Incidental detection of rare mesenteric inflammatory pseudotumor by $^{18}$F-FDG PET

Abstract

A 60 years old asymptomatic male underwent fluorine-18 fluorodeoxyglucose positron emission tomography ($^{18}$F-FDG PET) for his medical check-up, and abnormal $^{18}$F-FDG uptake was observed in the retroperitoneum. The maximum standardized uptake value (SUV$_{max}$) was 5.2. Based on CT, MRI and $^{18}$F-FDG PET findings, the differential diagnosis included specific or non-specific inflammatory change, malignant lymphoma, trauma, gastrointestinal stromal tumor and soft-tissue sarcoma. Tumor resection was performed, and the histopathological finding was an inflammatory pseudotumor (IPT) originating at the mesentery in the retroperitoneum. After two years and eight months from his initial operation, recurrent IPT was detected by $^{18}$F-FDG PET for follow up, although he was asymptomatic. The IPT could be of traumatic origin since the patient suffered a severe abdominal trauma 6 months before. A mesenteric IPT is very rare, and to our knowledge, this is the first case report of $^{18}$F-FDG PET detecting a mesenteric IPT. In conclusion, when abnormal high $^{18}$F-FDG uptake is observed in the mesentery incidentally in clinical routine examination, IPT should be included as one of the differential diagnoses. $^{18}$F-FDG may be useful in detecting local recurrence and follow-up after operation.

Introduction

An inflammatory pseudotumor (IPT) is a rare benign lesion characterized by the nonneoplastic proliferation of inflammatory cells, predominantly plasma cells, and the presence of intermingling collagen fibers. This pseudotumor commonly occurs in the lungs and orbita, while a mesenteric IPT is very rare [1, 2]. Clinical symptoms are diverse according to the location of the lesion, such as tumor, fever, weight loss, and pain [1]. Patients commonly have symptoms and laboratory findings suggestive of inflammation; however, a definitive diagnosis is often difficult to make in the absence of clinical findings [3]. Recently, fluorine-18 fluorodeoxyglucose ($^{18}$F-FDG) has been reported to accumulate in IPT in the lung, spleen, liver, pancreas, colon, orbita, mediastinum, and central nervous system [4-10]. However, to our best of knowledge, $^{18}$F-FDG has not been reported to accumulate in mesenteric IPT. We describe a rare case of asymptomatic mesenteric IPT incidentally identified by $^{18}$F-FDG-PET.

Case report

A 60 years old asymptomatic male was receiving medical treatment for primary hypertension in the outpatient clinic of our institution. He underwent $^{18}$F-FDG-PET for a medical check-up to screen for cancer. A dedicated full-ring PET scanner (Allegro: Philips Medical Systems, Inc., Cleveland, Ohio) consisting of a dedicated germanium oxyorthosilicate was used for data acquisition. Before $^{18}$F-FDG injection, the patient had fasted for 4h to maintain serum glucose concentration below 120mg/dL. Intake of sugar-free liquids was permitted. Prior to the examination, the patient drank 500mL of tap water to accelerate renal $^{18}$F-FDG elimination. His blood glucose levels were 88mg/dL. He was administered 252MBq (4.44MBq /kg) of $^{18}$F-FDG via an antecubital vein. Whole-body PET imaging was performed at approximately 60min after $^{18}$F-FDG injection. Transmission and emission images of the areas from the level of the auditory meatus to the mid-thigh were acquired (transmission images: 23sec, 10 bed positions; emission images: 2min and 30sec, 10 bed positions) with the patient in the supine position. Transmission scans were carried out to provide attenuation correction with a $^{137}$Cs point source. After both transmission and emission images were obtained, the images were reconstructed using 3D-

Yasumitsu Hirose1 MD, Hayato Kaida1 MD, Seiji Kurata2 MD, Yoshinobu Okabe1 MD, Masayoshi Kage1 MD, Yasumitsu Hirose1 MD

1. Division of Nuclear Medicine, PET Center and Department of Radiology, 2. Division of Gastroenterology and Department of Internal Medicine, and 3. Department of Pathology, Kurume University Hospital, Kurume City, Fukuoka, 830-0011, Japan

***

Keywords: Inflammatory pseudotumor, $^{18}$F-FDG PET - CT - MRI

Correspondence address:
Hayato Kaida MD Division of Nuclear Medicine, PET Center and Department of Radiology, Kurume University School of Medicine, 67Asahi-Machi, Kurume, Fukuoka, 830-0011, Japan. Tel: +81-(942)-31-7649 Fax: +81-(942)-32-7925 E-mail: hayato@med.kurume-u.ac.jp

Received: 26 June 2012 Accepted revised: 25 July 2012

Hellenic Journal of Nuclear Medicine - September - December 2012 247
RAMLA (3D-Row Action Maximum Likelihood Algorithm, Philips, Eindhoven, The Netherlands). The total examination time for whole-body PET images was approximately 30 min. The $^{18}$F-FDG PET scan showed abnormal uptake at the retroperitoneum in the abdomen. The maximum standardized uptake value (SUV max) was 5.2, and there was no abnormal $^{18}$F-FDG uptake in other regions (Fig. 1). Abdominal contrast enhancement computed tomography (CT) showed tumor with peripheral contrast enhancement and high attenuation area of mesenteric adipose tissue (Fig. 2). Abdominal MRI showed the slightly high intensity tumor on T1-weighted image (T1WI), T2WI, and high intensity on short T1 inversion recovery (STIR). The diffusion-weighted MRI image showed decreased apparent deficient coefficient (ADC) value (Fig. 3). Laboratory findings revealed that interleukin 2 receptor (IL2R) was slightly increased, while other laboratory findings such as liver, kidney, and pancreas function were normal, and the resultant data of C-reactive protein (CRP), red blood cells, white blood cells, hemoglobin, electrolytes, and carcinoembryonal antigen (CEA) were within normal range. Non-specific inflammatory change was considered, because there was a high attenuation area of mesentery adipose tissue around the tumor on CT, and also malignant lymphoma, gastrointestinal stromal tumor (GIST), and soft-tissue sarcoma based on the radiological imagings and laboratory data. A tumor resection was performed, and the intra-operative finding revealed that the oval mesentery was thickened and the tumor lesion was located inside the mesentery. The pathological tumor size was 2.0×1.0cm, and the macroscopic finding of this tumor was solid and hard. Hematoxylin and eosin staining (HE staining) showed that the tumor was diffusely infiltrated by fusiform fibroblasts, macrophages, and lymphocytes (Fig. 4). The histopathological diagnosis was mesenteric IPT, with no malignant cells.

After the operation, the patient was followed up in the outpatient clinic at our institution. He underwent $^{18}$F-FDG PET after two years and eight months from his initial operation, and abnormal $^{18}$F-FDG uptake was detected in retroperitoneum (SUV max 5.4) (Fig. 5). Abdominal contrast-en-

---

**Figure 1.** $^{18}$F-FDG-PET before tumor resection: (A) Whole-body image: (B) Axial image. $^{18}$F-FDG-PET showed abnormal uptake in the abdomen. The SUV$_{max}$ was 5.2 (arrow). Other round shaped uptake lesions in the thorax and the abdomen observed on the whole-body image were considered as physiological $^{18}$F-FDG uptakes of the liver, kidney, stomach and esophagus because there were no related abnormal findings on CT and endoscopy.

**Figure 2.** Abdominal CT before tumor resection. (A) Non-contrast CT showed the tumor lesion, 2cm in diameter, between the abdominal aorta and inferior vena cava. (B) Contrast-enhanced CT revealed the tumor with peripheral contrast enhancement (arrow).

**Figure 3.** Abdominal MRI before tumor resection. MRI showed the tumor lesion with slightly high intensity on T1WI (A) and T2WI (B), and high intensity on short STIR (C). Diffusion-weighted MRI imaging identified a decline in diffusion capacity (arrow) (D).

**Figure 4.** The histopathological findings after tumor resection. Hematoxylin and eosin staining (HE staining) revealed that the tumor was diffusely infiltrated by fusiform fibroblasts, macrophages, and lymphocytes. The histopathological diagnosis was mesenteric IPT, and it showed no malignant cells. Immunohistochemical staining showed no expressions of anaplastic lymphoma kinase (ALK), CD20, c-kit, IgG4, or Epstein-Barr virus (EBV).
hanced CT showed a tumor lesion in the mesentery, which was consistent with abnormal $^{18}$F-FDG uptake. Recurrent IPT was diagnosed from CT and $^{18}$F-FDG PET findings. This patient was asymptomatic and had no treatment for the recurrent IPT and continued to be followed-up in the outpatient clinic. Follow-up CT was performed two years later, and the tumor lesion had disappeared completely.

**Discussion**

An IPT is a benign rare tumor, and the clinical and imaging findings for an IPT are similar to those of a malignant tumor. The IPT are characterized by fibrous tissue infiltrated by inflammatory cells [11]. EBstein virus infection (EBV) and IgG4 expression were negative [1, 6, 12]. This patient had no history of bacterial infection such as tuberculosis, and there were no histopathological findings of tuberculosis after operation. However, he had past history of thoracic and abdominal traumas due to fall from tree approximately six months prior to the IPT resection: (A) Whole-body image; (B) Axial image. $^{18}$F-FDG-PET showed abnormal uptake in the abdomen. The SUV$_{max}$ was 5.4 (arrow). Other round shape uptake areas seen on the whole-body image were considered physiological uptakes of the liver and kidney because there were no related abnormal findings on the CT image.

**Bibliography**

