

Case of the Month

Clinical History:

History of previous open abdominal aortic aneurysm repair 3 months ago. Subsequent bowel surgery for ischaemic bowel and left ureteric injury managed with left nephrectomy. Continued fevers and rigors. Concern for infection of the aortic graft.

Findings:

Intense increased uptake of tracer is noted along the abdominal aortic aneurysm graft extending into both common iliac vessels. A right common iliac aneurysmal sac is also noted.

There is an intensely FDG avid fluid collection noted in the right iliac fossa which extends superiorly to the midline of the abdomen just anterior to the abdominal aorta just above the bifurcation at the level of L3.

Left nephrectomy noted. Intense uptake of tracer is noted at the site of surgical clips, in the left renal bed and at the left diaphragmatic crus. There is also quite extensive increased uptake of tracer noted in the soft tissue stranding along the left posterolateral abdominal wall in keeping with post-surgical changes.

Intense uptake of tracer is noted at the site of a small fluid collection in the left paracolic gutter.

Focal uptake in the pelvis associated with a 7mm nodule is thought to be nodal in aetiology.

A small low-density area in the right groin is not FDG avid and most likely represents a resolving thrombosed pseudoaneurysm at site of previous vascular access. Low grade tracer uptake is noted in adjacent inguinal nodes.

There is mild reversal of the hepatosplenic ratio and increased bone marrow uptake; appearances likely to be reactive.

Tracer uptake along the oesophagus is likely to be inflammatory.

Tracer distribution elsewhere is physiologic. A left iliac fossa stoma is noted.

Interpretation:

Intense uptake of tracer noted in the abdominal aortic graft extending into the common iliac arteries bilaterally is far more intense than expected at 3 months post abdominal aortic aneurysm repair and is highly suspicious for infection.

Fluid collections noted in the right iliac fossa extending up to the midline of the abdomen and in the left paracolic gutter are also highly concerning for infection.

Follow-up:

The patient had persistent positive *Escherichia coli* blood cultures, and this was presumed to be the causative bacteria; the graft was likely inoculated at the time of the patient's bowel ischaemia. Due to comorbidities, it was decided to treat the infected infrarenal aortic graft conservatively, and the patient was treated with broad-spectrum antibiotics. Follow-up FDG PET-CTs at 3, 6 and 12 months show incremental reduced metabolic activity in the graft. The patient has been placed on life-long antimicrobial prophylaxis.

Key Teaching points and Discussion:

- Aortic infection post graft repair is a rare, but highly morbid condition, with mortality ranging from 25-88%. Graft infection is more common after open rather than endovascular repair.
- *Staphylococcus aureus* is the most common causative bacteria in the first 3 months, with coagulase negative *Staphylococcus* more common in later infections.
- FDG PET-CT is helpful in the diagnosis of aortic graft infections, especially low-grade infections, with reported sensitivity and specificity of 89% and 86% respectively.
- A focal or heterogenous pattern of increased FDG uptake along the graft is most suggestive of infection.
- False positives can occur on PET due to low grade chronic inflammation along the graft surface, especially in the first 3 post-operative months.
- Review of the rotating maximum intensity projection (MIP) images can be extremely helpful to assess the extent of infection.
- Signs of infection on the non-contrast CT can be helpful in difficult cases, such as persistent or expanding perigraft soft tissue thickening, perigraft fluid collection and gas persisting for greater than 1 month postoperatively.
- FDG PET-CT is also a useful imaging modality to assess treatment response, as these patients will often require long term antibiotic treatment.

References:

Sah BR, Husmann L et al. Diagnostic performance of 18F-FDG-PET/CT in vascular graft infections. Eur J Vasc Endovasc Surg 2015;6:1183-1187

Keidar Z, Engel A et al. Prosthetic vascular graft infection: the role of 18F-FDG PET/CT. J Nucl Med 2007;8:1230-1236

Murphy DJ, Keraliya AR et al. Cross-sectional imaging of aortic infections. Insight Imaging 2016;6:801-818

Evidence-based Indications for the use of PET-CT in the United Kingdom 2016 – Infection imaging

- Evaluation of vascular graft or cardiac implantable device related infection in selected cases provided sufficient time has elapsed since surgery.