Incidental Finding of Appendiceal Adenocarcinoma in F-18 FDG PET/CT for Health Screening

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Abstract F-18 fluorodeoxyglucose (FDG) positron emission tomography/computed tomography (PET/CT) that simultaneously offers anatomic and metabolic information is widely used and has become an effective modality in many clinical fields, especially oncology, and also may detect an unexpected primary cancer. Appendiceal carcinoma is relatively uncommon and not associated with characteristic symptoms. We report the case of a 53-year-old man with appendiceal adenocarcinoma, who had only mild fever. The tumor was detected early on F-18 FDG PET/CT for health screening.

Keywords Appendiceal adenocarcinoma · F-18 FDG PET/CT · Health screening

Introduction

F-18 fluorodeoxyglucose positron emission tomography (FDG PET) assesses tumor metabolic activity. It has been found to be a useful tool in a variety of cancers [1]. F-18 FDG PET/CT also may detect an unexpected primary cancer or premalignant lesions [2]. Appendiceal cancer is a relatively rare disease, occurring at a frequency lower than that

of appendicitis [3]. In addition, appendiceal cancer is not associated with characteristic symptoms or signs, and since symptoms accompanied by occlusive complication of the appendix are similar to acute appendicitis, this is one of the factors contributing to difficulty in discriminating between these two diseases [4]. We report the case of a 53-year-old man who had only mild fever with appendiceal adenocarcinoma that was detected early on F-18 FDG PET/CT for health screening.

Case

A 53-year-old man underwent F-18 FDG PET/CT for health screening. The patient had mild fever (37.8 °C), but no specific lower abdominal tenderness and rebound tenderness, and there was no palpable abdominal mass. Blood tests showed that the complete blood cell count, liver function test and carcinoembryonic antigen were within normal limits. F-18 FDG PET/CT showed F-18 FDG accumulation with a maximum standardized uptake value (SUVmax) of 6.4 along the enlarged appendix (Fig. 1a). To evaluate the lesion characteristics, subsequent contrast-enhanced abdominal computed tomography (CT) was performed. The CT demonstrated an enlarged appendix with intraluminal polypoid enhancing lesion (Fig. 1b). The CT finding could not differentiate between appendicitis and appendiceal carcinoma. For accurate diagnosis, an appendectomy was performed. Macroscopically, the size of appendix was 5.0×3.0 cm. The entire appendix revealed proliferated mucosa in an abundantly folded fashion and the lumen was obliterated (Fig. 2a). Histologically the tumor was composed of large anaplastic epithelial cells, which tumor cells were cytologically large and pleomorphic with hyperchromatic nuclei. Glandular arrangement was poor. Tumor cell clusters

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Fig. 1 A 53-year-old man underwent F-18 FDG PET/CT for health screening. **a** F-18 FDG PET/CT showed linear FDG uptake with SUVmax 6.4 along the enlarged appendix (*red arrow*). **b** Contrast-enhanced abdominal CT scan demonstrated an enlarged appendix with intraluminal polypoid enhancing lesion (*red arrow*), which was proven to be appendiceal adenocarcinoma by histological examination

were invading the muscular layer with fibrous reaction of the stroma. These features were of the poorly differentiated adenocarcinoma arisen in the appendiceal mucosa (Fig. 2b).

Discussion

Primary appendiceal neoplasm is uncommon, being found in approximately 0.5–1.0 % of appendectomy specimens at pathologic evaluation [5]. There are several types of malignant neoplasms of the appendix: carcinoid tumor, adenocarcinoma, lymphoma, etc. With the exception of carcinoid tumors, most appendiceal neoplasms are seen in adults who are middle-aged or older [6]. A considerable percentage of appendiceal

carcinomas (approximately 30–50 %) will present acutely with obstructive appendicitis that is clinically indistinguishable from appendicitis without tumor [7]. Detection of these neoplasms at preoperative imaging is important because it may change the surgical approach and obviate additional surgery. Our patient was a 53-year-old man and had no specific symptom except for mild fever.

The contrast-enhanced CT scan is considered to be useful and significantly more sensitive than ultrasound for the diagnosis of appendicitis in adults [8]. Appendiceal wall thickening and increased enhancement with periappendiceal fat stranding are important signs of appendicitis. Most tumorous conditions of the appendix are diagnosed preoperatively as acute appendicitis [9]. Our patient also

Fig. 2 Gross feature of the opened appendix (*red arrow*). **a** The proliferated mucosa was present in abundant folded fashion, obliterating the lumen. Histological diagnosis (magnification $\times 100$). **b** Anaplastic epithelial cells with large pleomorphic nuclei were invading the muscular layer with fibrous reaction. These findings indicated the poorly differentiated adenocarcinoma originated from mucosa of the appendix

demonstrated an enlarged appendix with intraluminal polypoid enhancing lesion in the contrast-enhanced abdominal CT and could not differentiate between appendicitis and appendiceal carcinoma.

F-18 FDG PET/CT is a standard diagnostic test in the work-up of many malignancies. Since malignant cells exhibiting extremely accelerated proliferation exhibit greater glucose metabolism activity than normal cells, this can be noninvasively captured in images in the form of increased accumulation of F-18 FDG. To our knowledge, there are two cases in the literature that report patients with appendiceal carcinoma imaged with F-18 FDG PET/CT. Dang et al. [10] described the case of a 58-year-old man which showed intense abnormal FDG uptake in front of the right psoas muscle. Krauss et al. [11] described the other case of a 30-year-old woman after Caesarean section, who demonstrated focal FDG uptake in the ileocecal region. Both cases had typical symptoms, such as abdominal pain and tenderness, and were proven to be appendiceal adenocarcinoma by histological examination. Unlike the aforementioned cases, our patient only had mild fever.

Occasionally, F-18 FDG PET/CT reveals unexpected malignant or premalignant conditions that are unrelated to the disease for which the test was ordered. In larger series, up to 50 % of these incidental findings are either malignant or premalignant [2]. F-18 FDG PET is already in use for cancer screening in the United States, Japan and Taiwan [12, 13]. Our patient also detected appendiceal adenocarcinoma in F-18 FDG PET/CT for health screening.

In summary, this case demonstrates appendiceal adenocarcinoma that was detected early on F-18 FDG PET/CT for health screening. We suggest that F-18 FDG PET/CT may be instrumental in establishing a diagnosis of the appendiceal carcinoma.

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Conflicts of interest None.

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