

# Monitoring the Progression of a Calcifying Uterine Leiomyoma: Detection Using $^{18}\text{F}$ -NaF-PET/CT

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**Abstract:** Uterine leiomyomas (fibroids) are common and benign hormone-dependent tumors of the uterus, often coinciding with atypical menstrual bleeding, urinary incontinence, and lower abdominal pain. The PET tracer  $^{18}\text{F}$ -NaF has been used to study metastatic and benign bone disorders, but its potential use in investigating the molecular alterations of extraosseous tissues and tumors has not been fully investigated. In this report, we present a calcifying uterine leiomyoma incidentally detected on  $^{18}\text{F}$ -NaF PET/CT scans in a postmenopausal 61-year-old woman and follow-up image 2 years after, highlighting the potential of  $^{18}\text{F}$ -NaF in monitoring both the molecular and structural progression of uterine leiomyomas.

**Key Words:** calcification, fibroid, NaF, PET, uterine leiomyoma

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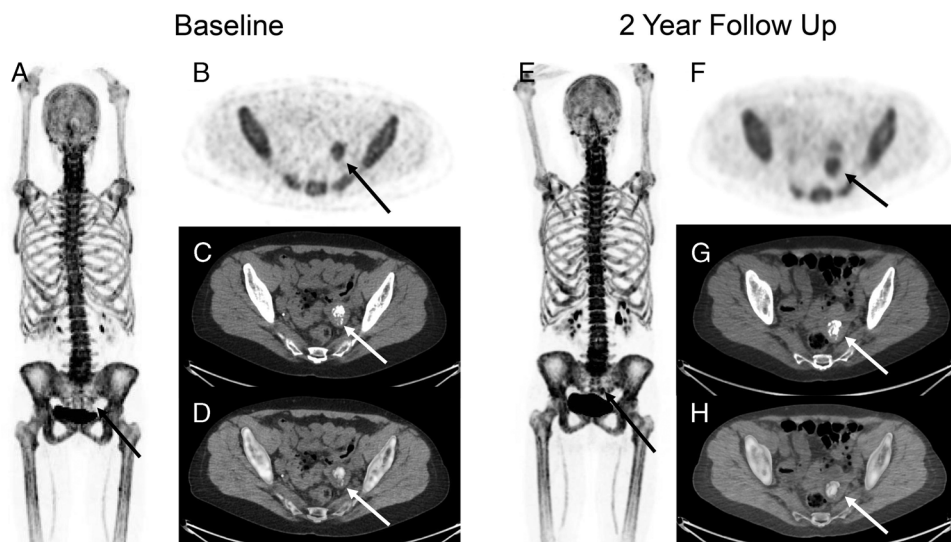
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**FIGURE 1.** Coronal MIP  $^{18}\text{F}$ -NaF PET (A), axial  $^{18}\text{F}$ -NaF PET (B), CT (C), and fused  $^{18}\text{F}$ -NaF PET/CT (D) images. Corresponding coronal MIP  $^{18}\text{F}$ -NaF PET (E), axial  $^{18}\text{F}$ -NaF PET (F), CT (G), and fused  $^{18}\text{F}$ -NaF PET/CT (H) images of the same subject 2 years after. A 61-year-old asymptomatic woman without history of cardiovascular, neoplastic, or autoimmune disease was initially recruited and underwent  $^{18}\text{F}$ -NaF PET/CT scans as a control subject of the CAMONA study, followed up 2 years after as part of the study protocol. A uterine leiomyoma undergoing calcification was incidentally detected (C and D; volume, 2380.56 mm<sup>3</sup> average; HU<sub>mean</sub>, 304.74) with focal  $^{18}\text{F}$ -NaF uptake (A and B; average SUV<sub>mean</sub>, 5.02). In a follow-up scan 2 years after, calcification within the uterine leiomyoma demonstrates increased size (G and H; volume, 3135.93 mm<sup>3</sup>; average HU<sub>mean</sub>, 311.98) and greater  $^{18}\text{F}$ -NaF uptake (E and F; average SUV<sub>mean</sub>, 5.51). Uterine leiomyomas or fibroids are benign, hormone-dependent tumors that typically decrease in size with onset at menopause because of diminishing estrogen levels.<sup>1</sup> As the leiomyomas regress, degeneration and necrosis ensue, resulting in calcium salt deposition<sup>2</sup> that can be captured using  $^{18}\text{F}$ -NaF PET/CT.<sup>3,4</sup> The role of  $^{18}\text{F}$ -NaF PET/CT in detecting calcification within osseous and soft tissues has been well demonstrated previously.<sup>5-8</sup> In our case study, the increased calcification and  $^{18}\text{F}$ -NaF deposition over time most likely signify the concurrent macroscopic and microscopic growth of calcification and highlight the potential of  $^{18}\text{F}$ -NaF PET in monitoring both the structural and molecular alterations within extrasosseous tissues such as uterine leiomyomas in a time-dependent manner.