Intense uterine activity on whole body ^{18}F-FDG PET/CT due to attenuation artifact

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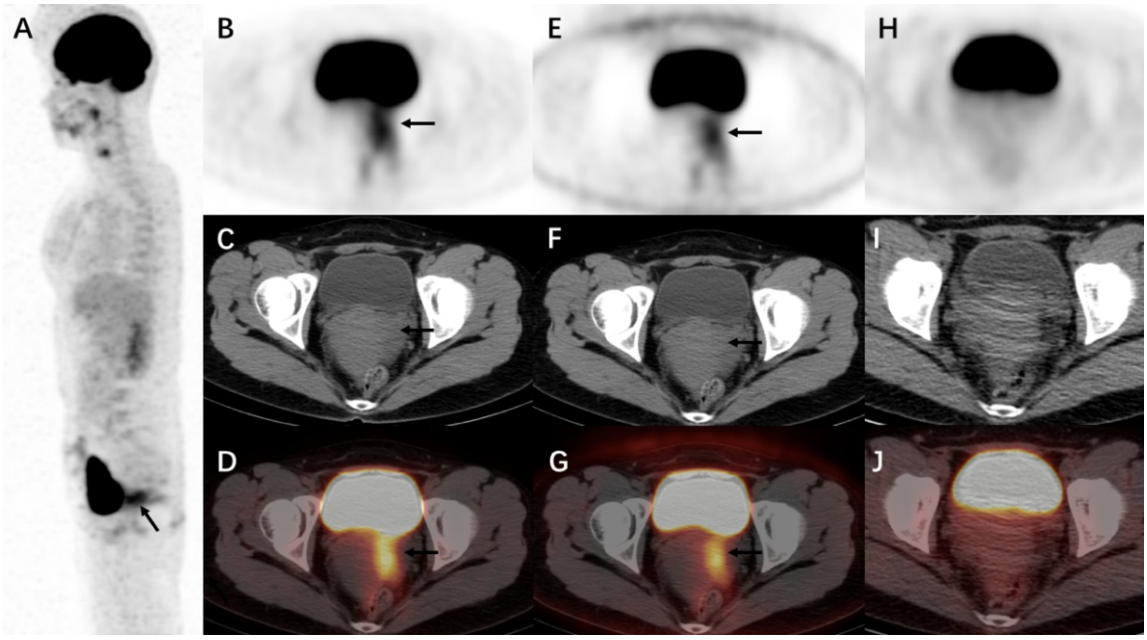

A 34 year old woman complained of abdominal wall pain for 2 months and ultrasonography revealed a hypoechogenic mass involving the left rectus abdominis muscle. She underwent lesionectomy and histopathologic diagnosis, surprisingly, was metastatic adenocarcinoma of unknown origin. Whole body fluorine-18-fluoro-deoxyglucose positron emission tomography/computed tomography (^{18}F-FDG PET/CT) was performed to evaluate possible primary lesion. The maximum intensity projection image showed an elevated activity in the pelvis, whereas there was no other abnormal activity all over the body (A). Transaxial images showed that the intense activity was located in the uterine corpus, corresponding to no morphologic abnormality (B-D). However, non-attenuation corrected images did not show significant inconsistence with attenuation corrected image (E-G). Therefore, the possibility of uterine lesion could not be excluded. Because the high-intensity region was found immediately posterior to the urinary bladder, the possibility of artifact was considered. To find a reliable explanation to the phenomenon, the patient underwent a subsequent ^{18}F-FDG PET/CT one day later (H-J). No abnormal uterine activity, once observed in the initial scan, was noted.

According to Lodge's study (2010) [1], increased activities in the region posterior to the bladder should be considered artifacts if their appearance was symmetric along the anterior-posterior axis passing through the mid rectum on attenuation corrected images whereas markedly asymmetric on the attenuation-corrected images. The artifacts and physiologic uptake may complicate the assessment of tumor in ^{18}F-FDG PET/CT studies of the pelvis [2-5]. Lodge et al. (2010) [1] have reported that movement of gas within the rectum between acquisition of PET and CT images would result in overcorrection for attenuation at the margin of the rectum and lead to an artifact in attenuation corrected PET images in the perirectal region. Our case shows that the overestimated attenuation correction may also lead to a high-activity artifact in the uterine region which is located posterior to the extremely high activity of bladder. Simultaneous acquisition during hybrid PET/MRI may be the best resolution for the problem [6].

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