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A case of small cell carcinoma of the esophagus detected incidentally by FDG-PET

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Small cell carcinoma (SmC) of the esophagus is rare, and is sometimes impossible to detect by macroscopic inspection using an endoscope or histological examination of biopsied specimens. A 73-year-old man received F-18 fluorodeoxyglucose positron emission tomography (FDG-PET) to evaluate the response to radiofrequency thermal ablation therapy for lung cancer. FDG-PET showed abnormal accumulation in the posterior mediastinum. Endoscopy disclosed ulcerous lesions with marginal elevation in the middle segment of the esophagus, but the biopsy specimen taken concurrently was not malignant histologically. FDG-PET, performed two months later, revealed abnormal accumulation in the suspect area, and the extent of accumulation was wider than previously. Histological examination of the specimen biopsied during the endoscopy led to a diagnosis of SmC. FDG-PET thus proved useful in the early detection of SmC.

Key words: FDG, PET, small cell carcinoma, esophagus

INTRODUCTION

ALTHOUGH MOST ESOPHAGEAL CANCERS are squamous cell carcinoma (SqC),[1] tumors showing histological features resembling small-cell lung carcinoma are occasionally seen in the esophagus and have been reported as esophageal small cell carcinoma (SmC).[2] As SmC is most frequently diagnosed when the patient complains of subjective symptoms such as dysphagia,[3] it is often at an advanced stage at the time of detection, with distant metastasis seen in most of these cases.[4,5] Moreover, SmC often shows an elevation covered with normal epithelium and is sometimes impossible to detect by macroscopic inspection using an endoscope or histological examination of biopsied specimens.[6] We report a case of SmC detected incidentally by F-18 fluorodeoxyglucose positron emission tomography (FDG-PET) performed during follow-up to radiofrequency thermal ablation therapy (RF) for lung cancer.

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CASE REPORT

A 73-year-old man underwent RF for the treatment of squamous cell carcinoma of the right lung. Two months later, he received FDG-PET to evaluate the response to therapy. FDG-PET showed abnormal accumulation of FDG in the posterior mediastinum, and the standardized uptake value (SUV) was 2.5 (Fig. 1). Enhanced CT scans of the chest, performed simultaneously to evaluate responses to RF, suggested slight hypertrophy of the esophageal wall (Fig. 2A). Endoscopy disclosed ulcerous lesions with marginal elevation in the middle segment of the esophagus (Fig. 3A). The biopsy specimen taken concurrently was not malignant histologically. FDG-PET often yields false-positive findings in the gastrointestinal tract, including the esophagus. We decided to follow the patient closely without treatment to exclude the possibility of a false positive and follow the therapeutic efficacy of RF.

FDG-PET, performed two months later, revealed abnormal FDG accumulation in the suspect area. The extent of accumulation was wider than previously. The intensity of accumulation was also higher, and the SUV was 3.2 (Fig. 4). Enhanced CT scans of the chest, performed simultaneously, disclosed more marked hypertrophy of

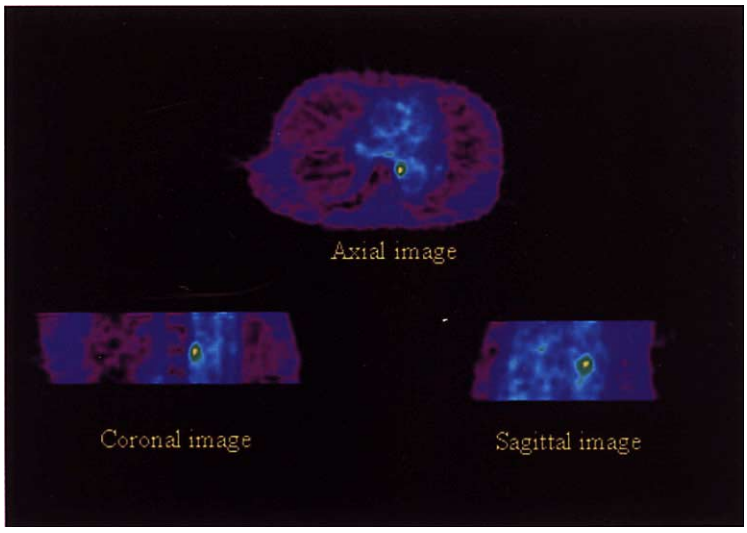

Fig. 1

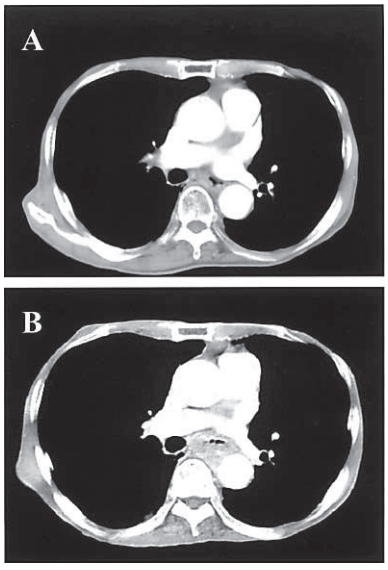

Fig. 2

Fig. 1 FDG-PET showed abnormal accumulation of FDG in the posterior mediastinum.

Fig. 2 A: Enhanced CT scans of the chest at the time of first FDG-PET, suggested slight hypertrophy of the esophageal wall. B: Enhanced CT scans of the chest, performed at the time of second FDG-PET, disclosed more marked hypertrophy of the esophageal wall than before.

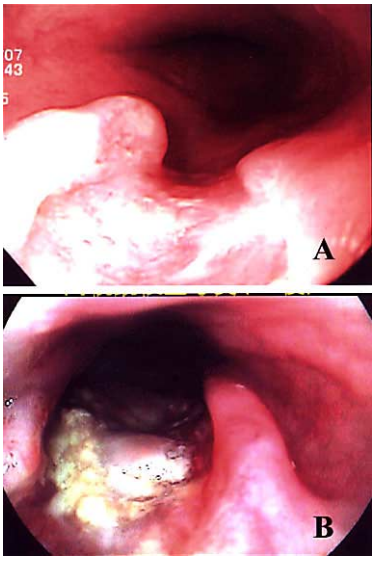

Fig. 3

Fig. 3 A: Endoscopy performed at the time of first FDG-PET, disclosed ulcerous lesions with marginal elevation in the middle segment of the esophagus. B: Endoscopy performed at the time of second FDG-PET, revealed ulcerous lesions with marginal elevation in the middle segment of the esophagus. The marginal elevation had collapsed and the ulcer floor was inhomogeneously covered with white slough.

Fig. 4 FDG-PET, performed two months later, revealed abnormal FDG accumulation in the suspect area. The extent of accumulation was wider than previously.

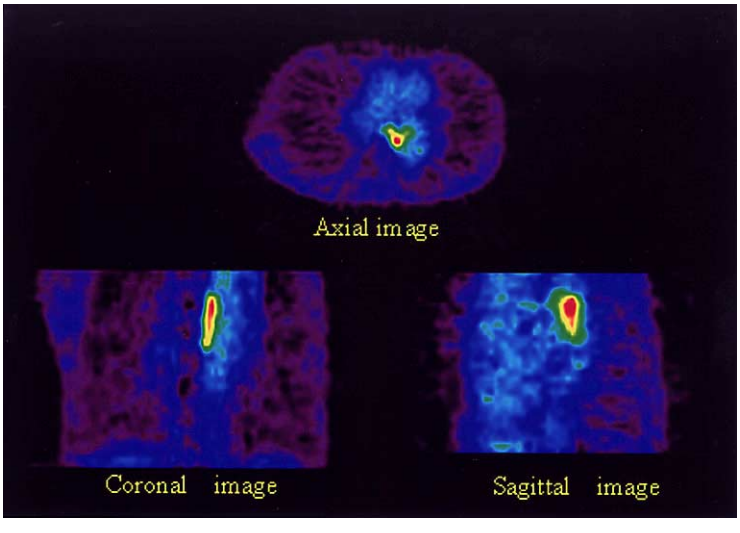

Fig. 4

the esophageal wall than before (Fig. 2B). Endoscopy revealed ulcerous lesions with marginal elevation in the middle segment of the esophagus. The marginal elevation had collapsed, and the ulcer floor was inhomogeneously covered with a white slough (Fig. 3B). Histological examination of the specimen biopsied from this area led to a diagnosis of SmC. No metastases to the lymph nodes or other adjacent organs were detected by either FGD-PET or CT.

DISCUSSION

SmC of the esophagus is rare, accounting for only 0.8–2.4% of all esophageal cancers.[1] SmC cannot be treated adequately by esophagectomy alone. Esophagectomy is therefore combined with chemotherapy and/or radiotherapy when dealing with this tumor.[7] However, extensive metastasis to the liver, adrenal gland, lymph nodes, and other organs, is often seen at the time of SmC diagnosis.[4,5] The prognosis of patients with SmC is therefore quite poor. Osugi et al.[8] reported that the cumulative survival rate after esophagectomy was significantly lower in patients with SmC than in patients with SqC. Macroscopically, SmC assumes the form of a submucosal mass. As the tumor grows, ulcers form in the center of the tumor. Biopsy is necessary to make a definitive diagnosis of this tumor, but exact biopsy of the tumor is difficult because the tumor surface is covered with normal epithelium. Mitani et al.[9] reported that the tumor was confined to the submucosal layer in all long-term survivors. In such cases, however, it is sometimes impossible to diagnose the tumor by means of endoscopy or endoscopic biopsy. For this reason, PET seems to be very useful in diagnosing SmC.

Because esophageal cancer often spreads to the lymph nodes or other adjacent organs, CT imaging has been commonly used to diagnose the presence of metastases. The advantage of FDG-PET is that it can be used to diagnose the original lesion and the presence of metastases in the lymph nodes and adjacent organs. Regarding the use of FDG-PET in the diagnosis of esophageal cancer, Yeung et al.[10] compared FDG to CT in the detection of primary lesions in 109 patients with esophageal cancer. They reported that sensitivity was 80% for PET and 68% for CT, specificity was 95% for PET and 81% for CT, and accuracy was 86% for PET and 73% for CT. On the basis of these results, they concluded that PET was more useful than CT in the detection of this tumor. Regarding the capability to accurately diagnose lymph node metastasis of esophageal cancer, Choi et al.[11] compared FDG-PET to CT in 61 cases of esophageal cancer. Their study also demonstrated that PET is more accurate than CT, with sensitivity of 57% for PET and 18% for CT, specificity of 97% for PET and 99% for CT and accuracy of 86% for PET and 78% for CT.

In our case, the first FDG-PET suggested the presence of tumor, but no sign of malignancy was revealed by endoscopic biopsy. It is known that FDG-PET often gives a false positive result for the gastrointestinal tract.[12,13] Bakheet et al.[14] reported three false-positive cases according to FDG-PET in esophageal lesions. Of these cases, one had bacterial esophagitis, another had Barrett's esophagus and the other had gastroesophageal reflux. In light of these reports, we considered the possibility that the FDG-PET finding suggesting the presence of tumor in our case was a false positive. The patient was therefore closely followed without treatment.

SmC is most frequently diagnosed by the presence of dysphagia.[6] Distant metastasis is present at the time of diagnosis in 62.5% of all SmC cases.[3] For this reason, it is essential to detect this tumor at an earlier stage when no subjective symptoms such as dysphagia are present. Because FDG-PET has low specificity but high sensitivity to detect malignant lesions, it can be expected to play an important role in the early detection of cancer. In recent years, FDG-PET has been increasingly incorporated into regular health examinations.[15] The prognosis for this tumor will be improved if early detection of SmC is facilitated by periodic examination using PET.

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