

# Vanishing Spot on Dual-Time-Point FDG PET/CT

## Colonic Diverticulitis

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**Abstract:** A 58-year-old man asked for an FDG PET/CT scan for a survey to determine if any malignancy related to the recent history of increasing serum concentration of carcinoembryonic antigen. The scan initially revealed a focal pattern of intense FDG radioactivity in the ascending colon but dramatically lost its existence on the delayed images. Usually, the finding represented physiological intestinal activity and were not attributed to any pathologic condition. However, the subsequent colonoscopy showed diverticulitis in the corresponding site of the ascending colon. Possible causes of this scan finding and the clinical importance will be discussed.

**Key Words:** FDG PET/CT, colonic diverticulitis, carcinoembryonic antigen

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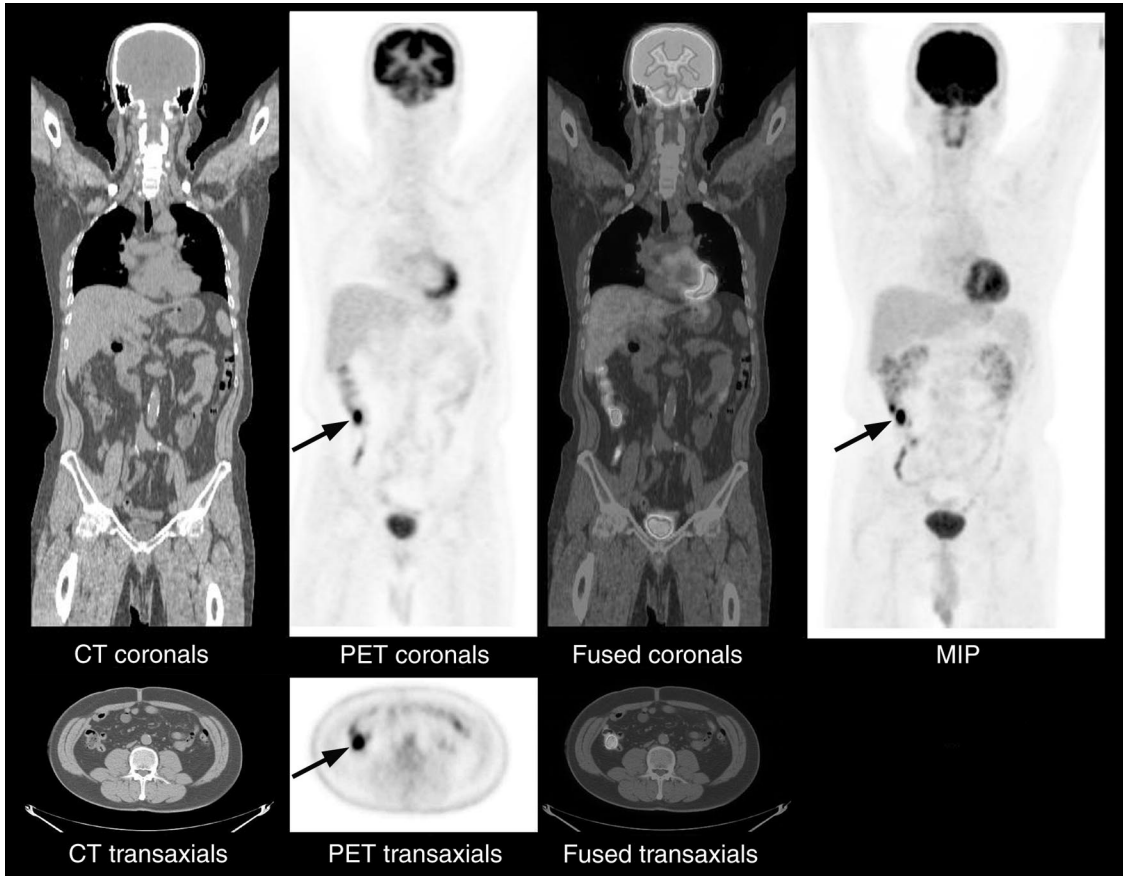
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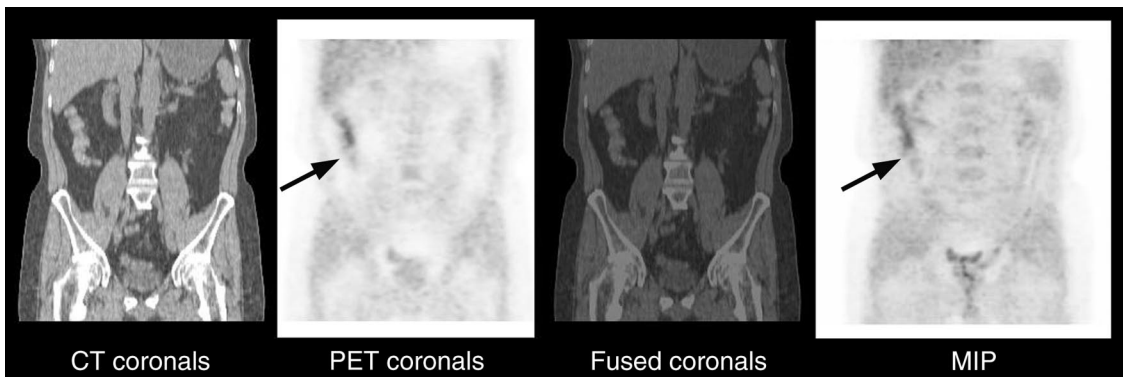
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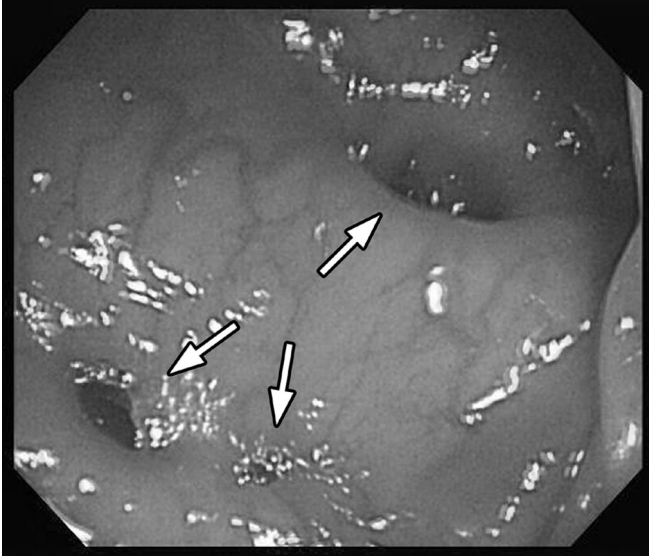
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**FIGURE 1.** A 58-year-old man was noted to have a gradual increase of serum concentration of carcinoembryonic antigen from 1.2 to 2.5 ng/mL and then to 3.5 ng/mL in the recent months. Although the value was still within the reference normal limit of this examination (<5 ng/mL), he asked for a thorough examination with FDG PET/CT in case the finding was an early sign of occult gastrointestinal malignancy. Sixty minutes after intravenous administration of FDG, he underwent whole body FDG PET/CT scan. Unexpectedly, an obvious focal uptake (arrows) with extremely high FDG radioactivity (maximum standardized uptake value, SUVmax = 19) was found and superimposed on the ascending colon on the CT component of the FDG PET/CT scan. The largest axial diameter of this finding was 22 mm. A malignant lesion was highly suspected based on its focal pattern of uptake.<sup>1-4</sup>



**FIGURE 2.** For further characterization of the FDG-avid finding, a delayed scan was carried out 1.5 hours later. He was also asked to drink low-density contrast medium for better delineation of the bowel. Surprisingly, the aforementioned FDG-avid focus in the ascending colon was not observed on the delayed scan. The SUVmax of the ascending colon (arrows), the corresponding site to the FDG-avid focus on the initial scan, was 3.4.



**FIGURE 3.** Previous studies<sup>5–8</sup> suggested to use dual-time-point FDG PET scans for diagnosing malignant lesions and revealed a tendency that the uptake of malignant lesions increased with time. Nevertheless, various benign and physiological factors cause increased intestinal FDG uptake, including metabolically active smooth muscle (intestinal peristalsis), swallowed secretions, microbial uptake, lymphocyte uptake, and intraluminal concentration of FDG (great turnover and shedding of intestinal mucosal cells).<sup>3,9,10</sup> However, a focal pattern of intestinal FDG uptake still prompts further appropriate invasive diagnostic procedures such as colonoscopy, biopsy, or surgery.<sup>1,3,11,12</sup> Therefore, a colonoscopy was performed 3 days later and several diverticuli with mild inflammation of mucosa (arrows) were noted in the ascending colon near the cecum, corresponding to the area with focal uptake on the FDG PET/CT scan. Colonic diverticulitis was considered and might be accountable for the gradual increasing serum concentration of carcinoembryonic antigen. Previous reports had found that diverticulitis, even only diverticula themselves,<sup>13</sup> would accumulate FDG. However, why our case revealed prominent FDG radioactivity in the early scan but rapid resolution in the delayed scan may be multifactorial as those mentioned above (especially rapid change in smooth muscle activity, content of swallowed secretions and intraluminal concentration of FDG) or other unknown causes. Most patients with diverticulosis will remain asymptomatic throughout their lifetime but diverticulitis, the most common cause of symptoms including hemorrhage and inflammation, will affect 10% to 25% of these patients.<sup>14</sup> Complicated diverticulitis can be fatal, especially in those immunocompromised patients including those who have undergone organ transplantation, have human immunodeficiency virus infection, or are taking corticosteroids.<sup>15</sup> Our case demonstrates a possible condition that may be considered as normal physiological FDG uptake rather than an actually benign etiology that sometimes has clinical importance, and emphasizes again to carefully survey any incidental intestinal focal FDG radioactivity.