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ORIGINAL ARTICLE – COLORECTAL CANCER

An Optimal Approach for Laparoscopic D3 Lymphadenectomy Plus Complete Mesocolic Excision (D3+CME) for Right-Sided Colon Cancer

Daxing Xie, MD, PhD, Chaoran Yu, MD, PhD, Chun Gao, MD, PhD, Hasan Osaiweran, MD, PhD, Junbo Hu, MD, PhD, and Jianping Gong, MD, PhD

Department of GI Surgery, Tongji Hospital, Tongji Medical College, Huazhong University of Science and Technology, Wuhan, Hubei, People's Republic of China

ABSTRACT

Background. It is common knowledge that high ligation of blood vessels at the D3 level and complete mesocolic excision (CME) are two critical points of right hemicolectomy for right colon cancer (RCC).[1–5] To date, a safe strategy for completing these two procedures under laparoscopic surgery has not been extensively described. The authors provide a video to demonstrate laparoscopic right hemicolectomy (D3 + CME) with an optimal mesentery-defined approach. By identifying three "tri-junctions," this approach facilitates dissection of the entire mesocolon along the embryologic planes as far centrally as possible and enables the high tie of feeding vessels at bifurcation. The authors propose that this approach is safe, decreases blood loss, and is a secure method for right colon cancer intervention.

Methods. Between June 2014 and June 2015, the study recruited 36 patients with informed consent, and these patients underwent laparoscopic D3+CME for right colon cancer by a single surgeon. All the participants provided informed written consent to participate in the study. This study was approved by the Tongji Hospital Ethics Committee. The patients' demographics, oncologic characteristics, postoperative outcomes within 30 days, and follow-up data were collected. The perioperative outcomes included blood lost, number of retrieved lymph nodes, postoperative hospital length of stay, and morbidity. The postoperative 30-day morbidity included cardiovascular, pulmonary, and urinary complications, as well as wound infection, anastomotic leakage, and postoperative ileus. The complications were diagnosed and categorized based on relevant clinical manifestations. For this procedure, all patients are placed in the Trendelenburg position, with five trocars inserted. Carbon dioxide (CO_2) is inflated through the intraumbilical trocar, maintaining steady intraabdominal pressure. The operating surgeon stands between the patient's legs, with the camera holder on the left and the assistant on the right. The operation table will be rotated left side up to redistribute the small bowels. The standard surgical procedures shown in the video are as follows. First, the surgeon identifies the first "tri-junction" (TJ1) in the ileocolic area (TJ1 is the fusion point of the mesocolon, the visceral peritoneum, and the intestinal mesentery). The surgeon then incises along the fusion fascia and separates the loose connective tissues with an ultrasonically activated device. Mobilization is continued to the origins of the ileocolic vessels, which are clipped and cut. The posterior mesocolic fascia is bluntly separated from the inferior mesentery bed, which is formed by duodenum, Gerota's fascia, and nearby structures. The second part of duodenum and the head of pancreas are exposed. Next, the surgeon mobilizes along the superior mesentery vein (SMV) and superior mesentery artery (SMA), with blunt dissection of the covering fascia and loose connective tissue to preserve

Video presented as an invited lecture at the 70th Annual Meeting of the Japanese Society of Coloproctology (70 JSCP), 2015, Nagoya, Japan.

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D. Xie, MD, PhD
e-mail: dxxie@tjh.tjmu.edu.cn

J. Gong, MD, PhD
e-mail: jpgong@tjh.tjmu.edu.cn

the entire mesocolon completely and as far centrally as possible. Careful dissection is continued until the middle colic vessels (middle colic vein and middle colic artery) are reached. Afterward, the superior right colic vein of Henle's trunk is exposed and divided at the root. One pack of gauze is inserted beneath the mobilized mesocolon. Second, the surgeon divides the greater omentum. Entrance to the omental bursa is established after the second "tri-junction" (TJ2) is identified (TJ2 is the fusion point of the transverse mesocolon, the mesogastrium and the greater omentum). The fusion plane is bluntly separated between the transverse mesocolon (TM) and the right gastroepiploic mesentery (RGEM) until the previously placed gauze is exposed. Finally, the third "tri-junction" (TJ3) is identified (TJ3 is the fusion point of the retroperitoneum, the mesocolon, and the lateral peritoneum) at the inferior attachments of cecum. The ascending colon is freed up with mobilization of the lateral retroperitoneal attachments from the cecum to the hepatic flexture. Special attention should be paid to avoid breaking the fascia renalis. The tumor carrying the colon is exteriorized through an abdominal incision with a wound protector. Continuity of the digestive tract is performed extracorporeally with side-to-side ileotransverse colon anastomosis using a linear stapler. All the treatments follow standardized recovery protocols.

Results. This study recruited 20 males and 16 females. The median age was 56.5 years, and the median body mass index (BMI) was 22.1 kg/m^2. Twelve patients had experienced previous abdominal surgery. No intraoperative complications occurred. The tumor was located in the ileocecus of 14 patients and in the hepatic flexture of 22 patients (Supplemental Table 1). The median number of retrieved lymph nodes was 20 (interquartile range [IQR], 14.8–27 (Supplemental Table 2). The median volume of blood lost was 5 ml (IQR 5–10 ml). The median postoperative hospital stay was 10 days (IQR 9–12.3 days). One patient received treatments from the intensive care unit (ICU). One patient underwent reoperation for incision dehiscence. Seven patients had a postoperative complication diagnosed within 30 days (Supplemental Table 3). The median follow-up period was 12 months (IQR 3–20) months. All the patients received adjuvant chemotherapy, with no case of recurrence (Supplemental Table 4).

Conclusion. An optimal mesentery-defined approach for laparoscopic D3 + CME allows for ligation of feeding vessels at their bifurcation and for CME to be performed simultaneously with technical efficiency. This procedure is safe and strongly practical for advanced right colon cancer intervention.

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