

COMPARATIVE STUDY BETWEEN LAPAROSCOPIC VERSUS OPEN RIGHT HEMICOLECTOMY

By

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ABSTRACT

Background: Colorectal cancer (CRC) incidence and mortality rates vary markedly around the world. The right colon has a thin wall, a large caliber, and its contents are liquid; thus, obstruction is a late event in right colon cancer. Also, right colonic tumors grow large enough to be palpable through the abdominal wall before other symptoms appear.

Objective: To compare between laparoscopic and open complete mesocolic excision with central vascular ligation in right colon cancer as regards technical feasibility, advantages and disadvantages of both procedures.

Patients and Methods: This study was conducted on 30 patients admitted to Al-Azhar University Hospitals, and diagnosed as operable right sided colon cancer. It was prospectively conducted during the period from October 2019 to June 2020, and all the procedures were done on elective basis. Informed consents were obtained from all patients included in the study which approved by the local ethics committee of Al-Azhar University Hospitals. Patients were 7 (46.7%) males and 8(53.3%) females. Their ages ranged from 51 to 71 years with a mean age of 58.33 ± 5.88 in laparoscopic technique, and ranged from 50 to 70 years with a mean age of 59.93 ± 5.20 in open technique.

Results: There was no statistical significant difference between the studied groups regarding the mean age, gender distribution, DM, hypertension and the tumor location. There was a statistical significant difference between the studied groups regarding the incision length as the incision of the open technique was longer than the laparoscopic technique, regarding the operative time and intraoperative blood loss as the laparoscopic technique take more time than the open technique and the intraoperative blood loss during the laparoscopic technique was less than the open technique.

Conclusion: Complete mesocolic excision(CME), with central vascular ligation is the novel key factor in the multimodal management of right colon cancer, determining a significant improvement in loco-regional control of tumors and improving the long-term oncological outcome, especially in intermediate stages of disease. it is a safe, valid, and feasible surgical method for right colon cancers, associated with smaller incisions, less operative blood loss, earlier recovery after operation, and shorter hospital stay compared with Open technique. The open technique is still superior in shorter operative time and more number of harvested lymph nodes.

Keywords: Colorectal cancer, complete mesocolic excision, laparoscopic right colectomy.

INTRODUCTION

Colorectal cancer incidence and mortality rates vary markedly around the world. Globally, colorectal cancer is the third most diagnosed cancer in males and the second in females (*Fitzmaurice et al., 2017*). Curative treatment for right colon cancer includes resection of the tumor-bearing bowel segment. There are standard types of operations, depending on the location of the tumor. These types of resections are depended on the knowledge of lymphatic drainage and lymph node anatomy (*Croner et al., 2018*).

Right sided hemicolectomy is the standard type of operation for cancers in the caecum and the ascending colon (*Wolff and Wang, 2012*).

CME helps to keep the colonic mesentery intact, clarify the dissected area from central lymph nodes, emphasize the importance of transecting colon-feeding blood vessels at the root, and increase the range of longitudinal enterotomy. So, complete mesocolic excision provides a standardization of surgeries for colon cancer (*Feng et al., 2016*).

The traditional approach to right colon cancer is through open exploration but these approaches has more blood loss, prolonged postoperative hospital stay, sever postoperative pain and delayed recovery (*Kahokehr et al., 2010*).

Laparoscopic right colectomy for right cancer colon became a well-established procedure in the field of colorectal surgery. It has many advantages: reduction in postoperative pain, duration of regain of bowel function, and the

period of hospital stay (*Stormark et al., 2016*).

The aim of this study was to compare between laparoscopic and open right hemicolectomy.

PATIENTS AND METHODS

This study was conducted on 30 patients admitted to AL-Azhar University Hospitals, and diagnosed as operable right sided colon cancer.

This study was prospectively conducted during the period from October 2019 to June 2020 and all the procedures were done on elective basis. Informed consents were obtained from all patients included in the study which approved by the local ethics committee of AL-Azhar University Hospitals. Patients were 7 (46.7%) males and 8 (53.3%) females in both groups. Their ages ranged from 51 to 71 years with a mean age of 58.33 ± 5.88 in laparoscopic technique and ranged from 50 to 70 years with a mean age of 59.93 ± 5.20 in open technique.

The patients were classified equally into two equal groups: Group A: Laparoscopic right hemicolectomy with complete mesocolic excision with central vascular ligation, and **Group B:** Open right hemicolectomy with complete mesocolic excision with central vascular ligation.

All patients were subjected to Full history taking, general examination, abdominal examination including DRE and PV, laboratory investigation (Complete blood picture, SGOT, SGPT, blood sugar, blood urea, serum creatinine, Prothrombine time, serum albumin and tumour markers), ECG, echocardiography,

Imaging studies (chest X-ray, US abdomen, CT abdomen and pelvis) and Histopathological diagnosis (colonoscopy biopsy and tissue diagnosis).

Inclusion Criteria:

Only operable cases of right colon cancer by CT scan criteria which included no permeation of surrounding fat planes, no encasement of major vascular structures, no extensive local spread and no distant metastases or peritoneal infiltration.

Exclusion Criteria:

All cases with perforation or obstruction, metastatic colon cancer, patients undergoing colectomy including another part of the colon than right colon.

Preoperative preparation:

All patients were prepared preoperatively in the usual manner: a standard mechanical cathartic bowel preparation on the day prior to surgery. In addition, both oral and parenteral broad spectrum prophylactic antibiotics were administered.

Anesthesia:

All patients received general anesthesia. Nasogastric tube and Foley's catheter were inserted together with elastic stockings for prophylaxis against lower limb DVT.

Operative technique in patients of group A: A high-definition laparoscope was used, and the patient was at a modified lithotomy position and 15 degree tilt of the operating table to the left. After achieving pneumoperitonium (12 mm Hg), a 12-mm trocar was placed through an incision just above the umbilicus, and a 30-degree camera was inserted through

the 12-mm trocar. The second 10-mm trocar was introduced at the upper left quadrant of the abdomen as the first major acting port. The third 5-mm trocar was introduced at the lower left quadrant as the second major active port. The fourth and the fifth 5-mm trocars were introduced at the upper right and lower right quadrants (**Fig. 1**). A medial to lateral dissection was done in most cases, but when the origin of ileocolic pedicles was not clearly identified, the dissection was alternated with lateral to medial fashion. The procedures of medial to lateral dissection were done as follow: Exploration of the abdomen to exclude metastasis and exposure of the superior mesenteric axis (**Fig. 2**). The ileocolic vessels are stretched by pulling the cecum laterally and downward (**Fig. 3**). Peritoneal incision is commenced at the base of the created peritoneal fold, dissection of the anterior peritoneal fold is performed until the origin of the ileocolic vessels from the superior mesenteric vessels (by sharp dissection using harmonic scalpel) (**Fig. 4&5**). Transection of the ileocolic vessels and the inconstant right colic vessels at their root with en block lymphadenectomy of the anterior aspect of superior mesenteric vessels (**Fig. 6&7**). For cecal and proximal ascending colon cancers, right hemicolectomy was performed and the right branches of the middle colic artery and vein were ligated. For hepatic flexure and proximal transverse colon cancers, extended right hemicolectomy was performed and the roots of the middle colic vessels were ligated. The anatomo-embryological plane along the Tolds fascia is sharply divided (from medial to lateral and from bottom to top) respecting the integrity of the right

mesocolon and of the retroperitoneal structures such as right ureter and gonadal vessels, dissection stop at the right lateral peritoneal fold (**Fig. 8**). Omentectomy was done just below the gastroepiploic vessels (**Fig. 9&10**). The hepatic flexure is mobilized by dissection of the lateral hepatocolic peritoneal fold. The right lateral peritoneal fold and the ileocaecal peritoneal fold (cecal ligament) are transected to obtain complete mobilization of the specimen (**Fig. 11**). Dissection of the mesentery of the terminal ileum at 10-15 cm from the ileocaecal valve (**Fig. 12**). Then the mobilized colon was exteriorized through transverse wound in right lower abdomen (**Fig. 13**), and transected with adequate

resection margin, then either extracorporeal stapled or hand-sewn end to end anastomosis was fashioned and 2 tube drains were placed in subhepatic and right paracolic sulci, or an intracorporeal anastomosis was performed (eliminating problems with extracorporeal delivery and unnecessary traction on the mesentery). The terminal ileum and transverse colon were aligned in side to side isoperistaltic fashion and enterostomies were made for insertion of an endostapler which was fired through these enterostomies creating the croach of the final anastomosis. The resulting common enterostomy was closed with another load of endostapler completing the side to side anastomosis.



Fig. (1): Port placement for laparoscopic RT hemicolectomy.



Fig. (2): Exposure of the superior mesenteric axis.



Fig. (3): Initiation: the anatomic projection of ileocolic vessels (ICA and ICV).



Fig. (4): Identification of superior mesenteric vessels (SMV/SMA) and ileocolic vessels (ICV/ICA), lymph nodes dissection at the root of these vessels.



Fig. (5): Dissection start from the origin of the ileocolic vessels from superior mesenteric vessels.

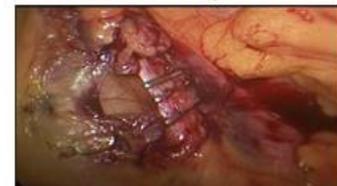


Fig. (6): Clipping of the ileocolic vessel.

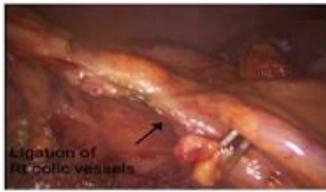


Fig. (7): Extension of transection of right branch of middle colic artery.

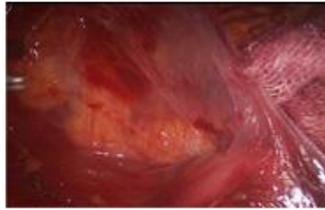


Fig. (8): Dissection is continued in the plane between Toldt's fascia and the back of colonic mesentery



Fig. (9): Separation of gastrocolic ligament



Fig. (10): Separation of gastrocolic ligament.



Fig. (11): Extend the extraperitoneal space (EPS) to mobilize the right-hemicolon.



Fig. (12): Separation of the terminal ileum mesentery.

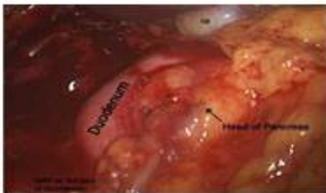


Fig. (13): The surgical field after complete procedure.



Fig. (14): Site of extraction of specimen from transverse wound in right lower abdomen (after laparoscopic right hemicolectomy)



Fig. (15): Specimen include terminal ileum, caecum, ascending colon with their mesentery.

In patients of group B: The patient was placed in a supine position. A midline incision was done. Then mobilization of the colon from paracolic gutter through avascular plane of Toldt and safe guarding of the ureter, gonadal vessels and duodenum were done (**Fig. 16**). After that the ascending colon and hepatic flexure were released from gall bladder by dividing hepatocolic ligament and mobilized from the duodenum and Gerota's fascia. Greater omentum was separated by ligation and division just below the gasroepiploic vessels. Identification of the ileocolic and right colic vessels was done (**Fig. 17&18**). Ligation of Ileocolic and right colic vessels from their origin in case of right hemicolectomy, or ligation of ileocolic,

right colic and middle colic vessels in extended right hemicolectomy to clear nodes was performed. Peritoneal incision on the mesentery of the terminal 15 cm ileum was completed and that part of the ileum was also mobilized. Occlusion clamps were placed at the line of resection. Another occlusion clamp was placed on the right 1/3rd to 1/2 of the transverse colon. Once right colon unit was completely mobilized, the division of the terminal ileum and transverse colon between clamps was done. After that constructing a safe (air tight, water tight) ileocolic end to end hand sewn anastomosis was performed. Then closure of the mesenteric defect, insertion of tube drain and closure of the abdomen were done.



Fig. (16): After Kocherization of the caecum and ascending colon



Fig. (17): Identification of ileocolic pedicle.



Fig. (18): Identification of right branch of middle colic vessel

Intraoperative, all patients were assessed for time of the procedure, amount of blood loss and any complications as nerve, vessel or ureteric injury.

Postoperative care: Patient was given medical treatment in the form of metronidazole and injectable antibiotics as 3rd generation cephalosporin postoperatively for five days. Ryle's tube was removed when bowel sounds were present, usually on postoperative second day. On the third postoperative day, clear liquid diet was started. Diet was advanced as tolerated. The patient was discharged from the hospital when bowel function return to normal, could tolerate a regular diet, and had adequate pain control with oral analgesics.

Follow up: Patients were followed up by the standardized follow up protocol.

They were examined by the outpatient setting after 2 weeks (post-operative) for wound infection, leakage, pathological outcome (The tumor node metastasis TNM stage, histologic grade of differentiation, number of harvested lymph nodes, lymphovascular invasion,

estimation of resection margins). Every 3 months for 1 year by history taking, physical examination, carcinoembryonic antigen measurement. Every 6 months in the second year by chest, abdomen-pelvic computed tomography for detection of local or systemic recurrence.

Statistical Analysis:

Data were collected and entered to the computer using SPSS (Statistical Package for the Social Sciences) program for statistical analysis, (version 20; Inc., Chicago. IL).

Two types of statistics were done: Quantitative data were shown as mean, SD, median, and range and qualitative data was expressed as frequency and percent. Fisher exact test was used when more than 25% of the cells have expected count less than 5. T- Test was used to compare 2 sets of quantitative. Mann-Whitney test was used to compare qualitative variables when the data were not normally distributed. P-value was considered statistically significant when it was less than 0.05.

RESULTS

There was no statistical significant difference between the studied groups regarding the mean age and gender distribution (p value > 0.05). Patients were 7 (46.7%) males and 8 (53.3%) females in

both groups. Their ages ranged from 51 to 71 years with a mean age of 58.33±5.88 in laparoscopic technique and ranged from 50 to 70 years with a mean age of 59.93±5.20 in open technique (**Table 1**).

Table (1): Socio demographic data of the studied groups

Groups Studied Variables	Laparoscopic right hemicolecotomy with CME N=15	Open right hemicolecotomy with CME N=15	P-VALUE
Age :			
Mean ± SD	58.33± 5.88	59.93± 5.20	> 0.05
Median	58.00	60.00	
Range	51-71	50-70	
	No (%)	No (%)	p-value
Gender			
Males	7 46.7%	7 46.7%	> 0.05
Females	8 53.3%	8 53.3%	

There was no statistical significant difference between the studied groups regarding DM and hypertension. In laparoscopic complete mesocolic excision, complete mesocolic excision group about

4 patients were diabetic and 3 patients were hypertensive and in open complete mesocolic excision group about 4 patients were diabetic and only 2 patients were hypertensive (**Table 2**).

Table (2): History of comorbidities among the studied groups

Groups Studied variables	Laparoscopic right hemicolecotomy with CME N=15	Open right hemicolecotomy with CME N=15	P-VALUE
Diabetes mellitus			
No	13 86.7%	11 73.3%	> 0.05
Yes	2 13.3%	4 26.7%	
Hypertension			
No	12 80.0%	13 86.7%	> 0.05
Yes	3 20.0%	2 13.3%	

There was no statistical significant difference between the studied groups regarding the tumor location (**Table 3**).

Table (3): Tumor location among the studied groups

Groups / Studied variables	Laparoscopic right hemicolecotomy with CME N=15	Open right hemicolecotomy with CME N=15	P-VALUE
Ascending colon	7 46.7%	8 58.3%	> 0.05
Cecum	5 33.3%	4 26.7%	
Hepatic flexure	3 20.0%	3 20.0%	

There was a statistical high significant difference between the studied groups regarding the incision length as the incision of the open technique is longer than the laparoscopic technique (p value < 0.001). It also showed that, there was a statistical high significant difference between the studied groups regarding the

operative time and intraoperative blood loss as the laparoscopic technique take more time than the open technique and the intraoperative blood loss during the laparoscopic technique is less than the open technique (p value < 0.001) / (Table 4).

Table (4): Intra Operative parameters between the studied groups

Groups / Studied variables	Laparoscopic right hemicolecotomy with CME N=15	Open right hemicolecotomy with CME N=15	P-VALUE
Incision length (cm) Mean±SD Median Range	6.02±0.44 6.0000 5.20-6.80	17.5±0.25 18.5 152.20	< 0.001
Operative time (Min) Mean±SD Median Range	180.0± 20.0 179.00 140-205	157.34± 15.0 155.00 90-175	< 0.002
Blood loss (ml) Mean±SD Median Range	92.00± 24.986 85.00 65-190	200.6±50.5 220.00 127-360	< 0.001

There was a statistical high significant difference between the studied groups regarding the hospital stay. The hospital

stay in laparoscopic CME group is shorter than the open group (3- 6 days vs. 5-7 days, p value < 0.001) / (Table 5).

Table (5): Hospital stay duration among the studied groups

Groups / Studied variables	Laparoscopic right hemicolecotomy with CME N=15	Open right hemicolecotomy with CME N=15	P-VALUE
Hospital stay Duration (Day) Mean±SD Median Range	4.40± 0.91 4.00 3-6	5.73±0.799 6.00 5-7	<0.001

There was no statistical significant difference between the studied groups regarding the tumour size, the number of

retrieved LNs, TNM classification and the histopathology findings (p value > 0.05) / (Table 6).

Table (6): Histopathological study among the studied group

Groups Studied Variables	Laparoscopic right hemicolecotomy with CME N=15	Open right hemicolecotomy with CME N=15	P-VALUE
Tumor size Mean±SD Median Range	4.31±3.50 4.5 1-11	5.25±4.34 5 1-18	>0.05
No.of retrieved L.Ns Mean±SD Median Range	27.0±8.23 26 18-36	32.0±10.38 29 20-49	>0.05
	No (%)	No (%)	p-value
TNM Classification I II III	4 13.3% 12 40.0% 14 46.7%	4 13.3% 14 46.7% 12 40.0%	>0.05
Histopathology: Well Differentiated Moderately Differentiated Poor Differentiated Mucinous	6 20% 16 53.3% 6 20% 2 6.7%	8 26.7% 14 46.7% 8 26.7% 0 0%	>0.05

There was no statistical significant difference between the studied groups regarding postoperative complications as ileus, anastomotic leak, postoperative bleeding, wound infection, intra-

abdominal sepsis and incisional hernia (p value < 0.05). The regain of bowel motion was so close in both groups (2-4 days vs. 1-5 days, p value = 0.42) / (Table 7).

Table (7): Postoperative parameters between the studied groups

Studied Variables \ Groups	Laparoscopic right hemicolectomy with CME N=15	Open right hemicolectomy with CME N=15	P-VALUE
Regain of bowel Motion (day) Mean±SD Median Range	2.9± 0.78 3 2-4	3.1±0.56 4 1-5	>0.05
Post-operative complications:			
No	21 70.0%	22 73.3%	>0.05
Yes	9 30.0%	8 26.7%	
Ilies			
No	28 93.3%	27 90%	>0.05
Yes	2 6.7%	3 10%	
Anastomotic leak			
No	29 96.7%	30 100.0%	>0.05
Yes	1 3.3%	0 0.0%	
Anastomotic bleeding			
No	27 90.0%	30 100.0%	>0.05
Yes	3 10.0%	0 0.0%	
Wound infection			
No	29 96.7%	27 90.0%	>0.05
Yes	1 3.3%	3 10.0%	
Intraabdominal sepsis			
No	28 93.3%	29 96.7%	>0.05
Yes	2 6.7%	1 3.3%	
Incisional hernia			
No	30 100.0%	29 93.3%	>0.05
Yes	0 0.0%	1 6.7%	

This table showed that, there was no statistical significant difference between the studied groups regarding follow up duration between the studied groups (p value > 0.05). During the follow-up of the

patients, there was one case of tumor local recurrence in laparoscopic group, no metastasis, nor were cancer-related deaths observed in either group (**Table 8**).

Table (8): Follow up and local recurrence between the studied groups

Studied Variables \ Groups	Laparoscopic right hemicolectomy with CME N=15	Open right hemicolectomy with CME N=15	P-VALUE
Follow up duration (month) Mean±SD Median Range	24-33± 4.79 24.00 11 - 36	26-53±5.399 26.00 12 - 35	>0.05
	No (%)	No (%)	p-value
Local recurrence			
Yes	1 3.3%	0 0.0%	>0.05
No	29 96.7%	30 100.0%	

DISCUSSION

Complete excision of the primitive dorsal mesenterium along the anatomic-embryological surgical planes by means of complete mesocolic excision is now the standard of care for colonic cancers. Technical strategies for complete mesocolic excision include two aspects: sharp separation of visceral and parietal fascia, based on embryonic anatomy, to minimize the likelihood of an incomplete resection, and ligation at the root of central supply vessels and more radical lymph node dissection for improving oncological outcomes (*Adamina et al., 2012*).

However, the right hemicolectomy is performed routinely worldwide, the feasibility and safety of complete mesocolic excision has been shown in open and laparoscopic surgeries (*Bae et al., 2014*).

In the present study, we compared between laparoscopic and open complete mesocolic excision with central vascular ligation in right colon cancer as regards technical feasibility, positive and negative impacts of both techniques. The statistical analysis revealed no significant difference between the studied groups as regards age and sex distribution, this ensures that the demographic data has no effect on the results of the study indicating no bias in it. Regarding the comorbidities of the patients, analysis of the results showed that, there was no statistical significant difference between the studied groups regarding DM and hypertension. In laparoscopic CME group about 4 patients were diabetic and 6 patients were hypertensive and in open CME group

about 8 patients were diabetic and only 4 patients were hypertensive.

These results were in agreement with those reported by *Sheng et al. (2017)* who stated that the open and laparoscopic techniques were the same in age, sex distribution, tumor localization, and potential comorbidities. Observed that there was a statistical significant difference with a higher prevalence of open procedure between the patients aged 60 or over.

In this study, there was a statistical high significant difference between the studied groups regarding the incision length as the incision of the open technique was longer than the laparoscopic technique.

This result agreed with the study done by *Negoi et al. (2017)* who reported that, patients from the laparoscopic group had a shorter incision, Also; *Huang et al. (2015)* reported that the laparoscopic CME group had a significantly shorter total incision length than the open CME group.

The duration of surgery remained one of the largest obstacles for laparoscopic CME. In our study, there was a statistical high significant difference between the laparoscopic and open procedures regarding the operative time as the laparoscopic technique take more time (range = 140– 205 min) than the open technique.

This result was in agreement with *Li et al. (2018)* who demonstrated that the operation time in the laparoscopic CME group was statistically longer than that in the open CME group another study by *Zhao et al. (2014)* reported that the mean operative time was significantly longer in

the laparoscopic CME group than that in the open CME group.

On the other hand, *Stergios et al. (2017)* reported that there was a statistically significant decrease of the operative time for the laparoscopic group compared to the open group as their surgical team had more skills and experience in laparoscopic technique.

Regarding intraoperative blood loss and the hospital stay, there was a statistical high significant difference between the studied groups as the intraoperative blood loss during the laparoscopic technique was less than the open technique detected in suction device container and soaked guaze, and hospital stay in laparoscopic group was shorter than the open group.

These results were in agreement with *Bae et al. (2014)* who reported that there was significant differences between open and laparoscopic groups in blood loss and hospital stay duration days, preferred the laparoscopic CME group. Also, *Sheng et al. (2017)* reported that patients in laparoscopic CME group had less operative blood loss and shorter hospital stay than those of the patients in the Open CME group.

In this study, there was no statistical significant difference between the laparoscopic and open groups regarding the tumour size, TNM classification and the histopathology findings. The number of harvested LNs in laparoscopic CME and open CME groups were.

These results were so close to the study done by *Huang et al. (2015)* who reported that there was no significant difference in TNM classification between the open and

laparoscopic techniques. The lengths of resected specimens in the laparoscopic and open groups were the same, as were the average number of harvested lymph nodes. *Kang et al. (2014)* demonstrated that the effect of the number of harvested lymph nodes after right colon cancer surgery on oncological outcomes has been emphasized.. Some studies have suggested that the number of retrieved lymph nodes and the proportion of involved to uninvolved nodes are significant prognostic factors even in the cases with stage III disease, in which improved survival is seen with increased lymph node yield.

West et al. (2010) demonstrated that complete mesocolic excision with central vascular ligation remove more tissue around a tumor with end result of a maximal lymph node harvest.

The present study showed that there was no statistical significant difference between the laparoscopic and open CME groups regarding postoperative complications. The regain of bowel motion was so close in both groups .The postoperative complication rate in the laparoscopic CME group was 30% ,and the complications included ileus, anastomotic leak that managed conservatively, postoperative bleeding that converted to open technique, intra-abdominal sepsis managed by ultrasound guided drainage of localized collection and the by antibiotic according to culture and sensitivity. The complication rate in the open CME group was 26.7%, including ileus, wound infection, intra-abdominal sepsis managed by antibiotic according to culture and sensitivity, and incisional hernia.

Chen et al. (2017) reported that the patients in laparoscopic CME group had earlier regain of bowel function after the operation and comparable incidence of postoperative complications compared to the patients in the open group. *Huang et al. (2015)* reported that there was no statistical difference between both groups regarding the post-operative complications and their rates in laparoscopic CME and open CME groups. Also, *Li et al. (2018)* demonstrated that, there was no statistical difference in the postoperative complication rate between the laparoscopic complete mesocolic excision and open CME groups. The postoperative complication rate in the laparoscopic complete mesocolic excision group was 10.0%, and the complications included incision infections and an intestinal obstruction. The complication rate in the open complete mesocolic excision group was 10.4%, including incision infections, a pulmonary infection, and postoperative anastomotic bleeding.

Regarding the follow up duration, there was no statistical significant difference between laparoscopic complete mesocolic excision and open complete mesocolic excision groups. During the follow-up, there was one case of tumor local recurrence in laparoscopic group, no metastasis, nor were cancer-related deaths observed in either group. These results were close to the study of *Sheng et al. (2017)*.

CONCLUSION

Laparoscopic complete mesocolic excision with central vascular ligation procedure is a safe, valid, and feasible surgical method for right colon cancers. Laparoscopic complete mesocolic

excision with central vascular ligation is associated with smaller incisions, less operative blood loss, earlier recovery after operation, and shorter hospital stay compared with open technique. The open technique is still superior in shorter operative time and more number of harvested lymph nodes.

REFERENCES

1. **Adamina, M., Manwaring, M. L., Park, K. J. and Delaney, C. P. (2012):** Laparoscopic complete mesocolic excision for right colon cancer. *Surgical Endoscopy*, 26(10), 2976-2980.
2. **Bae, S. U., Saklani, A. P., Lim, D. R., Kim, D. W., Hur, H., Min, B. S., and Kim, N. K. (2014):** Laparoscopic-assisted versus open complete mesocolic excision and central vascular ligation for right-sided colon cancer. *Annals of Surgical Oncology*, 21(7); 2288-2294.
3. **Chen, Z., Sheng, Q., Ying, X. and Chen, W. (2017):** Comparison of laparoscopic versus open complete mesocolic excision in elderly patients with right hemicolon cancer: retrospective analysis of one single cancer. *Int J Clin Exp Med*; 10(3): 5116-24.
4. **Croner, R. S., Ptok, H., Merkel, S. and Hohenberger, W. (2018):** Implementing complete mesocolic excision for colon cancer—mission completed?. *Innovative Surgical Sciences*, 3(1):17-29.
5. **Feng, B., Zhang, S., Yan, X., Ma, J., Sun, J., Lu, J., and Lu, A. (2016):** Operational approaches for laparoscopic complete mesocolic excision in right hemicolon cancer. *Minimally Invasive Approach to Colorectal Diseases*, 111. *Ann Laparsc Endosc Surg*;1:26.
6. **Fitzmaurice, C., Allen, C., Barber, R. M., Barregard, L., Bhutta, Z. A., Brenner, H., and Fleming, T. (2017):** Global Burden of Disease Cancer Collaboration Global, regional, and national cancer incidence, mortality, years of life lost, years lived with disability, and disability-adjusted life-years for 32 cancer groups, 1990 to 2015: a systematic analysis for

- the Global Burden of Disease Study. *JAMA Oncol*; 3(4): 524-548.
7. **Huang, J. L., Wei, H. B., Fang, J. F., Zheng, Z. H., Chen, T. F., Wei, B., and Liu, J. P. (2015):** Comparison of laparoscopic versus open complete mesocolic excision for right colon cancer. *International Journal of Surgery*, 23: 12-17.
 8. **Kahokehr, A., Sammour, T., Zargar-Shoshtari, K., Srinivasa, S. and Hill, A. G. (2010):** Recovery after open and laparoscopic right hemicolectomy: a comparison. *Journal of Surgical Research*, 162(1): 11-16.
 9. **Kang, J., Kim, I. K., Kang, S. I., Sohn, S. K. and Lee, K. Y. (2014):** Laparoscopic right hemicolectomy with complete mesocolic excision. *Surgical Endoscopy*, 28(9): 2747-2751.
 10. **Li, T., Meng, X. L. and Chen, W. (2018):** Safety and Short-term Efficacy of a Laparoscopic Complete Mesocolic Excision for the Surgical Treatment of Right Hemicolon Cancer. *Clinical Surgery Research Communications*, 2(2): 29-33.
 11. **Negoi, I., Hostiuc, S., Negoi, R. I. and Beuran, M. (2017):** Laparoscopic vs open complete mesocolic excision with central vascular ligation for colon cancer: A systematic review and meta-analysis. *World Journal of Gastrointestinal Oncology*, 9(12): 475- 419
 12. **Sheng, Q. S., Pan, Z., Chai, J., Cheng, X. B., Liu, F. L., Wang, J. H., and Lin, J. J. (2017):** Complete mesocolic excision in right hemicolectomy: comparison between hand-assisted laparoscopic and open approaches. *Annals of Surgical Treatment and Research*, 92(2): 90-96.
 13. **Stergios, K., Pergialiotis, V., Frountzas, M., Nalwaya, P., Kontzoglou, K. and Mohapatra, S. D. (2017):** Laparoscopic Versus Open Colectomies: Enhanced Surgical Skills And Rigorous Patient Selection May Improve Operative Times Without Compromising Outcomes. *J Surg*, 4(3): 555- 636.
 14. **West, N. P., Hohenberger, W., Weber, K., Perrakis, A., Finan, P. J. and Quirke, P. (2010):** Complete mesocolic excision with central vascular ligation produces an oncologically superior specimen compared with standard surgery for carcinoma of the colon. *Journal of Clinical Oncology*, 28(2): 272-278.
 15. **Wolff, B. G. and Larson, D. W. (2012):** Right hemicolectomy for treatment of cancer: open technique. *Fischer JE. Mastery of Surgery*. 5th ed. pbl Lippincott, Williams & Wilkins, p. 138.
 16. **Zhao, L. Y., Chi, P., Ding, W. X., Huang, S. R., Zhang, S. F., Pan, K., and Li, G. X. (2014):** Laparoscopic vs open extended right hemicolectomy for colon cancer. *World Journal of Gastroenterology: WJG*, 20(24): 7926 -7932.

دراسة المقارنة بين استئصال القولون الأيمن جراحياً وعن طريق المنظار الجراحي

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خلفية البحث: الجراحة هي العلاج الأساسي لسرطان القولون حيث يتم إزالة جزء من الأمعاء الغليظة مع السرطان، جنباً إلى جنب مع الغدد الليمفاوية المحيطة بها. وذلك عن طريق استئصال نصف القولون الأيمن أو استئصال نصف القولون الأيمن الممتد.

الهدف من البحث: دراسة المقارنة بين استئصال القولون الأيمن جراحياً وعن طريق المنظار الجراحي.

المرضى وطرق البحث: تمت هذه الدراسة على ثلاثين مريض من المرضى المتحجرين بمستشفيات جامعة الأزهر ومناسبون لإجراء جراحة استئصال سرطان القولون الأيمن في الفترة من أكتوبر 2019 إلى يوليو 2020. وقد تم تقسيم هؤلاء المرضى إلى مجموعتين: مجموعة (أ) خضعت للاستئصال الكامل للمسراق مع ربط الأوعية الدموية المركزية في سرطان القولون الأيمن عن طريق استخدام المنظار الجراحي ومجموعة (ب) خضعت للاستئصال الكامل للمسراق مع ربط الأوعية الدموية المركزية في سرطان القولون الأيمن عن طريق الجراحة المفتوحة. وهذه المجموعات خضعت للآتي: التاريخ المرضي والفحص الإكلينيكي الشامل والإختبارات المعملية مثل صورة دم كاملة ووظائف الكبد ووظائف الكلى ونسبة السكر بالدم ودلائل الأورام والأشعة التشخيصية مثل الأشعة التلفزيونية على البطن والأشعة المقطعية على البطن والحوض وأشعة عادية على الصدر وتحليل أنسجة الورم بعد أخذ مسحة منه.

نتائج البحث: يوجد فرق احصائي واضح بين المجموعتين بالنسبة إلى طول فتح الجرح، وقت إجراء العملية، كمية الدم المفقودة أثناء الجراحة ومدة الإقامة بالمستشفى بعد العملية ولا يوجد فرق احصائي بين المجموعتين بالنسبة إلى حجم الورم وعدد العقد الليمفاوية التي تم استئصالها على الرغم من أن عددها في

الجراحة عن طريق الفتح أكثر من عددها المستأصل عن طريق المنظار ولا يوجد فرق احصائي بين المجموعتين بالنسبة إلى نتائج التحليل الباثولوجي للعينة بعد استئصالها وفيما يخص الصعوبات الفنية أثناء العملية أو المشكلات التي حدثت بعد العملية و فيما يتعلق بعمر وجنس المريض أو المشاكل الصحية التي يعاني منها المريض.

الاستنتاج: يعتبر الاستئصال الكامل للمسراق مع ربط الأوعية الدموية المركزية هو العلاج الرئيسى الجديد فى طرق علاج سرطان القولون الأيمن، وينتج عنه تحسن كبير فى السيطرة على الورم وتحسن نتائج الورم على المدى الطويل ويعتبر الاستئصال الكامل للمسراق مع ربط الأوعية الدموية المركزية لعلاج سرطان القولون الأيمن باستخدام المنظار آمن وفعال ويتم بعمل فتح جرح أقل وكمية الدم المفقودة أثناء الجراحة أقل بكثير من الجراحة بالفتح وأقل أيضاً فى مدة الإقامة بالمستشفى مقارنة بالفتح. ولكن تعتبر الجراحة بالفتح أفضل من حيث وقت الجراحة ومضاعفات ما بعد الجراحة وعدد العقد الليمفاوية التي يتم استئصالها أثناء الجراحة. وأخيراً لا بد من اجراء دراسات وأبحاث كثيرة بالمستقبل على عدد أكبر من المرضى فيما يخص هذا الموضوع وذلك للوصول إلى أفضل وسيلة لإنهاء هذا السجال المستمر.