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CLINICAL CASE REPORT

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Primary Uterine Peripheral T-cell Lymphoma

A Case Report of MRI and ^{18}F-FDG PET/CT Findings

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Abstract: Primary uterine non-Hodgkin's lymphoma is extremely rare accounting for <1% of all extranodal non-Hodgkin's lymphomas. Imaging findings of primary uterine lymphoma have rarely been reported before. We present magnetic resonance imaging (MRI) and fluorine-18-fluorodeoxyglucose (^{18}F-FDG) positron emission tomography (PET)/CT findings in a patient with primary uterine peripheral T-cell lymphoma.

A 27-year-old female presented with intermittent fever with neutropenia for 7 months. MRI showed an ill-defined mass involved both the uterine corpus and cervix, resulting in diffuse enlargement of the uterus. This mass showed inhomogeneous hypointensity on unenhanced T1-weighted images, hyperintensity on diffusion-weighted imaging, relative hypointensity compared to the surrounding myometrium on T2-weighted images and lower enhancement than the surrounding myometrium on enhanced T1-weighted images. FDG PET/CT showed intense FDG uptake in the thickened wall of the uterine corpus and cervix with SUV_{max} of 26.9. There were multiple hypermetabolic lymph nodes in the pelvis and retroperitoneum. Uterine curettage and CT-guided biopsy of the uterine mass revealed peripheral T-cell lymphoma. Bone marrow biopsy revealed no evidence of lymphomatous involvement. The imaging and pathologic findings were consistent with primary uterine lymphoma. After 3 circles of chemotherapy, follow-up enhanced MRI showed decreased thickness of the uterine wall.

Despite its rarity, primary uterine non-Hodgkin's lymphoma should be taken into consideration when a uterine tumor shows large size, relative hypointesity on both T2-weighted images and enhanced T1-weighted images compared to the surrounding myometrium, and intense FDG uptake on PET/CT. MRI may be helpful for describing the relationship between the tumor and adjacent structures. FDG PET/CT may be useful for tumor detection and staging.

(*Medicine* 95(17):e3532)

Abbreviations: ^{18}F-FDG = fluorine-18-fluorodeoxyglucose, CT = computed tomography, MRI = magnetic resonance imaging, PET = positron emission tomography.

Editor: Michael Masoomi.
Received: January 20, 2016; revised: March 25, 2016; accepted: March 31, 2016.
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JG and AD contributed equally to the study.
The authors have no funding and conflicts of interest to disclose.

ISSN: 0025-7974
DOI: 10.1097/MD.0000000000003532

INTRODUCTION

Uterine lymphoma can be primary or secondary with the later being more common. Approximately 24% of non-Hodgkin's lymphomas are considered to be of extranodal origin.[1] Primary uterine non-Hodgkin's lymphomas are extremely rare accounting for <1% of all extranodal non-Hodgkin's lymphomas.[1,2] Early diagnosis and prompt treatment are essential for getting a better prognosis. However, the diagnosis of primary uterine lymphoma is often delayed due to its low incidence and nonspecific clinical presentation.[2–4] The imaging findings of primary uterine lymphoma are rarely reported before.[5–9] In this paper, we present magnetic resonance imaging (MRI) and fluorine-18-fluorodeoxyglucose (^{18}F-FDG) positron emission tomography (PET)/CT findings in a patient with primary uterine peripheral T-cell lymphoma.

CASE REPORT

A 27-year-old female was admitted to our hospital because of intermittent fever with neutropenia for 7 months. She gave birth to a healthy baby 7 months ago. On admission, a firm mass could be palpated at the lower abdomen. Laboratory tests showed decreased white blood cell count (1.4×10^9/L; range $4–10 \times 10^9$/L). Serum cancer antigen 125 was elevated (193 U/mL; range <35 U/mL). Serum carcinoembryonic antigen, α-fetoprotein, and cancer antigen 19–9 were normal. Pelvic MRI was performed. MRI showed an ill-defined mass involved both the uterine corpus and cervix, resulting in diffuse enlargement of the uterus. This mass showed inhomogeneous hypointensity on unenhanced T1-weighted images, hyperintensity on diffusion-weighted imaging, relative hypointensity compared to the surrounding myometrium on T2-weighted images, and lower enhancement than the surrounding myometrium on enhanced T1-weighted images (Figure 1). Endometrial cancer with cervical involvement was suspected. For staging purpose, ^{18}F-FDG PET/CT was performed showing intense FDG uptake in the thickened wall of the uterine corpus and cervix with SUV_{max} of 26.9. There were multiple hypermetabolic lymph nodes in the pelvis and retroperitoneum (Figure 2).

Uterine curettage and CT-guided biopsy of the uterine mass were performed. Microphotograph revealed diffuse myometrial infiltration by small round tumor cells with multifocal coagulative necrosis (Figure 3A). The tumor cells were positive for CD2, CD3 (Figure 3B), CD43, and LAT, and negative for CD19 and CD20. Ki-67 staining showed the proportion of the positive tumor cells was >60%. Bone marrow biopsy revealed granulocyte hypoplasia with no evidence of lymphomatous involvement. The imaging and pathologic findings were consistent with primary peripheral T-cell lymphoma of the uterus (stage, II E). After 3 circles of chemotherapy, a follow-up MRI showed decreased thickness of the uterine wall (Figure 4).

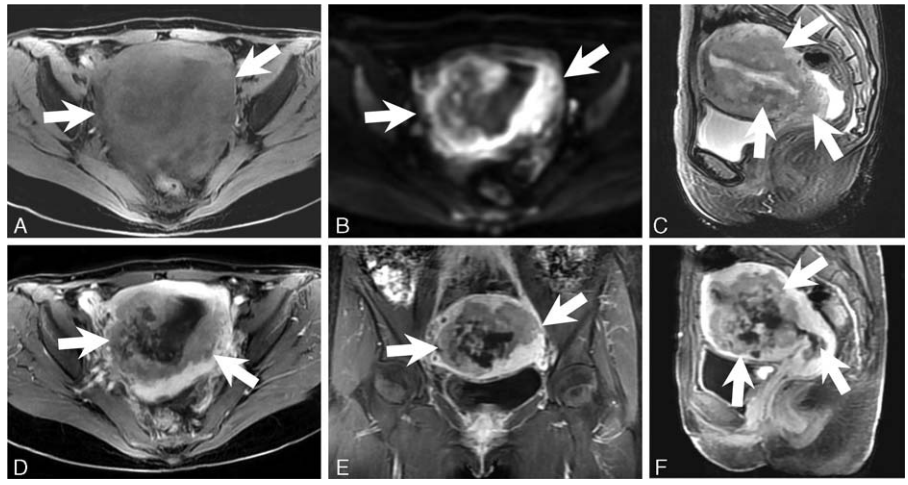

FIGURE 1. Transverse unenhanced T1-weighted image (A) showed an inhomogeneous hypointense mass (arrows) in the uterus. Corresponding transverse diffusion-weighted imaging (B) showed peripheral hypointensity of the mass. Saggital T2-weighted MR image (C) showed the mass (arrows) involved both the endomerium and myometrium, resulting in diffuse enlargement of the uterus. This mass showed relative hypointensity compared to the surrounding myometrium. On transverse (D), coronal (E), and saggital (F) enhanced T1-weighted images, this mass showed lower enhancement (arrows) than the surrounding myometrium. MR = magnetic resonance.

DISCUSSION

Primary uterine non-Hodgkin's lymphomas are extremely rare accounting for <1% of all extranodal non-Hodgkin's lymphomas.[1,2] The mean age of patients with primary uterine non-Hodgkin's lymphoma at presentation is 55 years and abnormal uterine bleeding is the most frequent complaint.[3] Cervix is the most common site.[3] Diffuse large B-cell lymphoma is the most common pathologic subtype.[3] The combination of chemotherapy and irradiation is the most effective treatment regimen for uterine lymphomas.[4]

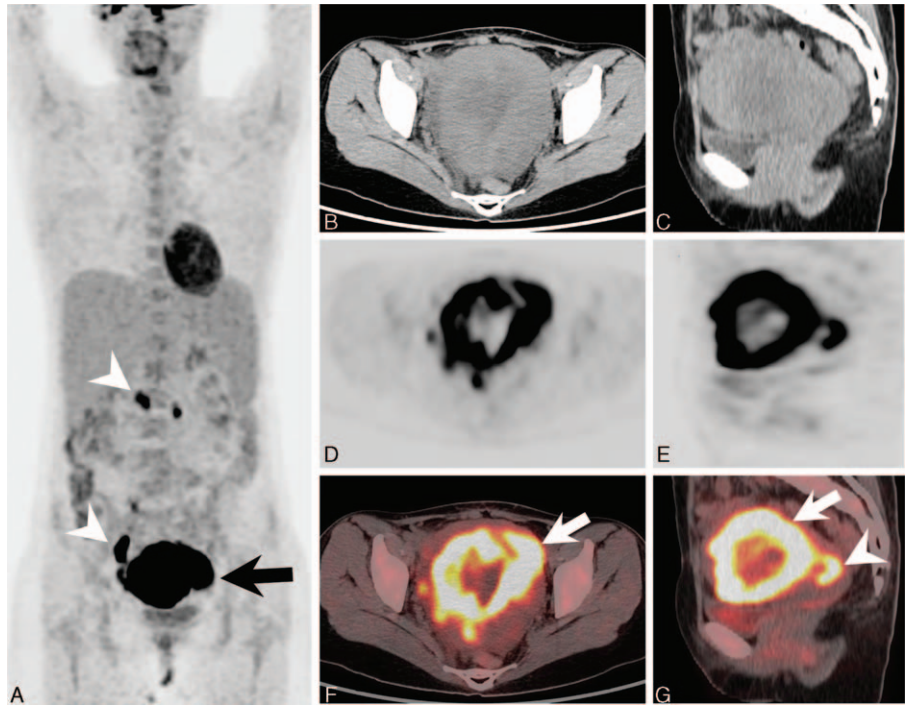

FIGURE 2. Maximum intensity projection PET (A) showed intense FDG uptake of the enlarged uterus (arrow) and multiple hypermetabolic lymph nodes (arrowheads) in the pelvis and retroperitoneum. Transverse CT (B, C), corresponding PET (D, E), and fused (F, G) images showed intense FDG uptake in the thickened wall of the uterine corpus (arrows) and cervix (arrowhead) with SUV_{max} of 26.9. CT = computed tomography, FDG = fluorodeoxyglucose, MRI = magnetic resonance imaging, PET = positron emission tomography.

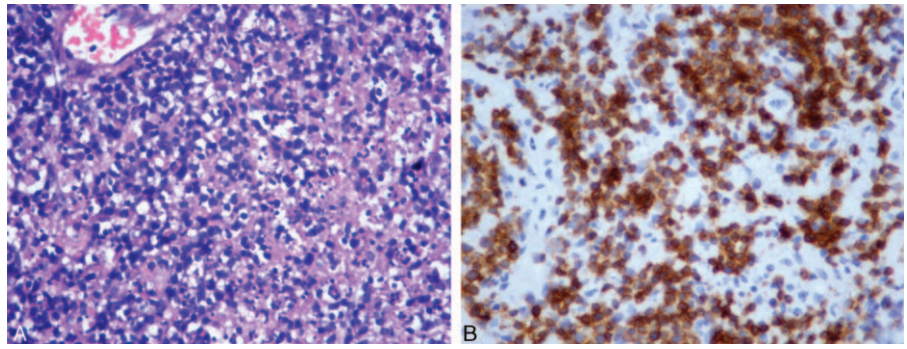

FIGURE 3. Histopathology at higher magnification (A, hematoxylin-eosin, original magnification × 400) revealed diffuse myometrial infiltration by small round tumor cells. The tumor cells were positive for CD3 staining (B, original magnification × 400).

On MRI, diffuse enlargement of the uterus, relatively homogeneous signal intensity, and multinodular growth pattern are helpful for diagnosing uterine lymphoma.[5,6] In this case, on T2-weighted MR images, the tumor showed relative hypointensity compared to the surrounding myometrium, which may be due to the hypercellularity and less necrosis of the tumor. On diffusion-weighted imaging, the tumor showed remarkable hyperintensity indicating marked restricted diffusion of the water molecules due to the dense microstructure. On enhanced T1-weighted MR images, the tumor showed lower enhancement than the surrounding myometrium, which may be due to the minimal tumor angiogenesis and destroying of the normal uterine vessels. MRI may be helpful for the differential diagnosis between uterine lymphoma and uterine leiomyosarcoma or abscess. Unlike uterine lymphoma, hemorrhage and necrosis are common in uterine leiomyosarcoma. Therefore, uterine leiomyosarcoma commonly manifests as a large infiltrating myometrial mass with heterogeneous hypointensity on T1-weighted MR images, and intermediate-to-high signal intensity with central hyperintensity on T2-weighted MR images.[7] Uterine abscesses commonly show high-signal intensity on T2-weighted MR images, which is different from relative hypointensity of uterine lymphoma.

Information on FDG PET/CT findings of uterine lymphoma is limited. FDG PET/CT may be useful for detection, staging, and treatment evaluation of uterine lymphoma.[2,8–10] High-grade uterine lymphomas usually show intense FDG uptake,[2,8,9] whereas the low-grade ones show lower FDG uptake.[10] Therefore, FDG PET/CT may be helpful for assessment of the tumor grade. This case indicates uterine lymphoma should be included in the differential diagnosis of abnormal uterine FDG accumulation along with physiological endometrial uptake,[11] postpartum uterus,[12] adenomyosis,[13,14] endometrial hyperplasia,[14] leiomyoma,[14,15,16] cervical cancer,[14,17] endometrial cancer,[14,18] choriocarcinoma,[19] uterine sarcoma,[14,16,20] and uterine metastasis.[14,21]

In conclusion, primary uterine non-Hodgkin's lymphoma should be taken into consideration when a uterine tumor shows large size, relative hypointensity on both T2-weighted images and enhanced T1-weighted images compared to the surrounding myometrium, and intense FDG uptake on PET/CT. MRI may be helpful for describing the relationship between the tumor and adjacent structures. FDG PET/CT may be useful for tumor detection and staging.

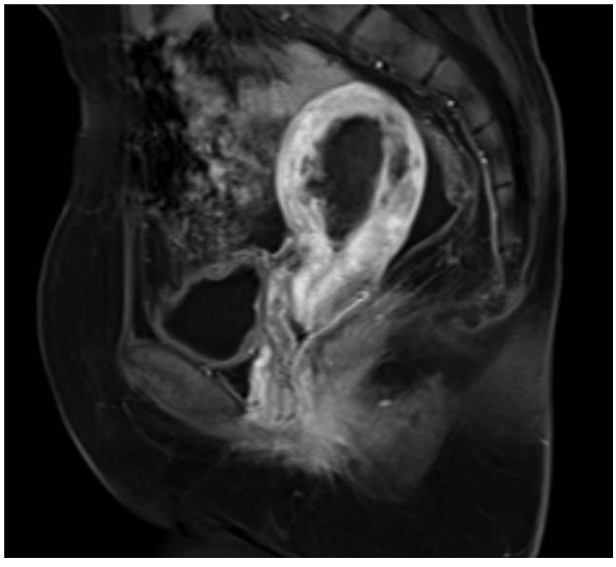

FIGURE 4. A follow-up enhanced T1-weighted image showed decreased thickness of the uterine wall after 3 circles of chemotherapy.

ETHICAL REVIEW AND CONSENT

Ethical approval was obtained from the Ethics Committee of Changhai Hospital, Shanghai, China. Written informed consent was obtained from the patient for publication of this case report and any accompanying images.

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