



Application and Outcomes of a Standardized Complete Mesocolic Excision with Central Vessel Ligation Technique in Patients with Advanced Right-Sided Colon Cancer

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Introduction

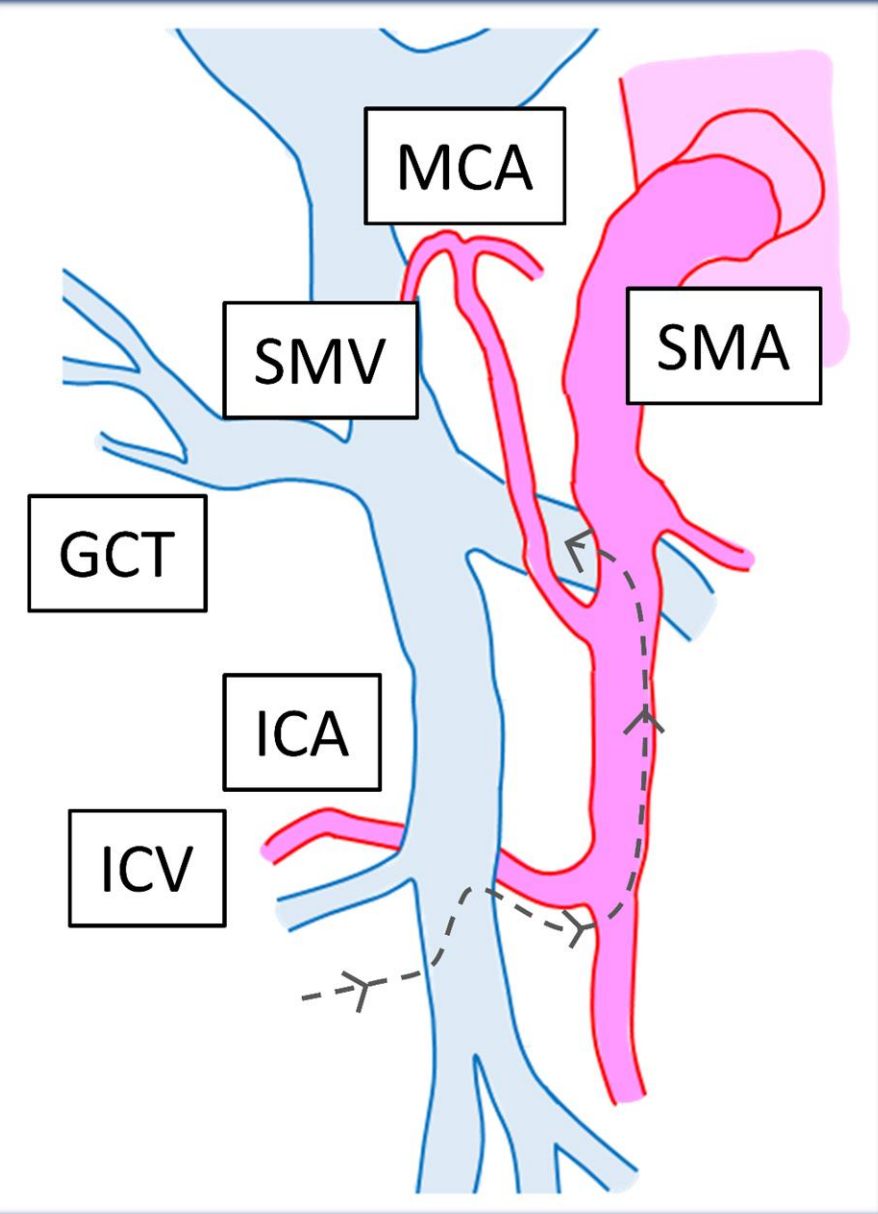
Complete mesocolic excision (CME) with central vessel ligation (CVL) is important for accurate staging and improving the prognosis of right-sided colon cancer. Although the procedure is often performed laparoscopically, approaching the ileocolic artery and middle colic artery is technically demanding, especially when complete ligation of the arteries at their roots is desired. The complicated anatomy and individual differences contribute to the challenge.

We standardized a laparoscopic CME with CVL technique to facilitate the procedure and ensure optimum lymph node dissection within the region of the ileocolic and middle colic arteries, and we assessed perioperative and short-term outcomes.

Study patients

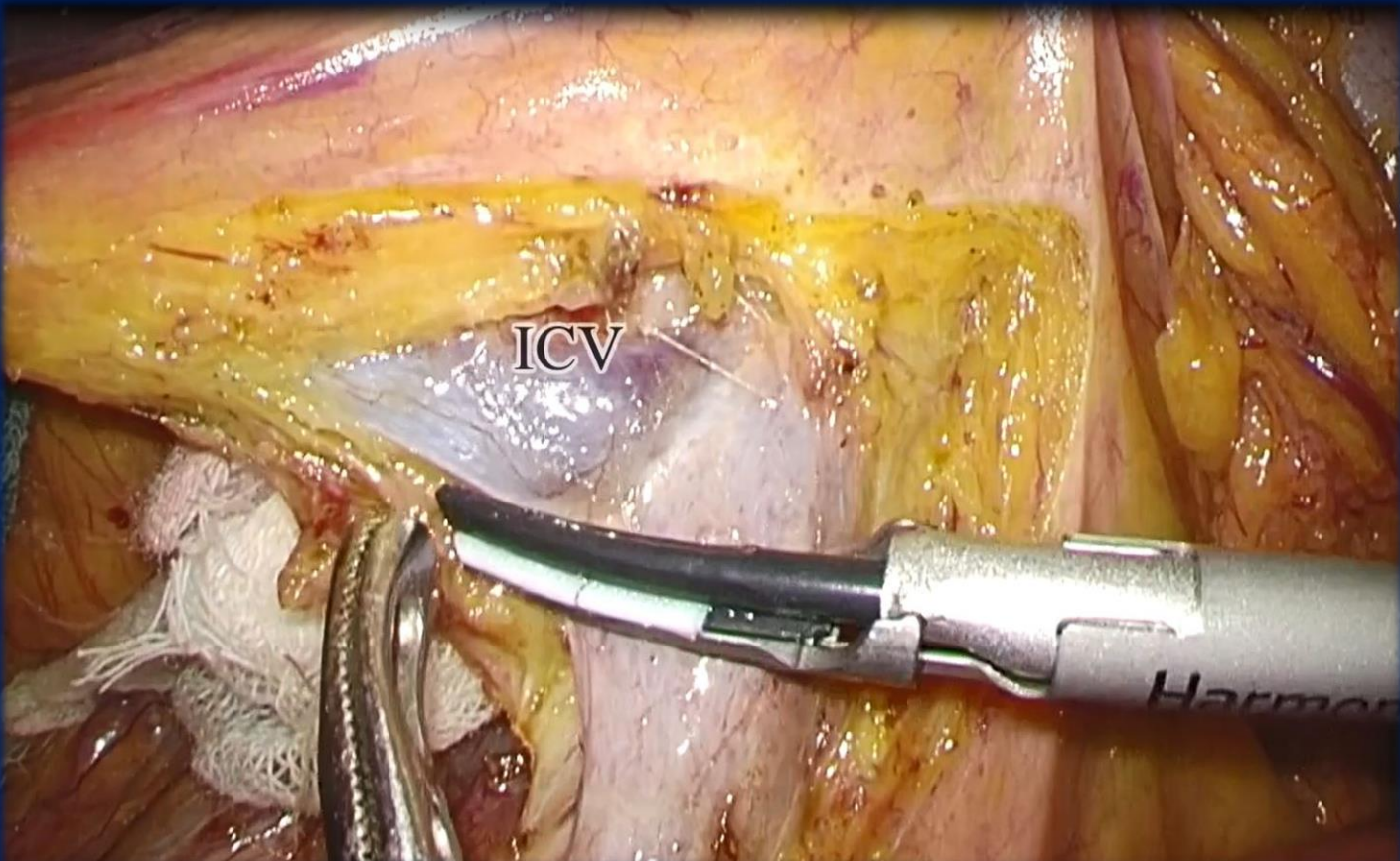
We applied the our standardized procedure in 41 consecutive patients undergoing laparoscopic extended right hemicolectomy with D3 lymphadenectomy for advanced right-side colon cancer at Kanagawa Cancer Center between May 2015 and January 2019.

Surgical technique

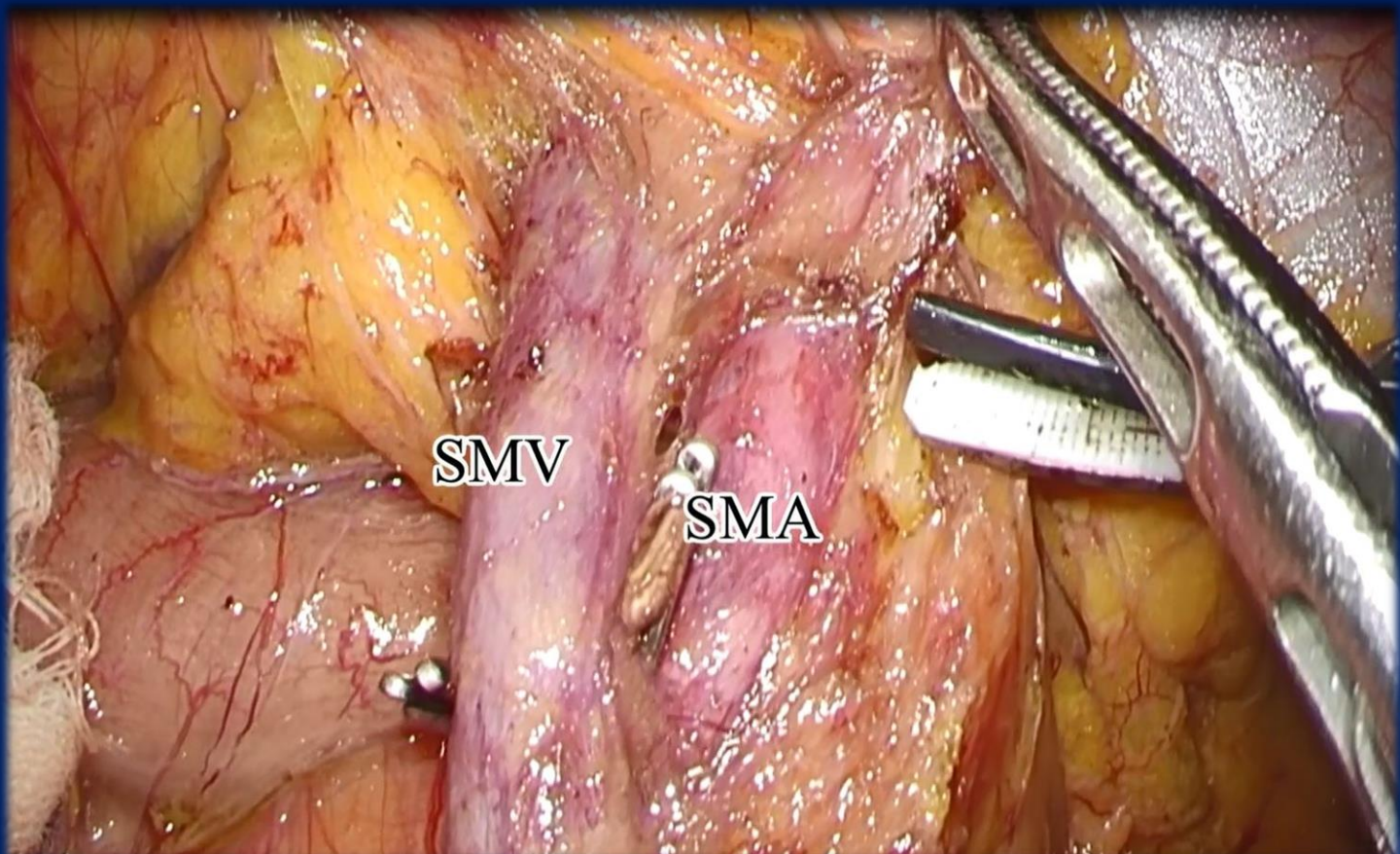
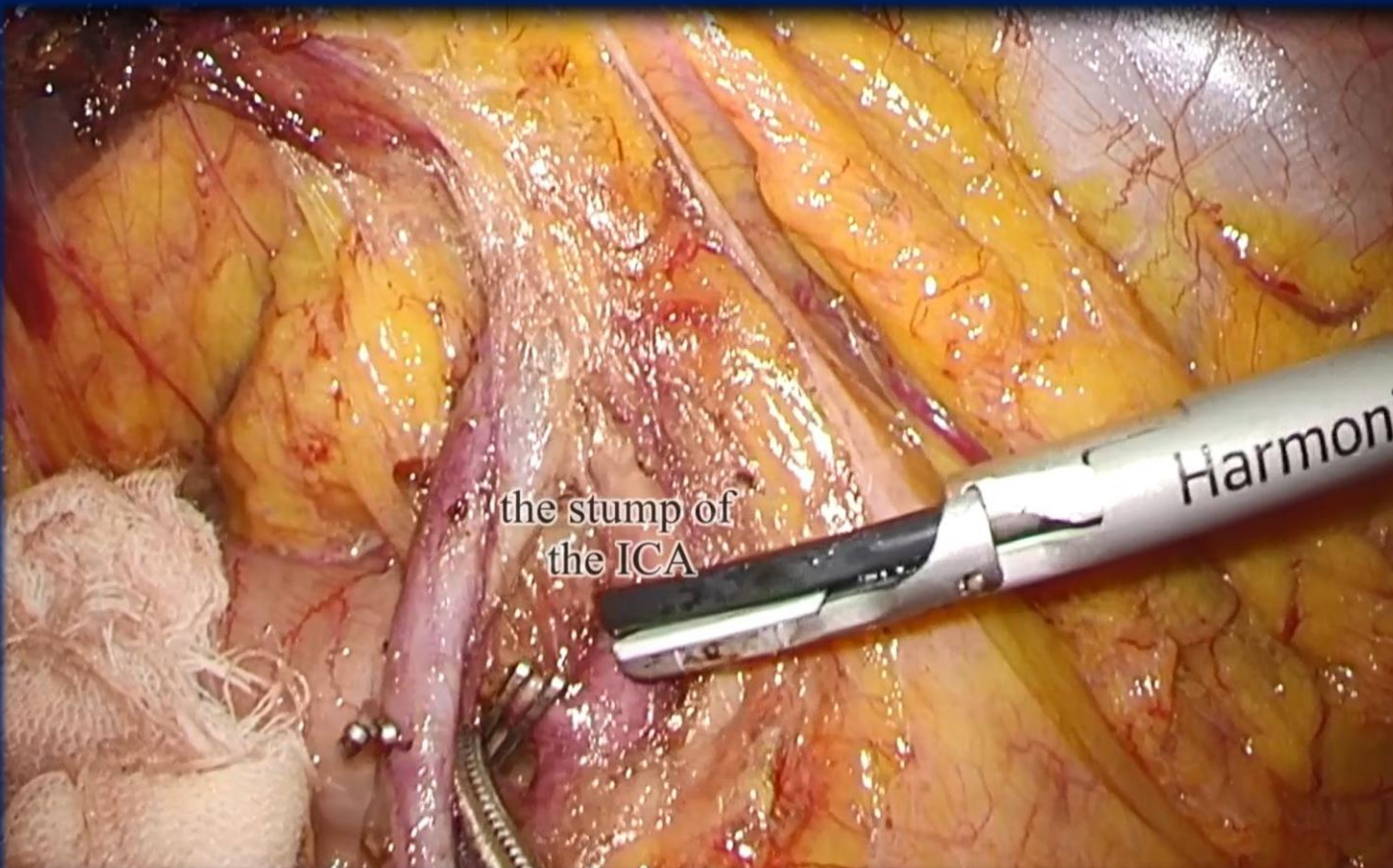
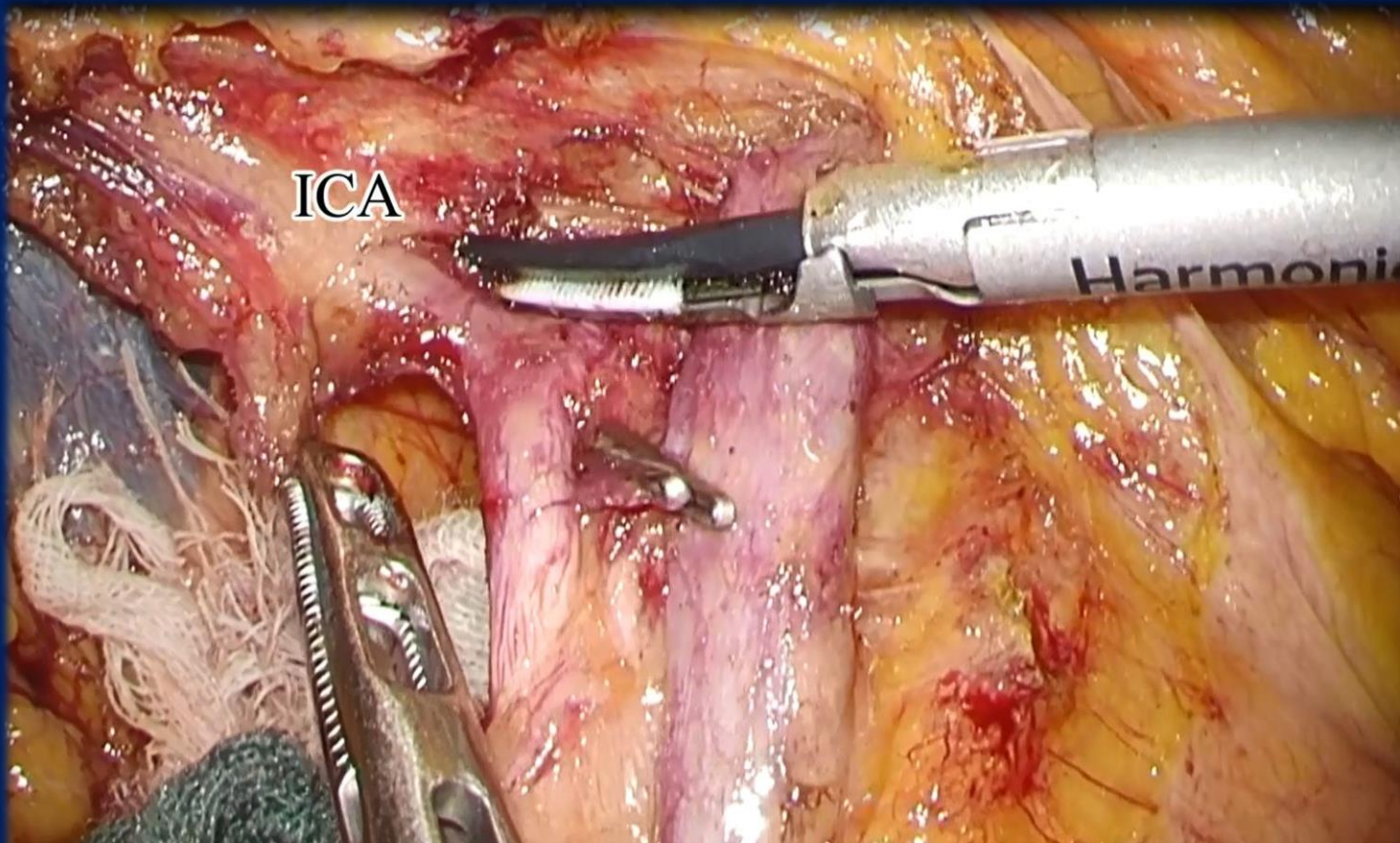


The laparoscopic extended right hemicolectomy was performed with ligation of the ICA and MCA at the roots, as D3 lymphadenectomy.

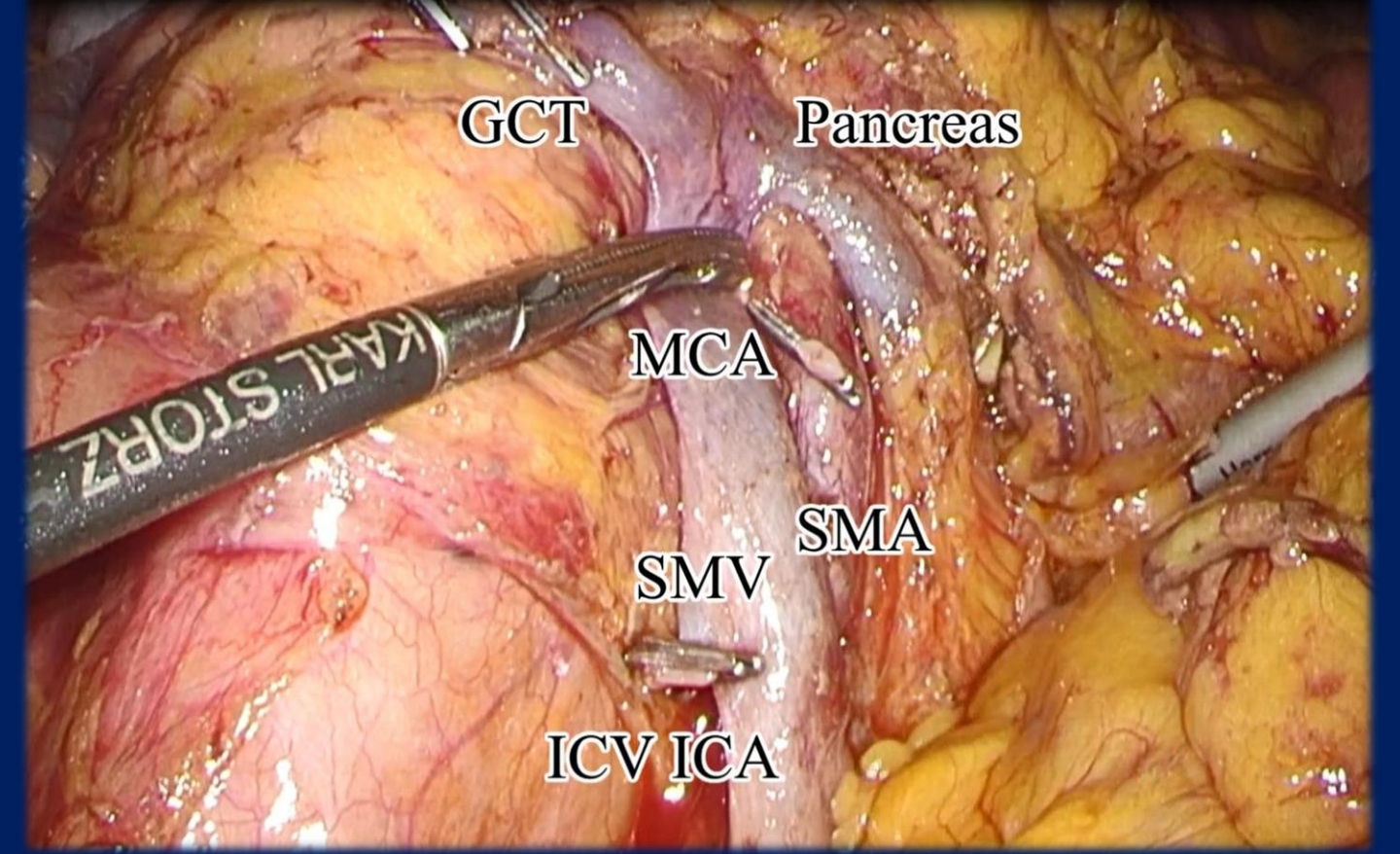
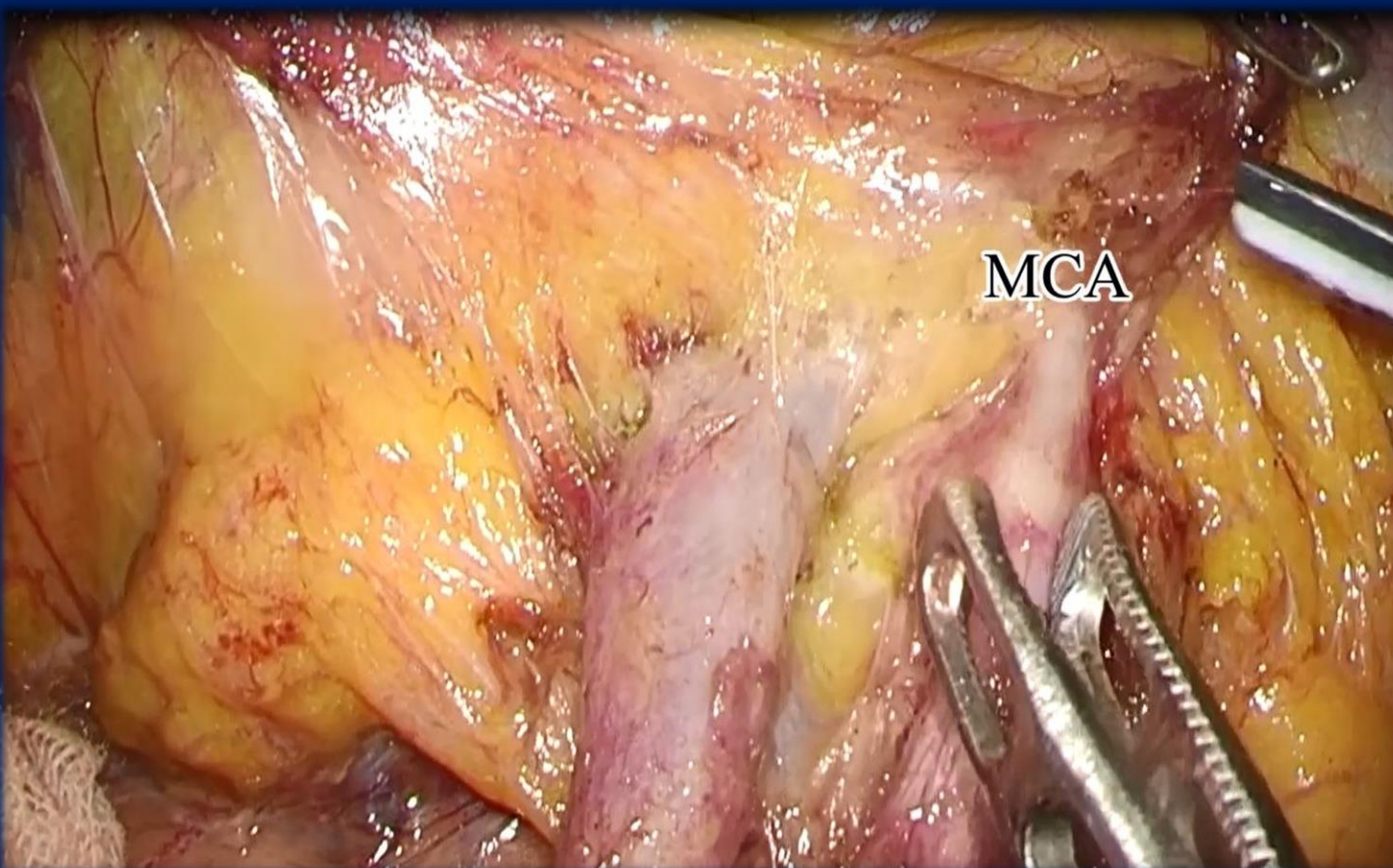
The right mesocolon is first fully mobilized from the right iliac fossa, mesocolon dissection is begun below the ileocolic vessel pedicle (ICA and ICV) and proceeds along the superior mesenteric vein (SMV), exposing the ICV.



In most cases, we dissect the ICV first to mobilize the SMV. The SMA is then easily identified to the right and behind the SMV. The root of the ICA is then exposed, and the ICA is ligated at its root.



Separation of the mesocolon should be advanced along the ventral side of the SMA. We think that grasping the tissue around the stump of the ICA is important to the performance of lymph node dissection in this area.



The mesocolon separation is easily continued to the level of the root of the MCA with the use of an energy device, providing cranial traction on the SMA. After ligation of the MCA, the lymph node dissection is continued upward until the pancreas is reached for D3 lymphadenectomy.

Results

Median age was 71 years (49–86). Lymph node metastasis was detected preoperatively in 16 patients (39.0%). Primary tumor was located at the ascending colon in 25 patients (61.0%) and transverse colon in the remaining 16 (39 %).

Median operation time was 285 minutes (190–470 minutes), and median blood loss volume was 40 mL (5–290 mL). Conversion to open surgery was required in 1 case.

Proximal margin	160 (95–800) mm
Distal margin	115 (75–225) mm
Positive resection margin	0
Number of lymph nodes harvested	
Total	46 (15–101)
Intermediate	3 (0–18)
Main	5.6 (0–17)

Table 2. Histopathologic examinations

Complications	Clavien-Dindo class					
	Grade I	Grade II	Grade IIIa	Grade IIIb	Grade IV	Grade V
Anastomotic leakage	0	0	0	0	0	0
Anastomotic bleeding	0	0	0	0	0	0
Prolonged ileus	4	0	2	0	0	0
Diarrhea	4	3	0	0	0	0
Urinary tract infection	0	1	0	0	0	0
Wound infection	2	1	1	0	0	0
Pancreatic fistula	2	0	0	0	0	0
Enterocolitis	1	1	0	0	0	0
Pneumonia	0	1	0	0	0	0
Total complications	13	7	3	0	0	0

Table 1. Postoperative complications (n=41)

Median postoperative hospital stay was 10 days (7–35). There was no postoperative mortality. Clavien-Dindo grade III or above complications occurred in 3 patients (7.3%) (Table 1).

The median number of lymph nodes harvested was 46.5 (15–101), 0 to 17 main lymph nodes were harvested (mean: 5.6) (Table 2). Lymph node metastasis was pathologically found in 21patients (51.2%).

Conclusions

Our approach to laparoscopic extended right hemicolectomy was shown to be a safe, feasible, and useful approach to advanced right-sided colon cancer. The technique facilitates maximal lymph node dissection. Having obtained favorable outcomes, we look forward to future study of long-term outcomes of the technique.