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Abdominal aortitis on PET CT: A case report and review of the literature

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ABSTRACT

INTRODUCTION: Aortitis often occurs in patients with systemic vasculitis.
PRESENTATION OF CASE: We reported a 73 year old man with giant cell arteritis who was presented with abdominal pain and weight loss.
DISCUSSION: Aortitis was diagnosed on PET-CT scan performed because initial investigations raised the possibility of pancreatic pathology.
CONCLUSION: This case highlights the utility of PET-CT in the diagnosis of abdominal aortitis and the need to consider aortitis as a differential in patients with abdominal pain with a history of vasculitis.

1. Introduction

Aortitis is the inflammation of the aortic wall, regardless of the underlying aetiology. Most commonly, aortitis occurs due to an infective or autoimmune process. Clinically aortitis can evade diagnosis as it commonly presents in a non-specific manner with a spectrum of symptoms including abdominal pain, fever and weight loss. Imaging is required to definitively establish a diagnosis and for follow up. Here, we present the case of a difficult diagnostic conundrum that required many imaging modalities to establish a diagnosis, and eventually led to an incidental finding of aortitis on PET CT.

2. Presentation of case

Our patient was a 73 year old gentleman who initially presented with a 1 week history of right sided colicky flank pain. Although a renal calculus was suspected, he had other symptoms including nausea, vomiting and anorexia. He had also noticed a significant weight loss over the previous ten months and described weakness and decreased energy levels. He had no constipation, diarrhoea or urinary symptoms. On examination his abdomen was soft, with mild right sided abdominal tenderness. His temperature was 37.8 and his inflammatory markers were slightly raised (WCC 16,000 cells per litre, CRP 48 mg/dl). His past medical history included stage 2 colon carcinoma treated by left hemicolectomy with no recurrence, giant cell arteritis (GCA) diagnosed 2 years ago, treated by prednisolone and type 2 diabetes diagnosed 10 years ago, for which he is taking metformin/vildagliptin (Eucreas). His GCA was diagnosed following temporal artery biopsy after he presented with heachache, visual disturbance and elevated erythrocyte sedimentation rate (ESR) Fig. 1.

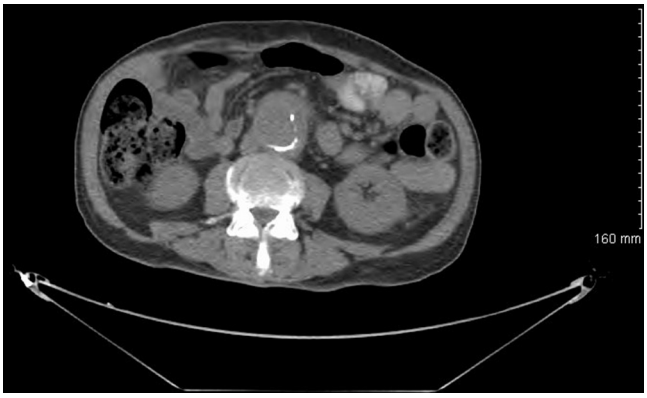

Fig. 1. CT pancreas showing atherosclerotic plaques in AAA.

A renal calculus was suspected but none was seen on plain X-ray or CT KUB, though the latter imaging demonstrated a small 3.8 cm abdominal aortic aneurysm and several pancreatic abnormalities, with coarse calcifications and low attenuation in the pancreatic bed suggestive of chronic pancreatitis and together with suspicion of a query pancreatic pseudocyst. His CA 19–9 was 748.7 units/ml

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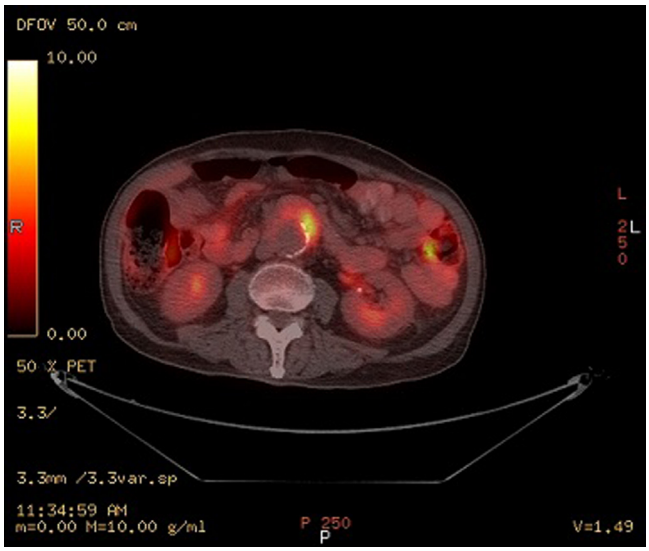

Fig. 2. CT PET showing intense tracer uptake in wall of aorta.

(0–37) and CEA 4.0 ng/ml (0–5) and given the pancreatic changes he was scheduled for a CT Pancreas Fig. 2.

This patient represented 3 days later, however, with more severe pain. CT pancreas at this time showed pancreatic duct obstruction due to a focal calcification in the pancreas neck and a 3.8 cm infrarenal AAA with extensive soft tissue plaque in the anterior wall. It was felt that a pancreatic neoplasm was less likely given the lack of appreciable soft tissue abnormality and more likely to be dystrophic calcification secondary to chronic pancreatitis. Given the elevated CA 19–9, it was decided to perform a PET CT to fully evaluate the pancreatic changes. At this point, we were not worried about the extensive soft tissue plaque in the anterior wall of his abdominal aortic aneurysm and treated it as an incidental finding as our primary concerns were the abnormal pancreatic findings, and we felt that a PET CT would provide conclusive evidence as to the presence or absence of a pancreatic malignancy.

PET-CT demonstrated no FDG-avid evidence of pancreatic malignancy but did show incidental intense tracer uptake in the wall of the aorta suggesting active inflammation within the atheromatous plaque or aortitis. The aorta size was also measure at 4.3 cm indicating and increase in size from the CT. Literature shows that PET CT is not as accurate as standard CT for demonstrating the size of vessels, which accounts for the increase in size [3,4]. He was subsequently referred to vascular and rheumatology for follow up. The patient was commenced on oral steroids by the rheumatologists and is having a follow up CT scan of his aorta at 6 months with the vascular team to assess the size and inflammation of his aneurysm. It was considered that conservative management should be the initial treatment approach and then if no significant improvement surgery would be considered. To date, the patient is symptom free and he has no further complications.

PET-CT was negative for pancreatic malignancy but allowed us to make the diagnosis of abdominal aortitis and refer to the appropriate specialist, thereafter. By performing the PET-CT our management of this patient changed as this scan had not been performed, the patient may have underwent further investigation for malignancy including colonoscopy and oesophago-gastro duodenoscopy. PET-CT should be reserved for those patients with a background of GCA who present with unexplained symptoms as aortitis. Aortitis is a rare complication but it is one that should be considered in patients with abdominal pain and a history of vasculitis [5].

3. Discussion

Aortitis is an inflammatory condition of infectious or inflammatory origin involving the vessel wall. It is a subtype of the vasculitides that can cause inflammation in blood vessels of any size in any location in the body. The clinical presentation is often non-specific and can evade diagnosis, as the laboratory results and its systemic manifestations often mimic other presentations. Aortitis can be either infectious or non-infectious, with vasculitis and autoimmune conditions common underlying aetiological factors. Common causes of non-infectious aortitis include giant cell arteritis, which was the likely cause of this patient's aortitis, given, he had a known history of GCA.

The incidence of large artery complications in GCA has been reported by Nuenninghoff et al. in 2003, which discovered that 27% of their cohort presented with complications such as aortic aneurysm and aortic dissection. Of the patients with aneurysm in the thoracic aorta, dissection developed in 9 of these patients [5%] and was the cause of death in [7] [4%]. Four patients [2%] had both thoracic and abdominal aortic aneurysm. One patient survived surgery for dissection of an abdominal aortic aneurysm and died later of an unrelated cause. They concluded that 18% of patients with GCA develop aortic aneurysm and/or aortic dissection and that delay to diagnosis in these patients resulted in inadequate treatment with steroids and poorer outcomes. From their studies, there was no obvious risk stratification tool to screen patients with GCA and they recommended that further large studies should be carried out to evaluate risk factors for large-artery complications in GCA [10].

Infectious causes of aortitis can include *Neisseria*, *Salmonella*, Tuberculosis, *Rickettsia*, Spirochetes, Fungi and viruses such as herpes varicella, hepatitis B and hepatitis C [11]. Infection may precipitate as fever and blood cultures may prove the most important diagnostic test in these cases. Stelzer reported in April 2014 of a patient, who presented with fever and abdominal pain with cultures positive for *Salmonella*. CT and PET scans subsequently revealed an aneurysmatic soft tissue inflammation diagnosed as infectious aortitis [9].

A variety of imaging modalities have been described in the diagnosis and surveillance of aortitis, including contrast enhanced CT, magnetic resonance imaging (MRI) and positron emission tomography (PET) [1]. There are a small number of reports of the use of PET-CT in abdominal aortitis, with more extensive literature on PET in the diagnosis of thoracic aortitis [7,8]. The various modalities of imaging used to best detect vasculitic inflammation include contrast enhanced CT, magnetic resonance imaging and particularly positron emission tomography (PET). CT and MRI are more accurate for the assessment of the thickness of the aortic wall and aortic diameter [1].

The F18-PDG PET (2-deoxy-2-fluoro D-glucose) tracer shows increased uptake in inflammatory and malignant processes and does not accumulate in normal vascular structures, hence it is useful in aortitis [2]. In this case, PET-CT was not carried out to evaluate the aorta, but rather there was a concern regarding the possibility of a pancreatic lesion. This does not alter the effectiveness of diagnosing aortitis on PET-CT, however, as there are no specific sequencing protocol for assessing vasculitis as F18-PDG only accumulates in inflammatory of infectious processes indicating that the aortic wall is abnormal [14]. While the inflammatory activity is well described on PET CT, the assessment of the vascular wall and lumen is limited due to the low resolution of PET scans, and it is useful to perform CT or MRI scans to improve the accuracy of the PET. In our case, the PET CT scan detected a 4.3 cm AAA, an increase of 0.5 cm from the CT scan. Studies have shown that irrespective of diameter F18-PDG is an excellent technique for detecting inflammatory changes but CT is more accurate for assessing the size of abdominal aortic

aneurysms [3,4]. There was FDG uptake in the patient's kidneys as about 20% of the F18-PDG is excreted renally and with a rapid half-life of 16 min, this makes the kidneys prominent in a normal PET scan [12]. Concurrent inflammation will also cause diffuse uptake in the spleen which is the case with this patient. His CRP was elevated which has been found to be a significant predictor of FDG uptake in the spleen associated with inflammation [13].

Giant cell arteritis represents one of the most common types of vasculitis and aortitis. Aortitis is a serious complication of the condition. It is recommended that at time of diagnosis of GCA, it has been stated that patients should be screened for aortic lesions by CT scan and followed up subsequently [5], as aortitis present at diagnosis of GCA often represents a poorer prognosis and a higher number of complications [6]. However, given the high dose of irradiation involved, it may be more beneficial to restrict advanced imaging techniques for those patients who present with unexplained weight loss and abdominal pain with a background of GCA, given the rarity of the condition and that it is responsive to steroids, and usually does not require surgical intervention [5].

4. Conclusion

PET-CT performed primarily for investigation of pancreatic abnormalities in this case led to a diagnosis of aortitis. Aortitis can be a difficult diagnosis and a high index of suspicion is required in patients with a history of vasculitis presenting with abdominal pain and systemic symptoms.

Conflict of intrest

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Consent

Consent obtained.

Author contribution

Dr. James Foley – Author of case report and writing.Dr. Daniel Mullan – Writing.Dr. Helen Mohan – Case report design.Dr. Karl Schmidt – Consultant Surgeon.

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