



# 18-FDG PET/CT in Colorectal Cancer

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Tallinn 2010



# Colorectal cancer

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- 2nd most frequent cancer in both sexes after lung carcinoma
- the 2nd most important cause of death due to cancer in the Western world
- ~70% of patients have resectable tumor and are treated with curative intent
- ~50% of patients will have hepatic metastases
- 5 year-survival is ~40%, but CRC can be cured if diagnosed and resected at an early stage

# Colorectal cancer

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- Colonic adenocarcinoma 60%
- Rectal adenocarcinoma 40%
- Adenocarcinoma usually FDG avid
- Mucinous adenocarcinoma has moderate FDG uptake -> reduced sensitivity
- Rectal cancer: locoregional recurrences, lung mets that can be isolated (hemorrhoidal veins)
- GISTs are rare, they take up FDG avidly



# Role of 18F-FDG-PET/CT:

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- Detection
- Staging
- Therapy monitoring
- Assessment of suspected recurrences



## Role of 18F-FDG-PET/CT: detection

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- High sensitivity detection of the primary tumor, but rarely used
- Clinically suspected CRC and/or elevated tumor markers (CEA), but the results of other diagnostic modalities are negative or equivocal

# Role of 18F-FDG-PET/CT:staging

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- T-stage  
MRI is the method of choice  
PET lacks spatial resolution  
PET can be useful in case of invasion of adjacent structures
- N-stage - pericolic and mesenteric lymph nodes  
In-s often contain small quantities of tumor cells and lie close to the primary tumor  
PET/CT sens. ~29%; spec. ~96%\*.

\*Rohren E et al. Clinical applications of PET in oncology. Radiology2004

# Role of 18F-FDG-PET/CT: staging

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- **M-stage** - disease spread beyond pericolic or mesenteric lymph nodes
  - via lymphatics: internal iliac nodes or retroperitoneal nodes
  - hemotogenous spread: lungs or liver -> other sites

- Detection of metastases

Liver metastases:

PET/CT sens. 97,9%; spec.97,7%; acc. 97,9%

CT sens. 91%; spec.95,4%; acc. 92,3%\*

\*Orlaccio A, Schillaci A et al.

Role of PET/CT in the detection of liver metastases from colorectal cancer. Radiol med 2009

# Role of 18F-FDG-PET/CT: staging

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- M-stage - PET/CT is the most accurate modality for detection of distant metastases
  - PET/CT affects surgical planning in ~30% of CRC patients
  - prior to metastectomy to avoid major surgery in patients with undetected distant metastases



# Role of 18F-FDG-PET/CT: treatment monitoring

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PET/CT provides a sensitive assessment of response to:

- Surgery - PET/CT after 6 weeks
- Chemotherapy - after 4 weeks
- Radiation therapy - after 4 months
- Radiofrequency ablation - after 1 week
- Early response to chemotherapy - after 1-3 cycles  
metabolic changes precede anatomic changes (CT)  
Baseline study needed

Treatment assessment may avoid futile therapies.

# Role of 18F-FDG-PET/CT: assessment of suspected recurrence

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- Most sensitive method in distinguishing postoperative fibrotic changes from recurrence in rectal cancer patients  
<100% sens., 96% spec.\*
- >95% sens. and >70% spec. for localization of relaps in patients with increased CEA
- Restage to detect locally recurrent disease, isolated metastatic disease and diffuse metastases

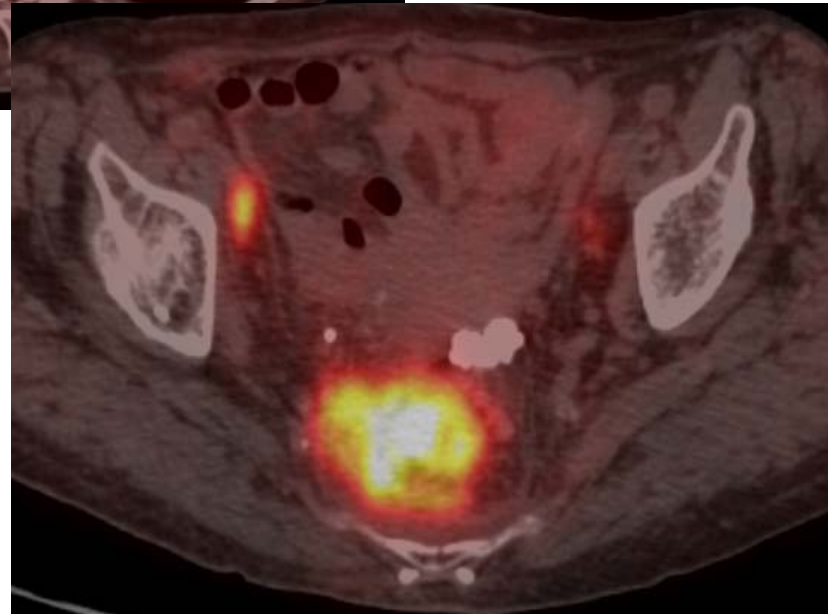
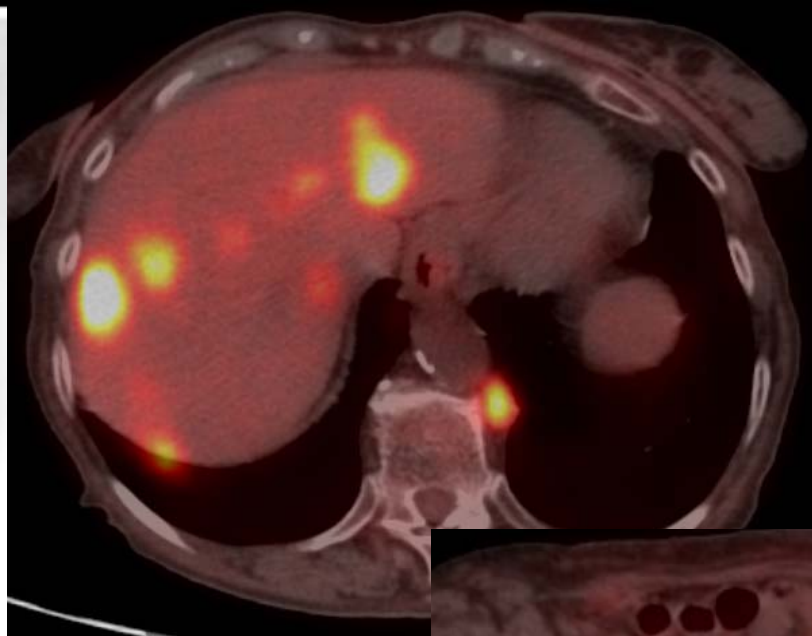
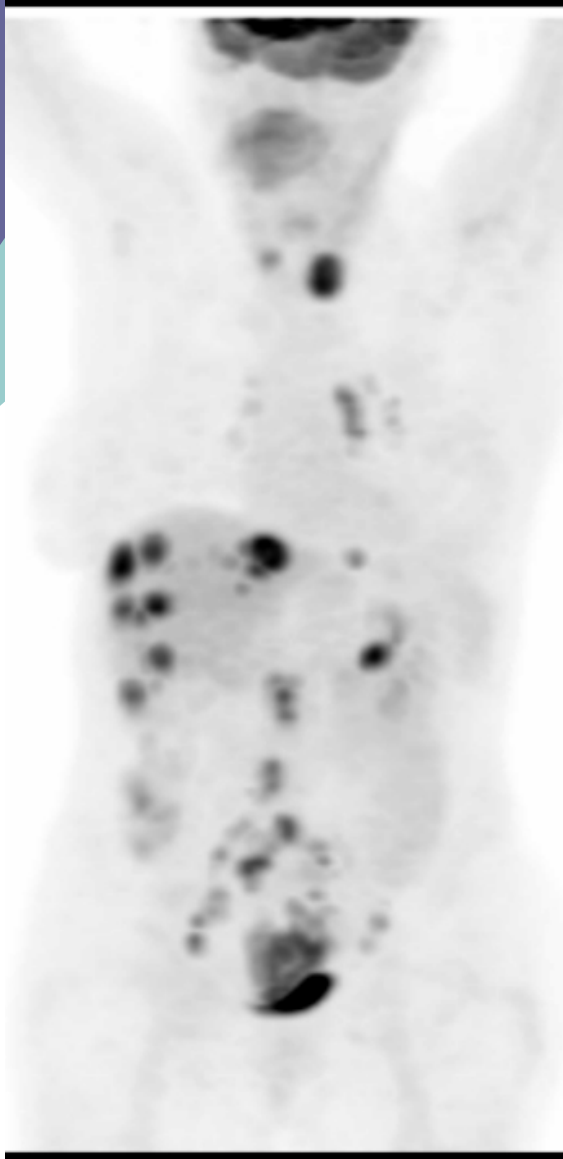
\*Even Sapir E et al Detection of recurrence in rectal cancer. Radiology2004

# 18F-FDG-PET/CT: wonderful, but not perfect

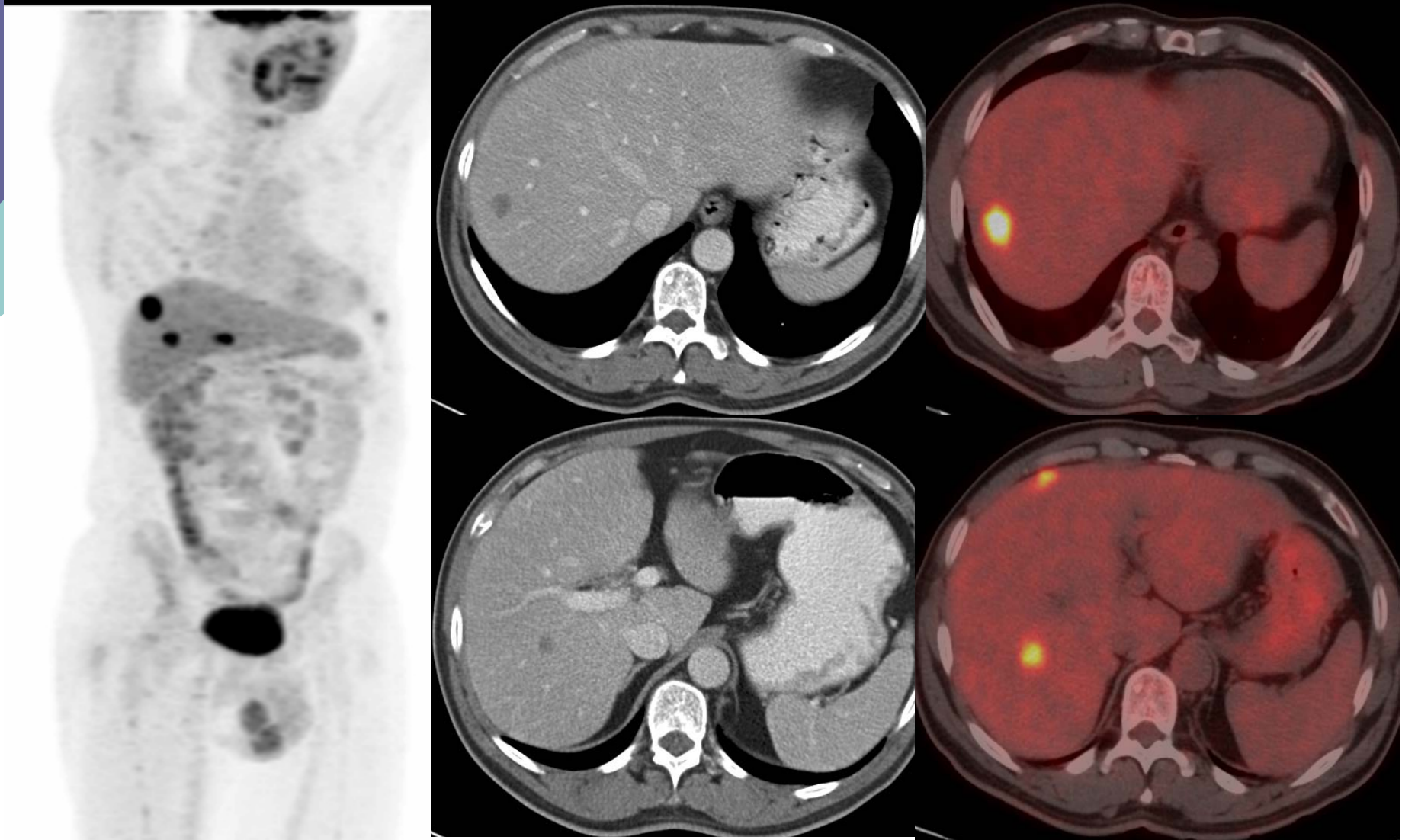
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- False-positives
  - physiological uptake
  - inflammation (diverticulitis, colitis)
  - polyps
  - postop.changes/ stoma site
- False- negatives
  - small volume disease
  - mucinous secreting tumors
  - peritoneal metastases
  - carcinoid tumors

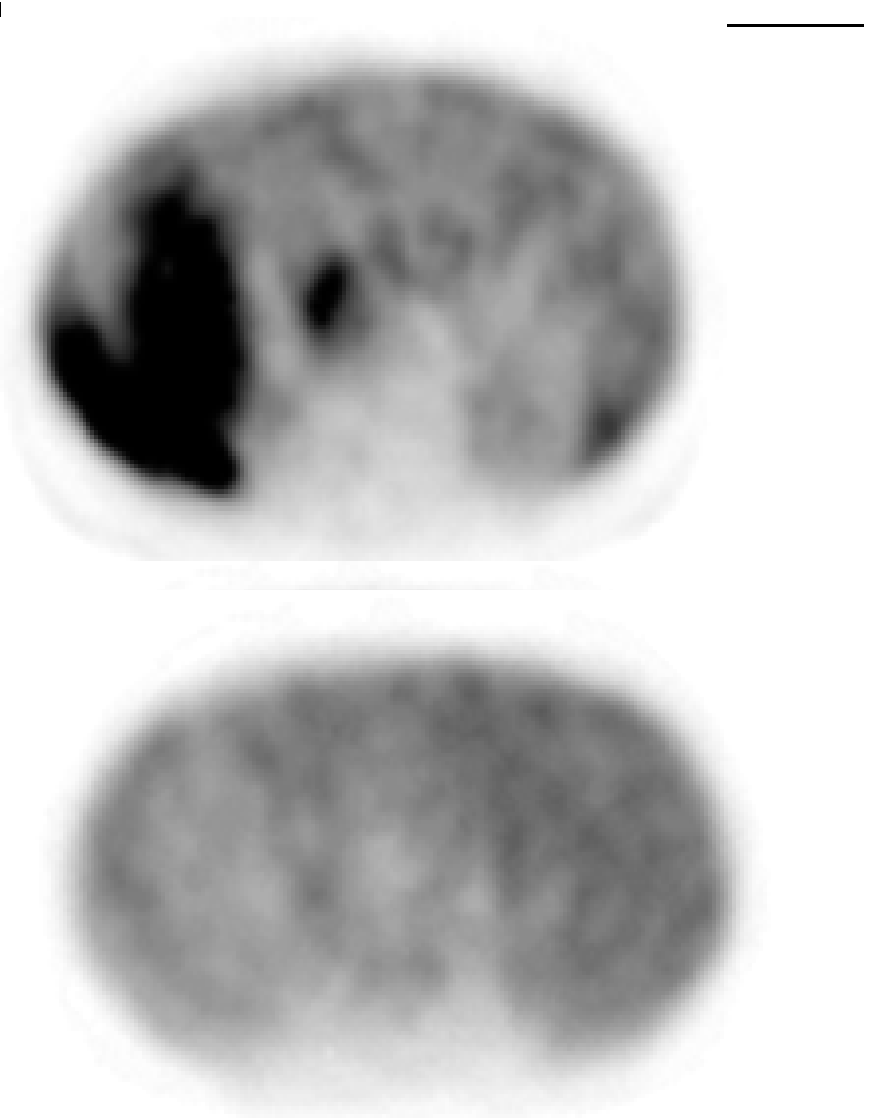
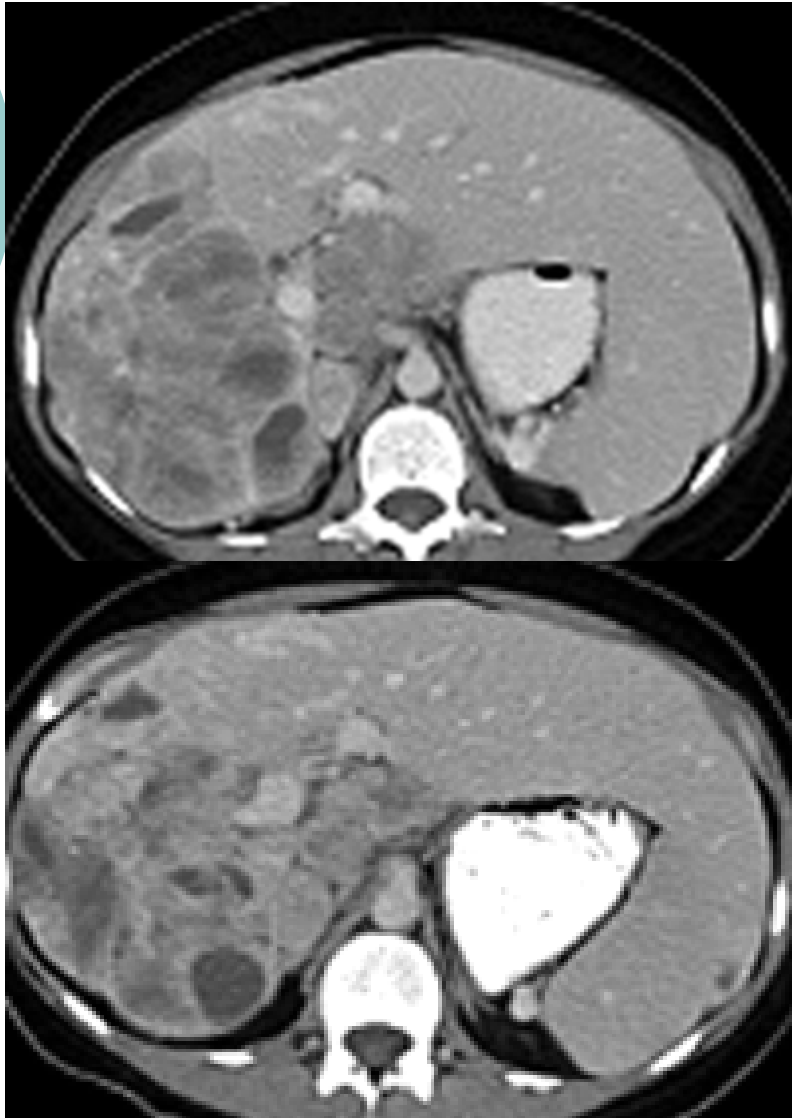
82 yo woman. Diagnosed rectal cancer. FDG-PET/CT for staging.



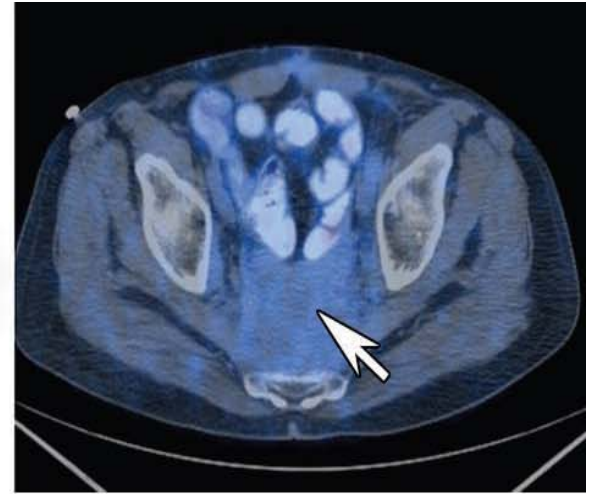
55 yo man. 1 year after curative surgery of sigmoid cancer. Elevated CEA. FDG-PET/CT for restaging.



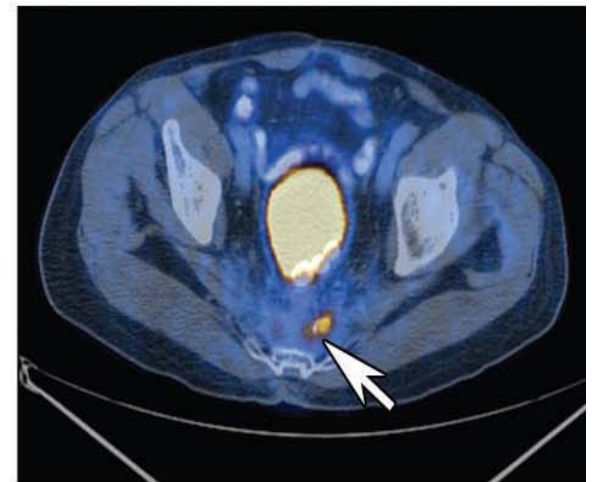
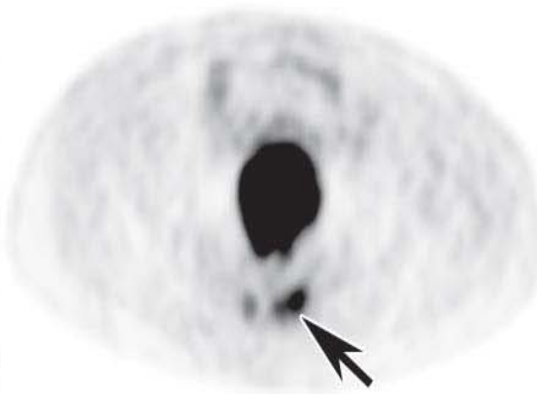
Therapy response assessment.  
Liver metastases from *GIST* prior and after therapy.



# Presacral masses after rectal cancer surgery



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# Take home!

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## Clinical indications for FDG-PET/CT in colorectal cancer patients:

- M-staging and restaging
- Prior to metastectomy
- Assessment of tumor response for therapy
- Assessment of a mass that is difficult to biopsy
- Unexplained rising of CEA and normal conventional imaging



# References:

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- Ryan, Almusa et al. Specialty Imaging PET/CT
- Lynch T.B. PET/CT in Clinical Practice
- Einat E-S, Yoav P et al. Detection of recurrence in patients with rectal cancer. Radiology 2004
- Rohren E, Turkington T, Coleman E Clinical applications of PET in oncology. Radiology 2004
- Barbaro B, Vitale R et al. Restaging locally advanced rectal cancer with MR Imaging after chemoradiation Therapy. Radiographics 2010
- Orlandi A, Schillaci O et al. Role of PET/CT in the detection of liver metastases from colorectal cancer. Radiol med 2009
- Von Schulthess et al. Integrated PET/CT. Radiology 2006
- EANM learning course on PET/CT in oncology



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**Thank you for your kind attention!**