

Metabolic Characteristics of Recurrent and Metastatic Colorectal Carcinoma in F-18 FDG-PET/CT imaging

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Introduction:

Colorectal cancer (CRC) is the third most commonly occurring cancer in men and the second most commonly occurring cancer in women. The mainstay of treatment is surgery with curative intent. However, recurrences are diagnosed after surgery in half the patients, usually within the first 2 years. [18F]2-fluoro-2-deoxy-D-glucose positron emission tomography (18FDG-PET) is considered superior to conventional imaging methods in early detection of recurrences. 18FDG-PET has the ability to detect recurrent CRC, through pathologically increased tissue metabolism, which precedes the appearance of morphological changes. The purpose of this study was to evaluate two semi-quantitative parameters in recurrent colorectal carcinoma at the surgery site and distant metastases after treatment.

Materials and methods:

Between January 2019 and May 2019, the medical records of 78 consecutive patients who are treated for colorectal cancer and had FDG PET/CT scan were evaluated retrospectively. All of the malignant lesions detected in the postsurgical area and liver parenchyma and as well as lung nodules above 9mm were analyzed. Maximum standardized uptake value (SUVmax) as well as tumor to liver ratio (TLR) was calculated.

The FDG-PET/CT examinations were performed on integrated PET/CT system (SIMENS Biograph 40). The low dose CT was performed for attenuation correction and anatomical localization without intravenous or oral contrast. PET scan was performed using a standard acquisition protocol in skull base to mid-thighs region (8-10 bed positions) and an acquisition time of 2 minutes per bed position. The fused PET/CT scan was described jointly by a nuclear medicine specialist and a radiologist. PET/CT image acquisition commenced 60 ± 5 min. after the administration of a weight adjusted dose of 4 MBq/kg.

Results:

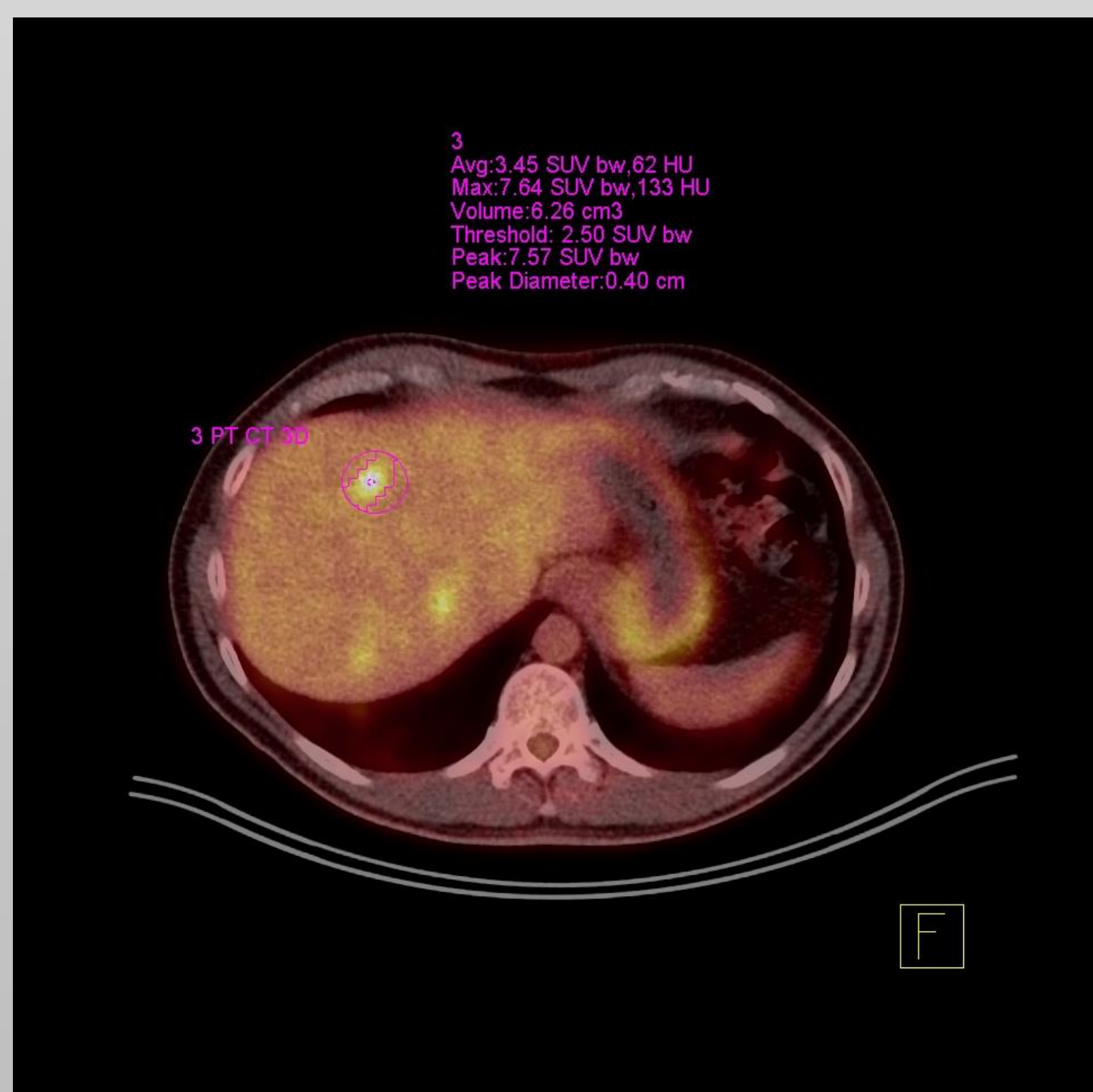
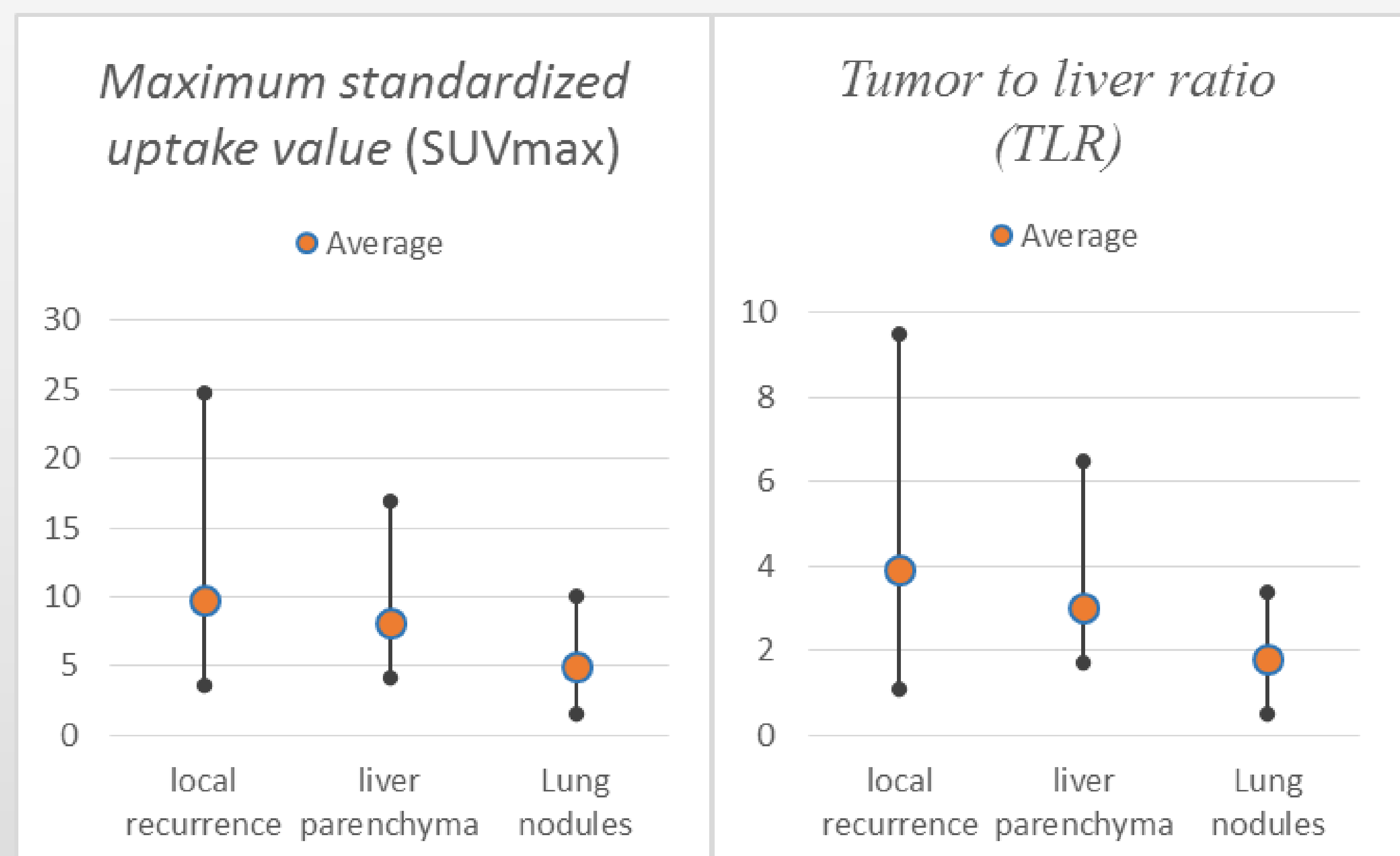


Figure 1: 47 years old man with right colon cancer treated with surgery followed by chemotherapy. FDG PET/CT show hypermetabolic lesion in right lobe of the liver

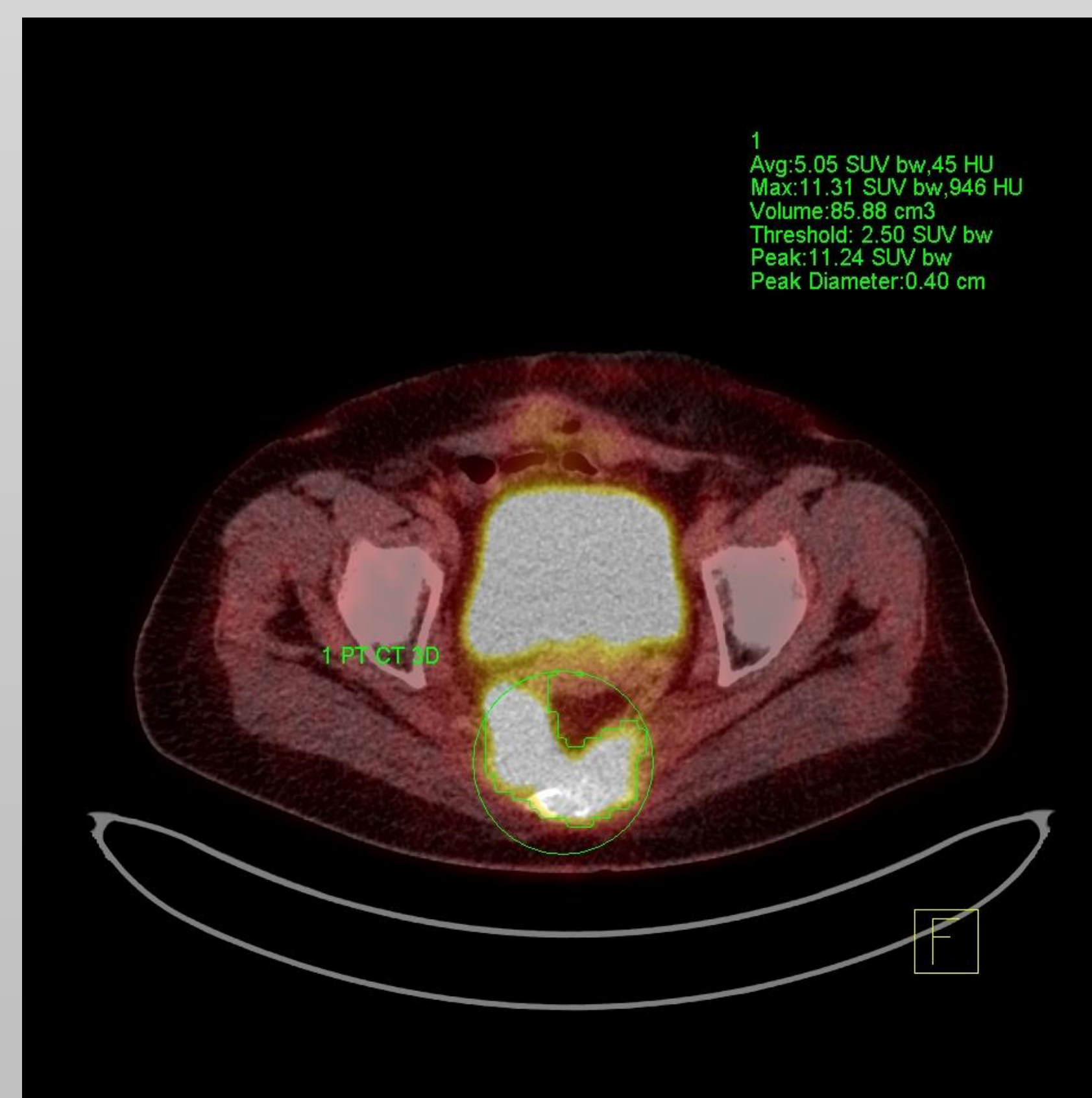


Figure 2: 70 years old woman with rectal cancer treated with surgery followed by chemoradiation. FDG PET/CT show hypermetabolic lesion presacral with involvement of the sacrum

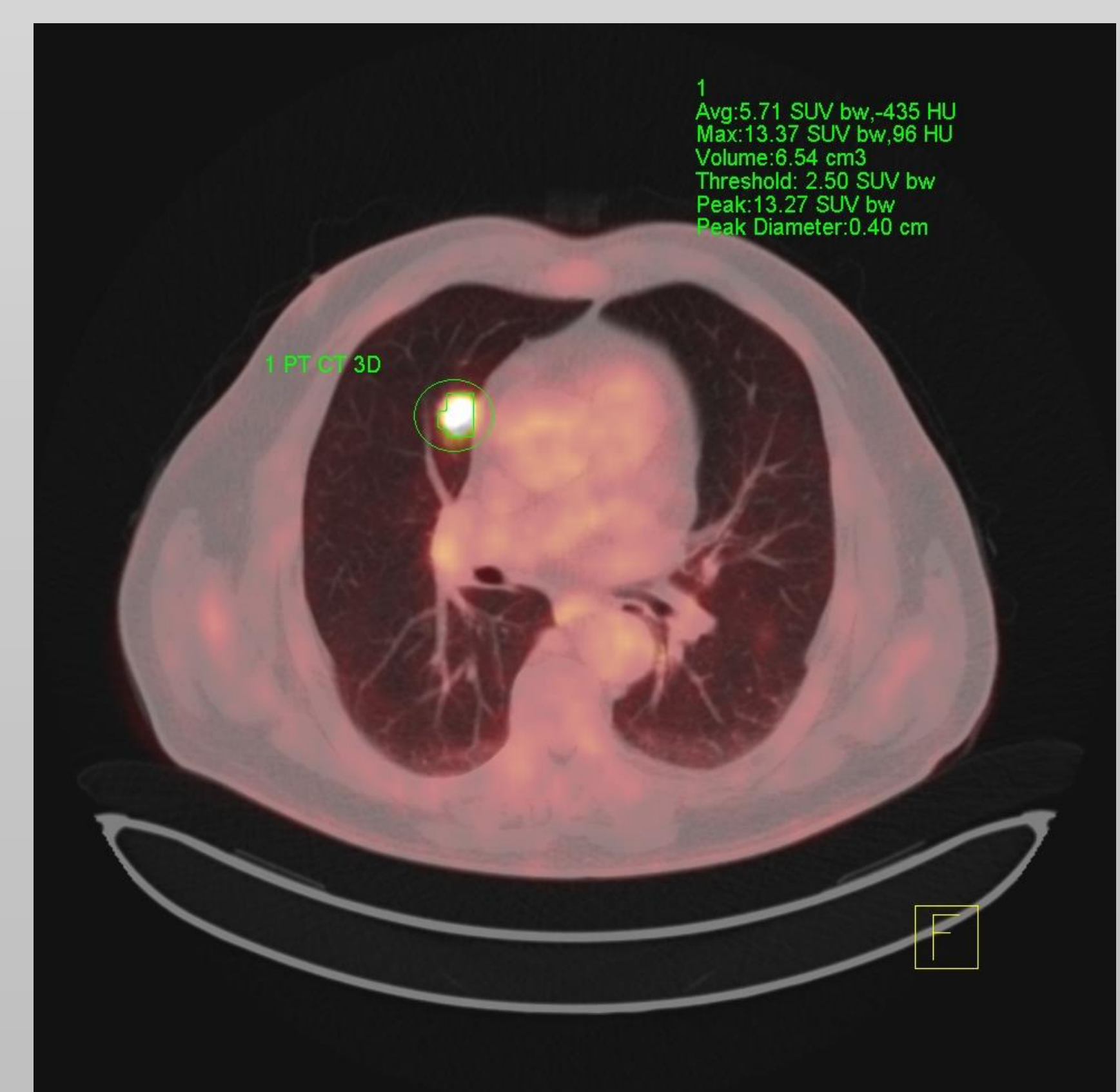


Figure 3: 50 years old man with right colon cancer treated with surgery followed by chemotherapy. FDG PET/CT show hypermetabolic lung nodule in the right lung parenchyma.

Conclusion:

The widely used semiquantitative parameters SUVmax and TLR significantly vary in local recurrence and distant metastasis in colorectal cancer. FDG uptake was highest in local recurrence, and lowest in lung metastases. Determination of a cutoff level of SUVmax and TLR is not plausible due to the wide range and it should be taken into account during the interpretation of the scans.