

Clinical Area: FDG PET for colorectal cancer: Recurrence/restaging
Keywords: FDG PET, colorectal cancer, recurrence, surgery
Reference: Staib L, Schirrmeister H, Reske SN, Beger, HG. Is ^{18}F -fluorodeoxyglucose positron emission tomography in recurrent colon cancer a contribution to surgical decision making? *Am J Surg* 2000; 180: 1-5.

Study Type: Comparison of diagnostic tests

Study Aim: To evaluation the accuracy of FDG PET and its contribution to surgical decision making in patients with recurrent or metastatic colorectal cancer.

Outcomes

- *Primary:* Sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV)
- *Secondary:* Surgical management

Design

- *Number of subjects:* n=100 patients
- *Description of study population:* Patients from a German hospital. Mean age=62 (range 32-80), 42 women/58 men.
- *Inclusion and exclusion criteria:* Inclusion: Histologically proven colon (n=45) or rectal (n=55) cancer; suspected relapse after curative resection of colorectal cancer and diagnostic problem defined as any of the following: 1) restaging of rest of the body in patients with known recurrence (n=30), 2) suspected recurrence (n=32), 3) increasing CEA level (n=13), 4) unclear finding on pelvic CT (n=7) and 5) confirmation of liver or lung metastases (n=18) otherwise diagnosed. Exclusion: Routine follow-up.
- *Power:* Not discussed.

Validity

- *Independent blind comparison with a gold standard or follow-up of those not receiving the gold standard test?* Partial. Evaluators were blinded to the results of standard imaging procedures, but with the knowledge of clinical diagnosis and indication. Histological confirmation was the gold standard.
- *Was "normal" defined?* No.
- *Appropriate spectrum of disease?* Yes, for patients with recurrent disease.
- *Consecutive patients?* Not specified.
- *Methods described in enough detail to enable you to replicate the test?* Yes.
- *Reproducible results?* Yes.

Conclusions regarding validity of methods:

Advantages of the study were that it was prospective, had a reasonable sample size and FDG PET interpreters were blinded to the results of other imaging procedures. Disadvantages were that the authors did not mention whether patients were consecutive; if not consecutive, selection bias could be introduced. In addition, not all patients received all the other diagnostic tests, so the ability to compare tests is limited.

Results

Comparison of FDG PET and other imaging techniques for diagnosing malignancy in recurrent colorectal cancer

Test result	PET (n=100) %	CT (n=87) %	CEA (n=98) %
Sensitivity	98	91	76
Specificity	90	72	90
PPV	93	80	92
NPV	95	82	82

PPV=positive predictive value; NPV=negative predictive value
CT=computed tomography; CEA=carcinoembryonic antigen

FDG PET accuracy by site

Test result	Liver metastases (n=100) %	Lung metastases (n=100) %	Local recurrence (rectum) (n=55) %	Local recurrence (colon) (n=45)
Sensitivity	100	100	95	100
Specificity	99	92	97	95
PPV	97	71	95	60
NPV	100	100	97	100

Clinical relevance and impact on surgical decision-making

Very high (PET correct and all other diagnostics incorrect) = 14%
High (PET correct and one other diagnostic correct) = 47%
Medium (PET correct but offers no additional information) = 31%
None = (False positive or false negative) = 8%

In cases of high and very high relevance (61%), FDG PET results had an influence on surgical decision-making.

Authors' Conclusions

“In conclusion, FDG PET provides a powerful new tool with high accuracy for detection of malignant cells in carefully selected patients (no acute inflammation, no uncontrolled diabetes). FDG PET has certainly no indication for routine follow-up, but it can contribute significantly and with an acceptable cost-benefit ratio to surgical decision-making in diagnostic problems that will have expensive consequences, such as surgical interventions.

Reviewer's Conclusions

FDG PET was found to have high sensitivity and reasonably high specificity in this study. Sensitivity and specificity was higher than that for CT scans or CEA levels. This study may have been affected by selection bias. FDG PET results influenced surgical management for over half of the patients, but patient outcome was not reported.