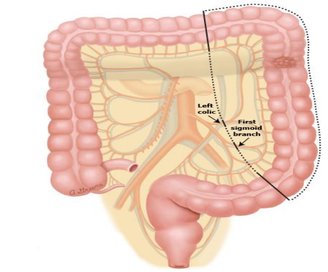
COMPARISON OF SHORT-TERM OUTCOMES BETWEEN INTRACORPOREAL ANASTOMOSIS AND EXTRACORPOREAL ANASTOMOSIS FOR LAPAROSCOPIC LEFT COLECTOMY: A RETROSPECTIVE STUDY

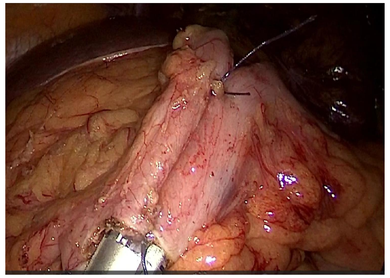
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INTRODUCTION

In recent years, laparoscopic colectomy (LC) has been became the standard of care for treating colon cancer worldwide. LC have two main techniques: Laparoscopic-assisted colectomy with extracorporeal anastomosis (LAC/EA) and Total laparoscopic colectomy with intracorporeal anastomosis (TLC/IA). Each technique has its own advantages and disadvantages. There were many studies compared LAC/EA and TLC/IA for laparoscopic right colectomy, while studies that compared these two techniques for laparoscopic left colectomy to treat colon cancer remain scarce. The purpose of our study is to compare short term outcomes between intracorporeal anastomosis and extracorporeal anastomosis in laparoscopic left colectomy for left-side colon cancer.



Left-sided colon cancer
(Source: Rodriguez-Bigas MA: Surgical resection of primary colon cancer.www.uptodate.com)



Intracorporeal anastomosis
(Source: Binh Dan Hospital)



Extracorporeal anastomosis
(Source: Binh Dan Hospital)

METHOD

A series of 103 patients underwent laparoscopic left colectomy for left-side colon cancer with intracorporeal anastomosis (IA group) and extracorporeal anastomosis (EA group) in Binh Dan Hospital - Vietnam from 01/2021 to 06/2023 were retrospectively analyzed. In order to minimize the risk of bias and potential confounding factors, and improve the validity of the statistical comparison, the PSM analysis was performed to match 1:1 patients of the IA and the EA group, using the following covariates which might affect the peri and postoperative outcomes: gender, age, BMI, tumor location, ASA grade, blood hemoglobin and albumin level. We used R software to generate propensity score values using the logistic regression method. The IA and EA groups were then paired 1:1 on these propensity scores. Nearest-neighbor matching, in a ratio of 1:1 without replacement, with a caliper of 0.2 standard deviation of the estimated logit, was performed (package Matchlt). After the PSM analysis, 21 of 54 patients in the EA group were matched with 21 of 49 patients in the IA group.

RESULTS

	IA group (N = 49)	EA group (N = 54)	p
Age	60 ± 12,6	61,5 ± 11,8	0,08
Sex	24/25	27/27	0,918
Medical history			0,764
None	42,86%	33,3%	
Cardiovascular diseases	24,5%	29,7%	
Diabetes, hyperthoidism	20,4%	26%	
Colonitis	4,08%	5,45%	
Colon polyps	6,12%	1,85%	
Abdominal surgery	1,04%	3,7%	

Table 1: Demographics and disease-related data

	IA group (N=49)	EA group (N=54)	p
BMI			0,43
<18,5	8,2%	5,5%	
18,5-24,9	81,6%	77,9%	
25-29,9	10,2%	11,1%	
≥30	0	5,5%	
ASA			0,53
I	4,1%	1,9%	
II	83,6%	75,9%	
III	12,3%	22,2%	

Table 2: BMI & ASA

	IA group (N=49)	EA group (N=54)	p
Hb (g/dL)	12,13 ± 1,74	12,09 ± 1,92	0,921
CEA (µg/L)	9,63 ± 17,29	18,38 ± 53,79	0,436
Albumin (g/L)	39,02 ± 3,8	40,12 ± 7,6	0,647
Tumor Location			0,08
Splenic flexure colon	20,4%	10,2%	
Descending colon	53%	18,4%	
Sigmoid colon	26,6%	71,4%	

Table 3: Tumor location, blood hemoglobin & albumin level

	IA group (N = 49)	EA group (N = 54)	p
Operative time (min)	204,33 ± 61,28	179,96 ± 41,07	**0,02**
Blood loss (ml)	37,55 ± 33,5	51,12 ± 30,2	**0,036**
Incision length (cm)	3,97 ± 1,47	6,21 ± 1,2	**<0,001**
Time to flatus (days)	2,49 ± 0,938	2,78 ± 0,798	**0,017**
Time to stool (days)	4,61 ± 1,151	5,29 ± 1,443	**0,014**
Length of stay (days)	6,94 ± 1,18	8 ± 3,304	**0,01**
VAS	2,29 ± 0,736	3,43 ± 0,707	**<0,001**
Harvested nodes	14,08 ± 7,516	11,93 ± 6,191	0,123

Table 4: Short-term outcomes before PSM

	IA group (N = 49)	EA group (N= 54)	p
Overall complications	4 (8,16%)	13 (24,07%)	**0,03**
Anastomosis leak	1 (2,04%)	4 (7,4%)	0,36
Wound infection	2 (4,08%)	5 (9,26%)	0,441
Paralytic Ileus	0	2 (3,7%)	
Adhesional small bowel obstruction	1 (2,04%)	0	
Intra-abdominal collections	0	1 (1,85%)	
Hospital-acquired pneumonia	0	1 (1,85%)	
Reoperation	0	2 (3,7%)	

Table 5: Postoperative complications before PSM

	IA group (N = 21)	EA group (N = 21)	p
Operative time (min)	183 ± 49,1	192 ± 58	0,61
Blood loss (ml)	35,2 ± 44,2	51 ± 31,9	**0,023**
Incision length (cm)	3,88 ± 1,16	5,88 ± 1,37	**<0,001**
Time to flatus (days)	2,67 ± 0,938	2,95 ± 0,67	**0,045**
Time to stool (days)	4,48 ± 1,3	5,48 ± 1,29	**0,016**
Length of stay (days)	6,67 ± 0,796	7.67 ± 1.39	**0,006**
VAS	2,48 ± 0,75	3,38 ± 0,67	**<0,001**
Harvested nodes	13,6 ± 7,02	13,6 ± 6,2	1

Table 6: Short-term outcomes after PSM

	IA group (N = 21)	EA group (N= 21)	p
Overall complications	0	8 (38,1%)	**0,0035**
Anastomosis leak	0	0	1
Wound infection	0	4 (19%)	0,107
Paralytic Ileus	0	2 (9,5%)	
Adhesional small bowel obstruction	0	0	
Intra-abdominal collections	0	1 (4,8%)	
Hospital-acquired pneumonia	0	1 (4,8%)	
Reoperation	0	0	

Table 7: Postoperative complications after PSM

DISCUSSION

After PSM, the IA group had less intraoperative blood loss and a shorter mean incision length. Recovery after surgery was also better in patients who underwent IA, as confirmed by the shorter time to flatus, time to stool, lower rate of overall complications, and mean VAS score. These results are quite similar to the pre-PSM results; however, there was no significant difference in the mean operative time. In the EA group, the colon and its mesentery must be mobilized sufficiently to be externalized and perform the anastomosis. Mean while, in IA group, only minimal colonic and mesenteric mobilizations are required, and in some cases, splenic flexure mobilization can be avoided thus causing less damage to the colon and mesentery. This contributes to less blood loss, a shorter time to flatus and stool, and a lower rate of overall complications in the IA group compared to the EA group. If the incision in patients undergoing the EA procedure is not long enough, the colon segment may be damaged due to the pressure exerted while extracting the tumor. However, in the IA group, the incision can be shorter than the tumor size, which is not possible in the EA group, especially in obese patients.

CONCLUSION

The intracorporeal anastomosis during laparoscopic resection of the left-sided colon is an efficient and safe procedure in terms of short-term outcomes. Major advantages are: shorter incision length, shorter time to flatus and to stool, shorter postoperative length of stay, lower rate of overall complications and mean VAS score than laparoscopic-assisted colectomy with extracorporeal anastomosis.

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