Evaluation of Response to Neoadjuvant Chemotherapy for Esophageal Cancer: PET Response Criteria in Solid Tumors Versus Response Evaluation Criteria in Solid Tumors

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Abstract

Recently, PET response criteria in solid tumors (PERCIST) have been proposed as a new standardized method to assess chemotherapeutic response metabolically and quantitatively. The aim of this study was to evaluate therapeutic response to neoadjuvant chemotherapy for locally advanced esophageal cancer, comparing PERCIST with the currently widely used response evaluation criteria in solid tumors (RECIST).

Methods: Fifty-one patients with locally advanced esophageal cancer who received neoadjuvant chemotherapy (5-fluorouracil, adriamycin, and cisplatin), followed by surgery were studied. Chemotherapeutic lesion responses were evaluated using ^{18}F-FDG PET and CT according to the RECIST and PERCIST methods. The PET/CT scans were obtained before chemotherapy and about 2 wk after completion of chemotherapy. Associations were statistically analyzed between survival (overall and disease-free survival) and clinicopathologic results (histology [well-, moderately, and poorly differentiated squamous cell carcinoma], lymphatic invasion, venous invasion, clinical stage, pathologic stage, resection level, reduction rate of tumor diameter, reduction rate of tumor uptake, chemotherapeutic responses in RECIST and PERCIST, and pathologic response).

Results: There was a significant difference in response classification between RECIST and PERCIST (Wilcoxon signed-rank test, $P < 0.0001$). Univariate analysis showed that lymphatic invasion, venous invasion, resection level, pathologic stage, and PERCIST were significant factors associated with disease-free or overall survival in this study. Although multivariate analysis demonstrated that venous invasion (disease-free survival: hazard ratio [HR] = 4.519, $P = 0.002$; overall survival: HR = 5.591, $P = 0.003$) and resection level (disease-free survival: HR = 11.078, $P = 0.001$) were also significant predictors, PERCIST was also significant in noninvasive therapy response assessment before surgery (disease-free survival: HR = 4.060, $P = 0.025$; overall survival: HR = 8.953, $P = 0.034$).

Conclusion: RECIST based on the anatomic size reduction rate did not demonstrate the correlation between therapeutic responses and prognosis in patients with esophageal cancer receiving neoadjuvant chemotherapy. However, PERCIST was found to be the strongest independent predictor of outcomes. Given the significance of noninvasive radiologic imaging in formulating clinical treatment strategies, PERCIST might be considered more suitable for evaluation of chemotherapeutic response to esophageal cancer than RECIST.