

COLON STENTING VS EMERGENCY SURGERY FOR ACUTE LEFT-SIDED MALIGNANT COLON OBSTRUCTION WITH RESECTION AND PRIMARY ANASTOMOSIS: A PROSPECTIVE COHORT STUDY

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Resume

The goal of our study was to determine whether colon stenting and later managing these patients through ERAS guidelines affected on hospital stay days and on other complication rates in case of acute left sided malignant colon obstruction compared to traditional care method - with colon resection and primary anastomosis formation.

In traditional care group of emergency colorectal surgeries (resection and primary anastomosis) we included 36 patients (Group A). In this group we observed that postoperative hospital stay days were 8-10. Infection complications high rate - 22.2%, 30-day readmission rate - 19.4%, PONV - 41.6%, respiratory complications - 16.6%, deep vein thrombosis - 5.5%, prolonged postoperative ileus - 19.4%, anastomosis leak - 11.1%.

In the second group of colon stenting and ERAS we included 12 patients. Our study demonstrates that hospital stay days was significantly decreased and it was average 5 days. Compared to traditional care group (Group B) respiratory complications number was 0, PONV - 8.3%, postoperative prolonged ileus 0, deep vein thrombosis 0, urine retention 0, 30-day readmission rate 0, surgical site infection 0, anastomosis leak 0.

Key words: Left-sided colorectal cancer, Self-Expanding Metallic Stents (SEMS), ERAS Guidelines.

INTRODUCTION

Left-sided colorectal cancer is characterized with following acute complications: acute colorectal obstruction, acute colorectal perforation, bleeding from tumor tissue and increasing the tumor into nearby organs and structures. Acute colorectal obstruction is the most frequent complication of left sided malignancies. It may be observed in about 25% of colorectal cancer patients. It must be considered, that clinical manifestation of this complication mainly develops acutely and it is absolute indication of emergency surgery for urgent decompression of the bowel [1, 2, 3]. There are still lot of debates regarding to the best proper surgical treatment for malignant left-sided large bowel obstructions. Main options of Obstructed Left sided Colon Cancer (OLCC) treatment are Primary resection with end colostomy, Hartmann's procedure (HP), Resection and Primary Anastomosis (RPA), also Loop colostomy, Tube decompression, Endoscopic colon stenting by Self-Expanding Metallic Stents (SEMS) [2, 4, 5]. This last procedure can be considered as a bridge to surgery or palliation. It's about twenty years after the first description of this technique and the debates are still open on the role of self-expandable metallic stents placement for symptomatic left-sided malignant colon obstructions.

Symptomatic left-sided colon cancer complicated with colon obstruction is a surgical emergency. Emergency surgery itself has its possible complications, including: increased risk of anastomotic insufficiency, increased rate of postoperative nausea and vomiting (PONV), respiratory

and urinary complications, postoperative prolonged ileus, surgical site infections, bleeding, performing stoma. Emergency operations are associated with 15-35% of mortality rate and morbidity in 32-64% despite all advances in perioperative care [6, 7, 8, 9, 10]. All of these complications are associated with decreased life quality, increased hospital stay days and costs, increased mortality rate. Stomas created after emergency surgery frequently report other complications and poorer health-related quality of life than do patients without colostomy [11, 12, 13, 14].

The key elements of ERAS protocols include preoperative counselling, patients' optimization prior to admission into the operating room, minimal fasting - which includes carbohydrate loading preoperatively until two hours before anesthesia; goal directed fluid therapy, standartized multimodal analgesia with minimal use of opioids and anesthetic regimens, early mobilization, no drains, no nasogastric tubes, increased patients' satisfaction, better outcomes [15, 16, 17]. (Table 1)

The aim of our study was to implement colon stenting procedure first time in Georgia for symptomatic left-sided colon cancer patients, to avoid emergency surgeries with stoma formation and to prepare and manage these patients for elective surgery according to Enhanced Recovery after colorectal surgery (ERAS) protocol principals.

MATERIAL AND METHODS

Patients, who were admitted into our emergency department with acute left-sided colorectal obstruction clinic

TABLE 1. A SAMPLE ENHANCED RECOVERY AFTER SURGERY (ERAS) PROTOCOL*

Period	ERAS System	Traditional Care
Pre-operative	<ul style="list-style-type: none"> • Provide complete information about the protocol and take an informed consent • Advice given regarding exercise, smoking and alcohol cessation • Optimise any pre-existing co-morbidity • Minimal starvation (6 hrs for solids and 2 hrs for liquids) • 100g oral carbohydrate drink • Avoid mechanical bowel preparation • Pre-operative antibiotic 	<ul style="list-style-type: none"> • Overnight starvation • No carbohydrate drinks • Mechanical bowel preparation • Parenteral hydration (to compensate for bowel preparation)
Intra-operative	<ul style="list-style-type: none"> • Epidural anesthesia (0.125% bupivacaine, continuous infusion) along with spinal or general anesthesia • Arterial/Central lines inserted only if unavoidable • Goal directed fluid therapy • Maintain optimal oxygenation • Avoid hypothermia • Minimal tissue handling • Elective use of nasogastric tubes, abdominal drains and urinary catheters 	<ul style="list-style-type: none"> • Done under spinal or general anesthesia • Routine use of Nasogastric tubes, abdominal drain and urinary catheter • Liberal hydration
Post-operative	<ul style="list-style-type: none"> • Maintain supplemental oxygen • Strict post-operative nausea and vomiting prophylaxis • Early enforced mobilization • Early enteral nutrition • Removal of epidural catheter by day 2 • Ensuring adequate analgesia after epidural catheter removal • Early removal of all tubes, drains and catheters 	<ul style="list-style-type: none"> • No emphasis on PONV prophylaxis • No enforced mobilization • Removal of nasogastric tube and abdominal drain delayed till markers of bowel motility are observed • Oral or Enteral nutrition given once bowel motility is restored

*Navavati AJ et al. *Fast Tracking Colostomy Closures*. 2015. [18]

caused by a colon cancer diagnosis, approved with one of these diagnostic methods such as: Colonoscopy, Computer tomography (CT) of abdomen and pelvis and in some cases Magnetic Resonance Tomography (MRT), after an appropriate preoperative counseling were enrolled in our prospective study to receive colonic stenting procedure as a bridge to elective surgery and later - for elective surgery to be managed according to ERAS guidelines during the whole perioperative period. Inclusion criteria were: obstruction confirmed by computed tomography (CT), or by colonoscopy; patients with age more than 28, patients' clinical status according to the American Society of Anesthesiologists (ASA) class I, II and III; The exclusion criteria were: patients under age 28, patients with the signs of peritonitis and perforation, ASA class IV and V;

One group of patients who satisfied all inclusion criteria were managed through colonic stenting procedure and later these patients were prepared for elective surgery according to ERAS guidelines principals (Group A) - totally 12 patients; and in the second group (Group B) we collected 36 patients with eligible criteria and those patients were operated on according to conventional standards - emergency surgery with resection and primary anastomosis and managed through traditional treatment methods (RPA).

The clinical characteristics for each patient: gender, age, American society of Anesthesiologists (ASA) scores, comorbidities, Body Mass Index (BMI), left-sided colon cancer. In both groups we investigated and compared following outcomes: hospital stay days, postoperative complications (during 30 days after surgery), pain management according to Visual Analogue Scale Scores (VAS Score) (Table 4) and patients satisfaction rate. (Table 2)

STATISTICAL METHODS

Sample size calculation was performed for t-test to compare means of continuous variables for the following parameters: E/S=0.5, Power = 80%, alpha = 0.05.

Descriptive statistics methods were used to characterize each variable. Comparison of continuous variables was performed by independent samples t-test or the Mann-Whitney U test according to the normality of the variables. Categorical variables were evaluated by two-tailed Chi-square test or Fisher's exact test where appropriate (for expected frequencies <5). The threshold for statistical significance was set to P<0.05. The statistical tests were performed by IBM SPSS statistics package v23.0 (IBM Corporation, Armonk, New York).

TABLE 2. CLINICAL CHARACTERISTICS OF PATIENTS

	Group A (n=12)	Group B (n=36)	P Value
Men	7	22	0.13
Women	5	14	0.14
Average age	49	49	1.0
BMI (mean)	25,13 ± 3.34	24,55 ± 3.29	0.24
ASA I	2	5	0.65
ASA II	7	24	0.75
ASA III	3	7	1.0
Cardiovascular disease	6	20	1.0
Diabetes	3	7	0.1
Smoking	5	16	0.66
Alcohol	2	5	0.40

TABLE N3. COLON STENTING VS EMERGENCY SURGERY GROUPS

Event	Group A (n=12)	Group B (n=36)	P value
Respiratory complications	0	6(16.6%)	0.02
PONV	1 (8.3%)	15(41.6%)	0,0001
Postoperative prolonged ileus	0	7(19.4%)	0.02
Anastomosis leak	0	4(11.1%)	0.02
Deep vein thrombosis	0	2(5.5%)	0.014
Urinary retention	0	3(8.3%)	0.02
30-day readmission	0	7(19.4%)	0.0001
Surgical site infection	0	8(22.2%)	0.0001
Length of stay (days)	5 ± 2 days	8 ± 2 days	0.0001

TABLE N4. PAIN MANAGEMENT ACCORDING TO VAS SCORE

POST-OP Day	Time	Group A (n=12) Mean	Group B (n=36) Mean
Day 1	09:00	5 ± 2.582	7 ± 2.582
	15:00	4 ± 2.582	6 ± 2.582
	21:00	4 ± 2.582	6 ± 2.582
Day 2	09:00	4 ± 2.582	6 ± 2.582
	15:00	3.88 ± 2.426	5.88 ± 2.426
	21:00	4 ± 2.582	6 ± 2.582
Day 3	09:00	3.88 ± 2.426	5.88 ± 2.582
	15:00	4 ± 2.582	6 ± 2.582
	21:00	3.88 ± 2.426	5.88 ± 2.426
Day 4	09:00	3.88 ± 2.426	5.88 ± 2.426
	15:00	3.88 ± 2.426	5.88 ± 2.426
	21:00	3.54 ± 2.067	5.88 ± 2.067
Day 5	09:00	3.54 ± 2.067	4.54 ± 2.067
	15:00	2.98 ± 1.645	4.98 ± 1.645
	21:00	3.54 ± 2.067	4.54 ± 2.067

RESULTS

Totally 48 patients were enrolled in our study. Twelve patients (7 male and 5 female, age range 23-72) were randomized in Group A and treated according to colon stenting and ERAS guidelines principals. This group was matched with 36 patients (22 male and 14 female, age range 23-72) gathered in Group B also prospectively, who had traditional perioperative care. The goal of our study was to observe how significant were colon stenting and ERAS protocols benefits especially on hospital stay days and decreased complication rates. In Group B we observed long postoperative length of stay (8-10 days), high rates of surgical site infection approaching 22.2% and according to these - high costs as well. During the hospital stay after emergency colon Resection and Primary Anastomosis (RPA) the incidence of perioperative nausea and vomiting (PONV) was 41.6%. Because of high demand on opioids, respiratory complications also had high incidence 16.6%. Deep vein thrombosis also was reported in 5,5% of patients, associated with late activation. In Group B where no complications were presented, patients' hospital stay was still increasing because of prolonged postoperative il-

eus 19.4%. As for Group A where the data were collected prospectively, our study showed big reduction of hospital stay days and it was average 5 days. Since patients were operated by the same team of surgeons, selection bias seems to be small. Compared to traditional care group incidence of respiratory complications was 0 in Group A, PONV incidence was significantly reduced and it was 8.3%, postoperative prolonged ileus 0, anastomosis leak 0, deep vein thrombosis 0, urinary retention 0, surgical site infection 0 (Table N3).

CONCLUSION

This study demonstrates, that colon stenting procedure proceeded with elective surgery managed through ERAS program principals, together as a whole is clearly beneficial and is followed with less negative effects, less hospital stay days, better pain management and increased patients' satisfaction rate compared to emergency surgery with resection and primary anastomosis (RPA).

Conflicts of Interest: the authors don't have any conflicts of interests to declare.

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მსხვილი ნაწლავის სტენტირება ურგებნულად ნაწლავის რეზექციისა და პირველადი ანასტომოზის ფორმირების წინააღმდეგ მსხვილი ნაწლავის ავთვისებიანი გაუვალობების დროს: პროსპექტიული კოჰორტული კვლევა

გიორგი მერაბიშვილი, ბაადურ მოსიძე, ზაზა დემეტრაშვილი, ია ალდგომელაშვილი

შპს „თბილისის სახელმწიფო სამედიცინო უნივერსიტეტის და ინვოროკვას მალალი სამედიცინო ტექნოლოგიების საუნივერსიტეტო კლინიკა“

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რეზიუმე

კვლევის მიზანი იყო, რომ განვესაზღვრა თუ რამდენად ახდენდა გავლენას მსხვილი ნაწლავის სტენტირება და შემდეგში უკვე ERAS გაიდლაინების მიხედვით პაციენტების მართვა საწოლდღეების რაოდენობასა და სხვა გართულებების რიცხვზე მსხვილი ნაწლავის ობტურაციული გაუვალობების დროს ტრადიციული მკურნალობის მეთოდებთან შედარებით - ნაწლავის რეზექციითა და პირველადი ანასტომოზის ფორმირებით.

ურგებულად ჩატარებული კოლორექტული ქირურგიის (ნაწლავის რეზექცია და პირველადი ანასტომოზის ფორმირება) ტრადიციული მკურნალობის ჯგუფში ჩვენ ჩავრთეთ 36 პაციენტი. აღნიშნულ ჯგუფში საწოლდღეების რიცხვი იყო 8-10 დღე. დაფიქსირდა ინფექციების მალალი რიცხვი - 22.2%, 30 დღის განმავლობაში რეჰსპიტილიზაციების რიცხვი - 19.4%, PONV - 41.6%, რესპირატორული გართულებები - 16.6%, ღრმა ვენების თრომბოზი - 5.5%, გახანგრძლივებული პოსტოპერაციული ილეუსი - 19.4%, ანასტომოზის უკმარისობა - 11.1%.

მსხვილი ნაწლავის სტენტირებისა და ERAS-ის ჯგუფში ჩავრთეთ 12 პაციენტი. ჩვენმა კვლევამ აჩვენა, რომ ამ ჯგუფში საწოლდღეების რიცხვი მნიშვნელოვნად იყო შემცირებული და ის იყო საშუალოდ 5 დღე. ტრადიციული მკურნალობის ჯგუფთან შედარებით რესპირატორული გართულებების რიცხვი იყო 0, პოსტოპერაციული PONV - 8.3%, პოსტოპერაციული ილეუსი 0, ღრმა ვენების თრომბოზი 0, შარდის შეკავება 0, 30 დღის განმავლობაში რეჰსპიტილიზაციების რიცხვი - 0, ქირურგიული მიდამოს ჭრილობის ინფექცია - 0, ანასტომოზის უკმარისობა - 0.

საკვანძო სიტყვები: მარცხენამხრივი კოლორექტული კიბო, თვითგაფართოებადი ლითონის სტენტი (SEMS), ERAS გაიდლაინი