

# Direct Visualization of F-18-Fluorodeoxyglucose Accumulation in Feces

D Wan, M Miro-Quesada, L Campos

## Citation

D Wan, M Miro-Quesada, L Campos. *Direct Visualization of F-18-Fluorodeoxyglucose Accumulation in Feces*. The Internet Journal of Radiology. 2009 Volume 12 Number 2.

## Abstract

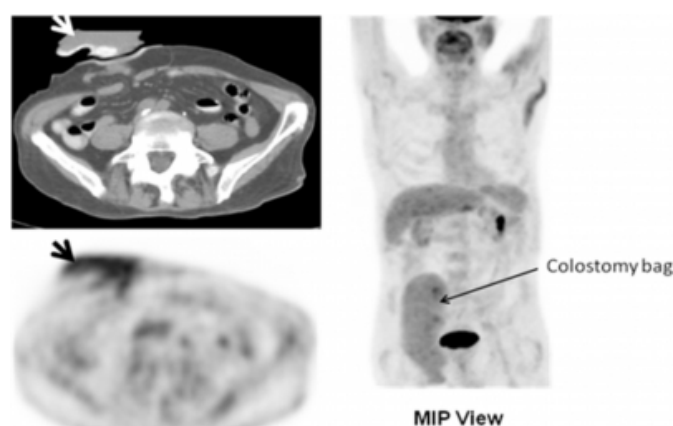
Although colonic F-18-fluorodeoxyglucose uptake is extremely common in whole-body positron emission tomography-computed tomography, direct visualization of fecal FDG accumulation in a clinical setting has not been reported. Here we report direct visualization of fecal FDG accumulation in the colostomy bag of a 75-year-old man with an 8-month history of rectal cancer. Although the mechanism of colonic FDG uptake is complex which includes both physiologic and pathologic factors, fecal FDG accumulation at least partially contributes to colonic FDG activity.

## CASE REPORT

A 75-year-old man with rectal cancer underwent positron emission tomography (PET)-computed tomography (CT) to follow up the disease. This patient was status post surgical resection of the tumor with a colostomy placement 8 months prior. The patient took CT oral contrast agent (1% barium sulfate) after intravenous injection of 15-mCi F-18 fluorodeoxyglucose (FDG) and drank 150 ml of the contrast before the scan. We obtained the PET-CT images 64 minutes after FDG tracer injection. We obtained the images starting from the top of the head to the thigh for a total imaging time of 25 minutes including the CT acquiring time. The transaxial PET, CT, and Maximum Intensity Projection (MIP) images (Figure 1) revealed diffuse FDG accumulation in the colostomy bag (arrows). The maximum standard uptake value was 2.6 and the average standard uptake value was 2.2. There was FDG activity in the gastrointestinal tract which did not demonstrate higher FDG activity than the colostomy bag accumulated. There was CT contrast agent in the intestine and the colostomy bag. The FDG accumulation in the colostomy bag was not an attenuation correction artifact, because non-attenuation-corrected images showed persistent activity in the colostomy bag (image not shown).

## Figure 1

Figure 1.



In less than 90 minutes (64 minutes plus 4 bed positions for the scanner to reach the lower abdomen, each bed position required 4 minutes), the intravenous injected FDG moved into the intestinal lumen and reached the colostomy bag. This was likely faster than normal. CT oral contrast agent induced diarrhea may have contributed to the short time by which the intestinal contents reached the colostomy bag. The fecal FDG accumulation was not due to gastrointestinal bleeding, because the colostomy was placed during the initial tumor resection 8 months prior; the patient had no history of gastrointestinal bleeding after the surgery; and the patient's stool guaiac tests during follow-up after surgery were negative.

## DISCUSSION

Researchers have suspected that FDG can accumulate in the intestinal lumen. Miraldi et al (1) observed that no FDG activity in the intestinal lumen after the intestine was treated with an iso-osmotic laxative solution. Kim et al (2) measured the radioactivity of stool samples and found definite FDG accumulation in the stool (3.8%-54.5% of FDG activity in the plasma). However, direct visualization of fecal FDG accumulation on PET-CT scan in the clinical setting has not been reported. Bidirectional glucose transporters in the gastrointestinal tract might play a role in FDG accumulation in the intestinal lumen (3). Kim et al (2) suggested that FDG seeps through tight junctions between the cells of the intestinal epithelium. Besides intraluminal fecal FDG accumulation, intestinal peristaltic muscular contraction (2, 4) and lymphoid tissue FDG uptake (5) also contributed to physiologic FDG uptake in the intestines.

Pathologic processes, such as colonic adenoma, primary and metastatic malignancy, and inflammatory disease in the colon, can also contribute FDG uptake in the colon. In general, there are 3 patterns of colonic FDG uptake: diffuse uptake, segmental uptake, and nodular focal uptake. A diffuse pattern involving the entire colon, regardless of grade, suggests a normal variation rather than a pathologic process (6), such as FDG accumulation in the intestinal lumen. A segmental pattern is more frequently seen in nonmalignant pathologic processes, such as enterocolitis, pseudomembranous colitis, Crohn's disease, and ulcerative

colitis (7-9). A nodular focal FDG uptake in the intestine indicates a premalignancy or a potential malignancy, including polyps, adenomas, carcinomas, or metastases (6). Our results indicate that fecal FDG accumulation contributes to colonic FDG uptake.

## References

1. Miraldi F, Vesselle H, Faulhaber PF, Adler LP, Leisure GP: Elimination of artifactual accumulation of FDG in PET imaging of colorectal cancer. *Clin Nucl Med*. 1998;23:3-7.
2. Kim S, Chung JK, Kim BT, et al: Relationship between gastrointestinal F-18-fluorodeoxyglucose accumulation and gastrointestinal symptoms in whole-body PET. *Clin Positron Imaging*. 1999;2:273-279.
3. Burant CF, Takeda J, Brot-Laroche E, Bell GI, Davidson NO: Fructose transporter in human spermatozoa and small intestine is GLUT5. *J Biol Chem*. 1992;267:14523-14526.
4. Engel H, Steinert H, Buck A, Berthold T, Huch Boni RA, von Schulthess GK: Whole-body PET: physiological and artifactual fluorodeoxyglucose accumulations. *J Nucl Med*. 1996;37:441-446.
5. Cook GJ, Fogelman I, Maisey MN: Normal physiological and benign pathological variants of 18-fluoro-2-deoxyglucose positron-emission tomography scanning: potential for error in interpretation. *Semin Nucl Med*. 1996;26:308-314.
6. Tatlidil R, Jadvar H, Bading JR, Conti PS: Incidental colonic fluorodeoxyglucose uptake: correlation with colonoscopic and histopathologic findings. *Radiology*. 2002;224:783-787.
7. Meyer MA: Diffusely increased colonic F-18 FDG uptake in acute enterocolitis. *Clin Nucl Med*. 1995;20:434-435.
8. Hannah A, Scott AM, Akhurst T, Berlangieri S, Bishop J, McKay WJ: Abnormal colonic accumulation of fluorine-18-FDG in pseudomembranous colitis. *J Nucl Med*. 1996;37:1683-1685.
9. Bicik I, Bauerfeind P, Breitbach T, von Schulthess GK, Fried M: Inflammatory bowel disease activity measured by positron-emission tomography. *Lancet*. 1997;350:262.

**Author Information**

**David Q. Wan, MD**

Department of Diagnostic and Interventional Imaging, University of Texas Medical School at Houston, 6431 Fannin Street, MSB 2.130B Houston, TX 77030

**Miguel Miro-Quesada, MD**

Oncology Consultants, 925 Gessner Street, Suite 600, Houston, TX 77024

**Luis T. Campos, MD**

Oncology Consultants, 925 Gessner Street, Suite 600, Houston, TX 77024