Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

^{18}F-fluorodeoxyglucose PET/CT findings in a systemic inflammatory response syndrome after COVID-19 vaccine

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A 65-year-old woman attended our hospital with a 1-day history of fever and falls, saying that her legs had given out from under her. The patient's symptoms began within 1 day of the first dose of the mRNA-1273 SARS-CoV-2 vaccine. She had a medical history of hypertension and diabetes.

On examination in the emergency department, the patient's temperature was 39·1°C, her respiratory rate was 25 breaths per min, and her heart rate was 88 beats per min. As she met the criteria for systemic inflammatory response syndrome (SIRS), an extensive infection work-up was initiated and she was started on broad-spectrum antibiotics.

Laboratory investigations found a D-dimer concentration of 5267 ng/mL, erythrocyte sedimentation rate of 69 mm/h, and a C-reactive protein concentration of 63·4 mg/L. The patient's white blood cell count, lactate, urinalysis, respiratory pathogen panel—including SARS-CoV-2—and urine and blood cultures were unremarkable. Due to concerns of exposure to SARS-CoV-2, the PCR test was repeated after 24 h, but this was again negative.

CT of the patient's chest showed multiple pulmonary nodules measuring up to 1·1 cm. A small filling defect in a distal subsegmental pulmonary artery was also seen, which we thought was inconsistent with an acute pulmonary embolism and probably artifactual. Doppler ultrasounds of the patient's lower limbs were normal; her head CT was also normal.

4 days after presentation, ^{18}F-fluorodeoxyglucose (^{18}F-FDG) PET/CT was done to characterise the pulmonary nodules; it showed uptake in the fat stranding posterior to the right deltoid (figure); moderately increased uptake within multiple right axillary lymph nodes (figure); and diffusely increased splenic uptake (figure). The pulmonary nodules had no uptake—indicating that they were probably benign.

The patient's symptoms resolved 3 days after the vaccination. Given the imaging findings, the temporal relationship of the symptoms to the vaccination, and negative test results from an extensive work-up for malignant and infectious causes, we believe, the diagnosis was a local and systemic immune response following vaccination. However possible masking effects of broad-spectrum antibiotics cannot be excluded.

The high D-dimer concentration probably reflected significant concomitant coagulation and fibrinolysis associated with SIRS.

The local response was demonstrated by hypermetabolism within the axillary lymph nodes draining the site of intramuscular injection; diffusely increased splenic activity suggests a systemic response—corroborated by elevated inflammatory markers.

As the global vaccination effort continues, more patients will undoubtedly require assessment and investigation shortly after immunisation. Imaging and laboratory findings consistent with a systemic immune response might result in further unnecessary evaluation or interventions. However, findings overlap with other diseases—notably those of the ^{18}F-FDG PET/CT scan in patients with malignancies. Recognition of the clinical and imaging features of the systemic immune response to vaccination might become essential in the coming months (video).

Contributors

AT was the admitting physician treating the patient. JS and AI were involved in interpreting the imaging. We were all involved in drafting, reviewing, and writing the final manuscript. Written consent for publication was obtained from the patient.

Declaration of interests

We declare no competing interests.

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See Online for video

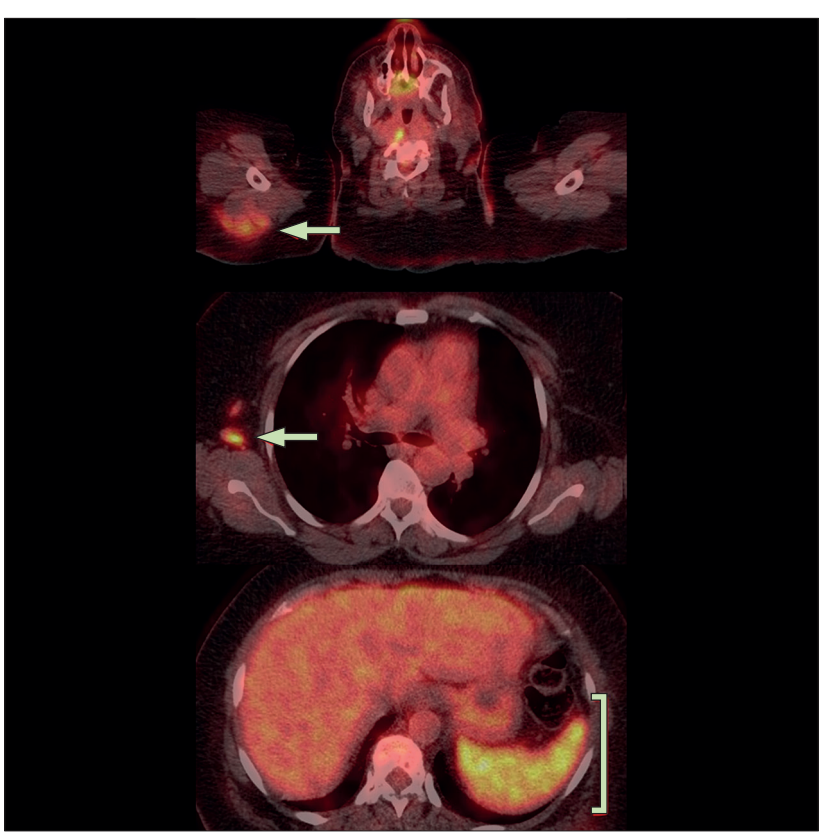

Figure: **^{18}F-fluorodeoxyglucose PET/CT findings in a systemic inflammatory response syndrome after COVID-19 vaccine**

^{18}F-fluorodeoxyglucose PET/CT shows uptake in the fat stranding posterior to the right deltoid (arrow; upper image) with moderately increased uptake within multiple right axillary lymph nodes (arrow; centre image), and diffusely increased splenic uptake (bracket; lower image).