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Interesting Images

PSMA-Positive Low Malignant Gastrointestinal Stromal Tumor in the Stomach on F-18-PSMA-1007 PET/CT

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Abstract: A 76-year-old man with newly diagnosed high-risk prostate cancer was referred for primary staging with F-18-PSMA-1007 PET/CT. The PET/CT scan showed no lymph node or bone metastases, only localized disease within the prostate gland. Additionally, the F-18-PSMA PET/CT scan showed a PSMA-positive lesion correlating to a polyp located in the body of the stomach on the greater curvature. A prior F-18-FDG PET/CT showed low FDG uptake in the polyp, but this was not reported initially in the written report. The patient had no upper gastrointestinal symptoms. A gastroscopy with biopsies was performed, and the histopathology results showed chronic unspecific inflammation with no granulomas, dysplastic or malignant changes in three out of three biopsies. A repeated gastroscopy with biopsy showed an epithelioid variant of a gastrointestinal stromal tumor (Ki-67 index 2%). A laparoscopic tumor extirpation was planned after radiation treatment in combination with endocrine therapy of the localized prostate cancer. To our knowledge, this is one of very few reported cases of a PSMA-positive gastrointestinal stromal tumor (GIST), and can be added to the list of malignant pitfalls of PSMA PET/CT in prostate cancer patients.

Keywords: PSMA; prostate cancer; FDG; polyp; pitfalls; PET/CT; GIST

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A 76-year-old man with newly diagnosed prostate cancer. The PSA level was 13 µg/L. Gleason 4 + 4 = 8 was found in 11 of 12 biopsies, alongside a cT2c tumor and a prostate volume of 20 ccm. About one month prior to the diagnosis, the patient was referred for an 18-F-FDG-PET/CT for unspecific symptoms, moderate elevation of C-reactive protein level and fever in order to locate infection sites or active inflammation, with the secondary aim of ruling out an underlying cancer. The patient had a medical history of methotrexate-treated seropositive rheumatoid arthritis. The F-18-FDG PET/CT showed localized uptake in the prostate and reactive mediastinal lymph nodes, and low FDG uptake (SUVmax 2.8) in a 35 mm polyp in the body of the stomach (Figure 1, Panel C and D). The latter was not mentioned in either the CT or PET report.

One month later, the patient was referred for primary staging with F-18-PSMA-1007 PET/CT. The scan showed localized disease within the prostate with no sign of involvement of the seminal vesicles, lymph nodes or bones. Additionally, the scan showed a PSMA-positive lesion (SUVmax = 21) in the body of the stomach on the greater curvature, correlating to a 35 mm polyp located close to the pylorus (Figure 1, Panel A and B).

A gastroscopy with biopsies initially showed chronic unspecific inflammation with no granulomas, dysplastic or malignant changes in three out of three biopsies. A repeat biopsy showed an epithelioid variant of a low malignant gastrointestinal stromal tumor (Ki-67 index 2%). A laparoscopic tumor extirpation was planned after radiation treatment in combination with endocrine therapy of the localized prostate cancer.

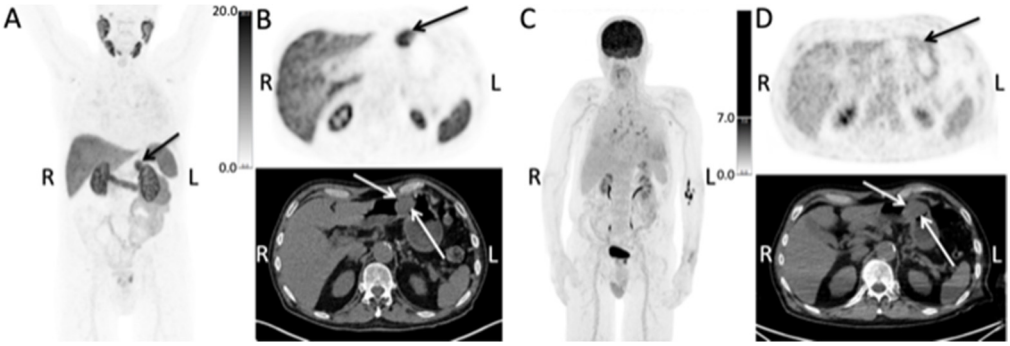

Figure 1. The maximum intensity projection (MIP) of the F-18-PSMA-1007 PET/CT (**A**) show a PSMA-positive lesion located in the upper abdomen (arrow) (R, right side; L, left side). Transaxial images of the of the F-18-PSMA-1007 PET/CT (**B**) show the PSMA-positive polyp in the body of the stomach, as indicated by the arrows. The maximum intensity projection (MIP) (**C**) and transaxial images (**D**) of the prior F-18-FDG PET/CT showed low FDG uptake in the polyp (arrows).

Increased PSMA expression is seen in most prostate cancers but has also been reported in other malignant and benign conditions [1–3]. PSMA PET is now widely used for detecting biochemical recurrence of prostate cancer [4] but is also increasingly used for primary staging of high-risk prostate cancer [5]. To our knowledge, this is one of very few reports [6,7] demonstrating PSMA-positive GIST. The other reported GIST cases were localized in the small bowel and in the gastric fundus. PSMA-PET could potentially be a competitive tracer of F-18-FDG-PET for the staging of GIST. However, a systematic review and meta-analysis by Kim and Lee [8] showed a high pooled FDG sensitivity of 88% in 177 patients across seven studies. In our case, the GIST tumor was not detected in the initial F-18-FDG PET/CT, but only in the following F-18-PSMA PET/CT. GIST tumors can be added to the list of PSMA-positive malignant pitfalls when reporting PSMA PET/CT scans in prostate cancer patients. This is likely due to PSMA binding to endothelial cells of the neovasculature, as seen in other PSMA-positive non-prostate cancers.

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