In a previous issue of *The Oncologist*, O’Neil and Venook [1] described the emerging evidence of clinically relevant activity of sorafenib in patients with advanced hepatocellular carcinoma (HCC) [2, 3]. They also emphasized the difficulty of adequate response assessment of treatment with conventional anatomic imaging. In the pivotal phase III study [3], several tumors demonstrated tumor necrosis in spite of an increase in size. This discrepancy might be an explanation for the significant longer overall survival time in spite of a very low rate of radiographic response.

To improve diagnosis, functional imaging with 18F-fluorodeoxyglucose positron emission tomography (18F-FDG-PET) has emerged in the past years. For HCC, the uptake of 18F-FDG is variable, with an inadequate sensitivity of 50%–65% [4, 5]. Therefore, it cannot replace conventional imaging modalities in primary diagnosis.

However, in HCC, in addition to differentiating between tumor grades and identifying metastatic disease, 18F-FDG-PET is useful in monitoring response to therapy [4, 6]. In another issue of *The Oncologist*, Boss et al. [7] hallmark the use of 18F-FDG-PET in early response measurements to avoid ineffective therapies and unnecessary side effects.

In this context, we recently investigated the use of 18F-FDG-PET scans in patients with advanced HCC to distinguish, in an early phase, responders from nonresponders to sorafenib treatment. 18F-FDG-PET scans were performed at baseline and 3 weeks after the start of treatment, in addition to conventional imaging. Whole-body two-dimensional PET images were acquired 60–90 minutes after i.v. injection (>6-hour fasting period) of on-site produced 18F-FDG (5 MBq/kg) on a Siemens ECAT HR+ (high resolution) positron emission camera (Siemens, Knoxville, TN) with attenuation correction. Images were reconstructed via ordered subset expectation maximization (two iterations, eight subsets).

In this letter, we would like to describe two patients treated with sorafenib—a responder (Fig. 1A) and a nonresponder (Fig. 1B). In the first patient at baseline (Fig. 1A1), the 18F-FDG-PET scan showed focal uptake in the liver. After 3 weeks (Fig. 1A2), a partial response to sorafenib treatment was evident with less uptake in the liver. This was in accordance with the computed tomography scan (week 12), which showed a partial response. In the second patient at baseline (Fig. 1B1), the 18F-FDG-PET scan showed multiple lesions (in the lungs, mediastinum, and liver). After 3 weeks, the 18F-FDG-PET scan (Fig. 1B2) showed progressive disease with multiple new lesions. This was in accordance with progressive lesions on the chest x-ray and a bone scan, performed because of complaints of dyspnea and pain in the bones. This patient died of progressive disease 12 weeks after the start of treatment.

To our knowledge, this is the first report addressing the
use of $^{18}$F-FDG-PET in monitoring response to sorafenib in HCC. In conclusion, in patients with positive $^{18}$F-FDG-PET scans at baseline, an $^{18}$F-FDG-PET scan early after the start of sorafenib treatment seems to be a promising technique for monitoring early response. However, our results should be confirmed in a larger patient population.

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