Anti-programmed-death-receptor-1 (PD-1) antibody (Pembrolizumab) induced pancreatitis diagnosed on 18F-FDG PET/CT

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Abstract

Immunotherapy related adverse events are commonly seen with immune check point inhibitors therapy. We report the case of a 40-year-old female diagnosed with stage IVB endometroid grade III endometrial cancer, on pembrolizumab immunotherapy, an anti-programmed-death-receptor-1 (PD-1) antibody. Patient was referred for 18F-FDG PET/CT for restaging. 18F-FDG PET/CT demonstrated diffuse increased FDG uptake throughout the body of the pancreas associated with fat stranding in the peripancreatic region, suggestive of pembrolizumab-induced pancreatitis. The diagnosis was confirmed by elevated amylase and lipase levels. immune-related adverse events (irAE) are frequently identified on 18F-FDG PET-CT, which may lead to early diagnosis, close clinical follow-up, and appropriate clinical management of immune-related adverse events.

Keywords: 18F-FDG PET/CT; pembrolizumab; pancreatitis; anti-programmed-death-receptor-1 (PD-1) antibody.
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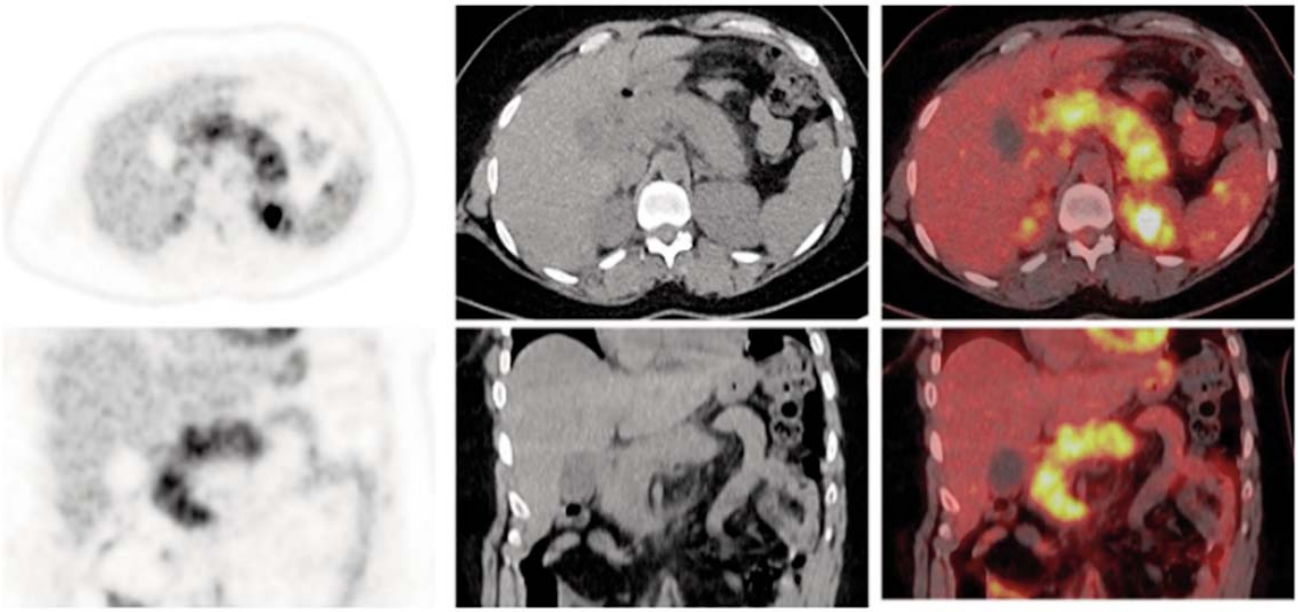

Figure: ^{18}F-FDG PET/CT axial and coronal images demonstrate diffuse increased FDG uptake throughout the body of the pancreas associated with fat stranding in the peripancreatic region. Findings are suggestive of pembrolizumab-induced pancreatitis. The diagnosis was confirmed by elevated amylase and lipase levels.

A 40-year-old female known case of metastatic endometrial cancer was on pembrolizumab immunotherapy, an anti-programmed-death-receptor-1 (PD-1) antibody treatment. ^{18}F-FDG PET/CT was done for restaging and it showed diffuse increased FDG uptake throughout the body of the pancreas associated with fat stranding in the peripancreatic region (Figure 1). Findings were likely to be related to pembrolizumab-induced pancreatitis. The diagnosis was confirmed by elevated amylase and lipase levels (221 U/L and 875.9 U/L respectively). Follow-up ^{18}F-FDG PET/CT showed complete resolution of the uptake in the pancreas with normalisation of pancreatic enzymes.

Immunotherapy with checkpoint inhibitors has prompted a major change in cancer treatment by improving the long-term benefit and survival. Immunotherapy relies on activation of the patient's own immune system to recognize and kill

cancer cells and is generally facilitated via modulation of the programmed cell death protein 1 (PD1) or PD1/programmed cell death protein ligand 1 (PD1/PDL1) axis or cytotoxic T-lymphocyte-associated protein 4 (CTLA-4) pathway.[1] The activated immune response may lead to the development of multiple immune-related adverse events (IrAEs) affecting almost any organ system, from mild symptoms to severe life-threatening conditions. The overall incidence of irAEs with either CTLA-4 or PD1/PDL1 inhibitors is approximately 15-30%.[2]

18F-FDG PET is enormously used in diagnostic staging, restaging, evaluating disease extent, monitoring treatment response and disease prognostication.[3] ^{18}F-FDG PET-CT is a sensitive non-invasive method to assess temporal changes in disease burden in patients receiving immunotherapy agents.[4] Pembrolizumab causes immune-related adverse events and are commonly seen on ^{18}F-FDG PET-CT such as, thyroiditis, pneumonitis, gastritis, hepatitis, and enterocolitis.[5] Immune-related pancreatitis is quite rare with an incidence of <1%.[6] It is generally associated with a rise in serum amylase but may be clinically asymptomatic. CT and MRI may demonstrate classic features of pancreatitis and ^{18}F-FDG PET/CT may show intense FDG uptake, and the intensity of uptake is correlated with the severity. Immunotherapy related adverse events are serious and life-threatening, which require timely patient management and adequate therapeutic decisions. Early diagnosis of immune-related adverse event irAEs and subsequent appropriate therapeutic intervention with corticosteroid therapy may help prevent long-term toxicities. It is therefore important for imagers to recognise the ^{18}F-FDG PET/CT findings to guide appropriate clinical management in patients undergoing immune checkpoint-targetted therapies.

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