Laparoscopic Right Hemicolectomy with Radical Lymph Node Dissection Using the No-Touch Isolation Technique for Advanced Colon Cancer

Junko Fujita, Ichiro Uyama, Atsushi Sugioka, Yoshiyuki Komori, Hideo Matsui, and Akitake Hasumi

Department of Surgery, Fujita Health University School of Medicine, 1-98 Dengakugakubo, Kutsukake-cho, Toyoake, Aichi 470-1192, Japan

Abstract The treatment of advanced right-sided colon cancer presents numerous challenges for the surgeon who must aim to minimize the invasiveness of surgery, achieve curative resection, and prevent port-site recurrences. To overcome these issues, we performed a totally intra-abdominal laparoscopic right hemicolectomy with radical lymph node dissection based on a no-touch isolation technique. To perform this no-touch technique, we initially dissected the lymph nodes along the surgical trunk, then transected the transverse colon, terminal ileum, and mesentery without tumor manipulation. Finally, the right side of the colon was freed retroperitoneally. We performed this surgical technique on three patients and no intraoperative complications were encountered. Curative resection was achieved in all three patients, as curability A according to the Japanese Classification of Colorectal Carcinoma, and their postoperative courses were uneventful. Therefore, this novel technique proved to be both feasible and safe. Furthermore, it enabled us to minimize the invasiveness of surgery, while providing clear access to resect the right-sided advanced colon cancer.

Key words Laparoscopic right hemicolectomy · Lymphadenectomy · No-touch isolation technique

Introduction

The current oncological standards for performing curative surgery of colon cancer include en bloc resection, the no-touch isolation technique, proximal lympho-vascular ligation, and complete lymphadenectomy. While left-sided colon cancer can be treated by laparoscopic high ligation of the inferior mesenteric artery or extended lymphadenectomy, neither of which is technically difficult, right-sided colon cancer poses unique problems related to the difficulties associated with laparoscopic lymph node dissection along the surgical trunk. Furthermore, in transverse colon cancer, a high ligation of the middle colonic vessels is very difficult and hazardous. Therefore, in colectomies requiring high ligation of the middle colonic vessels, laparoscopy-assisted surgery or hand-assisted surgery has been widely adopted; however, mini-laparotomy provides a poor operative field, while hand-assisted rough visceral manipulation and inadequate no-touch techniques can result in tumor spread.

To circumvent these problems, we successfully performed a totally intra-abdominal laparoscopic technique of right hemicolectomy with radical lymph node dissection in three patients with advanced colon cancer. Using this procedure, high ligation of the middle colonic vessels was carried out employing a no-touch isolation technique. Herein, we describe this new surgical procedure and report our initial clinical results.

Surgical Technique

Under general anesthesia, the patient was placed in the reverse Trendelenburg position with a 20° head-up tilt, the legs apart, and additional tilting to the left side down so that the small bowel fell toward the left lower quadrant. The surgeon stood to the left of the patient, with the first assistant to the right and the camera operator between the legs of the patient. After pneumoperitoneum was established using the open technique, four 12-mm ports were placed; one in the left upper abdomen, one in the left lower abdomen, one in the right lower abdomen, and one in the infraumbilical area. A flexible electrolaparoscope (Fujinon, Tokyo, Japan) was introduced through the infraumbilical port.
First, the ventral aspect of the caudal portion of the superior mesenteric vein (SMV) was exposed using an ultrasonic aspirator (Ultrasonic Surgical Unit: USU; Olympus, Tokyo, Japan) (Fig. 1). Exposure was carried cephalad toward the caudal portion of the pancreas, and the origin of the middle colic vein was dissected. The superior mesenteric artery (SMA) was exposed on the left side of the SMV and the origin of the middle colic artery was isolated from the SMA using USU (Fig. 2). The origins of the middle colic vessels were divided with double clips, allowing for the dissection of the middle colic root nodes. The origins of the right colic vessels and ileocolic vessels were isolated and divided using double clips. These procedures permitted dissection of the right colic root and ileocolic root nodes. At this stage of the procedure, the lymph node dissection along the surgical trunk was completed.

Next, the greater omental attachments to the transverse colon were dissected from the colonic edge and the omentum was completely transected along the distal resection line using laparoscopic coagulating shears (LCS) (Ethicon Endo-Surgery, Cincinnati, OH, USA). The transverse colon was transected with a 45-mm endoscopic stapler. To properly extend the mesentery of the transverse colon and also to avoid grasping the colon, two stay sutures were placed at both stumps of the transected transverse colon. The colonic stumps were then lifted toward the anterior abdominal wall and anchored to it percutaneously, thus allowing for easy division of the mesentery. This transection of the suspended mesentery was performed from the stump of the middle colic vessels up to the edge of the transverse colon using the LCS (Fig. 3).

The ileum was divided 5 cm distal to the terminal ileum using the endoscopic stapler. Dissection of mesentery was begun just medial to the base of the appendix and carried cephalad, medially and to the left toward the inferior edge of the duodenum. Next, the ileal mesentery was divided from the stump of the ileocolic vessels up to the edge of the ileum using the LCS. The right colonic mesentery was completely dissected retroperitoneally, without division of the lateral perito-