Large Vessel Vasculitis in a Patient Receiving G-CSF: A Possible Differential for Fever of Unknown Origin

Abstract

Large vessel vasculitis is a known but rare side effect of granulocyte colony-stimulating factor (G-CSF) therapy. We report a case of adenocarcinoma lung with pleural infiltration and mediastinal lymphadenopathy, who was treated with neoadjuvant chemotherapy and pegylated G-CSF. After three cycles, he developed a fever. He underwent F-18 fludeoxyglucose (FDG) positron emission tomography computed tomography for fever of unkwnown origin evaluation, which revealed a response to chemotherapy along with the appearance of FDG avid mural thickening in a few large arteries, suggesting a diagnosis of G-CSF-induced large vessel vasculitis.

Keywords: *Drug-related side effects and adverse reactions, fluorodeoxyglucose F18, granulocyte colony-stimulating factor, vasculitis*

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After three cycles, he developed a low-grade fever and malaise. After ruling out infectious causes of fever, he underwent ^{18}F-FDG PET/CT [Figure 1] for restaging and potential diagnostic clues for fever. PET/CT showed a decrease in the size and FDG avidity of the lung lesion, implying a favorable response to therapy. Maximum intensity projection image (e) showed foci of tracer activity at new places in the thorax (arrow). Transaxial CECT and fused transaxial PET/CECT images revealed the appearance of FDG avid mural thickening along the right common carotid (SUVmax 7.3, ~6 mm thickness, images (f and g), origin of left subclavian artery and arch of aorta (images h, SUVmax 4.8), abdominal aorta at the origin of right renal artery (SUVmax 4.3), and left common iliac artery. A possible diagnosis of G-CSF-induced large vessel vasculitis was proposed as the cause of fever. His G-CSF was stopped and intravenous dexamethasone was given, which relieved his symptoms. Meanwhile, he underwent surgical resection of the lung lesion. A follow-up FDG PET/CT (Maximum intensity projection (MIP)-I and trans axial images (j-l) after 4 months showed resolution of the FDG avid thickening along the vessels, confirming the diagnosis of G-CSF-induced large vessel vasculitis.

G-CSF is often used to prophylactically in patients receiving chemotherapy to prevent neutropenia. While G-CSF can be effective in doing so, it has also been linked to the development of vasculitis, more commonly involving the large blood vessels. The exact mechanism by which G-CSF causes vasculitis is not completely understood. It has been proposed that it may occur due to inflammation caused by the release of cytokines like interleukin-6 and tumor necrosis factor-alpha.[1] G-CSF causes neutrophil precursors to mature and increases chemotaxis, which could also be involved in the pathogenesis.[2] In rare cases, the end result of the inflammation could be aneurysm formation and life-threatening aortic dissection.[3] A few case studies also documented the development of vasculitis after administration of G-CSF.[4-10] Thus, in a patient presenting with a fever of unknown origin who has previously been treated with G-CSF, the possibility of large vessel vasculitis should be considered after ruling out the other causes.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient(s) has/have given his/her/their consent for his/her/their images and other

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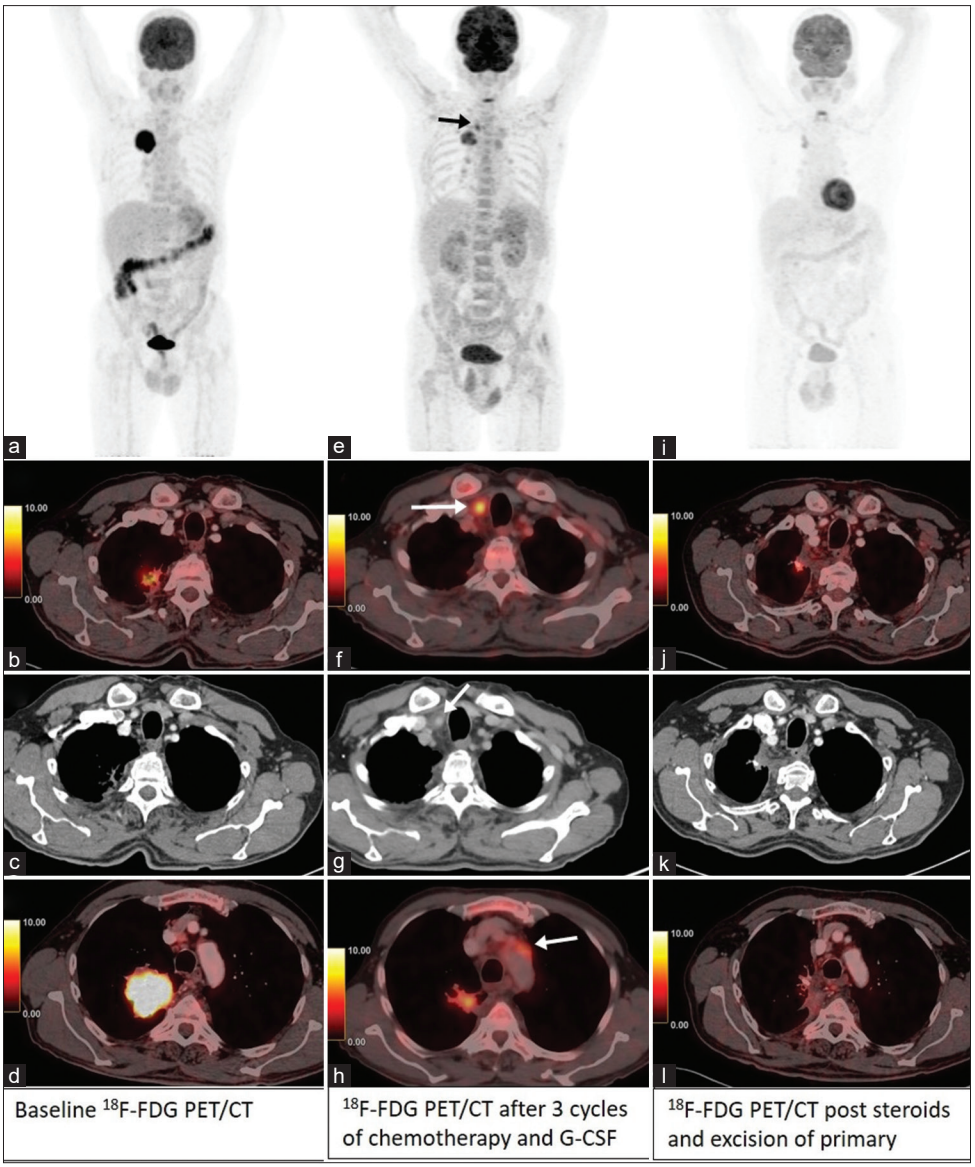

Figure 1: A 65-year-old male chronic smoker presented with complaints of cough, hemoptysis, loss of appetite, and weight for a year. Contrast-enhanced computed tomography (CECT) of the chest showed a soft-tissue mass in the right upper lobe of the lung, which was diagnosed with adenocarcinoma of the lung. Staging F-18 fludeoxyglucose positron emission tomography computed tomography (^{18}F-FDG PET/CT) (maximum intensity projection image-(a), transaxial CECT and fused PET/CT images (b-d) showed an FDG avid heterogeneously enhancing soft-tissue mass in the right lung with pleural infiltration with mediastinal lymphadenopathy. He was started on neoadjuvant chemotherapy with pemetrexed and carboplatin. 6 mg of pegylated granulocyte colony-stimulating factor (G-CSF) was given subcutaneously on day two of every cycle, After completion of three cycles of chemotherpay he developed fever and underwent FDG PET/CT. MIP image (e) showed foci of tracer activity at new places in the thorax (arrow). Transaxial CECT and fused transaxial PET/CECT images revealed the appearance of FDG avid mural thickening along the right common carotid (SUVmax 7.3, ~6 mm thickness, images (f and g), origin of left subclavian artery and arch of aorta (images h, SUVmax 4.8), abdominal aorta at the origin of right renal artery (SUVmax 4.3), and left common iliac artery. A possible diagnosis of G-CSF-induced large vessel vasculitis was proposed as the cause of fever. His G-CSF was stopped and intravenous dexamethasone was given, which relieved his symptoms. Meanwhile, he underwent surgical resection of the lung lesion. A follow-up FDG PET/CT (MIP-l) and trans axial images (j-l) after 4 months showed resolution of the FDG avid thickening along the vessels, confirming the diagnosis of G-CSF-induced large vessel vasculitis

clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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