

---

# Survival after Hepatic Resection for Metastatic Colorectal Cancer: Trends in Outcomes for 1,600 Patients during Two Decades at a Single Institution

Michael G House, MD, Hiromichi Ito, MD, Mithat Gönen, PhD, Yuman Fong, MD, FACS, Peter J Allen, MD, FACS, Ronald P DeMatteo, MD, FACS, Murray F Brennan, MD, FACS, Leslie H Blumgart, MD, FACS, William R Jarnagin, MD, FACS, Michael I D'Angelica, MD, FACS

---

- BACKGROUND:** This study analyzes factors associated with differences in long-term outcomes after hepatic resection for metastatic colorectal cancer over time.
- STUDY DESIGN:** Sixteen-hundred consecutive patients undergoing hepatic resection for metastatic colorectal cancer between 1985 and 2004 were analyzed retrospectively. Patients were grouped into 2 eras according to changes in availability of systemic chemotherapy: era I, 1985 to 1998; era II, 1999 to 2004.
- RESULTS:** There were 1,037 patients in era I and 563 in era II. Operative mortality decreased from 2.5% in era I to 1% in era II ( $p = 0.04$ ). There were no differences in age, Clinical Risk Score, or number of hepatic metastases between the 2 groups; however, more recently treated patients (era II) had more lymph node-positive primary tumors, shorter disease-free intervals, more extra-hepatic disease, and smaller tumors. Median follow-up was 36 months for all patients and 63 months for survivors. Median and 5-year disease-specific survival (DSS) were better in era II (64 months and 51% versus 43 months and 37%, respectively;  $p < 0.001$ ); but median and 5-year recurrence-free survival (RFS) for all patients were not different (23 months and 33% era II versus 22 months and 27% era I;  $p = 0.16$ ). There was no difference in RFS or DSS for high-risk (Clinical Risk Score  $>2$ ,  $n = 506$ ) patients in either era. There was a marked improvement in both RFS and DSS for low risk (Clinical Risk Score  $\leq 2$ ,  $n = 1,094$ ) patients.
- CONCLUSIONS:** Despite worse clinical and pathologic characteristics, survival but not recurrence rates after hepatic resection for colorectal metastases have improved over time and might be attributable to improvements in patient selection, operative management, and chemotherapy. The improvement in survival over time is largely accounted for by low-risk patients. (J Am Coll Surg 2010; 210:744–754. © 2010 by the American College of Surgeons)
- 

The role of hepatic resection as a potentially curative therapy for appropriately selected patients with metastatic colorectal cancer has been established with an actual 10-year cure rate documented in at least 1 in 6 patients.<sup>1</sup> Several large single- and multi-institutional experiences have shown 5-year overall survival rates of 35% to 60% after hepatectomy.<sup>2–5</sup> Despite improved operative strategies to

clear all detectable sites of metastases, recurrence is observed in as many as three-fourths of patients.<sup>6,7</sup> Risk of recurrence and disease-specific death after liver resection can be stratified by validated prognostic scoring systems that incorporate clinical factors serving as surrogate indicators of tumor biology.<sup>2,3,7,8</sup>

Despite improved ability to predict outcomes with snapshot clinical factors, it has been difficult to define scenarios that preclude long-term survival after resection for colorectal metastases. Effective chemotherapy, which can produce reliable and sustained treatment responses in the majority of patients, including those with initially unresectable disease, has been developed and applied routinely in recent years.<sup>9–11</sup> In addition, innovative surgical strategies, such as portal vein embolization, 2-stage hepatectomy, and extra-hepatic tumor eradication, have allowed patients with greater burdens of metastatic disease to undergo complete

**Disclosure Information:** Nothing to disclose.

Presented at the Southern Surgical Association 121st Annual Meeting, Hot Springs, VA, December 2009.

Received December 22, 2010; Accepted December 23, 2010.

From the Departments of Surgery (House, Ito, Fong, Allen, DeMatteo, Brennan, Blumgart, Jarnagin, D'Angelica) and Epidemiology and Biostatistics (Gönen), Memorial Sloan-Kettering Cancer Center, New York, NY.

Correspondence address: Michael I D'Angelica, MD, Department of Surgery, Memorial Sloan-Kettering Cancer Center, C-898, 1275 York Ave, New York, NY 10065. Email: dangelim@mskcc.org