Laparoscopic complete mesocolic excision with central vascular ligation for splenic flexure colon cancer: short- and long-term outcome

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Backgrounds

- Complete mesocolic excision (CME) with central vascular ligation (CVL) for colon cancer was introduced by Hohenberger and has improved oncologic outcomes after surgery.
- Transverse colon and descending colon cancers were excluded from the majority of previous prospective studies because of complex anatomy, technical difficulties, and difficulty in judging the related central vessels and regional lymph nodes.
- Since several decades has passed since the first described laparoscopic colectomy, with a better understanding of surgical anatomy and improvements in laparoscopic surgical techniques and innovative surgical devices, laparoscopic surgery for splenic flexure colon cancer was recently adopted.

Aim

- This retrospective study aimed to evaluate the short- and long-term outcomes of laparoscopic resection for splenic flexure colon cancer in our single institution.

Materials and Methods

- We retrospectively analyzed a total of 938 patients who underwent laparoscopic colectomy for colorectal cancer at Kindai University Hospital between January 2005 and December 2017 from our prospectively collected database.
- Splenic flexure colon cancer was defined as a tumor located between the distal third of the transverse colon and the first proximal portion of the descending colon within 10 cm of the splenic flexure.
- During the study periods, 45 consecutive patients (4.8%) who underwent laparoscopic curative resection for pathologically proved primary colon adenocarcinoma were reviewed retrospectively.

Results

Table 1 Patients' preoperative characteristics

	All patients (n = 45)	
Age (median [range], y.o.)	71	[39–89]
Gender (Male/Female) (no.)	20/25	
BMI (median [range], kg/m^2)	21.8	[15.8–29.1]
Tumor location (T/D, no.)	31/14	
ASA classification (no.)		
1	2	
2	33	
3	10	
4	0	
Stage (no., (%))		
0	1	(2.2)
I	9	(20.0)
II	20	(44.4)
III	13	(28.9)
IV	2	(4.4)

BMI body mass index, *T* transverse colon, *D* descending colon, *ASA*, the American Society of Anesthesiologists

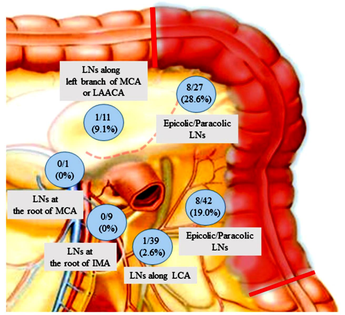


Fig. 1 Distribution of lymph node metastasis in 45 patients who underwent curative resection for splenic flexure colon cancer. *LNs* lymph nodes, *MCA* middle colic artery; *LAACA* left accessory aberrant colic artery, *LCA* left colic artery, *IMA* inferior mesenteric artery

Table 2 Operative and postoperative clinicopathological characteristics

	All patients (n = 45)	
Operative time (median [range], min)	178	[102–433]
Estimated blood loss (median [range], g)	20	[5–946]
Anastomosis		
FEEA/TST/DST (no.)	34/10/1	
Intraoperative complications (no., %)	4	(8.9)
Conversions (no., %)	2	(4.4)
Specimen		
Tumor size (median [range], mm)	35	[5–65]
Tumor differentiation		
Well or moderately differentiated (no., %)	43	(95.6)
Poorly differentiated or mucinous (no., %)	2	(4.4)
Harvested nodes (median [range], no.)	15	[6–56]
Proximal margin (median [range], mm)	80	[30–180]
Distal margin (median [range], mm)	110	[50–400]
Postoperative course		
Ambulation (median [range], days)	1	[1–3]
Flatus (median [range], days)	2	[0–4]
Oral intake (median [range], days)	4	[1–10]
Postoperative length of stay (median [range], days)	9	[6–227]
Postoperative complications (CD ≥ grade 2) (no., %)	6	(13.3)
Anastomotic leakage (no., %)	1	(2.2)
Recurrence (no., %)	5	(11.1)
Follow-up (median [range], months)	48.9	[4–174.8]
Death (no., %)	6	(13.3)

FEEA functional end-to-end anastomosis, *TST* triangulating stapling technique, *DST* double stapling technique, *CD* Clavien-Dindo classification

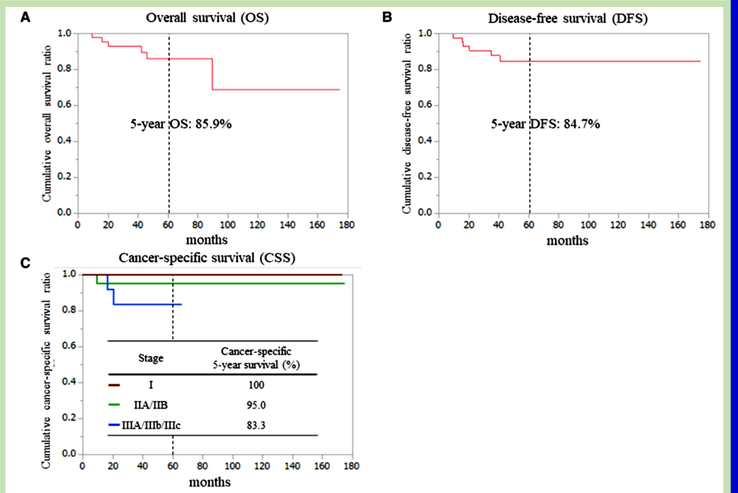


Fig. 2 Oncologic long-term outcomes. **A** Overall survival. **B** Disease-free survival. c Cancer-specific survival. The table shown in (**C**) indicates differences in cancer-specific survival according to disease Stage I to III

Table 3 Clinical characteristics of cancer recurrence among the total patient

Gender	Age	Location	Tumor stage	TNM staging	Previous metastasis	Tumor differentiation	Harvested lymph nodes (no.)	Adjuvant chemotherapy	Disease-free survival (months)	Recurrent site	Outcome
M	73	T	3	IIA	None	Well	15	None	11.2	Liver	Alive
F	76	T	3	IIIB	None	Well	14	None (Refused)	6.7	Peritoneum	Alive
M	69	T	3	IIIB	None	Mode	15	CapeOX	4.9	Peritoneum	Death †1
M	56	T	4a	IIIC	None	Muc	32	CapeOX	10.9	Peritoneum	Death †2
M	69	T	4a	IV	Oligometastatic liver	Mode	16	FOLFOX + Bev	28.9	Lung, Liver	Alive

†1This patient died caused by peritoneal dissemination followed by lung metastases

†2This patient died caused by peritoneal dissemination followed by refractory cachexia

T Transverse colon, *Well* well differentiated adenocarcinoma, *Mode* Moderately differentiated adenocarcinoma, *Muc* Mucinous adenocarcinoma, *CapeOX* Capecitabine + Oxaliplatin, *FOLFOX* Oxaliplatin + Leucovorin + 5-FU, *Bev* Bevacizumab

Limitations

- This study was a retrospective study, and a case number was small.
- This study was historically reviewed; it was not a comparative study with open surgery.
- Some technical errors and biases could not be ignored. For example, we did not estimate the injury of the mesentery, 'incomplete CME', in each case.

Conclusions

- Laparoscopic CME with CVL for splenic flexure colon cancer appears to be oncologically safe and feasible based on the short- and long-term outcomes reported in this study.
- However, this procedure is challenging because of the understanding of surgical anatomy and the necessity of surgeon's skill to balance the avoidance of other organ injury and the curability of cancer.
- The appropriate indication must be established with more case registries because our experience is limited.

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