Positron Emission Tomography/Computed Tomography and Biomarkers for Early Treatment Response Evaluation in Metastatic Colon Cancer

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Abstract

Background Treatment options for metastatic colon cancer (mCC) are widening. We prospectively evaluated serial 2-deoxy-2-[18F]fluoro-D-glucose positron-emission tomography/computed tomography (PET/CT) and measurements of tissue inhibitor of metalloproteinases-1 (TIMP-1), carcinoembryonic antigen (CEA), and liberated domain I of urokinase plasminogen activator receptor (uPAR(I)) for early assessment of treatment response in mCC patients.

Methods Thirty-three mCC patients scheduled for first-line chemotherapy with capecitabine, oxaliplatin (CAPOX), and bevacizumab participated; 27 were evaluated by PET/CT before treatment, after one and four treatment series. Morphological and metabolic response was independently assessed according to Response Evaluation Criteria in Solid Tumors and European Organization for Research and Treatment of Cancer PET criteria. Plasma TIMP-1, plasma uPAR(I), and serum CEA were determined.

Results Metabolic response after one treatment course predicted the ability of CAPOX and bevacizumab to induce morphological response after four treatment series with a sensitivity of 80%, specificity of 69%, and odds ratio of 13.9 (95% confidence interval [CI] 1.9; 182). Early metabolically stable or progressive disease was associated with shorter progression-free survival (hazard ratio [HR] = 3.2 [CI 1.3; 7.8]). Biomarker levels at early evaluation were associated with shorter OS (TIMP-1 per unit increase on a log-2-transformed ng/mL scale: HR = 2.6 [CI 1.4; 4.9]; uPAR(I) per 25 fmol/mL increase: HR = 1.5 [CI 1.1; 2.1]).

Conclusion This monocentric study demonstrated predictive value of early metabolic PET response and prognostic value of TIMP-1 and uPAR(I) levels in mCC treated with CAPOX and bevacizumab. Results support investigation of PET/CT, TIMP-1, and uPAR(I) guided early treatment adaptation in mCC.