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Survival Analysis of 150 Metastatic Mid-Gut Carcinoid Tumors

Jonathan Strosberg, MD, Nancy Gardener, PhD, Larry Kvols, MD

H. Lee Moffitt Cancer Center and Research Institute

Tampa, Florida, USA

Background: Contemporary survival data for small-intestinal neuroendocrine tumors (mid-gut carcinoids) is lacking due to the rarity of the disease. Information from the SEER (Surveillance Epidemiology and End Results) registry suggests a recent trend toward improving longevity (5-year survival of 50% in the 1990s vs. 36% in the 1970s and 1980s). We have hypothesized that increased utilization of newer treatment modalities including octreotide, hepatic artery embolization, and somatostatin-analog radiotherapy has yielded further improvements in survival rates.

Methods: We evaluated all cases of metastatic carcinoid tumor of the mid-gut (small bowel and cecum) seen at the H. Lee Moffitt Cancer Center between 1999 and 2003, measuring survival from time of diagnosis of metastatic disease. Survival analysis was performed using the Kaplan-Meier method. We also assessed the impact of clinical and demographic prognostic factors including age, gender, presence of carcinoid syndrome and carcinoid heart disease, and various surgical and medical treatments.

Results: One hundred fifty (150) cases of metastatic mid-gut carcinoid tumors were identified, the majority originating in the terminal ileum. Median overall survival was 94 months (95% confidence interval [CI], 79-114 months). The 5-year survival rate was 76% (95% CI, 67%-82%). The most common sites of metastatic disease included liver (90%), peritoneal tissues (47%), retroperitoneum (23%), and bone (23%). The majority of patients (89%) received octreotide therapy. Other medical treatments included hepatic artery embolization (37%), chemotherapy (23%), and peptide receptor radiotherapy (12%). Significant negative prognostic factors for survival ($P \leq .05$) included age >60

years and presence of carcinoid syndrome at diagnosis. Significant positive prognostic factors included resection of primary tumor, and hepatic cytoreductive surgery. Carcinoid heart disease occurred in 17% of cases and was not associated with any increase in mortality.

Conclusions: Survival rates have improved substantially for patients with metastatic mid-gut carcinoid tumors. Increasing utilization of newer therapies including octreotide, hepatic artery embolization, and peptide receptor radiotherapy may have improved prognosis. The frequency and morbidity of carcinoid heart disease appear to be decreasing.