Optimizing Outcomes in Minimally Invasive Resections of Colorectal Liver Metastases

Parit T. Mavani, MBBS; Mihir M. Shah, MD

The Minimally Invasive, Indocyanine-Guided Metastasectomy in Patients With Colorectal Liver Metastases (MIMIC) trial, a single-arm prospective multicenter cohort study conducted in 8 Dutch liver surgery centers, evaluated the accuracy of indocyanine green (ICG) in achieving margin-negative (R0) resections with minimally invasive resection colorectal liver metastasis (CRLM). Indocyanine green, 10 mg, was administered 24 hours prior to resection, and intraoperative ICG-fluorescence imaging was performed during and after parenchymal transection for real-time margin assessment. An R0 resection was defined as a distance of 1 mm or more between tumor and the resection margin. The final R0 resection rate was 92.4% in 201 patients included in the final analysis. This rate reflected an increase of 5.0% (from 87.4%) with re-resection of ICG-fluorescent tissue in the resection bed (P < .001). This modality of margin assessment reported a high specificity (90%) and negative predictive value (92%) with an acceptable sensitivity (60%) and positive predictive value (54%). Intraoperative surgical management changed in 27.9% of patients with use of ICG-fluorescence imaging.1

In the Oslo Laparoscopic Vs Open Liver Resection for Colorectal Metastases Study (Oslo-CoMet) randomized clinical trial, published in 2018, laparoscopic parenchyma-sparing liver resection of CRLM compared with an open approach was associated with significantly fewer postoperative complications (19% vs 31%; P = .02), with no significant change in the RO resection rate (71% in both groups; P = .83).2 In the Open vs Laparoscopic Liver Surgery for Colorectal Liver Metastases (LapOpHuva) randomized clinical trial published in 2019, minimally invasive liver resection compared with an open approach for CRLM demonstrated lower global morbidity (11.5% vs 23.7%; P = .02) with similar severe complications and no significant difference in the RO resection rate (95.8% vs 88.6%; P = .13).3 Both of these trials defined an RO resection similarly to the MIMIC trial with significant variability in RO resection rates. The findings suggest that each center should analyze its RO resection rate and perhaps the RO resection rate of individual surgeons to identify opportunities to improve techniques in liver resection and oncologic patient outcomes.

Survival outcomes in patients where intraoperative conversion of potentially R1 to RO resection is performed may not be different compared with R1 resection for CRLM. Intraoperative conversion of potentially R1 to RO resection may not be significantly different compared with R1 resection for CRLM. Categorizing CRLM based on RAS and BRAF status may be more predictive of oncologic outcomes.4,5 In a large multicenter retrospective study of pancreatic ductal adenocarcinoma, patients undergoing pancreaticoduodenectomy (the conversion of an intraoperative R1 margin to a final RO margin) did not demonstrate a significant difference in overall survival compared with the final R1 margin (13.7 months vs 11.9 months; P = .98).6,7 Reports from the Central Pancreatic Consortium concluded that additional resection to achieve a negative margin after a positive frozen section was not associated with improved overall survival.6,7 Achieving an RO resection should be one of the cornerstones of sound oncologic surgical resection. The MIMIC trial described the intraoperative use of ICG-fluorescence imaging and demonstrated an improvement in the final RO resection rate. It may be prudent for surgeons and their institutions to establish guidelines on using this technique, if desired, and to assess their outcomes. Future studies should aim to examine whether re-resection of ICG-fluorescent tissue to a final RO resection is associated with a difference in recurrence and survival outcomes compared with final R1 resection, categorized by RAS and BRAF status.
Optimizing Outcomes in Minimally Invasive Resections of Colorectal Liver Metastases

REFERENCES


