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TITLE: FDG PET/CT imaging of Hodgkin lymphoma in a child with common variable immunodeficiency

RUNNING TITLE: PET/CT in lymphoma with immunudeficiency

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Abstract

Common variable immunodeficiency (CVID) is characterized by low levels of serum immunoglobulins and antibodies, recurrent infections and predisposition to malignancy. Here we present 18F-fluorodeoxyglucose positron emission tomography/computed tomography findings of a 7-year-old boy with CVID and Hodgkin lymphoma.

Key words: Immunodeficiency, PET/CT, lymphoma

Introduction

Common variable immunodeficiency (CVID) is one of the most common primary immune deficiencies that affect approximately one in 10,000–50,000 people. Recurrent infections and granulomatous diseases are main features of this disorder. Risk of malignancy, especially gastric carcinoma and lymphoma, also increases in patients with CVID *(1)*. Herein, we reported 18F-fluorodeoxyglucose (18F-FDG) positron emission tomography/computed tomography (PET/CT) findings of a 7-year-old boy with CVID and Hodgkin lymphoma.

Case Report

Hodgkin lymphoma (HL) was detected in a 7 year old-boy with CVID. Patient was suffering from recurrent lower respiratory tract infections, growth retardation, chronic diarrhea and hypogammaglobulinemia since 4 years-old. PET/CT for staging of HL demonstrated 18F-FDG-avid supra-diaphragmatic lymphadenopathies (Fig. 1). Abdominal lymphadenopathies seen on CT images of PET/CT didn’t show distinctive 18F-FDG uptake (Fig. 2). Widespread bronchiectasis, accompanying infiltrations and peribronchovascular

thickening with intense 18F-FDG uptakes were demonstrated in the bilateral lung fields predominantly in left lung (Fig. 1). Dilatation in ductus choledochus and 18F-FDG accumulation in biliary tract considering cholangitis were also seen in PET/CT (Fig. 3). Magnetic resonance cholangiopancreatography revealed intra and extrahepatic duct dilatation and lymph nodes in the hepatic hilus. High alanine aminotransferase and aspartate aminotransferase levels were noted in this patient. It was thought that an obstructive suppurative cholangitis was resulted from biliary obstruction provoked by enlarged lymph nodes. The patient recieved 6 cycles of chemotherapy with the ABVD (doxorubicin, bleomycin, vinblastine and dacarbazine) schedule (bleomycine ruled out of protocol) and 3000 cGy total mediastinal radiotherapy with diagnosis of Stage III HL. Unfortunately he died of sepsis 15 months after initial diagnosis. Informed consent was obtained from the patient's parents.

Discussion

In our case, foci of infections in the lung and biliary tract were detected in 18F-FDG PET/CT scan. Recognising coincidental infections is very important in patients under immunosuppression with malignancy due to increased risk of sepsis secondary to toxic effect of chemotheraphy. So; 18F-FDG PET/CT may be valuable for monitoring the patients with CVID. However, there is hypersensitivity to X-ray radiation in patients with CVID and increased radiosensitivity is one of the risk factor for malignancy. It has been shown that the lymphocytes derived from patients with CVID are significantly more radiosensitive than healthy individuals. The chromosomal aberrations (chromatid breaks and gaps) increase after x-ray exposure in the CVID patients *(2).* Significant radiation exposure occurs from PET/CT, even with child-adapted low-dose regimen. In a study, the

average radiation dose from 18F-FDG PET/CT was estimated to be 12.2 mSv; 5.89 mSv from 18F-FDG PET and 6.26 mSv from CT *(3).* 18F-FDG positron emission tomography/magnetic resonance imaging (PET/MR) provides lower radiation exposure and the sensitivity and specificity of 18F-FDG PET/MR has been shown to be similar to that of 18F-FDG PET/CT for staging of lymphoma patients *(4).*

Conclusion

18F-FDG PET/CT may also be useful in monitoring of malignancies and detecting the focus of the infections in pediatric patients. However, due to risk of hypersensitivity to X-ray radiation, PET/MR may be a choice in the staging of lymphomas in patients with primary immune deficiencies.

Authors declared no conflict-of-interest.

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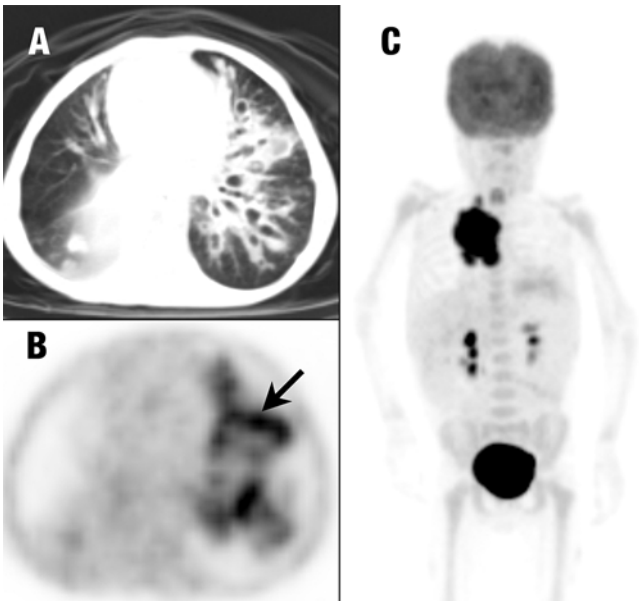

Fig. 1 PET/CT demonstrated widespread bronchiectasis, accompanying infiltrations and peribronchovascular thickening in the left lung (A, B) and 18F-FDG-avid supradiaphragmatic lymph nodes (C) (arrows).

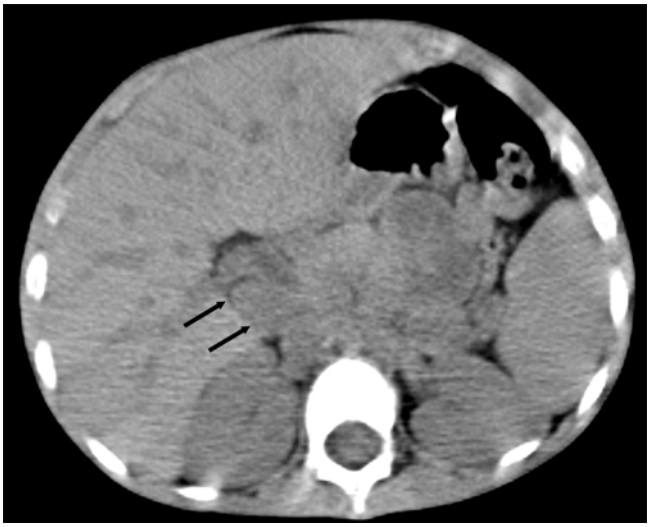

Fig. 2 There were no 18F-FDG uptakes in abdominal lymphadenopathies seen on CT images of PET/CT (arrows).

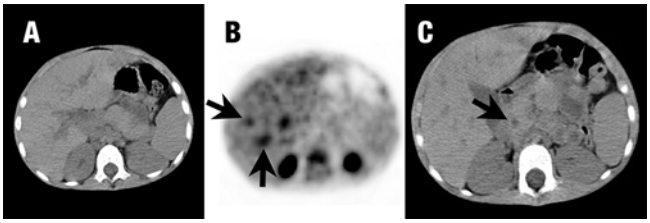

Fig. 3 18F-FDG PET/CT (A,B, C) demonstrated 18F-FDG accumulation in biliary tract (A, B) and dilatation in ductus choledochus (C) (arrows).