

## COMPARISON OF HARTMANN'S PROCEDURE VERSUS RESECTION WITH PRIMARY ANASTOMOSIS IN MANAGEMENT OF LEFT SIDED COLON CANCER OBSTRUCTION: A PROSPECTIVE COHORT STUDY

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Acute colorectal obstruction may be observed in about 25% of patients with colorectal cancer, Other causes of large bowel obstruction include uterine, ovarian, gastric, breast, bladder and kidney malignancies. and it often leads to emergency surgical decompression [1,2,3]. There is still significant debate regarding the best surgical treatment for malignant left-sided large bowel obstruction. Main options for treatment of Obstructed left sided colon cancer (OLCC) are Primary resection with end colostomy: Hartmann's procedure (HP), Resection and primary anastomosis (RPA), also Loop colostomy, Tube decompression, Endoscopic colonic stenting by self-expanding metallic stents (SEMS) [2,4,] the last procedure can be considered as bridge to surgery or palliation (Table 1). In recent years, primary bowel resection with anastomosis is gaining more acceptance to avoid end-colostomy complications but there are still controversies. Primary resection end colostomy (Hartmann's procedure (HP)) is considered the safer option but main disadvantages of HP are the need for a second major operation to reverse the colostomy, and the fact that 40%-60% of patients do not have their colostomy reversed [5,6], thereby significantly affecting their quality of life (QOL). The restoration of bowel continuity usually should take place 3 month after HP. The aim of our study is to compare Hartmann's procedure (HP) and Resection and primary anastomosis (RPA).

The main goal of our study is to compare and analyze the results of HP of obstructed left sided colon cancer to the results of RPA.

**Material and methods.** From December 2010 to January 2017 patients over 18 years of age who treated to our hospital with diagnosis of resectable left-sided malignant colon obstructions were enrolled in this prospective study. The inclusion criteria were: symptoms of left-sided malignant colon obstruction confirmed by computed tomography (CT) of abdomen and pelvis, or colonoscopy, and patient's consent to participate in the study. The exclusion criteria were: peritonitis, bowel perforation, or sepsis de-

manding urgent surgery, distal rectal cancers <8cm from the anal verge, patients with the American Society of Anesthesiologists (ASA) scores 4 and 5, obstructions due to non-colon malignancies, or from benign origin and patients' refusal to participate in the study. Eligible patients were assigned to one of two groups: those who have undergone Resection and primary anastomosis (RPA) (Group A) and those who have undergone Hartmann's procedure (HP) (Group B). The assignment of the patients to the specific groups was performed by the clinical manager, who was not involved in the surgical procedures. All of these operations were performed with open surgery method by 3 surgeons, who were well experienced in colorectal surgeries.

For diagnostic method were used: Colonoscopy, Computer tomography (CT) of abdomen and pelvis and in some cases Magnetic resonance tomography (MRT).

The clinical characteristics were collected for each patient: gender, age, American society of Anesthesiologists (ASA) risk group, comorbidities, location of tumor, stage of tumor, and associated chronic diseases. In both Groups we investigated and compared following outcomes: type of surgeries, duration of the surgery, hospital stay days, postoperative complications (during 30 days after surgery) and mortality.

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).

**Results and discussion.** 90 patients admitted with left-sided malignant colon obstructions were recruited. 37 pa-

Table 1. Surgical treatment options for obstructed left-sided colon cancer

Main options	Choices among main options
Loop colostomy (C) (bridge to resection or palliation)	
Primary resection with end colostomy: Hartmann's procedure (HP)	
Resection and primary anastomosis (RPA)	Total/subtotal colectomy (TC)
	Segmental colectomy (SC)
Tube decompression	
Endoscopic colonic stenting by self-expanding metallic stents (SEMS)	Bridge to surgery
	Palliation

tients were randomized to the HP and 53 patients were randomized in the RPA group. There were no significant

differences in the clinical characteristics between these two groups (Table 2).

Table 2. Demographic, clinical, imaging, and histological/oncological characteristics of OCC patients operated on

Total sample	(n=90)	HP n=53	RPA n=37
Demographic and clinical variables			
Gender (M/F)	[n] 53/37	22/18	31/19
Age (year) [median (range)]	71 (3 (3-94))	73 (38-94)	61.5 (33-90.7)
Age > 75 (year) [n (%)]	34 (37.8)	22 (40)	8 (47.1)
BMI (kg/m <sup>2</sup> ) [median (range)]	25.8 (14-34)	14-34	14-34
Obesity (BMI ≥ 30 kg/m <sup>2</sup> )	[n (%)] 16 (17.8)	10 (18.8)	2 (5.4)
ASA score	[n%] 0.043		
• I-II	42 (46.7)	21 (39.6)	8 (21.6)
• III-IV	48 (53.3)	34 (64.1)	9 (24.3)
Comorbidity (> 1)	[n (%)] 38 (42.2.)	25 (47.2)	7 (19)
Diabetes	[n (%)] 14 (15.6)	10 (18.8)	2 (5.4)
Cardiopulmonary diseases	[n (%)] 57 (63.3)	32 (60.4)	12 (32.4)
Kidney failure	[n (%)] 6 (6.7)	0	0
Neurocognitive disorders	[n (%)] 14 (15.6)	0	0
Smoking	[n (%)] 30 (33.3)	20 (37.7)	6 (16.2)
Surgical approach [n(%)]			
• Laparoscopy	17 (18.9)	4 (7.54)	13 (35.1)
• Open surgery	73 (81.1)	49 (92.5)	24 (64.8)
One- or two-stage surgery	[n (%)] 0.236	34 (64.1)	30 (81)
• One-stage surgery with primary anastomosis	70 (77.8)	0	30 (81)
• Two-step procedure by temporary ostomy	20 (22.2)	10 (18.8)	3 (8.1)
Simultaneous splenectomy	[n (%)] 8 (8.9)	5 (9.4)	2 (5.4)
Preoperative imaging assessment on CT-scan			
Tumor size (largest dimension, cm) [mean (SD)]	4.44 (2.01)	14 (26.4)	5 (13.5)
Peri-colic nodal involvement	[n (%)] 40 (44.4)	13 (24.5)	3 (8.1)
Patients with suspected extra-colic organs involved	[n (%)] 5(5.6) 0<0.0001	15 (28.3)	7 (18.9)
Suspected synchronous metastasis	[n (%)] 16 (17.7) 0.693	10 (18.8)	3 (8.1)
Histological/oncological variables			
Stage of disease AJC	[n (%)] 0.490		
• I	5 (5.6)	10 (18.8)	2 (5.4)
• II	34 (37.8)	12 (22.6)	19 (51.3)
• III	40 (44.4)	22 (41.5)	14 (37.8)
• IVa	11 (12.2)	9 (17)	2 (5.4)
Vascular invasion	[n (%)] 27 (30)	7 (13.2)	3 (8.1)
Lymphatic invasion	[n (%)] 33 (36.7)	13 (24.5)	3 (8.1)

In group A 53 patients out of 90 (58.9%) had undergone different types of colon resections with primary anastomosis. In group B 37 patients (41.1%) had undergone Hartmann's procedure. It was 1 mortality in group A and 1 mortality in group B (due to pulmonary embolism). Length of Resection and Primary anastomose surgeries was -  $151 \pm 23$  min, Length of Hartmann's procedure -  $60 \pm 20$  min. In group A, there were 7 complications (13.2%). 1 intraabdominal abscess after colorectal anastomosis, which was cured with antibiotic therapy and percutaneous drainage; 5 cases of wound infections, 1-leak of colorectal anastomosis and in group B there were 8 (21.6%) complications (7 - wound infections, 1-necrosis of colostomy). But this difference is not statistically reliable. In stenting RPA stay were - 6 days and in HP group, it was 8 days. This difference is statistically reliable ( $P=0.02$ ).

The early signs of bowel obstruction are revealed in 10-30% of colorectal cancer patients [5,6]. Bowel obstruction is mostly complication of left sided colon cancer. Most patients as a rule need to be done emergency operations, mostly because of short operation time and poor experience in colorectal surgery, surgeon prefer to perform Hartmann's procedure, Should be mentioned also, that these patients will have different type of colostoma for whole their remaining life and of course it affects the quality of their life [7,10].

There are Several options to manage obstructive left colon cancer (OLCC) are available.

According to the results of our study, there are more surgical operations performed with primary anastomosis than Hartmann's procedure and the results are statistically relevant ( $P=0.02$ ). This fact is considerable because the patients, who had undergone Resection and Primary Anastomosis, didn't need forming of colostomy and their quality of life is better, than in case of Hartmann's Procedure surgery patients. This result of our study is identical to other studies [7,10]. Although, there are some studies, where these differences are not manifested [11,12].

In our study, there is one more statistically reliable difference between these groups: this is hospital stay days. In patients, who have undergone Resection and Primary Anastomosis hospital stay days are less, than in case of HP patients ( $P=0.02$ ). These results of our study are identical to some other studies [6,7,8], but there are also the studies with the different results [10-12].

As for the results about postoperative complications, the duration of operation and mortality, there are no significant statistical differences between the groups. There are different data in literature about these parameters. It is considerable, that the number of the scientist, who are unable to detect these differences, is much bigger [4,7,8], rather than the number of the scientist, who note that the rate of complications and mortality is higher in the emergency surgery group [9,10].

The limitations of the study are the non-randomized design, small sample size and unexplored long-term out-

comes (recurrence of cancer, survival rate). During reviewing the scientific literature, the following fact was noted: There are quite a few studies where there would be compared long-term oncological outcomes from each group. Therefore, it's needed to conduct large, multi-center, randomized trials which will study both methods and their short-term and long-term oncological outcomes.

**Conclusions.** According to the results of our study, we can make the following conclusions: Performing Resection with Primary anastomosis intervention in patients with acute colonic cancer obstruction is cost-effective since it allows single-stage surgery, a shorter stay in the intensive care unit, and shorter hospitalization in comparison to HP and stoma reversal procedure and should be preferred rather Hartmann's procedure (HP). But, For selected group of patients with High risk of complications, HP is still a method of choice.

In future it's needed to perform the randomized trials, which will study the long-term outcomes (recurrence of cancer and survival rate) of this treatment method.

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## SUMMARY

### COMPARISON OF HARTMANN'S PROCEDURE VERSUS RESECTION WITH PRIMARY ANASTOMOSIS IN MANAGEMENT OF LEFT SIDED COLON CANCER OBSTRUCTION: A PROSPECTIVE COHORT STUDY

**Merabishvili G., Mosidze B., Demetrashvili Z., Agdgomelashvili I.**

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The aim of our prospective study is to compare and analyze the results of two treatment methods of left-sided malignant colon obstruction: Hartmann's procedure (HP) and Resection with primary anastomosis (RPA).

90 Patients with diagnosis of left-sided malignant colon obstructions were enrolled in this study. The patients were assigned into two groups: Hartmann's procedure (HP) group and Resection and Primary anastomosis group (RPA). Several clinical characteristics were determined and compared between the groups: hospital stay days, duration of the surgery, postoperative complications (during 30 days after surgery) and mortality was assessed.

37 patients were enrolled in the Hartmann's procedure (HP) group and 53 patients were enrolled in the Primary anastomosis (RPA) group and had undergone different types of colon resections with primary anastomosis. There was 1 mortality in HP group and 1 in RPA group. In RPA group, there were 7 complications (13.2%). 1 intraabdominal abscess after colorectal anastomosis, which was cured with antibiotic therapy and percutaneous drainage; 5 cases of wound infections, 1- leak of colorectal anastomosis and in Hartmann's procedure group there were 8 (21.6%) complications (7 - wound infections, 1- necrosis of colostomy). But this difference is not statistically reliable ( $p=0.110$ ). In stenting RPA stay were - 6 days and in HP group, it was 8 days. This difference is statistically reliable ( $P=0.02$ ).

In case of left-sided malignant colon obstructions, Primary anastomosis intervention should be preferred, rather than Hartmann's procedure. In the future it's needed to

perform the randomized trials, which will study the long-term outcomes (recurrence of cancer, survival rate) of this treatment method.

**Keywords:** left-sided large bowel obstruction, Hartmann's procedure, primary anastomosis, emergency treatment.

## РЕЗЮМЕ

### СРАВНЕНИЕ ПРОЦЕДУРЫ ХАРТМАНА И РЕЗЕКЦИИ С ПЕРВИЧНЫМ АНАСТОМОЗОМ В УПРАВЛЕНИИ ОБСТРУКЦИИ РАКА ЛЕВОСТОРОННЕЙ ТОЛСТОЙ КИШКИ: ПРОСПЕКТИВНОЕ КОГОРТНОЕ ИССЛЕДОВАНИЕ

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Целью проспективного исследования является сравнение и анализ результатов двух методов лечения левосторонней злокачественной обструкции толстой кишки.

В исследование включены 90 пациентов с диагнозом левосторонней злокачественной обструкции толстой кишки. Пациенты разделены на две группы: группа процедуры Хартмана (HP) и группа резекции и первичного анастомоза (RPA). Оценивались и сравнивались между группами следующие клинические характеристики: дни пребывания в стационаре, продолжительность операции, послеоперационные осложнения (в течение 30 дней после операции) и летальность.

37 пациентов включены в группу HP и 53 пациента - в группу RPA, которым выполнены различные виды резекции толстой кишки с первичным анастомозом. В группе HP отмечен 1 смертельный исход и в группе RPA также 1. В группе RPA выявлено 7 (13,2%) осложнений: 1 интраабдоминальный абсцесс после колоректального анастомоза, излеченный антибактериальной терапией и перкутаным дренированием, 5 случаев раневых инфекций, 1 - несостоятельность колоректального анастомоза; в группе HP - 8 (21,6%) осложнений: 7 - раневых инфекций, 1 - некроз колостомы, разница статистически недостоверна ( $P=0.110$ ). При RPA длительность пребывания в стационаре составила 6 дней, в группе HP - 8 дней, разница статистически достоверна ( $P=0,02$ ).

Результаты проведенного исследования позволяют заключить, что при левосторонней злокачественной обструкции толстой кишки предпочтительнее вмешательство первичного анастомоза, а не процедура Хартмана. В будущем необходимо провести рандомизированные исследования для изучения отдаленных результатов (рецидив рака, коэффициент выживаемости) указанного метода лечения.

## რეზიუმე

ჰარტმანის პროცედურისა და პირველადი ანასტომოზით რეზექციის შედარება მსხვილი ნაწლავის კიბოს მარცხენამხრივი ობსტრუქციის მართვის დროს: პროსპექტული კოჰორტული კვლევა

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ი. აღდგომელაშვილი

თბილისის სახელმწიფო სამედიცინო უნივერსიტეტი; მაღალი სამედიცინო ტექნოლოგიების ცენტრი, საუნივერსიტეტო კლინიკა, საქართველო

პროსპექტული კვლევის მიზანს წარმოადგენს მსხვილი ნაწლავის მარცხენამხრივი ავთვისებიანი ობსტრუქციის მკურნალობის ორი მეთოდის - ჰარტმანის პროცედურის და რეზექციისა და პირველადი ანასტომოზის შედეგების შედარება და ანალიზი.

გამოკვლეულია მარცხენამხრივი მსხვილი ნაწლავის ავთვისებიანი ობსტრუქციის დიაგნოზით 90 პაციენტი. პაციენტები გაიყო ორ ჯგუფად: ჰარტმანის პროცედურის (HP) ჯგუფი და რეზექციისა და პირველადი ანასტომოზის ჯგუფი (RPA). ჯგუფებს შორის განისაზღვრა და შეფასდა რამდენიმე კლინიკური ნიშანი: საავადმყოფოში ყოფნის დღეები, ოპერაციის ხანგრძლივობა,

პოსტოპერაციული გართულებები (ოპერაციიდან 30 დღის განმავლობაში) და ლეტალობა.

HP ჯგუფი შედგებოდა 37 პაციენტისგან, RPA ჯგუფი - 53 პაციენტისგან, რომელთაც ჩაუტარდათ მსხვილი ნაწლავის რეზექციის სხვადასხვა ტიპის ოპერაციები პირველადი ანასტომოზით. HP ჯგუფში დაიღუპა 1, RPA ჯგუფშიც 1 პაციენტი. RPA ჯგუფში აღინიშნა 7 (13,2%) გართულება: 1 ინტრააბდომინალური აბსცესი კოლორექტალური ანასტომოზის შემდეგ, რომელიც განიკურნა ანტიბიოტიკოთერაპიითა და პერკუტანული დრენირებით, ჭრილობის ინფექციის 5 შემთხვევა, კოლორექტალური ანასტომოზის გაქონვის 1 შემთხვევა; ჰარტმანის პროცედურულ ჯგუფში - 8 (21,6%) გართულება: 7 - ჭრილობის ინფექცია, 1 - კოლოსტომის ნეკროზი, სხვაობა სტატისტიკურად სარწმუნო არ არის ( $P=0.110$ ). პოსპიტალიზაციის პერიოდი RPA ჯგუფში შეადგენდა 6 დღეს, HP ჯგუფში - 8 დღეს, განსხვავება სტატისტიკურად სარწმუნოა ( $P=0,02$ ).

კვლევის შედეგებზე დაყრდნობით ავტორებს გამოტანილი აქვთ დასკვნა, რომ მსხვილი ნაწლავის მარცხენამხრივი ავთვისებიანი ობსტრუქციის დროს უპირატესობა ეძლევა პირველადი ანასტომოზის პროცედურას და რეკომენდებულია მომავალში რანდომიზებული კვლევების ჩატარება ამ მეთოდის გრძელვადიანი შედეგების (კიბოს რეციდივი, გადარჩენის მაჩვენებელი) შესასწავლად.

## COMPARATIVE ANALYSIS OF CURRENT SURGICAL APPROACHES TO THYMIC TUMORS TREATMENT

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The unified neuroendocrine-immune system (NEIM-system) operating in the human body ensures the maintenance of homeostasis under conditions of constant exposure to adverse factors, and participates in the mechanisms of regulation of immunological and endocrine processes. One of the central connecting organs that simultaneously participate in the reactions of the immune system and the endocrine system is the thymus (thymus gland). Thymus tissue is responsible for the blood serum concentration of the peptide hormone thymulin, which has a pronounced effect on the development of T- and B-lymphocytes, and, as a result, on subpopulations of T-cells, the expression of CD28, CD27 and CD40L. The complexity of the interaction of systems and

errors in regulation cause disturbances in the functional and morphological status of the thymus, leading to the formation of pathology of tissue growth, in particular to various variants of hyperplasia of the thymus tissue, which in the structure of oncological morbidity are up to 1-1,5% [10].

*Classification.* According to recent studies [4], the types of thymic hyperplasia include tumor-like lesions, cysts, and thymomas, the latter accounting for 60% of all thymic lesions [5, 6], although some authors believe that they account for up to 90% [2, 3]. In the clinic, thymomas appear more often after 35 years of age with a positive trend in women under 70 years of age [1]; peak incidence occurs between the ages of 55 and 65 [10].