Case Report

Detecting “Silent Graft Infection” - PET Scanning may be your Friend

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Abstract

Synthetic arteriovenous grafts are a source of infection in 11-35% of the hemodialysis patients. Even when not in use – after these patients receive a transplant – they can serve as a potential source of chronic bacterial infection. Previous reports describe infections in clotted grafts. We present a case of a ‘silent infection’ in an unused but functioning arteriovenous graft.

ABBREVIATIONS

AVG: Arteriovenous Grafts; HD: Hemodialysis; CKD: Chronic Kidney Disease; AVF: Arteriovenous Fistula; SPK: Simultaneous Pancreas and Kidney; PTFE: Polytetrafluoroethylene, CT: Computed Tomography; PET: Positron Emission Tomography

INTRODUCTION

Arteriovenous grafts (AVG) for hemodialysis (HD), which are not in use, can serve as a potential source of chronic bacterial infection in patients on dialysis programs. Previous reports describe infections in clotted grafts [1-4]. We present a case of a ‘silent infection’ in an unused but functioning AV graft.

CASE PRESENTATION

A 42-year-old man presented to our hospital in May 2015 with septic shock as well as abdominal and back pain. His previous medical history included chronic kidney disease (CKD) due to diabetes mellitus type 1, mitral valve replacement with a bio-prosthetic valve in 2011, and simultaneous pancreas and kidney (SPK) transplant in 2012.

Prior to his transplant he was on haemodialysis through a right PTFE brachio-axillary graft that was inserted in November 2012 after his previously native arteriovenous fistula (AVF) had failed in August 2012. The graft had been used for a few weeks before the patient was called for the SPK transplant on 25/12/2012. The transplantation was successful and he was discharged from hospital nine days later.

In May 2015, he returned to hospital feeling unwell, febrile, with abdominal and back pain. Blood cultures showed a methicillin sensitive staphylococcus aureus bacteraemia. He underwent a series of tests to determine the focus of the sepsis including trans-thoracic and trans-oesophageal echocardiograms that excluded any vegetations of cardiac origin and a CT abdomen and pelvis that showed good perfusion of the kidney and pancreas grafts with no other signs of infective focus like a pseudo aneurysm. Discitis was also ruled out with an MRI of the spine. A Doppler ultrasound of the right arm showed good flow in the graft with no signs of perigraft collections. In particular, his right arm did not show any swelling or tenderness along the functioning brachio-axillary graft (Figure 1).

In the absence of an infective source, a PET scan was performed that showed focal increased tracer activity at the mid portion of the PTFE graft on the right upper arm as the only abnormality. The patient was commenced on Vancomycin and Gentamicin initially and then changed to Flucloxacillin following advice from microbiology. The course was continued for a total

Figure 1 PET Image showing focal (LEFT) and along the whole graft (RIGHT) increased tracer activity at the right upper arm level of the PTFE graft.

of four weeks. A routine follow up PET scan was performed two weeks after the antibiotics were completed. This showed uptake along the whole graft. At the time the patient had swelling and tenderness localized especially over the arterial anastomosis and the CRP was 45 mg/L. Therefore it was decided to explant the whole graft under general anaesthesia. The patient recovered well after this operation and did not have any more recurrence of sepsis.

DISCUSSION

Although the first vascular access option for hemodialysing patients is an AVF, there are patients who lack a suitable autologous subcutaneous venous circulation for AVF creation and therefore an AVG is used to serve as a cannulation segment [5]. Other indication for AVG insertion include failed AVF/ exhausted superficial veins, destroyed vessels by indiscriminate venipuncture, late referral for vascular access, need for immediate cannulation with avoidance of a central venous catheter (relative indication) and children who cannot tolerate multiple painful venipuncture associated with autogenous AVFs [6].

The most commonly used material is the ePTFE that is concerned as the gold standard for such grafts. Synthetic AV grafts are a common source of infection in HD patients. According to literature 11-35% of the patients with an AVG have an incident of infection [7]. Factors that promote such infection include difficulty in cannulation of the PTFE graft, perigraft hematoma formation, prolonged post dialysis bleeding from the graft and a break in the sterile technique. Infection of PTFE graft material may also develop as a result of a transient bacteremia caused by an infection at a distant site [4]. It is a common practice for uncomplicated clotted grafts to remain in situ and another graft to be inserted in a different site. There are many reports in the literature describing silent infections in abandoned clotted grafts [1,2,4,5]. In our case, the graft was functioning but was not in use anymore as the patient had a successful simultaneous pancreas kidney transplant one month after the graft insertion and, therefore, there was no need for hemodialysis. So it was abandoned after having been used for a short time. The sepsis incident happened three years later. At the beginning of this presentation, no clinical evidence of graft infection was noted. In particular, as mentioned previously, the right arm did not show any swelling or tenderness along the graft and the Doppler ultrasound of the right arm showed good flow in the graft with no sign of perigraft fluid collection or oedema. Indium 111-labeled leukocyte scanning and PET scan have been proposed for localization of infection, and for detecting infected AVFs that have previously clotted [1,8,9]. We used a PET scan to identify the source of infection in our case. After the localization of the sepsis focus, antibiotics were given according to the current guidelines [10] and microbiology advice. The repeated PET scan showed increased tracer activity at the right upper arm level of the PTFE graft along the whole graft and therefore surgical excision of the graft was performed. During the operation the whole graft was excised and the vessels were over sewed with prolene 5-0 stich. The excised graft was sent for microbiology examination that came up negative for bacterial growth after 48 hours on incubation. It is therefore unclear the cause of the infection since the last needling of the graft was more than three years before the incident and the graft was fully functional in the meantime.

CONCLUSION

“Silent” graft infection should always be considered as an infective source in the immunocompromised patient. Fully functional graft without any clinical signs can be the source of sepsis. PET scan assessment may be required to reveal the source of sepsis.

REFERENCES