

ONE-STAGE SEGMENTAL COLECTOMY FOR OBSTRUCTIVE LEFT-SIDED COLON CANCER

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ABSTRACT

Background: The management of obstructive left-sided colon cancer is an optional operation and remains a highly controversial topic. Some evidence suggests that primary anastomosis following left sided colorectal resection in the emergency setting may be safe in selected patients. **Objectives:** This study aimed to evaluate the results and risk factors of segmental colectomy with primary anastomosis following intra-operative colonic irrigation (ICI) in 30 days postoperation period. **Materials and methods:** A prospective case series report was performed at Nguyen Dinh Chieu hospital from 2015 to 2020. **Results:** There were 72 consecutive patients, the median age was 67.5, the age older than 74 was frequent. The comorbidity was 48.61%. All patients were successfully oncological colectomy with primary anastomosis following ICI. The regional lymph nodes harvest greater than or equal to 12 was 87.5%. The mean operative time was 192.36 ± 52.48 ms (range 100-360), and the median time of intraoperative colonic lavage was 15 minutes (range 7-35). The complication rate was 23.61%, including wound infection and pneumonia were 13.89%, 8.33%, respectively and there is no anastomotic dehiscence. The mortality was 4.17%. The median length of hospital stay was 11 days. Risk of the complications were age and diabetes. **Conclusions:** The one-stage emergency oncological segmental colectomy with ICI and primary anastomosis was feasible and safe in selected patients. The procedure managed both obstruction and colon cancer in one-stage. However, the results showed that age and diabetes were risk factors of postoperative complications, therefore, they should be applied in selected patients.

Keywords: left-sided colon cancer, obstruction, one-stage emergency surgery

I. INTRODUCTION

Colon cancer is the fourth most commonly diagnosed malignant disease and the third leading cause of cancer-related death in the world [4]. The most common complication of colon cancer is obstruction, there was 10-25% of the first colonic cancer presentation is acute/subacute obstruction [13]. Acute obstructive colon cancer occurs more frequently in elderly patients with more comorbidities is common in advanced-stage disease, so the risk of postoperative complication and mortality is high [11]. The management of obstructive left-sided colon cancer is challenging and remains controversial. Several surgical options for management of obstructive left-sided colon cancer including primary resection (with or without anastomosis), subtotal colectomy (with or without anastomosis) or defunctioning stoma with interval resection, self-expanding stents placement as a bridge to surgery depends on the tumor stage, the severity of obstruction, and general patient characteristics. Some evidence suggests that primary anastomosis following left sided colorectal resection in the emergency setting may be safe in selected patients [8],[11],[15]. This study aimed to evaluate the results and risk factors of segmental colectomy with primary anastomosis following intra-operative colonic irrigation (ICI) in 30 days postoperation period.

II. MATERIALS AND METHODS

This is a prospective case series report performed at Nguyen Dinh Chieu hospital in Ben Tre City. Obstructive resectable left-sided colon cancer patients admitted from 2015 to 2020, excluding patients with hemodynamic unstable, septic shock, general peritonitis, perforated or cecal necrosis, peritoneal carcinomatosis and ASA score > IV. The complete mesocolic excision (CME) and central vascular ligation (CVL) open technique were performed. The ICI technique was followed by Dudley's method with modification, a Foley tube was inserted into the cecum via appendix orifice after appendectomy (patients had an appendectomy, the Foley tube was inserted via ileotomy). The patient's demographic, obstruction characteristics, intraoperative findings, postoperative complications were collected and statistically analyzed. The stage of disease was classified following 8th AJCC's cancer classification. The univariate analysis by Pearson's Chi-square test or Fisher's exact test, Mann-Whitney U test, as appropriate, and the multivariate analysis by logistic regression. Statistical analyses were performed using Stata version 13.0, Stata Corp LP.

III. RESULTS

3.1. The patient characteristics

Table 1. The patient characteristics

Characteristics		N=72	%
<i>Age</i>	Median (IQR)	68 (58-80)	
	Range	29-90	
	< 61	22	30.56
	61-74	24	33.33
	> 74	26	36.11
<i>Sex</i>	Female	39	54.17
	Male	33	45.83
	<i>Co-morbidities</i>	35	48.61
	Hypertension	18	25
	Diabetes	9	12.50
	COPD	3	4.17
	Cerebrovascular accident sequelae	2	2.78
	Anemia (Hemoglobin < 110g/L)	16	22.22
	Hypoalbuminemia (< 35g/L)	39	54.17
<i>ASA</i>	I	4	5.56
	II	54	75
	III	14	19.44

3.2. Intraoperative findings

Closed-loop obstruction that was completely colon obstruction and the cecal-ileum valve was competent occurred in 23.61% of the patient. It was a risk factor of the serosal colonic tear (OR = 8.92; 95%CI: 1.79 - 47.94; p=0,00). Proximal dilated colonic lesions were 15.28%, including the serosal colonic tear in 13.88% and ischemic necrosis in 1.39%. There were 63,89% of tumor invasion at cT4a level and 30,56% at T4b level. All the invaded structures were successfully extended resected en bloc with the primary tumor and the serosal colonic tears were simply sutured.

Table 2. Intraoperative findings

Intraoperative findings	N=72	%
<i>Tumor location</i>		
Sigmoid	44	61.11
Descending	18	25.00
Splenic flexure	10	13.89
<i>Obstructive types:</i>		
Closed-loop	17	23.61
Non closed-loop	55	46.19
<i>Proximal colonic lesions</i>		
Serosal tear	10	13.89
Ischemic dilated colon	1	1.39
<i>cT stage</i>		
T3	4	5.56
T4a	46	63.89
T4b	22	30.56
<i>Invaded neighbor structures</i>		
Bilateral ovary-fallopian tube and bladder	1	1.39
Bladder	1	1.39
Ovary	2	2.78
Stomach	1	1.39
Ileum	1	1.39
Jejunum	1	1.39
Abdominal wall	13	18.05
Uterus and bilateral fallopian	2	2.86
<i>Metastasis</i>		
Liver	2	2.78

Table 3. Operative and pathological characteristics

Characteristics	Freq	%
Sigmoidectomy	37	51.39
Left hemicolectomy	34	47.22
Extensive left hemicolectomy	01	1.39
Median irrigation time (minute)	: 15 (7-35)	
Median volume fluid for irrigation (L)	: 7.63 ± 3.59L	
Mean operative time (minute)	: 192.36 ± 52.48 (100-360)	
Lymph node harvested	: 17.45 ± 6.74 (7-43)	
Mean proximal resected length (cm)	: 15 (IQR 10-20)	
Mean distal resected length (cm)	: 5 (IQR 9-10)	
Lymph node ≥ 12	63	87.5
<i>Histology:</i>		
Adenocarcinoma	66	91.67
Mucinous adenocarcinoma	6	8.33
<i>Differentiation types:</i>		
Well-differentiated	10	13.89
Moderate differentiated	56	77.78
Poorly differentiated	6	8.33

Table 4. Operative and pathological characteristics (cont)

Characteristics		Freq	%
<i>Tumor invasion</i>			
pT3		4	5.56
pT4a		46	63.89
pT4b		22	30,56
<i>Lymph node metastasis</i>			
1	(N1a)	8	11.11
2-3	(N1b)	15	20.83
Tumor deposit	(N1c)	3	4.17
4-6	(N2a)	7	9.72
≥7	(N2b)	2	2.78
<i>Stage</i>			
IIA		4	5.56
IIB		19	26.39
IIC		14	19.44
IIIB		18	26.39
IIIC		15	23.83
IVA		2	2.78

3.3. Postoperative complications

Table 5. Postoperative complications

Complications	Frequency	Percentage
Wound infection	10	13.,89
Pneumonia	6	8.33
Renal failure	3	4.17
Urinary retention	3	4.17
Anastomotic dehiscence	0	0
Death	3	4.17
Median length of hospital stay (day): 11 (IQR 9-14)		
30-days postoperation		
<i>Daily activities</i>		
Normally	60	86.96
Limited	9	13.04
<i>Defecation</i>		
Normally	67	97,10
Constipation	1	1,45
Diarrhea	1	1,45
<i>Wound</i>		
Well-healing	68	98,55
Still skin opened	1	1.45
<i>Fecal leakage</i>	0	0
<i>Re-admission</i>	0	0
<i>Death</i>	0	0

The postoperative complications rate was 23.61%. The multivariate analysis showed that the age and diabetes were statistically significant independent variate related to the complications. (age: OR=1.06; 95% CI: 1.00 - 1.13; p=0.03; diabetes: OR=9.60; 95% CI: 1.31 - 70.07; p=0.02).

The wound infection rate was 13.89% that resolved by medical management. The multivariate analysis showed that the age and diabetes were statistically significant independent variate related to the complications. (age: OR = 1.06; 95% CI: 1.00 - 1.13; p = 0.03, diabetes: OR = 9.60; 95% CI: 1.31-70.07; p=0.02). The postoperative pneumonia was 8,33%, three of them were regressed to septic shock, multi-organ failure, and finally led to death. Univariate analysis showed the age, COPD and diabetes were the risk factor, but they were not independent variate related to pneumonia in multivariate analysis.

IV. DISCUSSION

4.1. The patient characteristics

Obstructive left-sided colon cancers occurred frequently in elderly patients who had more co-morbidities, especially cardiovascular morbidity, were usually in the advanced stage with more invasion and metastasis [11],[5],[14]. Our study results also found that the age older than 74 was more frequent, the tumors were almost on T4 invasion. The regional lymph node metastasis was 44.44% and liver metastasis was 2.78%. The stage of disease classified following 8th AJCC was prominent at stage II and stage III. These results were similar to previous reports [2],[5],[11].

4.2. Surgical management

The management of obstructive left-sided colon cancer is challenging and remains controversial. Several surgical options for obstructive left-sided colon cancer that depends on the tumor stage, the severity of obstruction, and general patient characteristics. There is an ongoing debate on the best treatment approach for patients with left-sided obstructive colon cancer [1],[8],[11]. Sánchez et al. compared one-stage primary anastomosis to one-stage primary anastomosis with the protective stoma. They revealed no significant differences in aspect mortality between the 2 treatment strategies and concluded that primary anastomosis after emergency left-sided colon resection in selected patients appears safe, a defunctioning stoma might reduce the outcomes of anastomotic leakage [9]. A comparison between 4 strategies: colectomy with a primary anastomosis after antegrade ICI, Hartmann procedure, colostomy diversion, and stent placement as a bridge to surgery found that colectomy with a primary anastomosis after antegrade ICI can be safely performed in selected patients [3].

The ICI and manual decompression were accepted for one-stage primary anastomosis. A retrospective case series was performed at Nhan Dan Gia Dinh Hospital about a one-stage operation without ICI in the treatment of left-sided colonic obstruction concluded that manual decompression was less time consuming and comparable to ICI in the aspect of morbidity mortality in carefully selected patients and performed by experienced surgeons [6]. A recent systematic review and guideline pointed out manual decompression and ICI were comparable, either procedure could be performed, depending on the preference of the surgeon [8]. In our study, the median time of ICI was 15 minutes (IQR 10-20 minutes), so the ICI was not operative time consuming.

As previously mentioned, obstructive colon cancer is generally at a more advanced stage, so one of the aspects to be considered whether the principles of oncologic resection are observed, especially in an emergency setting where the surgical field was limited due to bowel dilatation. The principle of oncologic colon cancer resection was considered such as the length of cutting segmental colon with negative surgical margins, en bloc resection of

invaded structures, lymph node harvested of at least 12. Many previous studies have reported the oncologic resection of obstructive colon cancers was comparable to non-obstructive colon cancers [7], [12]. In our study, all invaded structures were successfully en bloc resected with the primary tumor, the median length of proximal and distal colon resected were longer than 10 cm and the regional lymph node dissected more than twelve was 87.5%. This result is comparable to another.

4.3. Postoperative complications

In our study, the complication was 23.61%, including wound infection 13.89%, pneumonia 8.33%, renal failure 4.17% and urinary retention 4.17%, especially, there was any anastomotic failure. Similar to other reports [5], [11], our data analysis found that age and diabetes were risk factors for postoperative complications.

Table 6. Result of reports

Authors	N	Wound infection (%)	Pneumonia (%)	Anas. failure (%)	Mortality (%)
Awotar [3]	18	27.87	11.11	5.56	4.88
Ng. V. Hai [6]	74	12.2	1.4	9.5	1.4
Mege [5]	329	9	-	13	6
Sasaki [10]	101	5	3	3	0
Otsuka [7]	25	28	-	4	0
Sánchez [9]	97	-	-	13.4	3.1
Our study	70	13.89	8.33	0	4.17

Obstructive left-sided colon cancer remains a challenging and controversial topic, many strategies for management were proposed. A retrospective from 2009 to 2016 in the Netherlands with 2,587 obstructive left-sided colon cancers revealed acute resection, diverting stoma, and stent placement as a bridge to surgery was 77.8%, 13.3%, 8.9% respectively. The acute resection and primary anastomosis were the most preferred approach in suitable patients. The trend of management was changed since 2014, the emergency resection was decreased while diverting stoma and stent placement as a bridge to surgery were increased but the overall complication and mortality was unchanged at a high rate. This trend is changing due to the patients are getting older and have more co-morbidities, so they are suitable for staged surgery [14].

V. CONCLUSIONS

Obstructive left-sided colon cancers occurred frequently in fragile elder patients with more co-morbidities and more invaded structure around the primary tumor and more at a late stage of the disease. The emergency segmental colectomy and primary anastomosis followed by intraoperative colonic irrigation were feasible and safe, especially oncologic principles of resection were respected. The procedure managed both obstruction and colon cancer in one-stage surgery. However, the postoperative complication is still high rate. The results showed that age and diabetes were risk factors of postoperative complications.

Therefore, in this study, we recommend that the emergency segmental colectomy and primary anastomosis followed by intraoperative colonic irrigation it should be applied in selected patients and was performed by experienced specialist surgeons.

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