

# **Oncological Outcomes of Complete versus Conventional Mesocolic Excision in Laparoscopic Right Hemicolectomy**

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# Background

# Background:

- ✓ Colorectal cancer is the third most commonly diagnosed malignancy worldwide and the third leading cause of cancer death in the United States. In Egypt, nowadays, according to NCI database, there is a shift towards higher incidence in younger population than rest of the world

# Background:

- ✓ Laparoscopic right hemicolectomy increasingly become a standard surgical approach for right sided colon cancer; with many short-term benefits, such as decreased postoperative pain, more rapid postoperative recovery, shortened duration of hospital stay, improved quality of life, and similar long-term oncological results as compared with open right hemicolectomy.

# Background:

- ✓ This theory of complete mesocolic excision (CME) entailed complete separation by sharp dissection between the visceral and parietal peritoneal fascia up to the origin of superior mesenteric vessel, with central vascular ligation (CVL).
- ✓ This will lead to excision of the tumor and its draining vessels and lymph nodes totally enclosed in a closed facial envelope and avoids interruption of lymphatic and vascular drainage that may cause peritoneal dissemination of tumor cells. In addition, it increased the retrieved draining lymph nodes.

2.

Patients and Methods:

# A.

# Patient Recruitment

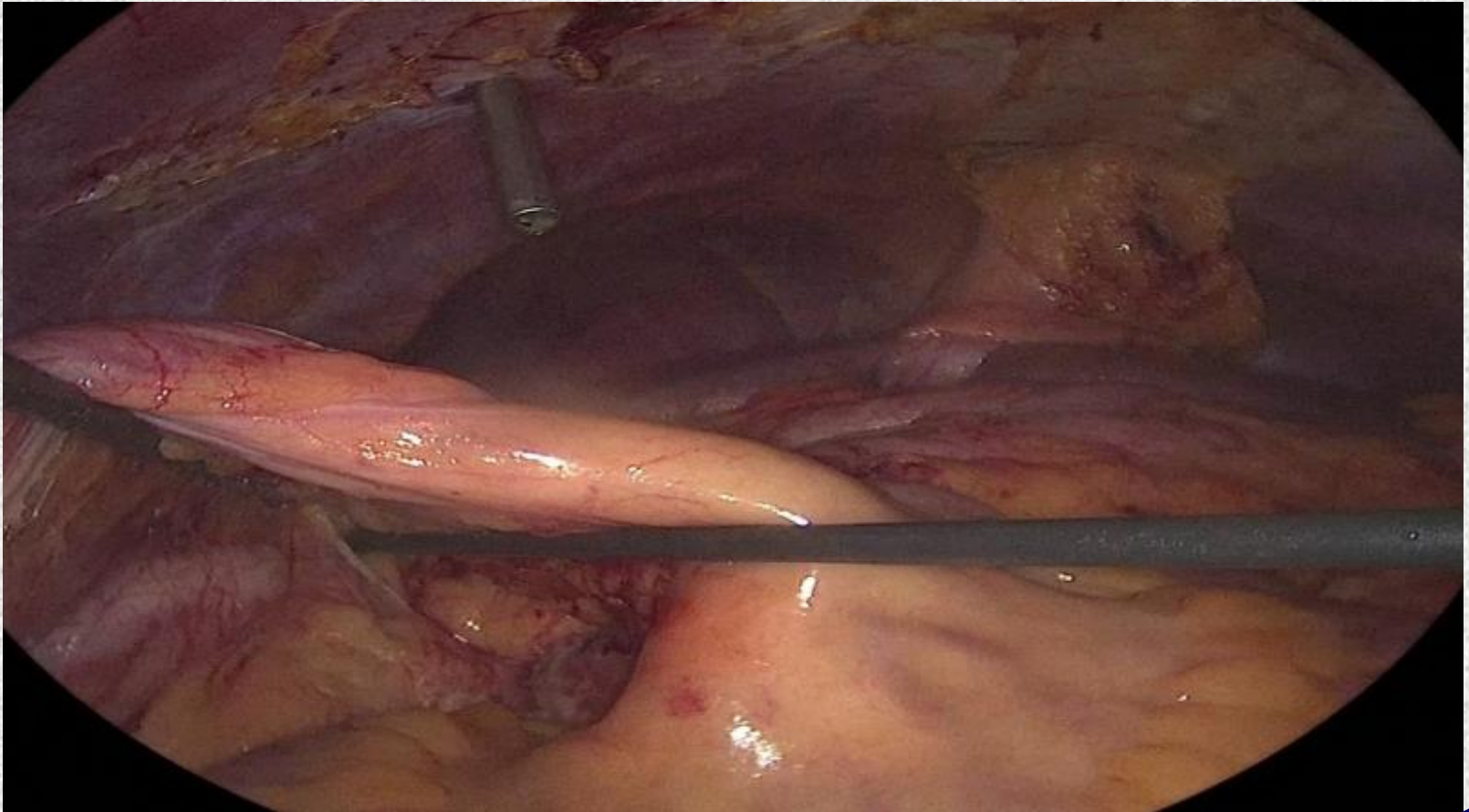
- ✓ This is a prospective, comparative, clinical study done on 38 fit patients (CME group) diagnosed as stage I–IIIc cancer right colon by colonoscopic biopsy, and staged by abdomino-pelvic CT, chest CT, and carcino-embryonic antigen (CEA) at General Surgery Department, Menoufia University Hospitals, between Dec. 2016 to April. 2021.
- ✓ Patients with distant metastasis (stage 4), patients with obstructed or perforated tumor, patients with synchronous multicentric tumors, and unfit patients for general anesthesia and laparoscopy were excluded from the study.
- ✓ The following data were collected, recorded and compared to a group of patients (38 patients) previously had laparoscopic conventional right hemicolectomy in our department (conventional group):



B.

# Surgical Procedures

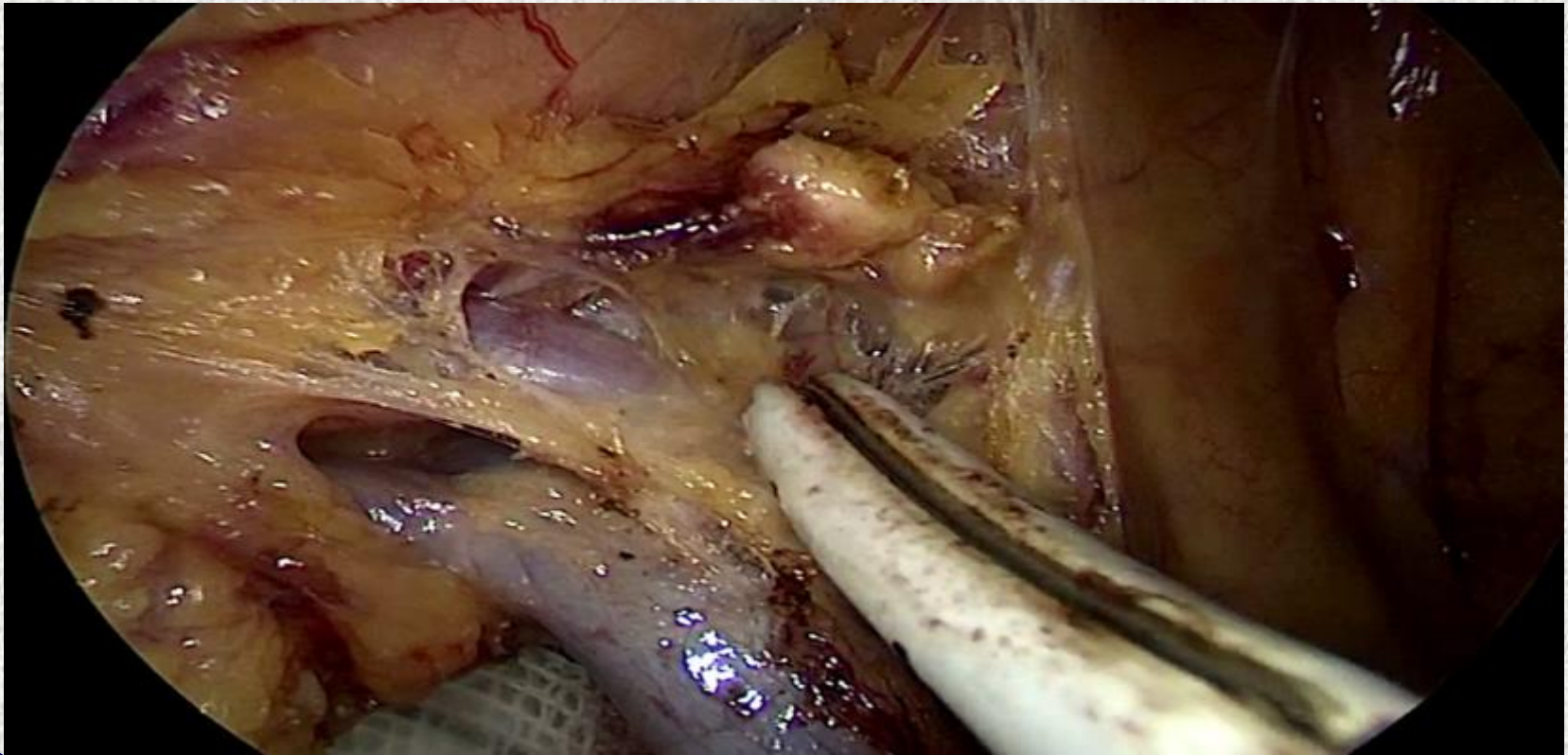
✓ Dissection started from Terminal Ileum





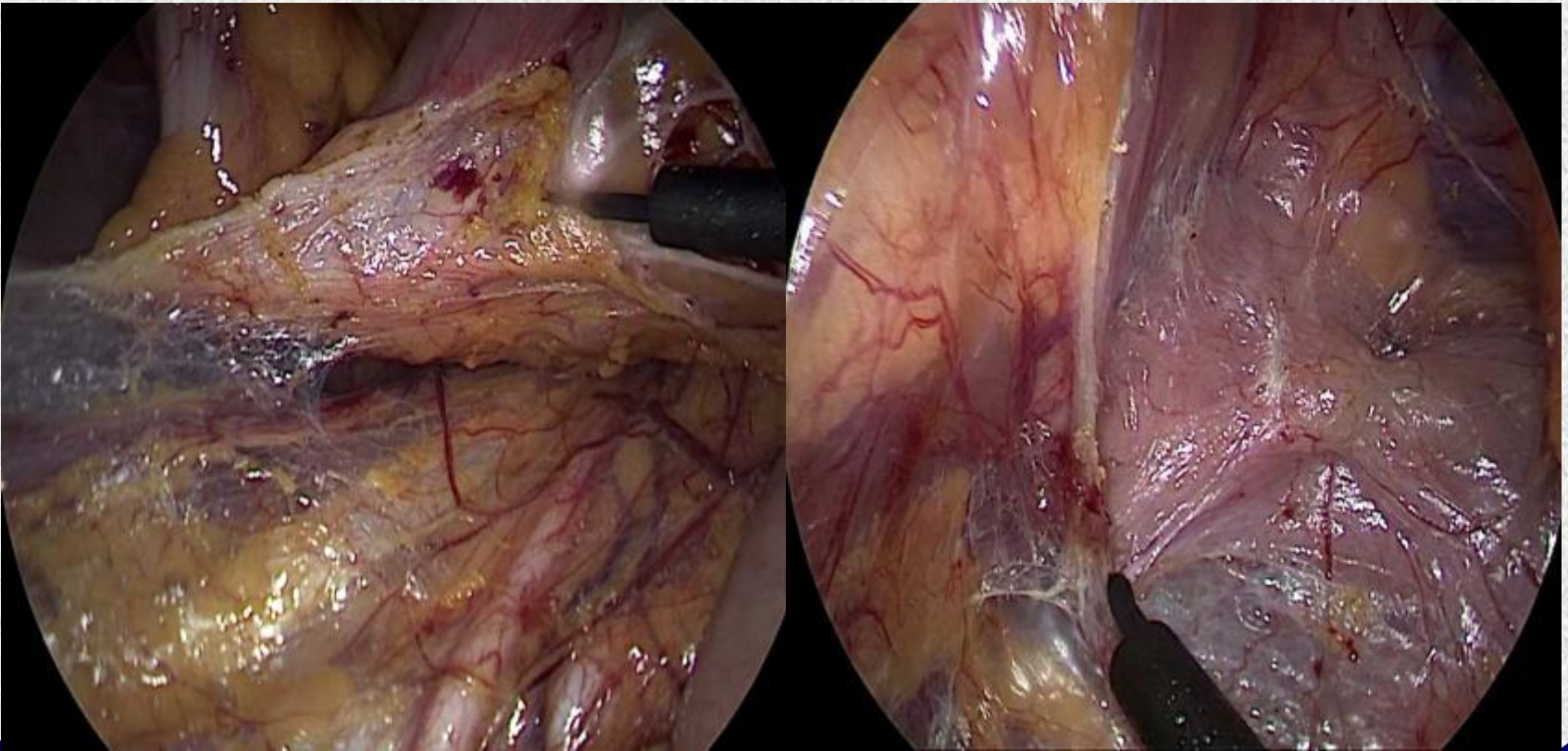
# Surgical Procedures

- ✓ Dissection from ileocolic vessels



# Surgical Procedures

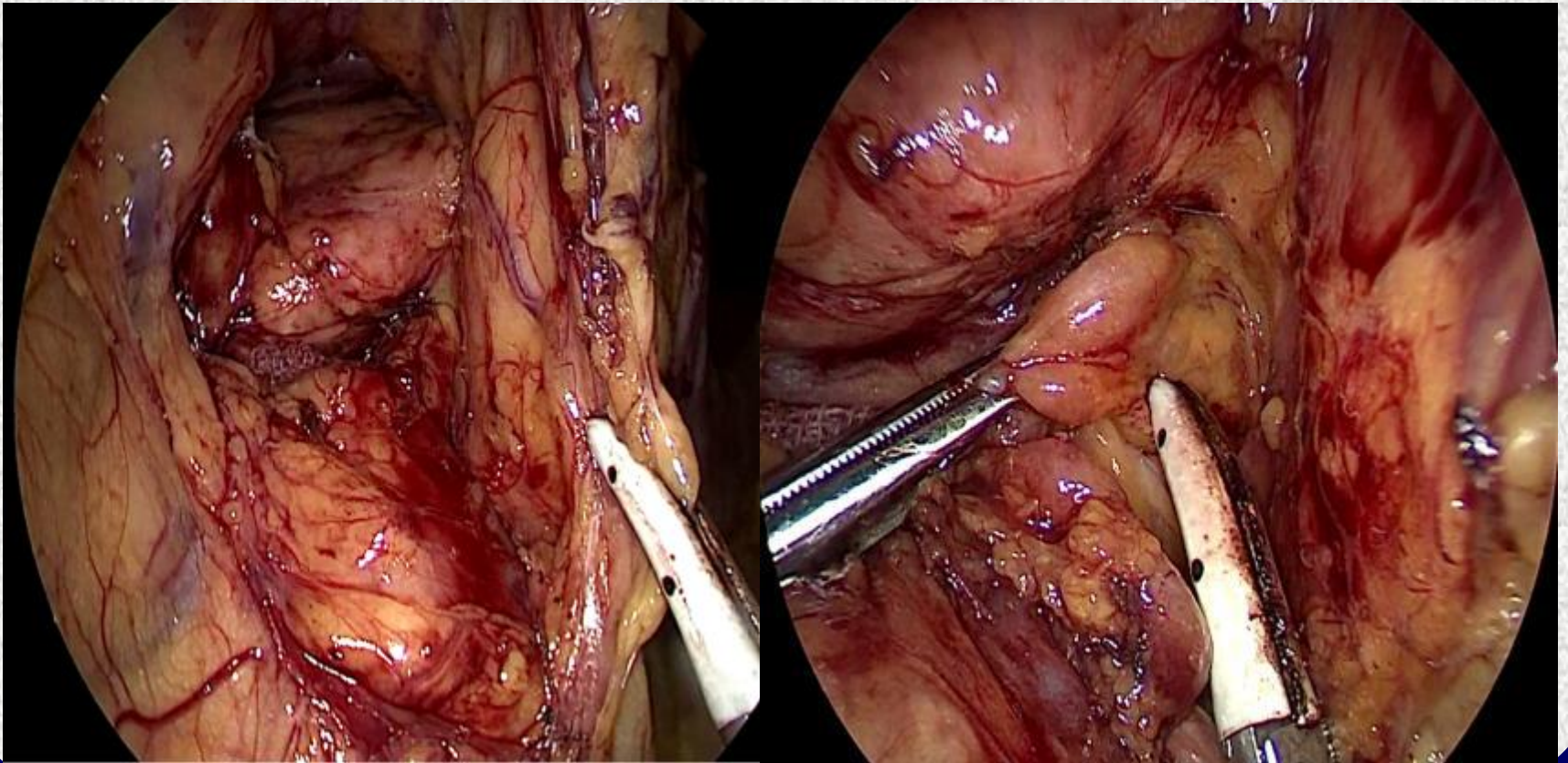
- ✓ Dissection from retroperitoneal structures





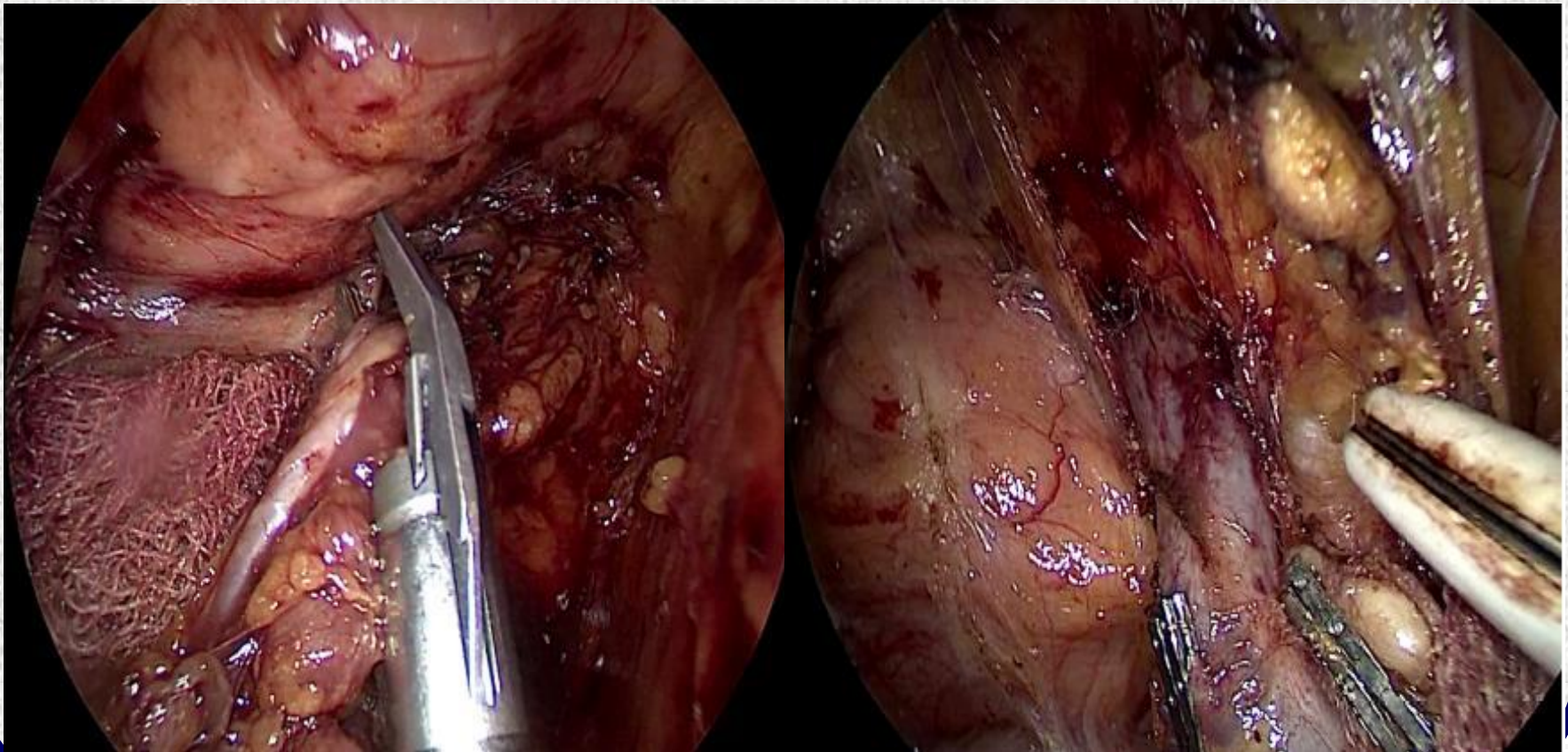
# Surgical Procedures

## ✓ Supracolic Dissection with Apical Lymphadenectomy



# Surgical Procedures

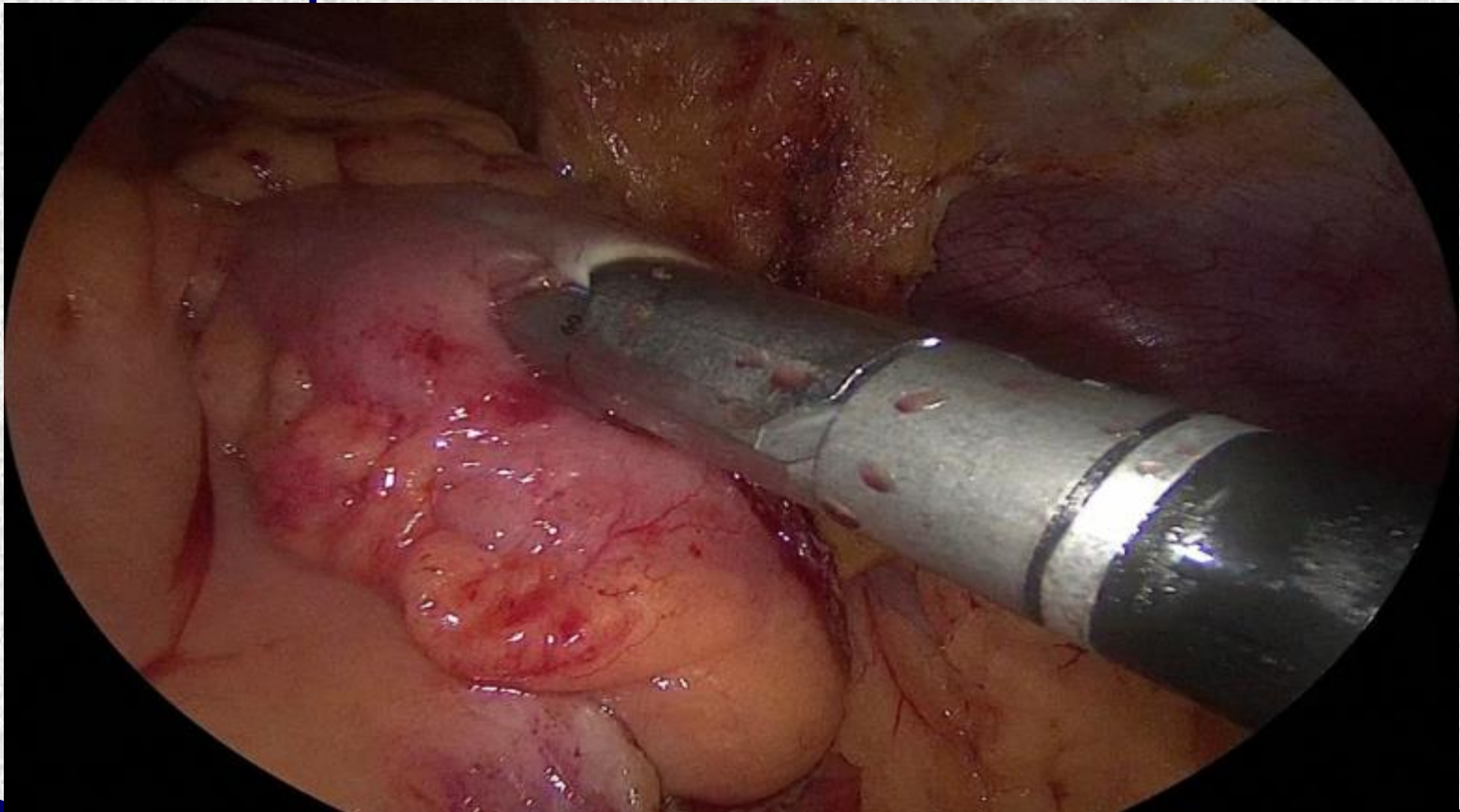
- ✓ Dissection and Clipping of middle colic vessels





# Surgical Procedures

## ✓ Intracorporeal Anastomosis



3.

# Results

# Sociodemographic data

**Table 1 Sociodemographic data of participants**

	Conventional group (38 patients) [n (%)]	TME group (38 patients) [n (%)]	$\chi^2/t$ test	P value
Age	61±11 (39–74)	58±13 (35–71)	1.8	0.12
Sex			2.3	0.09
Male	27 (71.1)	25 (65.8)		
Female	11 (29.9)	13 (34.2)		
Comorbidity			2.1	0.11
Yes	25 (65.8)	23 (60.2)		
No	13 (34.2)	15 (39.8)		

TME, total mesorectal excision.



# Clinico-pathological Data

**Table 2 Clinicopathological factors of studied groups**

	Conventional group [n (%)]	TME group [n (%)]	$\chi^2$	P value
Site			1.9	0.18
Cecum	20 (52.6)	18 (47.3)		
Ascending colon	15 (39.8)	18 (47.3)		
Hepatic flexure	3 (7.6)	2 (5.4)		
Stage				
I	5 (13.1)	3 (7.6)		
II	15 (39.8)	18 (47.3)		
IIIA	7 (18.4)	4 (10.5)		
IIIB	6 (15.6)	7 (18.4)		
IIIC	5 (13.1)	6 (15.6)		
Proximal margin (cm)	11.4±4.6	12.5±5.2	1.8	0.12
Distal margin (cm)	12.7±5.4	13.2±4.4	2.1	0.11
Grade			3.4	0.08
Well	7 (18.4)	9 (23.7)		
Moderate	21 (55.2)	17 (44.7)		
Poor	10 (26.4)	12 (31.6)		
R0 resection	33 (86.8)	37 (97.3)	31	0.04
LN retrieval	12±2.4	19.8±3.1	56	0.002

LN, lymph node, TME, total mesorectal excision.

# Intra-operative Parameters

**Table 3** Intraoperative and postoperative outcomes of the studied groups

	Conventional group	TME group	$\chi^2$
Duration of surgery (min)	136±26	188±32	89.5
Blood loss (ml)	240±25	230±40	3.5
Conversion rate [n (%)]	3 (7.6)	2 (5.4)	1.1
First time passage of flatus (h)	56.5±2.5	50.25±3.5	8.6
Hospital stay (days)	7.8±2.4	8.3±1.8	2.8
30 day postoperative morbidity [n (%)]	10 (26.4)	9 (23.7)	1.3

TME, total mesorectal excision.

# Oncological Outcomes

**Table 4 Short-term oncological outcomes of the studied groups**

	Conventional group	CME group	$\chi^2$	<i>P</i> value
Mean follow-up period (months)	46.3±3.7 (25–50)	38±3.8 (25–45)	78	0.01
3-year overall survival [ <i>n</i> (%)]	32 patients (84.2)	33 patients (86.8)	2.3	0.12
Disease-free survival [ <i>n</i> (%)]	28 patients (73.6)	32 patients (84.2)	19.7	0.03

CME, complete mesocolic excision.

4.

Debate

# LANCET Perspectives

## Spotlight

Is complete mesocolic excision superior to conventional colectomy for colon cancer?

Opening opinion: Yes

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D3 resections show). Hence, it is safe to assume that their D2 resection is still much better than what most patients will receive. The Dutch Colorectal Cancer Group even incorporated the concept of a very good D2 resection into their national cancer guidelines, by suggesting to cut

When Werner Hohenberger and colleagues described CME in 2009, they had already been doing it for many years, and they could show increasingly improved survival outcomes in their patient series. The three main pillars of this surgical technique were precise dissection along embryological planes, transection of the vascular pedicles at their origin with radical excision of the lymphovascular tissue, and appropriate longitudinal resection margins. This strategy was not a radically new idea, but a thorough implementation of accepted concepts of cancer surgery. Critics were not in short supply of arguments, raising concerns about selection bias, lack of randomisation, and generalisability, just to name a few limitations. But the critics did not see the truly important message behind it all: how cost-effective and remarkable would it be if simply changing a surgical technique could improve outcomes? If simply training surgeons to do a better job could save lives? There would be no expensive kit or costly chemotherapy or multimodal treatment involved, just surgical skill.

But what about the randomised controlled trial data? Long-term data are still awaited from the Chinese RELARC and the Russian COLD trials, both comparing outcomes after D2 versus D3 lymphadenectomy in patients with all stages of colon cancer. The issue with these trials is that the surgeons doing the procedures are highly skilled in D3 lymphadenectomies (and to a high standard as the lack of differences in complication rates between D2 and

often cited and commonly misunderstood retrospective study. The SMV injury rate is significantly higher in the CME group. Nine (1.7%) of 529 patients compared with four (0.2%) of 1701 in the non-CME group had this potentially devastating complication. This finding seems to be logical, as injuries are more likely to occur when operating nearer these vessels. One important detail is often forgotten when mentioning these results. None of patients who had an SMV injury had any long-term problems. Vascular injuries during CME are still rare and hardly ever lead to devascularisation or uncontrollable bleeding. They can be fixed, as long as the surgeon is experienced and appropriately trained. This brings us to the last—but perhaps most important—issue. Should every cancer surgeon start doing CME? Although the answer is in principle yes, the question might be wrong. Operating on colon cancer should no longer be regarded as a basic operation of the colorectal surgeon, but considered to be a highly specialist procedure that requires appropriate training. CME training might only emerge in future training programmes for the next generation of surgeons. Structured training programmes cost a fraction of large-scale drug trials and the opportunities are too large to ignore.

CME is likely to deliver superior oncological results. It can be done safely and surgeons can be trained. It is less complicated than often assumed. It is simply good surgery.



# Counter opinion: No

## Counter opinion: No

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CME aims to deliver an oncologically superior colon cancer specimen enclosed within an intact mesocolic package. Radical surgery for right-sided colon cancer, as envisaged by proponents of this technique, combines CME with central vascular ligation of the principal blood vessels at their origins on the superior mesenteric vein and artery. Studies in the past decade have reported improved cancer outcomes after CME for colon cancer compared with conventional colectomy, although this has not been a universal finding and opinions on the optimal extent of mesenteric dissection remain divided. Although the technique continues to gain a steady following, doubts persist about oncological efficacy and safety, with some experts having reported significantly increased rates of intraoperative major visceral injury and 90-day mortality compared with conventional colectomy. The question remains, should CME be regarded as the current benchmark of care for patients with colon cancer?

Unquestionably, respecting embryological planes and ensuring adequate margins of tumour excision are of paramount importance in any well executed cancer operation, but these are not new concepts. The main source of controversy with CME for colon cancer is centred

metastases, and distant metastases is increasingly being questioned.

Up to now, studies evaluating CME have been challenging to compare because of variability in operative techniques and methods for defining the extent of mesenteric dissection. Long-term results from the RELARC trial are eagerly awaited, although this study again showed a significantly increased rate of major vascular injury with CME compared with D2 right colectomy. Two well publicised studies with long-term data are worth highlighting. Anders C Bertelsen and colleagues compared outcomes in 813 patients undergoing conventional colectomy, with 256 patients undergoing CME. They reported a 7.9% reduction in the cumulative risk of recurrence with CME. However, data on local recurrence alone, the yardstick against which CME should primarily be assessed, were not presented. Additionally, 117 (14%) of patients in the non-CME cohort required multivisceral resection (compared with 22 [9%] in the CME group;  $p=0.019$ ), indicating that this group of patients had more aggressive disease. Notably, significantly fewer patients in the conventional colectomy cohort had surgery done by a specialist. Zhidong Gao and colleagues compared outcomes with CME ( $n=220$ ) versus conventional colectomy ( $n=110$ ) and found no significant differences in 3-year overall, disease-free survival, or metastasis-free survival. The authors reported significantly higher local recurrence-free survival in the CME group. However, T3 and T4 tumours were grouped



# Debate

## Oncological outcomes of complete versus conventional mesocolic excision in laparoscopic right hemicolectomy

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Affiliations + expand

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### Abstract

**Background:** Complete mesocolic excision (CME) has been proposed for colon cancer to improve oncological outcomes. The risks and benefits of laparoscopic CME have not been examined fully. We compared short- and long-term outcomes of CME with a conventional mesocolic excision (non-CME) in laparoscopic right hemicolectomy (RHC) for right-sided colon cancer.

**Methods:** In total, 115 patients who underwent laparoscopic RHC with stage I-III right-sided colon cancer at Busan Paik Hospital from August 2007 to October 2011 were enrolled in this case-control study. Three trained colorectal surgeons reviewed videos of the surgeries; patients were divided into two groups: those who underwent a CME (CME group, n = 34) and those who underwent a conventional mesocolic excision (non-CME group, n = 81).

**Results:** There was no significant difference between the CME and non-CME groups in operative time, post-operative complications, or hospital stay. However, the CME group had more lymph nodes harvested ( $P < 0.001$ ) and lower blood loss ( $P = 0.016$ ) versus the non-CME group. There was no difference in 5-year disease-free survival rate between the groups, but 5-year overall survival rate was 100% in the CME group and 89.49% in the non-CME group ( $P < 0.05$ ).

**Conclusions:** Laparoscopic RHC with CME is safe and associated with better 5-year overall survival rate than non-CME for patients with stage I-III right-sided colon cancer. Implementation of CME surgery might improve oncological outcomes for patients with right-sided colon cancer.

# Debate

## Right hemicolectomy with complete mesocolic excision is safe, leads to an increased lymph node yield and to increased survival: results of a systematic review and meta-analysis

G Anania <sup>1</sup>, R J Davies <sup>2</sup>, F Bagolini <sup>1</sup>, N Vettoretto <sup>3</sup>, J Randolph <sup>4</sup>, R Cirocchi <sup>5</sup> <sup>6</sup>, A Donini <sup>7</sup>

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[Free PMC article](#)

### Abstract

**Background:** The introduction of complete mesocolic excision (CME) for right colon cancer has raised an important discussion in relation to the extent of colic and mesenteric resection, and the impact this may have on lymph node yield. As uncertainty remains regarding the usefulness of and indications for right hemicolectomy with CME and the benefits of CME compared with a traditional approach, the purpose of this meta-analysis is to compare the two procedures in terms of safety, lymph node yield and oncological outcome.

**Methods:** We performed a systematic review of the literature from 2009 up to March 15th, 2020 according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. Two hundred eighty-one publications were evaluated, and 17 met the inclusion criteria and were included. Primary endpoints analysed were anastomotic leak rate, blood loss, number of harvested lymph nodes, 3- and 5-year oncologic outcomes. Secondary outcomes were operating time, conversion, intraoperative complications, reoperation rate, overall and Clavien-Dindo grade 3-4 postoperative complications.

**Results:** In terms of safety, right hemicolectomy with CME is not inferior to the standard procedure when comparing rates of anastomotic leak (RR 0.82, 95% CI 0.38-1.79), blood loss (MD -32.48, 95% CI -98.54 to -33.58), overall postoperative complications (RR 0.82, 95% CI 0.67-1.00), Clavien-Dindo grade III-IV postoperative complications (RR 1.36, 95% CI 0.82-2.28) and reoperation rate (RR 0.65, 95% CI 0.26-1.75). Traditional surgery is associated with a shorter operating time (MD 16.43, 95% CI 4.27-28.60) and lower conversion from laparoscopic to open approach (RR 1.72, 95% CI 1.00-2.96). In terms of oncologic outcomes, right hemicolectomy with CME leads to a higher lymph node yield than traditional surgery (MD 7.05, 95% CI 4.06-10.04). Results of statistical analysis comparing 3-year overall survival and 5-year disease-free survival were better in the CME group (RR 0.42, 95% CI 0.27-0.65,  $P=0.0002$ ; RR 0.26, 95% CI 0.17-0.56,  $P=0.0002$ ).

5.

Conclusion

# Conculsion

- ✓ Laparoscopic CME is a safe, valid, and feasible surgical method for right-sided colon cancer. It is associated with comparable postoperative morbidity with the conventional method but has better pathological and short-term oncological outcomes.

Thank  
you!

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