

## Relapsed Carcinoma Cervix Presented with Multiple Rare Visceral Metastases: Role of 18F-Fluorodeoxyglucose Positron Emission Tomography/Computed Tomography

### Abstract

Carcinoma cervix spread to locoregional lymph nodes. Distance metastases are uncommon and occur through hematogenous routes in advanced stages. The common sites include bone and lungs. Another organ involvement is uncommon. Computed tomography (CT) and magnetic resonance imaging have a crucial role in diagnosing local and distant metastasis. 18F-fluorodeoxyglucose positron emission tomography/CT (18F-FDG PET/CT) is a sensitive molecular imaging modality for various cancers, including gynecological ones. We present a case of recurrent cervical carcinoma presented with cervical mass and several rare visceral metastases. 18F-FDG PET/CT is a whole-body modality that accurately localized all lesions in a single study.

**Keywords:** Carcinoma cervix, 18F-fluorodeoxyglucose positron emission tomography/computed tomography, gynecological cancers, unusual metastasis

### Introduction

Cervical cancer affects over a million women worldwide, especially in developing nations. It has high morbidity, mortality, and a high risk of recurrence. Fortunately, incidence and mortality are decreasing due to the wide-scale implementation of cytological screening programs.<sup>[1]</sup> Positron emission tomography/computed tomography (PET/CT) with 18F-fluorodeoxyglucose (18F-FDG) is acknowledged as an imaging modality for cervical cancer. It helps in the detection, prognosis, and treatment planning. Locally advanced disease at presentation or recurrent disease can present with systemic metastases. The common sites for hematogenous spread are the lungs, liver, and bone, followed by the bowel, adrenal, spleen, and brain.<sup>[2]</sup> Our case shows the utility of 18F-FDG PET/CT in the restaging of the carcinoma cervix.

### Case Report

This 46-year-old woman suffered from pervaginal discharge for more than 6 months. Clinical examination revealed a hard cervical mass. Magnetic resonance imaging (MRI) pelvic showed a cervical

mass with vaginal involvement. The biopsy showed squamous cell carcinoma. She received six cycles of cisplatin-based chemotherapy and 25 fractions of radiotherapy. She remained asymptomatic for 1 year. The symptom of prevaginal discharge recurred after 1 year. She had no pain or other complaints. Physical examination revealed a hard mass in the cervix, suggesting local recurrence. She was referred for the 18F-FDG PET/CT for restaging. It showed a cervical mass with vaginal involvement. There was no evidence of metabolically active enlarged pelvic or retroperitoneal lymphadenopathy. FDG-avid metastases were noted in the thyroid, lung, kidneys, and right femur with mediastinal lymph nodes [Figures 1 and 2]. Fine-needle aspiration cytology for the thyroid lesion suggested metastatic squamous cell carcinoma.

### Discussion

The prognosis for metastatic cervical cancer patients remains poor despite advancements in management. The median survival time of metastatic cervical cancer is only 8–13 months, with a dismal 5-year survival rate of 16.5%.<sup>[3]</sup> Diagnostic imaging modalities play an important role in staging,

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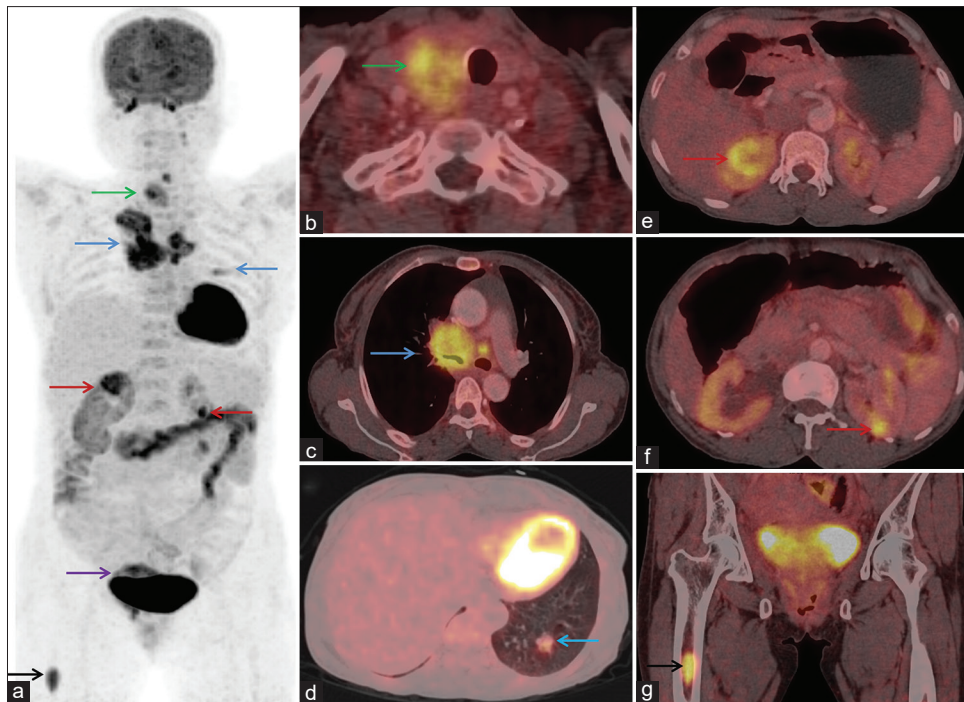
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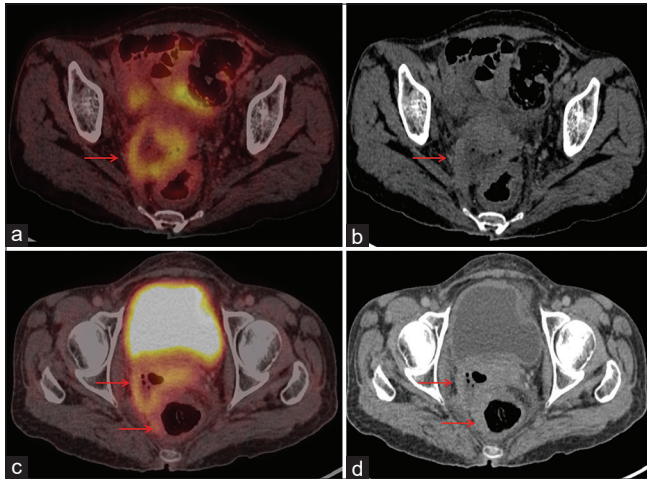
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**Figure 1:** Whole-body 18F-FDG PET/CT (a) MIP shows FDG-avid lesions involving the neck (green arrow), mediastinal (blue arrow), left thorax (blue arrow), bilateral renal (red arrow), pelvic (violet arrow), and right femoral (black arrow) region. (b-f) Fused axial FDG PET/CT image showing abnormal FDG-avid lesion in the right thyroid lobe measuring ~ 3.0 cm × 2.5 cm, SUV max 5.5 (b, green arrow), mediastinal nodes measuring ~ 4.4 × 3.2, SUV max 7.5 (c, blue arrow), left lung nodule ~ 1.2 cm in size, SUV max 2.7 (d, blue arrow), right kidney, SUV max 6.5 (e, red arrow) and the left kidney, SUV max 6.1 (f, red arrow) (g) Fused coronal image shows FDG-avid lesion of the proximal end of right femur in the intramedullary region, SUV max 4.9 (black arrow). 18F-FDG PET/CT: 18F-fluorodeoxyglucose positron emission tomography/computed tomography, MIP: Maximum intensity projection image



**Figure 2:** (a and b) Fused axial 18F-FDG PET/CT and CT images showing FDG-avid lesion involving the cervix, SUV max 7.0, maximum thickness ~ 1.2 cm (red arrow). (c and d) Fused axial 18F-FDG PET/CT and CT images reveal upper vaginal involvement with the right lateral pelvic wall and rectal infiltration (red arrow). 18F-FDG PET/CT: 18F-fluorodeoxyglucose positron emission tomography/computed tomography

restaging, and prognosticating cervical cancer. MRI and PET/CT have complementary roles. MRI is indispensable for the local staging of the primary tumor, and PET/CT is a valuable modality for finding regional nodal and distant metastatic lesions.<sup>[4]</sup> In a large meta-analysis, PET or PET/CT showed the highest pooled sensitivity (82%) and specificity (95%) for the detection of metastatic lymph

nodes. In contrast, sensitivity and specificity were 50% and 92% for CT and 56% and 91% for MRI, respectively.<sup>[5]</sup> Lee *et al.* studied 51 patients with treated cervical cancer and found tumor recurrence or metastasis in 37. They found that PET/CT had excellent sensitivity (97.3%) and specificity (71.4%), with an accuracy of 90.2%.<sup>[6]</sup> The International Federation of Gynecology and Obstetrics 2018 staging system and the National Comprehensive Cancer Network guidelines recommend FDG PET/CT in all patients with disease of stage 1B2 or higher, particularly for the evaluation of nodal involvement and distant metastatic disease. Patients with suspected metastatic cancer based on findings from any other imaging modalities should also undergo PET/CT.<sup>[7]</sup> 18F-FDG PET/CT is useful for preoperative assessment of disease extent in patients undergoing pelvic exenteration for recurrent gynecological malignancies.<sup>[8]</sup>

The pattern and distribution of metastatic spread are predictable in the carcinoma cervix, with few exceptions. In a clinical study with 1347 patients with single-site metastatic cervical cancer, lungs were the most common site (37.9%), followed by bones (16.7%) and liver (12.5%). Brain metastases were uncommon, only accounted for 1.6%. In patients with multi-organ metastases, lung plus liver metastases and lung plus bone metastases are more common than other multiorgan metastases.<sup>[9]</sup> In a large retrospective study (1997–2017), 113 (9.5%) out of

1185 cervical cancer patients who underwent 18F-FDG PET/CT had supraclavicular nodes and/or distant nonnodal metastatic disease. About 72 (6.1%) of 1185 patients with FDG-avid distant nonnodal metastatic disease. The most common sites of distant metastasis were lung (35%), omentum/peritoneum (16.5%), bone (16.5%), and liver (7%), and 25% of patients had multiple sites of distant disease.<sup>[10]</sup> The rare sites of metastases include the liver (2.2%), gastrointestinal tract (8.0%), spleen (1.6%–30%), heart (1.2%), brain (0.7%–1.2%), and mediastinal lymph nodes (1.7%).<sup>[11]</sup> Metastases to the thyroid gland are rare and seldom reported.<sup>[12,13]</sup> Similarly, renal metastasis is rare. They are usually incidentally diagnosed. However, they may present with cause symptoms that may simulate a renal-abscess-like flank pain, hematuria, or fever in some cases.<sup>[14-16]</sup> As far as we know, this is the only reported case of asymptomatic, extensive, and unusual visceral metastasis without pelvic or retroperitoneal lymph node involvement. This reestablishes the role of 18F-FDG PET/CT as a hybrid whole-body imaging.

## Conclusion

18F-FDG PET/CT has an unparalleled role in imaging cancer cervix. Being a whole-body hybrid imaging, it is instrumental in the staging and management of cervical cancer therapy. FDG PET/CT could aid in decision-making at the time of recurrence.

## Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient (s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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## Conflicts of interest

There are no conflicts of interest.

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