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Original Research Article

Medial versus lateral approache in laparscopic right hemicolectomy

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ABSTRACT

Background: Approach to right colon cancer is through open exploration but it has many complication, now laparoscopic right hemicolectomy is an advanced cancer surgery, laparoscopic right hemicolectomy can be done by medial or lateral or combined approach.
Methods: This is prospective study carried out on 30 patients admitted to department of surgery in menufia university hospital from September 2016 to September 2018 and all cases have RT colon cancer; The patients are divided into three groups, 1- group A (n=10): underwent medial approach for laparscopic right hemicolectomy 2- group B (n=10): underwent lateral approach for laparscopic right hemicolectomy, 3- group C (n=10) : underwent combined laparscopic medial and lateral approach, Blood loss, operative time, operative and postoperative complication were assessed. The period of follow up is for 6 months.
Results: Operative duration and blood loss were significantly lower in combined approach. Intra and post operative complications were low in combined and MA.
Conclusions: Laparoscopic combined approach reduces the operative time and blood loss than MA and LA. Besides the oncologic advantages of an early vessel division and a "no-touch" dissection.

Keywords: LA, Laparscopic RT hemicolectomy, MA

INTRODUCTION

Colorectal cancer is the 7th commonest cancer in Egypt, representing 3.47% of male cancers and 3% of female cancers. The estimated number of colon cancer patients (excluding rectal cancer) in 2015 was slightly more than three thousand; colon cancer is the second most frequent cause of cancer death.[1] Diagnosis of colon cancer can be done by histopathological study of specimen after colonoscopy. This is then followed by metastatic workup to determine if the disease disseminate.[2]

The primary treatment for colon cancer is surgery. Cancer found in the ascending colon and hepatic flexture, the right side is removed by right hemicolectomy or extended right hemicolectomy.[3]

Traditionally, approach to right colon cancer is through open exploration but now Laparoscopic right hemicolectomy is an advanced cancer surgery in today's era.laparscopic right hemicolectomy can be done by medial or lateral or combined approach and each approach has advantages and disadvantages.[4]

Objective of this study was to compare the medial versus lateral versus combined approach in laparscopic right hemicolectomy as regard technical feasibility and advantage and disadvantage of these procedures.

METHODS

Study design and data collection

This is a prospective analysis of collected data from RT colon cancer patients who had undergone laparoscopic medial approach (n=10), combined laparscopic medial and lateral approach (n=10), and laparoscopic lateral approach (n=10) laparoscopic right hemicolectomy by a consultant surgeon between September 2016 to September 2018. The research protocols used in this research were approved by the local ethics committee of Menoufia University Hospitals, Faculty of medicine, Menoufia, Egypt [MU IRB Protocol #1301765].

Inclusion criteria

Patients with primary operable right sided colon cancer as stage I and or stage II and patients fit for laparscopic surgery and have no medical comorbidities for laparscopy (cardiac or respiratory diseases).

Exclusion criteria

Patients with localy advanced or metastatic right sided colon cancer (stage IV). Complicated right sided colon cancer (Obstructed or Perforated colon cancer and Patients not fit for laparscopic surgery (cardiac or respiratory diseases).

Preoperative work

All patients were subjected to the following. Thorough history, Complaint: abdominal pain or swelling and bleeding per rectum, Clinical examination. Local (Abdominal) examination: Local examination of abdomen to asses for any palpable mass. Colonoscopy and histopathology of the tumor. Laboratory investigations: complete blood count, AST, ALT, Urea, Creatinine, P.T, Alkaline phosphatase, Blood sugar, carcino-embryonic antigen. Imaging studies: CT of the abdomen and pelvis and metastatic workup (ultrasound of the abdomen and chest radiography).

Surgical technique

Operative management: Preoperative preparation: the abdomen is shaved from hair and sterilized by povidine iodine. Anesthesia: General anesthesia and Ryle's tube is placed and bladder is catheterized under general anesthesia.

Position of the patient: The position of patient is supine and tilted toward left and the operator and camera man are on the left of the patient and the monitor on right side of the patient. Sterilization: Operative field in all patients was sterilized by povidone-iodine and toweled up in normal manner. Ports position as in Figure 1:10 mm umbilical, camera port for 30 degree telescope, 10 mm port, hand breadth and below camera port in left midclavicular line (right hand working), 5 mm port hand breadth below right working port in left midclavicular line (left hand working) and 5 mm right lumbar for holding bowel.

Figure 1: Port placement for lap RT hemicolectomy.

10 mm umbilical camera port, 10 mm port, hand breadth and below camera port in left midclavicular line, 5 mm port hand breadth below right working port in left midclavicular line, 5 mm right lumbar for holding bowel.

Group A; (Medial approach right hemicolectomy): include initial exploration and The small bowel was displaced to the left and the omentum was turned up to the upper quadrant, locating the ileocolic and superior mesenteric vessel pedicles: The ileocecal junction was grasped laterally displaying the ileocolic and superior mesenteric vessels clear. Making a “mesenteric window” and entering the right retrocolic space: The right retrocolic space between the mesocolon and the right pre-renal fascia was the natural surgical plan with identification of the duodenum and ureter and their protection as in Figure 2.

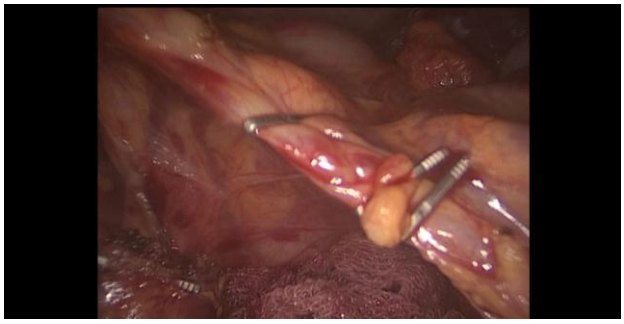

Figure 2: Identification and clipping of ileocolic vessels: Making a “mesenteric window” and entering the right retrocolic space.

The ileocolic vessels root was clipped at their origin from the SMV (superior mesenteric vessels). Dissecting the gastrocolic ligament and MCA (middle colic artery). The RCA (right colic artery) and the gastrocolic trunk were skeletonized when dissecting the front of the SMV caudally to cranially. The RCV, and middle colic vessels were ligated at their root one by one carefully. The

gastrocolic ligament was dissected rightwards near to the greater curvature border until the hepatocolic ligament was dissected completely, and then the transverse colon and hepatic flexure were mobilized. The transverse mesocolon was dissected caudally until it joined the plan of RRCS dissected previously. A functional ileocolic anastomosis was made by end-to-end through the right hypochondrial incision using a hand seewen.

Group B: Dissection of right paracolic peritoneal attatchment and freeing of ceacum, The right paracolic space is dissected pararel to the ascending colon toward the hepatic flexure. The right ureter is identified by grasping the peritoneal edge around the cecum. The ureter is clarified via blunt dissection along the Toldt's fascia, medially to the gonadal vessels.

Hepatic Flexure is freed by opening the peritoneum overlying the hepatic flexure and the right phrenocolic ligament, identifying the duodenum above border of the kidney without entering a wrong space behind it. The hepatic flexure and the proximal transverse colon are freed from the front of the kidney and the duodenum by blunt dissection, as the colon is brought by its own weight toward the pelvis without any traction.

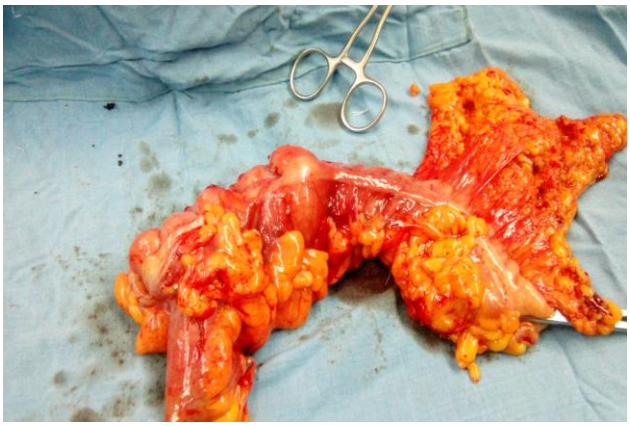

Figure 3: Specimen of colon after laparscopic RT hemicolectomy.

The appendix is firmly grasped through the MB trocar: this helps to exteriorize the colon. The umbilical port incision is extended above to join the epigastric port incision, and the right colon is exteriorized.

Gastrocolic ligament dissection by grasping it near the transverse colon and elevated both toward the anterior abdominal wall to identify the correct spae between the gastrocolic ligament and the underlying the transverse mesocolon. Exteriorization, vascular control, division and anastomosis the appendix is firmly grasped through the MB trocar: this helps to exteriorize the colon. The umbilical port incision is extended above to join the epigastric port incision, and the right colon is exteriorized as in Figure 3.

Group C: (Combined laparscopic medial and lateral approach), they begin with medial approach to achieve vascular control to vascular pedicles at its origin (non touch) technique and use of lateral approach to open peritoneal attachment of colon with abdominal wall.

Statistical analysis

Demographic characteristics, intra, and postoperative data were envolved and analyzed using SPSS 24.0 (IBM SPSS Inc. Armonk, NY, USA). Categorical variables are summarized using frequency and percentage, and are presented as the mean ± standard deviation. 3 groups were put in comparison by Student's t test for continuous variables and the chi-square test for categorical variables. P-value of lower than 0.05 was considered significant.

RESULTS

Table 1 show that duration of operation was ranged from 100-120 min with mean value 90.0± 8.2 in group A, and ranged from 130-150 min with mean value 140.9± 9.0 in group B and ranged from 95-105 min with mean value 87.1± 8.1 in group C with statistically significant difference between both groups as p value was 0.001.

Table 1 shows that blood loss was ranged from 90-120 cc with mean value 100±10 in group A, and ranged from 100-150 cc with mean value 136.3±13.9 in group B and ranged from 50-70 cc with mean value 50±7.9 in group C with statistically significant difference between both groups as p value was 0.020. Table 2 shows that there is no statistically significant difference between group A, group B and group C regarding ureteric and duodenal injuryas P value is 0.962.

There is statistically significant difference between group A, group B and group C regarding gonadal V injury as P value is 0.024. Ureteric injury is repaired by refreshment of edges and direct repair, gonadal V injury is controlled by ligation.

Table 1: Evaluation of duration of operation and blood loss.

		Group A	Group B	Group C	T-test	P value
Duration of operation (minutes)	Mean ±SD	90.0±8.2	140.9±9.0	87.1± 8.1	75.007	0.001
	Range	100–120	130–150	95-105		
Blood loss (CC)	Mean ±SD	100±10	136.3±13.9	50±7.9	13.206	0.020
	Range	90–120	100–150	50-70		

Table 2: Evaluation of intraoperative complication.

	Group A (n=10)		Group B (n=10)		Group C (n=10)		Chi	P value
	No	%	No	%	No	%		
1-Ureteric injury	1	10	2	20	1	10	0.002	0.962
2-Gonadal V injury	0	0	2	13	0	0	2.143	0.024
3-Doudenal injury	0	0	0	0	0	0		

Table 3: Post operative complication.

Variables	Group A (n=10)		Group B (n=10)		Group C (n=10)		Chi	P value
	No	%	No	%	No	%		
Ileus	1	10	3	30	1	10	1.154	0.028
Anastomotic leak	1	10	3	30	0	0	1.154	0.018
Intraperitoneal infection	0	0	2	20	1	10	2.143	0.014
Anastomotic stenosis	1	10	2	20	0	0	0.376	0.643

Table 4: Post operative evaluation of number of L.N harvested.

		Group A	Group B	Group C	T-test	P value
Number of L.N harvested	Mean ±SD	19.6±3.3	15.1± 2.3	18±3.9	2.990	0,005
	Range	15–24	13–20	13-24		

Table 5: Surgical feasibility.

Surgical feasibility	Group A		Group B		Group C		Chi	P value
	No	%	No	%	No	%		
Easy	7	70	3	30	8	80	3.742	0.003
Difficult	3	30	7	70	2	20		

Regarding post operative complication (Anastomotic leak- Intraperitoneal infection-and Ileus), Table 3 show that there is statistically significant difference between group A, group B and group C as P values are 0.018, 0.014 and 0.028 respectively. 3 patients with leak were treated conservatively and 1 patient needs intervention. Patient with infection (sub phrenic abcess) treated with Begtail insertion. Patients with ileus treated conservatively. There is no statistically significant difference between group A, group B and group C regarding anastomotic stenosis as P value is 0.643. Patients with stenosis treated by endoscopic dilatation.

Table 4 show that number of L.N harvested was ranged from 15-24 with mean value 19.6±3.3 in group A, and ranged from 13-20 min with mean value 15.1±2.3 in group B and ranged from 13-24 min with mean value 18±3.9 in group C with statistically significant difference between both groups as p value was 0.005.

Table 5 shows that there is statistically significant difference between group A, group B and group C regarding surgical feasibility as P value is 0.003. As 70% of patients are fessible in group A, 30% of patients are feasible in group B and 80% of patients are feasible in group C.

DISCUSSION

Colorectal cancer (CRC) is the third most commonly diagnosed cancer in males and the second in females, with over 1.4million new cancer cases and 693,900 deaths estimated to have occurred worldwide.[5]

The surgery is the primary option for colon cancer erradication. The part of the colon with cancer is removed, along with surrounding lymph nodes. Malignancy present in the ascending colon and hepatic flexture, the right side is removed by right hemicolectomy or extended right hemicol ectomy.[6]

Traditionally, approach to right colon cancer is through open exploration but now Laparoscopic right hemicolectomy is an advanced cancer surgery in today's era. During the past few decades, minimally invasive laparoscopic surgery was known as a revolutionary technique for surgical management of patients. In contrast to open surgery, laparoscopic surgery provides better postoperative recovery with lower pain and complications, shorter hospital stay, and faster return to working life.[7]

In this study Table 1 show that that duration of operation was ranged from 100-120 min with mean value 90.0±8.2

in group A, and ranged from 130-150 min with mean value 140.9±9.0 in group B and ranged from 95-105 min with mean value 87.1±8.1 in group C with statistically significant difference between both groups as p value was 0.001.

Pingping Xu et al, 2015 showed that the operation time in MA ranged from 120- 138.4 min with mean value 130.5±10. Zhao et al in 2014 showed that the operation time in LA, min. ranged from 120-156.2 min with mean value 130.5±10.[8,9]

A meta-analysis by Ding et al, 2013 has analysed 5 cohort studies including 2 randomized control trials and 3 retrospective studies incorporating 881 patients.[10] They reported significantly shorter operative time. Right-sided resections took 136 (114–145) minutes in the medial-to-lateral group compared to 156 (136–157) minutes in the lateral-to-medial. Pagazzi et al in 2007 supported the idea that the MA in laparoscopic right hemicolectomy provides shorter operative time.[11] However, Ballantyne et al, 2006 showed that the medial approach provides the same results as the laeral approach in laparoscopic RT hemicolectomy.[12]

Table 1 in this study, blood loss was ranged from 90-120 cc with mean value 100±10 in group A, and ranged from 100-150 cc with mean value 136.3±13.9 in group B and ranged from 50-70 cc with mean value 50±7.9 in group C with statistically significant difference between both groups as p value was 0.020.

Yan et al, 2010 found that patients in the MA group had blood loss ranged from (52.0-65.0 ml), Tang et al, 2015 show that blood loss in LA group ranged from (80.0-110.0 ml).[13,14]

In Table 2 according to intra operative complication there is no statistically significant difference between group A, group B and group C regarding ureteric and duodenal injury as P value is 0.962. There is statistically significant difference between group A, group B and group C regarding gonadal V injury as P value is 0.014. It was agreeded by Huscher et al.[15] Kang et al, show that laparoscopic medial approach surgery was safe and feasible; it had good short-term results including shorter postoperative recovery, shorter hospitalization stay, fewer intra and postoperative complications, and other advantages, and agreeded by Adamina et al.[16,17] Ignjatovic et al, show that the medial-to-lateral, caudal-to-cranial, and posterior-to-anterior procedures had priority to make the exposure adequate and precise, the dissection distinct, and the operation easier.[18]

Regarding post operative complication in Table 3 (anastomotic leak- intraperitoneal infection-and ileus) there is statistically significant difference between group A, group B and group C as P values are 0.018, 0.014 and 0.028 respectively. 3 patients with leak were treated conservatively and 1 patient needs intervention. Patient with infection (sub phrenic abcess) treated with Begtail insertion. Patients with ileus treated conservatively. There is no statistically significant difference between group A, group B and group C regarding anastomotic stenosis as p value is 0.643. Patients with stenosis treated by endoscopic dilatation.

Yong et al, show significant difference regarding post operative complication as $p<0.05$. Xu et al, show that There were significant differences in complications during surgery (p=0.008), minor postoperative complications (p=0.005), major postoperative complications (p=0.001), and agreeded by Senagore et al and Veldkamp et al.[19-22]

Regarding number of LN harvested in Table 4, This study show statistically significant difference between group A, group B and group C regarding number of lymph nodes harvested as p value is 0.005, Duck et al.[23] The average nodal yield of 31.3 is consistent with previously published reports of 30 lymph nodes with MA group and is superior to average yields of fewer than 20 lymph nodes with LA group, and West et al.[24] Zhu et al show the MA group had significantly more retrieved lymph nodes (MA, 18.8 vs. LA, 16.0; p=0.028) and positive lymph nodes (MA, 3.4 vs. LA, 2.2; p=0.025), and agreeded by Le Voyer et al and Chang et al, 2007.[25-27]

In this study, laparoscopic combined and MA for resection of right side colon reduces the operative duration, intraoperative blood loss which decrease the postoperative proinflammatory which result in reduction in time of intestinal recovery and MA surgery good short-term results including faster postoperative recovery, shorter hospitalization time, fewer intra and postoperative complications so MA was safe and feasible and this is supported by Poon, et al.[28] Dayn and Lau reported anumber of advantages for this approach. They reported a reduced conversion rate for medial-to-lateral group.[29]

CONCLUSION

Laparoscopic MA and combined approaches are safe and feasible with less operative duration and blood loss than lateral approach. Besides the oncologic safety of early vessel ligation and a "no-touch" dissection, the longer the lateral peritoneal attachments of the bowel are preserved, the better the exposure and the easier the dissection.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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