

Clinical Science

Combined stoma reversal and liver resection: a matched case–control study



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Abstract

BACKGROUND: Stoma reversal can be performed during liver resection (LR) in patients with colorectal liver metastases (CRCLM) whose primary colorectal tumor has been previously resected with a diverting loop ileostomy. This combined procedure is reputed to be associated with an increased morbidity. This study investigates the impact of simultaneous loop ileostomy closure (LIC) on the postoperative outcome of LR for CRCLM.

METHODS: From November 1996 to April 2012, 408 patients who underwent LR for CRCLM were retrospectively studied from a prospective database. Patients who underwent simultaneous LR and LIC were matched for the type of the main liver procedure, the use of preoperative chemotherapy and the need for greater than or equal to 6 cycles of preoperative chemotherapy with LR only patients. Intraoperative and postoperative complications were recorded and compared.

RESULTS: Twenty-four patients (6%) with simultaneous LR and LIC were matched with 72 patients with LR only. Both groups were comparable for patients' demographics and intraoperative findings. Liver related ($P = .957$) and overall postoperative morbidity ($P = .643$) rates did not differ between groups.

CONCLUSION: The combined procedure appeared to be safe when strict surgical technique is used.
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Diverting stomas are frequently performed after low colorectal and coloanal anastomoses to reduce the incidence and consequences of anastomotic complications.^{1,2} Although the benefit of temporary fecal diversion in low

anastomoses has been demonstrated with a good level of evidence,² about 25% of patients will develop complications after loop ileostomy closure (LIC),³ with widely varying reported anastomotic leak rates.^{4,5}

About 25% of patients with colorectal cancer have synchronous colorectal liver metastases (CRCLM) at presentation.^{6,7} For these patients, surgery is the only curative treatment with reported 5-year survival of 35% to 58%.^{8–11}

The optimal strategy for resectable synchronous CRCLM remains controversial. Some surgeons favor a staged approach with initial resection of the primary colorectal tumor followed by liver resection (LR) about

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2 months later.¹²⁻¹⁴ Proponents of the staged approach fear an increased morbidity of the simultaneous procedure, which may delay adjuvant systemic chemotherapy.¹² The specific concern in this setting is a possible higher frequency of intestinal anastomotic leakage because of bowel edema and translocation of intestinal bacteria to the liver transection bed, both favored by liver pedicle clamping.^{12,15-17}

Patients with synchronous liver metastases of rectal cancer frequently undergo a first rectal resection with a diverting ileostomy loop followed by a few cycles of chemotherapy. LR is then usually performed as soon as possible (after 2 to 6 cycles) to minimize the effects of prolonged preoperative systemic chemotherapy on the remnant liver parenchyma¹⁸ and LIC can be simultaneously performed.

Other patients treated for colorectal cancer keep longer their diverting loop ileostomy because of anastomotic complications. Synchronous or metachronous CRCLM can lead to LR that can also be associated to LIC.

This study aimed to investigate the impact of combined LIC on the postoperative morbidity and length of hospital stay after a LR for CRCLM.

Patients and Methods

From November 1996 to April 2012, all patients who underwent LR with curative intent for CRCLM, included in a prospective database, were retrospectively reviewed. Synchronous CRCLM was defined as diagnosed before or within 6 months following the diagnosis of the primary tumor. Preoperative assessment included thoracoabdominal computed tomography, magnetic resonance imaging, and, since 2007, a [18-F]-fluoro-deoxyglucose-PET scan. Intraoperative ultrasound was used to assess the extent of liver involvement and to define the transection plane. Intermittent clamping of the hepatic pedicle (Pringle's maneuver) was used to decrease the blood losses whenever needed. The decision to perform simultaneously LR and LIC was at discretion of the surgeon because of the lack of established preoperative criteria dictating the therapeutic sequence. The combined procedure (LR + LIC) followed a strict protocol and was entirely performed by the surgical team performing LR. Closure of the loop ileostomy was first performed through a dedicated peristomal incision. Manual 4-0 absorbable single-layer small bowel anastomoses were performed. Peristomal incision was closed using a pursestring skin closure technique as described by Banerjee in 1997.¹⁹ The skin of the operating field was then cleaned up "de novo" before LR, and instruments, dressing of the surgical field, and surgeons' gloves were changed. Thus, the ileal anastomoses were constructed before the potentially deleterious effects of pedicle clamping on bowel wall, and bacterial contamination of the operative field of the secondary LR was minimized. Clamping of the hepatic pedicle was

performed whenever needed to reduce the blood losses, using an intermittent (15 minutes/5 minutes) mode to reduce splanchnic edema.

Each patient who underwent the combined procedure (LR + LIC) was manually matched to 3 patients (1:3 basis) who underwent LR only. The matching criteria were the type of the main liver procedure (ie, right/left hepatectomy, right posterior sectionectomy, left lateral sectionectomy, nonanatomical metastasectomy), the use of preoperative chemotherapy, and the need for greater than or equal to 6 cycles of preoperative chemotherapy. One criterion among the 3 was allowed to be not exactly matched if no better match was possible by screening the whole database. Number of resected (whether completely or partially) liver segments and type of chemotherapy (Oxaliplatin/Irinotecan based vs 5-FU alone) were also matched whenever possible. The investigators were blinded during matching procedure for the postoperative morbidity.

Studied primary end points included postoperative complications and mortality. Postoperative morbidity was graded according to Dindo and Clavien's classification.²⁰ Hepatic insufficiency was defined by an increased international normalized ratio and concomitant hyperbilirubinemia on or after postoperative day 5.²¹ Biliary fistula was defined as bilirubin concentration in the drain fluid at least 3 times the serum bilirubin concentration on or after postoperative day 3 or as the need for radiologic or operative intervention to treat biliary collections or bile peritonitis.²² Post hepatectomy hemorrhage was defined as a drop in hemoglobin exceeding 3 g/dL postoperatively compared with the postoperative baseline level or performance of postoperative transfusion of packed red blood cells or the need for radiological embolization or relaparotomy to stop active bleeding or drain hemoperitoneum.²³ Ascitis, hepatic insufficiency, biliary fistula, abscess in the LR bed, and hemorrhage from the LR bed were considered as "liver-related" complications. Postoperative mortality was defined as any death occurring within 90 days after surgery.

Statistical analysis

Statistical analysis was carried out with the SPSS 20.0 statistical package (IBM Corporation, Los Angeles, CA). Continuous variables were expressed as median (range) or mean \pm standard deviation and were compared with the *t* test. Categorical variables were compared with the chi-square test or Fisher's exact test, as appropriate. Values of *P* less than or equal to .05 were considered as statistically significant. This study was approved by the Institutional Review Board of the Saint Antoine Hospital.

Results

From November 1996 to April 2012, 408 patients underwent LR with curative intent for CRCLM. Among them, 24 patients (6%) who underwent a combined

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