PURPOSE: We prospectively evaluated the predictive value of therapy-induced reduction of tumor glucose use for subsequent response and patient survival in patients with gastric cancer treated by preoperative chemotherapy. PATIENTS AND METHODS: Forty-four consecutive patients with locally advanced gastric carcinomas were studied by positron emission tomography with the glucose analog fluorine-18 fluorodeoxyglucose (FDG-PET) at baseline and 14 days after initiation of cisplatin-based polychemotherapy. On the basis of a previous study, a reduction of tumor FDG uptake by more than 35% was used as a criterion for a metabolic response. The metabolic response in FDG-PET was correlated with histopathologic response after completion of therapy (< 10% viable tumor cells in the resected specimen) and patient survival. RESULTS: Thirty-five (80%) of the 44 tumors were visualized with sufficient contrast for quantitative analysis (two of 19 intestinal and seven of 25 nonintestinal tumors showed only low FDG uptake). In the 35 assessable patients, PET imaging after 14 days of therapy correctly predicted histopathologic response after 3 months of therapy in 10 (77%) of 13 responders and 19 (86%) of 22 nonresponders. Median overall survival for patients with a metabolic response has not been reached.
(2-year survival rate, 90%); for patients without a metabolic response, median survival was only 18.9 months (2-year survival rate, 25%; P = .002) CONCLUSION: This study prospectively demonstrates that in patients with gastric cancer, response to preoperative chemotherapy can be predicted by FDG-PET early during the course of therapy. By avoiding the morbidity and costs of ineffective therapy, FDG-PET imaging may markedly facilitate the use of preoperative chemotherapy.