

Uterine fibroids with positive ^{18}F -FDG PET/CT image and significantly increased CA19-9

A case report

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Abstract

Rationale: Uterine fibroids are the most common pelvic solid tumors and common to 25% of women. ^{18}F -fluorodeoxyglucose (^{18}F -FDG) is an energy metabolism tracer. Although FDG is generally concentrated in malignant lesions with high glucose metabolism, it can also accumulate in normal tissues, benign lesions, and inflammatory sites. The exact mechanism of FDG uptake by uterine fibroids is not clear. Here, we report a case of uterine fibroids with positive ^{18}F -FDG positron emission tomography/computed tomography (PET/CT) imaging and significantly increased CA19-9.

Patients concerns: The patient was a 43-year-old woman and admitted to our hospital because of “1-year-extended menstrual periods.” At admission, she had normal CA125, AFP, and CEA level and CA19-9 >1000.00 U/mL. Gynecological transvaginal ultrasound found enlarged uterus with an anterior hypoechoic area of 3.9 × 4.2 cm. CT and contrast-enhanced CT showed significantly enhanced mass shadow on the left anterior wall of uterus. ^{18}F -FDG PET/CT showed increased FDG metabolism of tumor in the anterior wall of the uterus.

Interventions: Laparoscopic hysterectomy was performed.

Diagnosis: Pathological examination demonstrated subserosal leiomyoma.

Outcomes: Her CA19-9 level dropped to 91.50 U/mL 1 day after surgery.

Lessons: Significantly elevated CA19-9 was positioned in the uterus by PET/CT imaging, which not only avoided unnecessary gastrointestinal endoscopy and reduced the suffering of patients, but also strengthened the operation confidence in gynecologists.

Abbreviations: ^{18}F -FDG = ^{18}F -fluorodeoxyglucose, PET/CT = positron emission tomography/computed tomography.

Keywords: CA19-9, ^{18}F -fluorodeoxyglucose, positron emission tomography/computed tomography, uterine fibroids

1. Introduction

Uterine fibroids are the most common pelvic solid tumors and common to 25% of women. Uterine fibroids are benign tumors derived from over growth of smooth muscles and connective tissues. During the past 35 years, the incidence of uterine fibroids is as high as 30%, but only 0.2% of uterine fibroids become sarcoma.^[1]

^{18}F -fluorodeoxyglucose (^{18}F -FDG) is an energy metabolism tracer. Although FDG is generally concentrated in malignant lesions with high glucose metabolism, it can also accumulate in normal tissues, benign lesions, and inflammatory sites. Lee et al^[2] first reported a case of benign uterine fibroids confirmed by pathology with FDG uptake. The exact mechanism of FDG uptake by uterine fibroids is not clear but may be associated with the following factors, including hormone dependence, number of viable tumor cells, microvascular density, tumor cell proliferation, expression of growth factors (fibroblast growth factor, transforming growth factor- β , granulocyte-macrophage colony-stimulating factor, Ki-67, and its receptor), glucose transporter-1, and hexokinase, as well as existence of endometrial tissues and inflammatory cells.^[3]

2. Case presentation

Previous written and informed consent were obtained from the patient, and this study was approved by the ethics review board of Soochow University. The patient was a 43-year-old woman and admitted to our hospital because of “1-year-extended menstrual periods.” At admission, she had normal CA125, AFP, and CEA levels and CA19-9 >1000.00 U/mL. Gynecological transvaginal ultrasound found enlarged uterus with an anterior hypoechoic area of 3.9 × 4.2 cm. Computed tomography (CT) and contrast-enhanced CT showed significantly enhanced mass shadow on the left anterior wall of the uterus (Fig. 1B,C). ^{18}F -FDG positron emission tomography/computed tomography

Editor: N/A.

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

All authors declare that there is no conflict of interest and financial interest.

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Medicine (2017) 96:51(e9421)

Received: 18 November 2017 / Received in final form: 30 November 2017 /

Accepted: 1 December 2017

<http://dx.doi.org/10.1097/MD.00000000000009421>

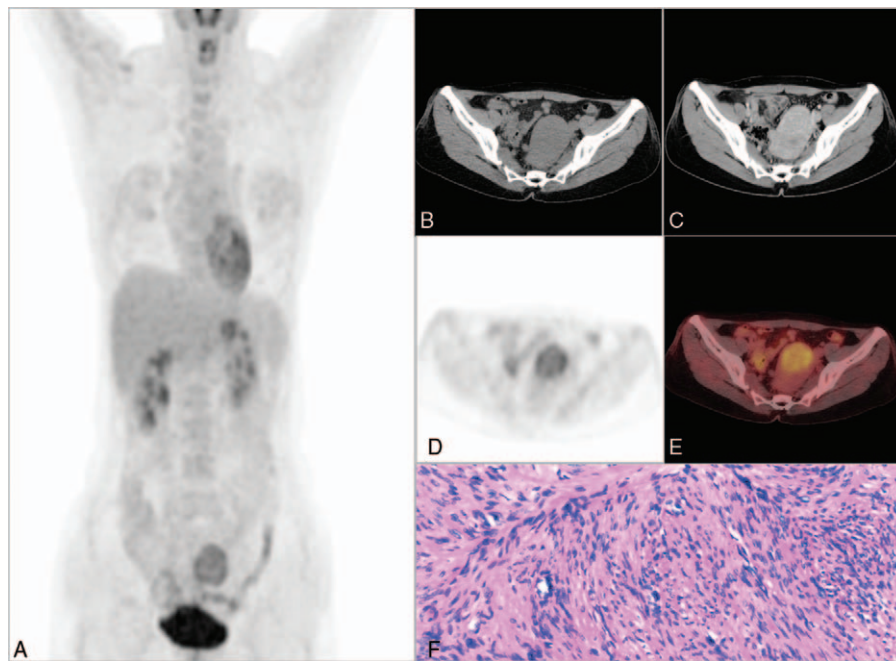


Figure 1. A, The whole-body ^{18}F -fluorodeoxyglucose (^{18}F -FDG) positron emission tomography/computed tomography (PET/CT) presented only 1 lesion of the uterus. B, C, CT and contrast-enhanced CT showed markedly enhanced mass with smooth and intact edge and maximum diameter of approximately 5 cm in the left anterior wall of the uterus. D, E, PET and fusion showed enhanced FDG metabolism only in the mass in the anterior wall of the uterus (maximum diameter of approximately 5 cm, $\text{SUV}_{\text{max}}=3.5$). F, Histology found that the tumor cells were arranged in bundles and interlaced structures [hematoxylin, eosin, saffron (HES) $\times 100$].

(PET/CT) showed increased FDG metabolism of tumor in the anterior wall of the uterus (Fig. 1A, D, E). She was treated with laparoscopic hysterectomy. Intraoperative observation showed middle uterus with size as 60 days of pregnancy, obvious bulge at the left anterior wall of the uterus, and 1 uterine fibroid with size about 4.0×4.0 cm, smooth endometrium, and normal bilateral tubes. Postoperative pathological examination confirmed that she had subserosal leiomyoma (Fig. 1F). Her CA19-9 level dropped to 91.50 U/mL 1 day after surgery.

3. Discussion

CA19-9 is a mucus-containing macromolecule carbohydrate tumor-associated antigen mainly secreted by tumor cells in gastrointestinal tracts. It has been widely used for diagnosis and effective monitoring of gastrointestinal cancer. Tsao et al^[4] found that uterine fibroids may be associated with elevated CA19-9 up to 60 U/mL. Recently, Babacan et al^[5] also found that in addition increased CA125 by 19.7%, CA19-9 level also increased by 6.6% in patients with uterine fibroids, and the elevated CA19-9 level is related to the position of fibroids. In this case, the patient had CA19-9 level >1000.00 U/mL, which is extremely rare. Therefore, clinicians should consider malignancy-induced significant increase in CA19-9.

The diagnostic value of ^{18}F -FDG PET/CT for uterine tumors has been extensively studied previously. Negative FDG imaging could exclude the possibility of malignant leiomyosarcoma of uterine,^[6] but high false positive rate makes it difficult in differential diagnosis of benign and malignant uterine tumor.^[7] Nishizawa et al^[3] found that the rate of positive FDG imaging is higher in premenopausal women with uterine fibroids than in

postmenopausal women with uterine fibroids (10.4% vs 1.2%), especially female at an age of approximately 40 years old. This phenomenon may be related to cell richness and estrogen dependence of uterine fibroids.^[8,9] Yoshida et al^[10] also believed that FDG metabolism is higher in premenopausal uterine fibroids than postmenopausal ones and slightly higher in the proliferation period of menstrual cycle than other period of the menstrual cycle. Once high metabolic FDG was found in uterine fibroids at postmenopause, possible malignancy should be considered. However, high FDG uptake cannot distinguish benign and malignant leiomyoma. Other tracers, such as 3'-deoxy-3'- ^{18}F -fluorothymidine or 16α - ^{18}F -fluoro-17 β -estradiol, may provide more useful information.^[6,11] In this case, significantly elevated CA19-9 was positioned in the uterus by PET/CT imaging, which not only avoided unnecessary gastrointestinal endoscopy and reduced the suffering of patients, but also strengthened the operation confidence in gynecologists.

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