

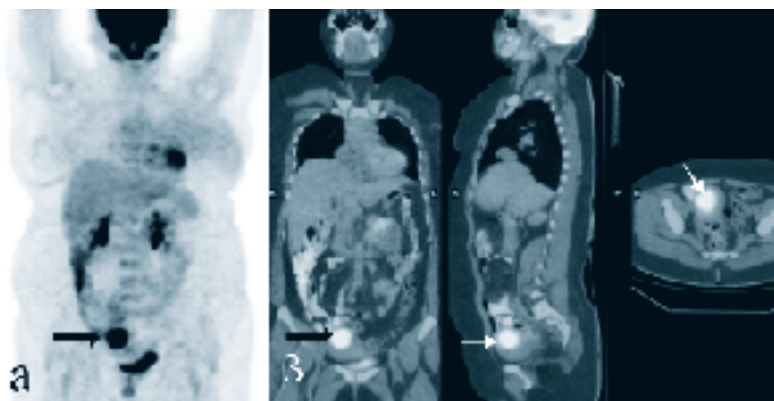
## Pitfall of $^{18}\text{F}$ -FDG-PET imaging in oncology: uterine fibromyoma

**To the Editor:** In patients being evaluated for oncological indications, the possibility of  $^{18}\text{F}$ -FDG accumulation in the lower pelvis caused by benign fibromyomas must be kept in mind and clinical and radiological correlation can help in accurate interpretation. As an example, we present a case of a 45 years old female with carcinoma of the left breast who was operated and histopathology revealed infiltrating ductal carcinoma with level III lymph nodes, positive for metastases. She was treated by radiotherapy followed by chemotherapy a year back. Her oncologist asked for a whole body  $^{18}\text{F}$ -fluorodeoxyglucose ( $^{18}\text{F}$ -FDG) positron emission tomography/computed tomography (PET/CT) scan. The only abnormality detected on this scan was focal abnormal tracer accumulation in the suprapubic region on the right side which on the fused image was localized to the uterine myometrium (Fig. 1a, b and Fig. 2). On review of the history, she was being followed up for fibromyomas-fibroids- for more than six years by repeated ultrasound examinations (Fig. 3) which had revealed two hypoechoic lesions measuring 5.0 x 4.8 cm and 2.3 x 2.1 cm suggestive of fibromyomas in the posterior and anterior myometrium respectively. The size of these lesions had not changed over the follow-up period. Uterus was anteverted and bulky 12.25 x 4.78 cm in size. Ovaries were normal in size. Since the patient was asymptomatic and nearing menopause, no intervention was decided and she was kept on regular follow-up. On the last examination after 18 months, the size of the fibromyomas on the ultrasound remained the same.

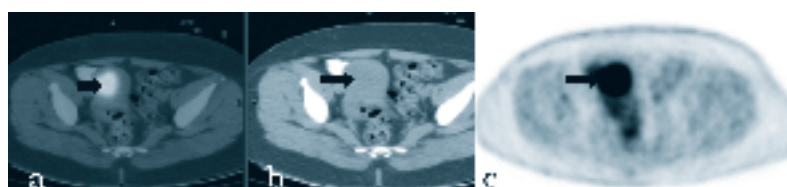
Uterine fibromyomatosis is a widely recognised and well studied pathology, found in around 30% of over 35 years old women.  $^{18}\text{F}$ -FDG has been reported to accumulate in benign uterine fibromyomas [1-4]. Various mechanisms have been proposed for this accumulation. On immunohistochemical analysis of resected benign leiomyomas, it has been shown that glucose transporter-1 is positive in endometrial tissue and negative in leiomyomas [1]. Thus the mechanism of  $^{18}\text{F}$ -FDG accumulation is not glucose transporter-1 dependent, unlike in malignancies.  $^{18}\text{F}$ -FDG accumulation in benign

fibromyomas has been attributed to higher level of growth factors like basic fibroblast growth factors, transforming growth factor  $\beta$ , granulocyte-macrophage colony-stimulating factor and also their receptors, and to proliferation of smooth muscle cells [2].

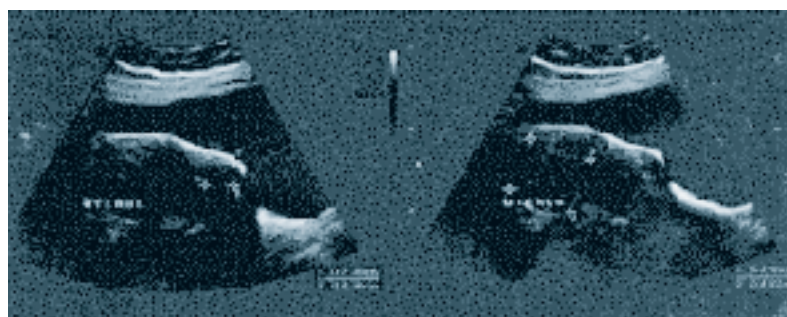
There is no significant correlation between the intensity of  $^{18}\text{F}$ -FDG uptake in uterine fibromyomas and menstrual cycle. Detailed histopathological and immunohistochemical study of benign fibromyomas showing  $^{18}\text{F}$ -FDG accumulation, demonstrated that there was no association between



**Figure 1.** a) Maximum intensity projection image showing a focus of abnormal  $^{18}\text{F}$ -FDG accumulation above the bladder (arrow). b) Fused PET and CT images in coronal, sagittal and transaxial views localizing the FDG accumulation to the uterine myometrium in the fundal region posteriorly (arrows).



**Figure 2.** Transaxial: a) Fused  $^{18}\text{F}$ -FDG PET/CT b) Low dose CT and c) Plain PET images showing abnormal intense  $^{18}\text{F}$ -FDG accumulation in the uterine myometrium corresponding to mild inhomogeneity of attenuation with a bulky uterus on CT.



**Figure 3.** Ultrasound of pelvis showing two hypoechoic lesions in the posterior and anterior myometrium. The ovaries appear normal in size. Uterus is anteverted and bulky.

this accumulation and increased ki-67 index. The ki-67 is a nuclear antigen present in the nuclei of cycling cells. It is used as an immunohistochemistry marker of cellular proliferation present in all active phases of the cell cycle and is an excellent marker to determine the growth fraction of a given cell population and the positivity of PET imaging [4]. Increased vascularity is present in all fibromyomas suggesting non-specific tracer accumulation. The menstruating endometrium, inflammatory changes within the ovary during ovulation and the corpus luteum of pregnancy can also demonstrate increased  $^{18}\text{F}$ -FDG accumulation in pre-menopausal women and this must also be kept in mind while reporting pelvic  $^{18}\text{F}$ -FDG accumulation.

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The harbor of Igumenitsa, Greece, opposite to Italy, at dawn. By S. Bellou.