

Three synchronous primary tumors with different histology detected by ^{18}F -FDG PET/CT

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Abstract

The aim of this study is to present a patient with 3 primaries diagnosed with the ^{18}F -FDG PET/CT study performed for the staging of endometrial cancer. Pathologic accumulations of the tracer were detected in both lobes of the thyroid gland, in the left lung and in the known primary of the uterus. A bilateral multifocal differentiated thyroid carcinoma and a peripheral carcinoid tumor in left lung were the final diagnosis as shown by histology. In conclusion, in this patient the PET/CT study performed for staging endometrial cancer demonstrated two new synchronous primary tumors. This is the second similar case but the first where all three primaries had entirely different histology.

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Introduction

Positron emission tomography (PET) in combination with computed tomography (CT) using 2-[fluorine-18] fluoro-2-deoxy-D-glucose (^{18}F -FDG) has gained widespread use in oncology. Although the role of ^{18}F -FDG-PET imaging in gynecologic tumors excluding the cervical and ovarian cancers is not well documented, it alters management by documenting distant metastases in many cases in endometrial cancer [1]. We report a case with a newly diagnosed endometrioid carcinoma in which ^{18}F -FDG-PET/CT demonstrated three pathologic cancer foci in different organs. We describe this case because all three cancerous foci had different histology.

Case report

A postmenopausal woman who is 58 years old was presented with dysfunctional uterine bleeding to our clinic. The diagnosis was endometrioid cancer upon fractionated curettage. A PET scan with non-diagnostic CT study was performed for staging of the disease. The blood glucose level was 85mg/dL before injection of 370MBq of ^{18}F -FDG. The images

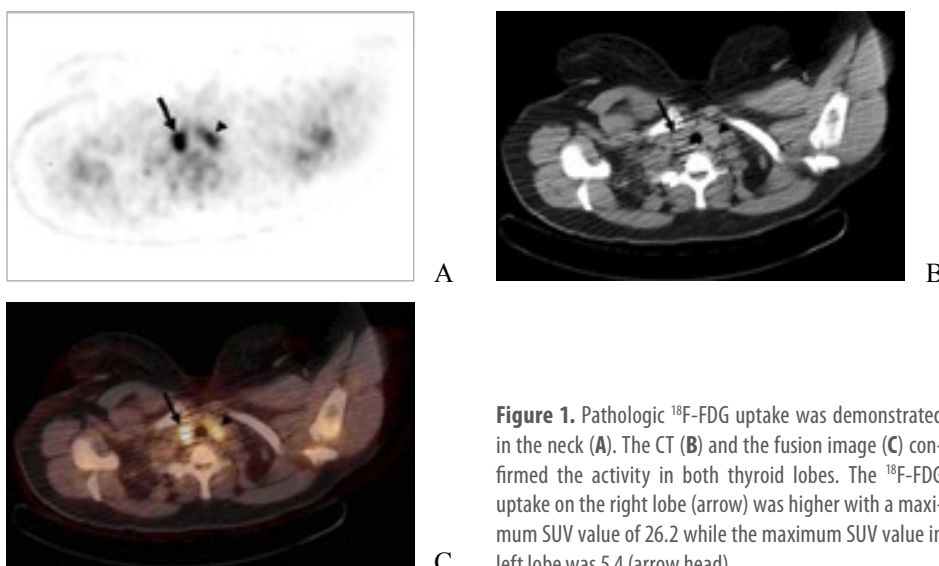


Figure 1. Pathologic ^{18}F -FDG uptake was demonstrated in the neck (A). The CT (B) and the fusion image (C) confirmed the activity in both thyroid lobes. The ^{18}F -FDG uptake on the right lobe (arrow) was higher with a maximum SUV value of 26.2 while the maximum SUV value in left lobe was 5.4 (arrow head).

were obtained using Gemini TF PET/CT (Philips Medical Systems) after a 60min uptake period. Two minutes per bed position was used for data acquisition. Pathologic ¹⁸F-FDG uptake was observed bilaterally in thyroid (Fig. 1) gland and in the left lung parenchyma (Fig. 2) in addition to the uptake in known primary tumor of the uterus (Fig. 3).

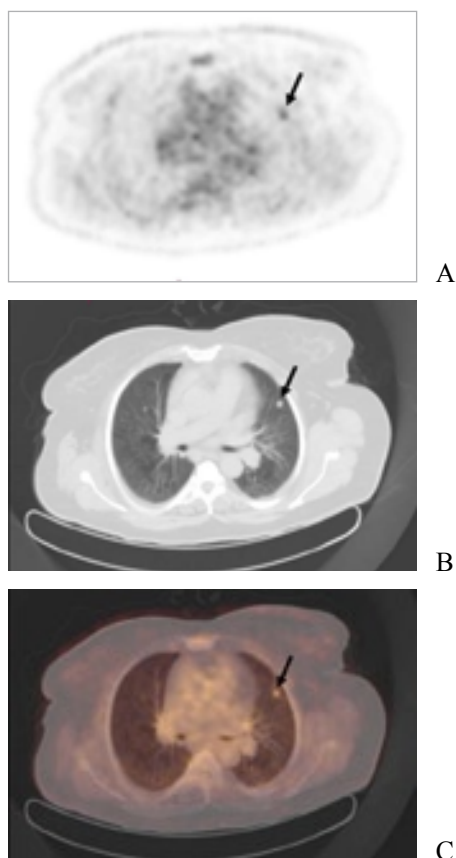


Figure 2. A focal ¹⁸F-FDG uptake was demonstrated in the left lung (A). The CT (B) and the fusion images (C) confirmed this activity located in the left upper lobe (arrows), about 1cm in diameter. The maximum SUV value of this lesion was 2.5.

Total abdominal hysterectomy, bilateral salpingo-oophorectomy and pelvic lymph node dissection were performed. The final pathologic diagnosis was endometrial adenocarcinoma (Fig. 4) (stage IB) and no further treatment was planned for her endometrial primary.

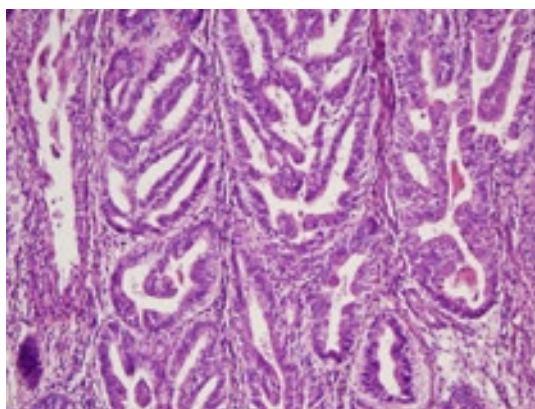


Figure 4. Endometrial carcinoma of endometrium (hematoxylin-eosin X 20)

Following surgical treatment, the neck ultrasonography (US) was performed. The largest nodule was an iso-hyper-echoic nodule with the dimensions of 15x10mm, on the right lobe. Fine needle aspiration biopsy of this nodule was performed. The cells possessed malignant potential on cytological evaluation.

A wedge resection of the lung nodule was carried out first. The tumor cells were ceratin, chromogranin and cynaptophysin positive and the diagnosis was peripheral carcinoid tumor (Fig. 5). The tumor boundaries were well demarcated and its diameter was 6mm. One month later a bilateral total thyroidectomy was performed. A classic variant papillary carcinoma and a Warthin's like tumor were diagnosed in the right lobe (Fig. 6). The largest diameter of this tumor was 35mm. There was not any tumor capsule and lymphovascular spread. Another focus of papillary carcinoma of classic and follicular variant without a capsule and lymphovascular spread on the left side was also demonstrated. The largest diameter of this tumor was 11mm. A radioiodine ablation treatment was given to the patient and a follow-up programme was started.

Discussion

Some criteria were defined for the diagnosis of multiple primary cancers for the first time at 1932 by Warren and Gates [2]. These are further grouped by Moertel and coworkers according to the histology and the origin of the cancer tissue [3]. They also defined different cancers detected within a 6 months of time period as synchronous tumors.



Figure 3. A focal ¹⁸F-FDG uptake was demonstrated in the pelvis (A). The lesion is not detectable with the non-diagnostic CT (B), and the fusion images (C) confirmed the activity to the uterus (arrows) at the known primary of the patient. The maximum SUV value of this lesion was 8.7.

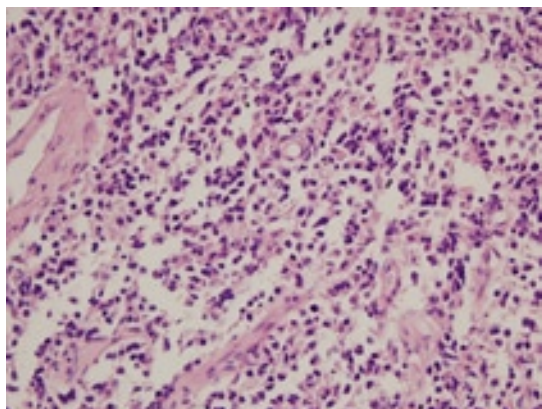


Figure 5. Peripheral carcinoid tumor of lung (hematoxylin-eosin X 40)

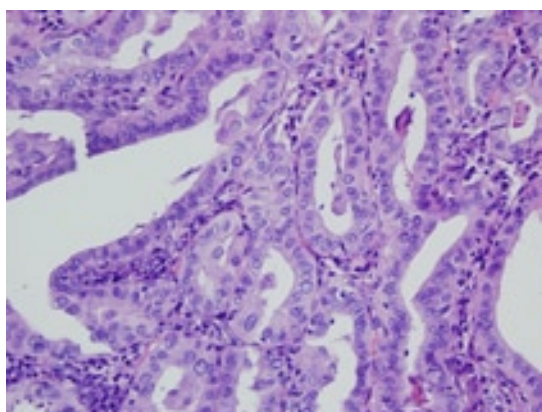


Figure 6. Papillary carcinoma of thyroid (hematoxylin-eosin X 40)

Although the causative factors for multiple primers are not known in certainty, there are some proposed factors like family history, genetic and immunologic factors, to be exposed to some carcinogens etc. [4]. The incidence of multiple primary cancers differs according to the organ systems. The reported incidence of multiple primaries associated with female genital tract was about 1.7 % to 5.17 % [5].

Endometrial cancers were known to be associated with multiple primary tumors like ovarian cancers among female genital tract neoplasms [5]. However the peripheral bronchial carcinoid of the lung is rare like its presence as a synchronous tumor [6]. Thyroid carcinomas were also declared to present synchronously with other malignancies. It has been shown that a thyroid malignancy was observed in about one fourth of the patients demonstrating an increased ^{18}F -FDG uptake in the thyroid gland [7, 8].

The presence of three synchronous primary tumors is rare. There is only one case report in the literature declaring 3 synchronous primary tumors originating from different organ systems [9]. In this report, a third primary in the tonsil of a patient (a squamous cell carcinoma) was diagnosed by biopsy following demonstration of high ^{18}F -FDG uptake on

PET scan. The patient was known to have two other primary tumors, a squamous cell carcinoma of esophagus and an adenocarcinoma of lung, until the staging with ^{18}F -FDG PET was performed. However, the two primaries in the esophagus and tonsil demonstrated the same histology; a squamous cell carcinoma. In our case ^{18}F -FDG PET study demonstrated two new primary tumors in addition to the known endometrial malignancy. As with the other case all three synchronous malignancies were originated from different organ systems (this is well understood here). Unlike the case presented by Mitra and coworkers [9], the histologic characteristics of all three primaries were different in our case.

In conclusion, in our patient the PET/CT study performed for staging endometrial cancer demonstrated two more synchronous primary tumors. This is the second such case and the first where all three primaries had entirely different histology.

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The authors declare that they have no conflicts of interest.

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