METASTASES HEPATIQUES D’UN CANCER COLORECTAL: INTERET DU PET/CT AU 18FDG

Dr CHABOREL
Centre d’Imagerie Nucléaire SCINTIAZUR Mougins

www.scintiazur.fr
M+ dans 40 à 60% des cancers colo-rectaux

15 à 20% de métastases hépatiques synchrones et 20% de métastases hépatiques métachrones dans les 5 ans
INDICATIONS DU PETSCAN

- Pas d’indication dans le bilan d’extension initial
- Recommandé pour le bilan de résécabilité de métastases hépatiques (niveau B de recommandation)
- Option dans la recherche de récidive quand ACE et pas de cible sur les autres examens.
- Option dans la surveillance des lésions traitées par radiofréquence

Ref: Thésaurus National de Cancérologie Digestive®
Le PET/CT apparaît primordial en modifiant la prise en charge dans 1/4 à 1/3 des patients :

- Soit en montrant plus de métastases hépatiques
- Soit en montrant des lésions extra-hépatiques
- Soit, au contraire, en montrant qu'une lésion douteuse en TDM ne fixe pas le FDG
Impact of $^{18}$F-FDG-PET in decision making for liver metastectomy of colorectal cancer

Table 2 Potential liver resection subgroup ($n = 54$)

<table>
<thead>
<tr>
<th>Suitable for liver resection based on FDG-PET results</th>
<th>Unsuitable for liver resection based on FDG-PET results</th>
</tr>
</thead>
<tbody>
<tr>
<td>30 (55.6%)</td>
<td>24 (44.4%)</td>
</tr>
<tr>
<td>No liver disease</td>
<td>More extensive liver disease</td>
</tr>
<tr>
<td>11 (20.4%)</td>
<td>5 (9.2%)</td>
</tr>
<tr>
<td>Extra-hepatic disease</td>
<td></td>
</tr>
<tr>
<td>8 (14.8%)</td>
<td></td>
</tr>
</tbody>
</table>

FDG-PET, $^{18}$F-fluorodeoxyglucose positron emission tomography.

Table 3 Impact of FDG-PET on the management plan for the potential liver resection subgroup ($n = 54$)

<table>
<thead>
<tr>
<th>Management plan based on standard imaging</th>
<th>Management plan incorporating FDG-PET scan results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Liver surgery planned ($n = 42$)</td>
<td>1. Clinical management plan confirmed –</td>
</tr>
<tr>
<td></td>
<td>Suitable for hepatic surgery</td>
</tr>
<tr>
<td></td>
<td>18 (42.9%)</td>
</tr>
<tr>
<td></td>
<td>2. Management plan altered substantially –</td>
</tr>
<tr>
<td></td>
<td>Hepatic surgery cancelled</td>
</tr>
<tr>
<td></td>
<td>24 (57.1%)</td>
</tr>
<tr>
<td>Liver surgery being considered ($n = 12$)</td>
<td>3. Management plan altered substantially –</td>
</tr>
<tr>
<td></td>
<td>Hepatic surgery appropriate</td>
</tr>
<tr>
<td></td>
<td>12 (100.0%)</td>
</tr>
</tbody>
</table>

FDG-PET, $^{18}$F-fluorodeoxyglucose positron emission tomography.
The Impact of Fluor-18-Deoxyglucose-Positron Emission Tomography in the Management of Colorectal Liver Metastases

A Systematic Review and Metaanalysis

In conclusion, despite the apparent omissions in the literature, the pooled results clearly indicate that FDG-PET is useful in the diagnostic workup of patients with potentially resectable hepatic metastases from colorectal carcinoma. Most evident is the detection of extrahepatic disease, in which the FDG-PET demonstrated superior sensitivity and specificity compared with CT scanning. A clear influence of FDG-PET on clinical management was observed in the majority of studies.
Le PETscan au 18FDG peut détecter les récidives indépendamment du taux d'ACE.
Fig. 4. Software image fusion of CT, MRI and FDG-PET. The images show transverse slices through the liver of a patient who underwent prior RFA treatment (upper arrow) and liver resection for liver metastasis of colon carcinoma. Both CT (a) and MRI (c) are difficult to interpret in the region of the surgical clips. The PET image (b) clearly shows a recurrent liver metastasis (lower arrow), which could be localized only after image fusion with MRI (d). This permitted guided locoregional therapy.

Therapeutic Response to Radiofrequency Ablation of Neoplastic Lesions: FDG PET/CT Findings

Nilendu C. Purandare, DMRD, DNB • Venkatesh Rangarajan, DRM, DNB, Sneha A. Shah, DRM, DNB • Anshu R. Sharma, DRM, DNB • Suyash S. Kulkarni, DMRD, DNB • Aniruddha V. Kulkarni, MD • Sumeet G. Dua, DMRD

RadioGraphics 2011; 31:201–213 • Published online 10.1148/rg.311105033 • Content Codes: CT IR NM GC

Figure 1. Solitary hepatic metastasis in a 64-year-old man with rising tumor marker levels who had undergone surgery for colon cancer. (a–c) Before RFA, the axial CT image (a) shows a hypodense metastatic lesion (arrow) that is FDG avid on the axial PET (b) and fused PET/CT (c) images. (d–f) Immediately (6 hours) after ablation, the periphery of the necrotic zone is seen as a photopenic area (arrow). Note the appearance of increased FDG avidity in the center of the lesion (arrow). (g–i) The low-grade uptake is still present in the center of the ablated lesion (arrow) at 48 hours after ablation. The decreased intensity and size of the focal nodular uptake (arrow) is suggestive of complete ablation of the tumor. This lack of FDG uptake is reflected as a photopenic area on the FDG PET examination earlier than the CT image shows complete photopenia at the ablated site. Note the low-grade homogeneous and uniform distribution of FDG in the surrounding area (arrow).

Figure 2. Solitary hepatic metastasis in a 72-year-old man who had undergone surgery for colon cancer. (a–c) Two days (48 hours) after RFA, the axial PET and fused PET/CT images show low-grade FDG uptake in the periphery of the ablated area (arrowhead) caused by inflammatory changes. The focal nodularFDG uptake (arrow in e and f) is suggestive of residual disease. No corresponding abnormality is seen in the same area on the CT image (arrow in d). At follow-up PET/CT performed 4 weeks later, the axial PET (h) and fused PET/CT (i) images show an increase in the size and intensity of the focal nodular uptake (arrow), which is suggestive of unequivocal progression; the axial CT image (g) now shows an enhancing nodule (arrow), confirming progression of residual disease. There is regression of the low-grade peripheral rim of inflammatory uptake seen earlier (arrowhead). Note the early depiction of residual disease on the FDG PET images (arrow in e and f), with no obvious corresponding morphologic change on the CT image (arrow in d).

Figure 3. Hepatic metastasis in a 64-year-old man with rising tumor marker levels who had undergone surgery for rectal cancer. (a, b) Before RFA, the axial CT image (a) shows a hypoattenuating metastatic lesion (arrow) that is FDG avid on the axial PET (b) and fused PET/CT (c) images. (d–f) Two days (48 hours) after RFA, the axial CT image (d) shows a hypoattenuating area (arrow) with a peripheral enhancing inflammatory rim (arrowhead), and the axial PET (e) and fused PET/CT (f) images show low-grade FDG uptake in the periphery of the ablated area (arrowhead) caused by inflammatory changes. The focal nodular FDG uptake (arrow in e and f) is suggestive of residual disease. No corresponding abnormality is seen in the same area on the CT image (arrow in d). (g–i) At follow-up PET/CT performed 4 weeks later, the axial PET (h) and fused PET/CT (i) images show an increase in the size and intensity of the focal nodular uptake (arrow), which is suggestive of unequivocal progression; the axial CT image (g) now shows an enhancing nodule (arrow), confirming progression of residual disease. There is regression of the low-grade peripheral rim of inflammatory uptake seen earlier (arrowhead). Note the early depiction of residual disease on the FDG PET images (arrow in e and f), with no obvious corresponding morphologic change on the CT image (arrow in d).
Monitoring and predicting response to therapy with 18F-FDG PET in colorectal cancer: a systematic review.

Dans toutes les études : Valeur pronostique de la variation du SUVmax mais pas de consensus sur le moment idéal de réalisation du PET.

**FIGURE 1.** Typical example of colorectal cancer patient with nonresectable liver metastases that responded to chemotherapy. Relative to baseline (A), 85% decrease in MR<sub>glu</sub> was seen on 18F-FDG PET after 2 mo of chemotherapy (B). Transversal fused PET/CT scans are shown on left; transversal PET scans are shown on right. (Courtesy of Dr. W.V. Vogel.)
Value of DCE-MRI and FDG-PET/CT in the prediction of response to preoperative chemotherapy with bevacizumab for colorectal liver metastases

CONCLUSION
QUAND DEMANDE UN PETSCAN?

- Lésion douteuse sur les autres examens d'imagerie lors du bilan initial
- Avant d'envisager une chirurgie de métastase hépatique
- Évaluation précoce de l'efficacité d'un traitement par radiofréquence
- Détection des récidives si imagerie par CT ou IRM non concluante
- Évaluation de chimiothérapie?