Introduction: Polymyalgia rheumatica (PMR) is closely associated with giant cell arteritis, the most common cause of vasculitis in the elderly population. Diagnostic challenges may arise when patients present with marked systemic upset, raising concerns about a malignancy. Our patient initially presented with marked weight loss, anaemia and significantly raised CRP and ESR, prompting urgent referrals to gastroenterology and haematology to rule out a malignancy. He was eventually referred to the rheumatology team and a PET-CT demonstrated characteristic findings of polymyalgic-onset rheumatoid arthritis. We also explore the expanding role of PET imaging in other rheumatic disorders.

Case description: A 65-year-old Caucasian gentleman presented to his GP in September 2018 with significant weight loss and general malaise. He had been managing large joint arthralgia by self-medicating with aspirin 300mg daily. Initial investigations by his GP demonstrated a normocytic anaemia, neutropaenia and low iron levels (haemoglobin 103g/L, MCV 86.9fL, neutrophil count 0.5x10^9/L, iron level 4umol/L). His past medical history was significant of hypercholesterolemia and a right inguinal repair. He had no regular prescribed medications. He worked as an electrical engineer. He had a significant smoking history of 40-pack-years.

He was initially referred to the colorectal and haematology teams under the 2-week-wait rule. Video capsule endoscopy, cross-sectional imaging and bone marrow trephine identified no occult malignancy. His ESR was markedly elevated at 133mm/h with a corresponding CRP of 134mg/L. Serum protein electrophoresis was consistent with chronic inflammation. He was subsequently referred to the rheumatology clinic in December 2018 by the haematologists in view of the raised inflammatory markers.

At initial review, he reported right knee pain and symmetrical small joint arthralgia of the hands. He also described pain affecting the cervical spine, both shoulders and hips with significant early morning stiffness. Careful questioning revealed no symptoms of a connective tissue disorder. Examination demonstrated marked, symmetrical synovitis over his metacarpophalangeal, proximal interphalangeal and wrist joints. Immunology tests were all negative. Due to ongoing concerns regarding a malignancy a PET-CT scan was requested. This demonstrated widespread FDG-avid symmetrical polyarthralgia in a rheumatoid pattern in addition to enthesopathy in keeping with PMR. There was no evidence of large vessel vasculitis.

After 3 months of investigations under multiple specialties, the patient was diagnosed with polymyalgic-onset rheumatoid arthritis. He was started on prednisolone with an excellent clinical response. His CRP improved to 17mg/L. His full blood count also normalised which eventually allowed the introduction of methotrexate.

Discussion: Rheumatologists are frequently asked to assess patients with unexplained elevated inflammatory markers or multisystem diseases. It is important to remember that constitutional symptoms can be the first presentation of a rheumatic disorder, particularly when an occult malignancy and infection have been ruled out. Although this patient...
had clinically apparent synovitis on clinical examination, his inflammatory markers were extremely elevated with marked systemic upset. Interestingly, PET-CT demonstrated typical features of PMR which were not apparent from the initial consultation with no evidence of large vessel vasculitis.

PET imaging has been used extensively in oncology to identify malignant lesions but it is important to understand its expanding role in rheumatology in identifying active inflammation. It has been used in the diagnosis of large vessel vasculitides, including giant cell arteritis and Takayasu’s arteritis, and IgG4-related disease. Moreover, it is very useful in identifying the extent of the disease which may guide treatment decisions. PET-CT can also be used in the diagnosis and to assess the extent of disease in PMR. Typically, there is FDG uptake in the shoulders, sternoclavicular and hip joints. There is often increased extra-articular uptake between the spinous processes and ischial tuberosities. The use of PET-CT to diagnose PMR is not widespread as the diagnosis of PMR is usually evident based on the history, clinical findings and inflammatory markers. However, when there is marked systemic upset and/or very high inflammatory markers, it is important to consider utilising PET-CT to assess for concurrent occult malignancy or large vessel vasculitis. More recently, PET imaging has also been used in the diagnosis of early rheumatoid arthritis and some studies have shown that it is more sensitive and specific than MRI at picking up subclinical synovitis.

**Key learning points:** This case highlights the usefulness of PET-CT as a diagnostic tool in patients who present with systemic illness. The use of PET-CT is two-fold; firstly, to rule out an occult malignancy and secondly, to look for other features that would support an alternative diagnosis. There are characteristic findings of PMR on PET-CT and as rheumatologists, we must be aware of the expanding role of PET-CT in our field so that it can be appropriately applied to our clinical practice.

**Conflicts of interest:** The authors have declared no conflicts of interest.