regular haemodialysis as well as a superior vena cava syndrome and peripheral vasculopathy secondary to multiple central venous lines as well as multiple arteriovenous fistulas failure in the past. At the moment of presentation, she had a right femoral tunnelled central venous catheter (CVC), described as her last viable vascular access.

Three months earlier she had fever during several haemodialysis sessions. A *Pseudomonas aeruginosa* was isolated on blood cultures. A 1-month course of both lock in (4 mg/mL gentamicin plus sodium citrate 4% anticoagulant solution) and systemic therapies with gentamicin was then performed, after which CVC's collected blood cultures were negative.

On physical examination, the patient presented remarkable tenderness and stiffness on the left shoulder, as well as lumbar pain on palpation. No inflammatory signs were present on vascular access inspection.

A purulent drainage was obtained on left shoulder arthrocentesis and a positive culture for *P. aeruginosa* (sensitive to both gentamicin and ceftazidime-avibactam) was present. A relation between the actual complaints with the previous CVC infection was considered and a B-mode ultrasound imaging was obtained using a 5.0 MHz curvilinear probe (video 1). It revealed a swinging vegetation adjacent to the tip of catheter, suggestive of a bacterial biofilm. Both blood and CVC cultures revealed the same bacterial growth as in arthrocentesis. On lumbar MRI, both vertebral L1–L2 osteomyelitis and discitis were present. Transthoracic echocardiogram revealed no abnormalities.

Intravenous ceftazidime-avibactam and gentamicin (both systemic and lock in therapies, the second one with the same composition mentioned above) were initiated.

One week later, both peripheral and CVC blood cultures were negative and CVC tip imaging revealed no vegetations. An abdominal and pelvic angiographic CT scan revealed no vascular stenosis. Right femoral CVC was then replaced, and no microbiological growth was present on CVC tip cultures.

Video 1 In this video, a swinging vegetation adjacent to the tip of the central venous catheter is evident, on both longitudinal and axial perspectives. This image is suggestive of a *Pseudomonas aeruginosa* biofilm.

Learning points

- ▶ Ultrasound has an important role in confirming the diagnosis of vascular access infection.
- ▶ Rapid initiation of empiric broad-spectrum antibiotics is fundamental to treat vascular access infection.
- ▶ Prompt replacement of infected vascular access in the presence of metastatic infectious complications is fundamental, particularly in the case of *Pseudomonas aeruginosa* infection.

This case report intends to reinforce the complexity of managing a patient with such an important vasculopathy and dependence on a CVC to perform regular haemodialysis. Moreover, it emphasises the potential role of ultrasonography in identifying a bacterial biofilm at the tip of the catheter as a starting point to a bloodstream infection. Particularly, *P. aeruginosa* is one of the most common bacteria associated with CVC infection (up to 16% of cases).^{1,2} Prompt initiation of empiric broad-spectrum antibiotics is fundamental in this situation, as well as vascular access replacement.³

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