Peliosis Hepatis Shows Isometabolism on ^{18}F -FDG PET/CT: Two Case Reports

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Abstract Peliosis hepatis (PH) is a rare benign disease that is characterized by multiple blood-filled cystic spaces in the hepatic parenchyma. It is also characterized by a range of radiologic findings that might mimic various diseases, including metastatic liver disease and hepatocellular carcinoma. The findings of PH on ^{18}F -fluorodeoxyglucose (FDG) positron emission tomography (PET)/computed tomography (CT) are not well reported. We here report two cases of biopsy-proven PH. Both patients had been treated for cancer (advanced gastric carcinoma and rectal adenocarcinoma), and follow-up CT of both cases revealed hepatic lesions with the possibility of metastasis. Examination of ^{18}F -FDG PET/CT images suggested that the lesions were isometabolic, having metabolism similar to that of adjacent hepatic parenchyma. The outcomes of hepatic core-needle biopsies were consistent with peliosis hepatis.

Keywords Peliosis hepatis · ^{18}F -FDG · PET · Biopsy

Introduction

Peliosis hepatis (PH) is a rare benign disease of the liver. It is histologically characterized by blood-filled cystic spaces that are continuous with hepatic sinusoids [1, 2]. Although the pathogenesis of PH is not well known, it is frequently associated with tuberculosis, malignancy (such as hepatocellular

carcinoma), acquired immunodeficiency syndrome (AIDS), and drugs (including steroids and oral contraceptives) [3–12]. Given its benign nature, asymptomatic PH does not require treatment. Timely recognition can reduce morbidity by obviating unneeded biopsy or surgery.

PH shows variable imaging findings and might mimic various hepatic diseases, including malignancy, as for hepatocellular carcinoma or metastatic liver disease [13–15]. Notwithstanding the many articles and reports on imaging findings of PH on computed tomography (CT), ultrasonography (US), and magnetic resonance imaging (MRI), the findings on ^{18}F -fluorodeoxyglucose (FDG) positron emission tomography (PET)/CT are not well known [16]. We report two cases of biopsy-proven PH, which enhanced-CT scans had initially suggested were liver metastases.

Case Reports

Case 1

A 48-year-old woman was diagnosed with rectal cancer, and underwent neoadjuvant chemoradiation and surgical resection. The pathology specimens obtained during surgery revealed a 1.8-cm residual moderately differentiated adenocarcinoma confined to the mucosa with clear resection margins and no lymph node metastasis. The patient underwent adjuvant chemotherapy after surgery. Upon completion of adjuvant chemotherapy, enhanced abdominal CT revealed a low density lesion, which had been noted on a previous CT, and a slight increase in size (from 0.9 to 1.2 cm) over the 4-month interval. ^{18}F -FDG PET/CT was performed to evaluate the possibility of metastasis. The hepatic lesion noted on enhanced CT was hardly identifiable on ^{18}F -FDG PET/CT and showed metabolism similar to that of the adjacent hepatic parenchyma (Fig. 1). Core needle biopsy conducted 2 weeks

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Fig. 1 PET/CT and enhanced CT images of a 48-year-old patient who had been treated for rectal cancer. **a** Enhanced CT, which was performed upon completion of adjuvant chemotherapy, revealed a low density lesion

that increased in size over a 4-month interval. **b, c** Fusion and PET-only images of ^{18}F -FDG PET/CT showing no increase in metabolism that was discernible from the adjacent hepatic parenchyma

later confirmed that the lesion was consistent with PH (Fig. 3a, b).

Case 2

A 34-year-old man underwent distal gastrectomy with gastroduodenostomy, followed by adjuvant chemotherapy due to advanced gastric carcinoma (the surgical specimen revealed a 5.4-cm sized, Borrmann type 3, poorly differentiated, tubular adenocarcinoma with signet ring cells). Follow-up CT at 6 months after surgery showed a new patchy ill-defined low attenuating lesion of 2.6 cm in the liver. Analysis by ^{18}F -FDG PET/CT, which was performed as a part of a metastatic work-up, indicated that the lesion was isometabolic to the adjacent hepatic parenchyma (Fig. 2). A subsequent core needle biopsy confirmed that the lesion was consistent with PH (Fig. 3c, d).

Discussion

The two cases of PH we describe here showed isometabolic activity on ^{18}F -FDG PET/CT. The only report of ^{18}F -FDG

PET/CT findings of PH is a Korean case report that mainly described the radiologic (US, CT, MRI) findings of PH and also included a PET image in which PH was also isometabolic [16].

PH is a rare vascular condition of the liver, characterized by cystic blood-filled cavities distributed randomly throughout the liver parenchyma. Considering this histologic finding of PH, it is not surprising that the hepatic lesions in our two cases did not show significantly increased metabolic activity. If PH was just a blood-filled cyst without any inflammatory focus or malignant transformation, it might be anticipated that ^{18}F -FDG PET/CT would reveal PH lesions to be isometabolic with their adjacent tissues.

However, cholestasis, hepatic failure, or hemorrhagic necrosis might also be present [17–19]. Bacillary peliosis can contain clumps of microorganisms (*Bartonella henselae* or *B. quintana*) that may present with lymphadenopathy [20]. In such cases, it is possible that PH might show increased ^{18}F -FDG uptake.

Although our two cases involved focal lesions, PH frequently involves the entire liver. Both cases were found at relatively early stages of PH, given that the two patients

Fig. 2 PET/CT and enhanced CT images of a 34-year-old patient who had been treated for advanced gastric cancer. **a** Enhanced CT, which was performed upon 6 months after surgery, showing a new 2.6-cm patchy ill-

defined low attenuating lesion in the liver. **b, c** Fusion and PET-only images of ^{18}F -FDG PET/CT showing no increase in metabolism that was discernible from the adjacent hepatic parenchyma

Fig. 3 Histologic findings of hepatic core needle biopsies. Microscopic examination of a hepatic core needle biopsy in the rectal cancer patient showing multifocal sinusoidal dilatations (**a**, hematoxylin and eosin stain,

×200) and patchy disruptions of reticulin fibers (**b**, reticulin stain, ×200). The examination of the gastric cancer patient shows similar findings (**c**, **d**)

underwent regular follow-ups for surveillance of rectal or gastric cancer. Although PH showed isometabolism in our current cases, further studies and observations are needed to characterize PH that involves the entire liver on ^{18}F -FDG PET/CT.

There is a possibility of sampling error in the core needle liver biopsies in our two present cases. However, during the 2-year follow-up of both patients after these biopsies, the hepatic lesions regressed in both cases, and the patients remained clinically free from recurrence or metastasis at the time of writing. The hepatic lesions in these individuals were therefore truly benign.

The cause of the PH in our two patients was not clear. Their chemotherapy regimens [11, 12] and medications [10] did not contain any drug known to be associated with PH. There was no known predisposing factor, such as a chronic debilitating disease (for example, tuberculosis, hematologic malignancy, or AIDS), or long-term use of anabolic steroids or oral contraceptives, in either patient. Previous reports have also described PH patients with no predisposing condition [13, 18]. In fact, no associated condition can be identified in 20–50 % of patients with PH [18, 19].

The various enhancement patterns on CT and MRI that are associated with PH depend on histopathologic findings [13, 19]. If not enhanced, PH can mimic hypovascular liver metastasis and a well-enhanced lesion can also mimic hepatocellular carcinoma or hypervascular metastases [13]. If PH is detected during work-up or follow-up for cancer, it will almost always not involve the entire liver and be a focal lesion. We conclude from our two cases that the possibility of PH should be considered if a new hepatic lesion shows isometabolism on ^{18}F -FDG PET/CT. If this finding is confirmed in future studies, negative ^{18}F -FDG PET/CT findings might help to avoid unnecessary biopsies in carefully selected patients and reduce potential complications such as bleeding.

Conflict of Interest Minjung Seo, Suk Hyun Lee, Sangwon Han, Changhwan Sung, Da Hye Son, Jong Jin Lee declare no conflicts of interest.

Informed Consent Our institutional review board has exempted this case report from review. This study has been performed in accordance with the Helsinki Declaration.

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