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Our Experience with Multivisceral Resections for Locally Advanced Colorectal Cancer

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Abstract
Purpose: *During the recent decade, there is a broader application of multivisceral resections in patients with locally advanced colorectal cancer worldwide. The aim of our investigation was to share our eight-year experience with multivisceral resection applications in patients diagnosed with locally advanced colorectal cancer.*
Material/methods: *Our study covered 79 patients at a mean age of 61.2±9.7 years (range, 38-87 years), 48 males and 31 females, undergoing multivisceral resection on the occasion of colon, rectum or rectosigmoid junction cancer between January 1, 2013 and December 31, 2020 in the Complex Oncology Centre of Shumen. There were 54 patients with colon cancer, 15 patients with rectosigmoid junction cancer and ten patients with rectum cancer. Most patients were with TNM-stage III colorectal cancer.*
Results*: The most common procedures were the low anterior resection of rectum and sigmoid colon combined either with partial intestinal resection, or with partial cystectomy as well as the low anterior resection of rectosignoid junction along with hysterectomy and/or adnexectomy. There were 19 variants of jointly affected visceral organs in one and the same patient. Rectosigmoid junction cancer occurred in nine variants with other cancers among 47 patients. The 30-day mortality rate was 7.59% (six lethal cases). The one-, three- and five-year overall survival rates were 25.32%, 17.72%, and 6.33%, respectively.*
Conclusion: *The multivisceral resection for locally advanced colorectal cancer was safe and feasible and required careful patient's selection and preoperative preparation as well. The significant intraoperative blood loss was no contraindication for this extended surgery.*
Keywords*: locally advanced colorectal cancer, multivisceral resection, low anterior resection, total pelvic evisceration, survival rate*

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I. Introduction

Radical surgery remains the most effective management approach in patients with locally advanced colorectal cancer. The analysis of the publications abstracted in *PubMed* data-base demonstrates that multivisceral resection for colorectal cancer should only be performed if an R0 status can be achieved [1]. Recurrent rectal cancer presents with elevated morbidity and decreased overall survival rates. Maximal cytoreductive surgery can be applied for colorectal cancer with acceptable morbidity rates and without an increased risk for reduced overall survival rates.

Recently, modern surgical techniques for radical multivisceral pelvic resections designed for locally advanced and recurrent rectal cancer and their contemporary outcomes are reviewed [2]. There is emerging experience and evidence of robotic assistance in multivisceral pelvic exenteration surgery for locally advanced rectal cancer [3]. Robotic combined multivisceral resections for malignant neoplasms are safe and feasible when performed in high volume centres by expert surgeons [4]. Between September 2014 and August 2019, robotic multivisceral resection using da Vinci Xi platform is carried out in 22 out of 202 colorectal cancer patients in a specialized unit in India [5]. Such resections for primary locally advanced pelvic malignancy involving a rectal cancer is carried out in eight patients at a median age of 56 years [6]. Mean hospital length of stay is 15 days (range, 7-26 days). There are neither serious postoperative morbidity, nor lethal cases.

The objective of the present investigation was to share our eight-year experience with the application of multivisceral resections in patients with locally advanced colorectal cancer.

II. Materials & Methods

During the period from January 1, 2013 and December 31, 2020, a total of 643 primary colorectal cancer patients were hospitalized and operated on in the Complex Oncology Centre of Shumen. It dealt with 390 patients, 221 males and 169 females with colon cancer, 193 patients, 115 males and 78 females with rectum cancer, and 60 patients, 30 males and 21 females with rectosigmoid junction cancer.

Our present study covered a total of 79 locally advancer colorectal cancer patients, 48 males and 31 females, who underwent multivisceral resections during this eight-year period. There were 54 patients, 33 males and 21 females with colon cancer, 15 patients, nine males and six females with rectosigmoid junction cancer, and ten patients, six males and four females with rectum cancer. The mean age of all the patients was 61.2±9.7 years (range, 38-87 years). It was slightly more advanced in males (62.1±7.9 years; range, 38-84) than in females (60.7±9.1 years, range 43-87).

The diagnosis of the colorectal cancer was based on the purposeful usage of reliable clinical, laboratory and imaging methods.

The choice of the concrete multivissceral resection type depended on the features of the malignant neoplasm and the affected neighbouring abdominal organs. As a whole, the following surgical interventions were made use of: low anterior resection, left and right hemicolectomy, total pelvic evisceration, distal pancreatectomy, *en bloc* splenectomy, intestinal resection, partial intestinal resection, appendectomy, cystectomy, partial cystectomy, partial hepatectomy, segmentectomy, bisegmentectomy, left nephrectomy, hysterectomy, adnexectomy, gastrectomy, and leaf-shaped duodenal excision.

III. Results

Some results of ours are systematized in four tables.

Patients' distribution according to gender and localization of the primary colorectal cancer is demonstrated in Table 1. Male patients prevail (in 60.76% of the cases). The most common malignant neoplasm localizations are sigmoid colon (in 21.52%) and rectosigmoid junction (in 18.99% of the cases).

In Table 2, one can see the patients' distribution according to age and diagnosis of the primary colorectal cancer. Most patients are aged between 51 and 80 years (68 or 86.08% of the cases). There are 14 patients with sigmoid and 13 patients with rectosignoid junction cancer at this age.

The patients' distribution according to primary malignant neoplasm diagnosis and TNM-stage is indicated in Table 3. TNM-stage III strongly dominates in this contingent (in 49 patients or in 62.03% of the cases) mainly on the account of sigmoid and rectosigmoid junction cancer (in 12 and 11 cases, respectively). The patients at TNM-stage IV undergo palliative surgery only.

The patients' distribution according to the affected visceral organs and the number of multivisceral resections of different types is shown in Table 4. There are a total of 19 variants of jointly affected visceral organs in one and the same patient. Rectosigmoid junction cancer occurs in nine variants with other cancers among a total of 47 patients. Next comes intestinal cancer with six variants among 27 patients followed by rectum and left colon cancer with three variants each among 19 and six patients, respectively.

The low anterior resection of rectum and sigmoid colon accompanied by partial intestinal resection for cancer of the rectum and sigmoid colon and histologically proven intestinal damage, the low anterior resection of rectosignoid junction in combination with partial cystectomy for cancer of the rectosignoid junction and urinary bladder, and the low anterior resection of rectosignoid junction along with hysterectomy and/or adnexectomy for cancer of the rectosignoid junction and uterus are most commonly applied (in 12, 12, and 11 patients, respectively).

The postoperative follow-up reveals a very low 30-day mortality rate of 7.59% (six lethal cases, four males and two females). On the other hand, one-, three- and five-year overall survival rates are relatively unfavourable - 25.32%, 17.72%, and 6.33%, respectively.

IV. Discussion

It should be emphasized that the timely application of the appropriate multivisceral resection type in carefully selected patients with locally advanced colorectal cancer is a reasonable management practice as this quite difficult surgical approach used by highly experienced colorectal surgeons considerably improves patient's quality of life and additionally prolongs patient's survival.

Recently, several papers by foreign authors report similar results obtained by the use of open and laparoscopic multivisceral resections in oncological coloproctology. However, certain postoperative complications are reported, too.

The analysis of Dutch ColoRectal Audit data for 2015-2019 in the Netherlands demonstrates that colorectal cancer patients referred in tertiary care hospitals are younger, at a more advanced disease stage, and undergo more commonly multivisceral resection and simultaneous metastasectomy than the patients who are not referred in secondary care hospitals ($p<0.001$) [7].

Accordung to Dutch ColoRectal Audit data for the period from January 2009 to December 2017 in the Netherlands, multivisceral resections are carried out in 936 of 2242 cT4 rectal cancer patients [8]. There are 629 extended multivisceral resections. Age ≥70 years [odds ratio (OR) of 1.28; between 1.04 and 1.56 at 95% confidence interval (CI); p=0.02], male sex (OR of 1.68; between 1.38 and 2.04 at 95% CI; p<0.001), mucinous tumours (OR of 1.55; between 1.06 and 2.27 at 95% CI; p=0.02), extended multivisceral resection (OR of 1.98; between 1.56 and 2.52 at 95% CI; p<0.001), Hartmann procedure (OR of 1.42; between 1.07 and 1.90 at 95% CI; p=0.02), and abdominoperineal resection (OR of 1.56; between 1.25 and 1.96 at 95% CI; p<0.001) are independent predictors of of postoperative complications.

According to data from the Swedish ColoRectal Cancer Registry and the Dutch ColoRectal Audit for the period between 2011 and 2015, multivisceral resections are carried out in 17% and 8% of locally advanced cT1-3 and cT4 stage rectal cancer patients [9].

Between January 2009 and June 2016, 91 primary T4b colorectal cancer patients undergo multivisceral resections [10]. Laparoscopic surgery is applied in 38 while open conventional surgery is done in 53 cases. In the first group, there is statistically significantly smaller incision length (p<0.001), less blood loss (p=0.01) and shorter interval to first flatus (p=0.025). The laparoscopic multivisceral resection can reduce the incidence of postoperative complications.

The results from a retrospective study during the period from 2007 to 2015 of a total of 81 locally advanced colorectal cancer patients undergoing multivisceral resection show a statistically significantly smaller amount of blood loss in 31 patients after laparoscopic than in 50 patients after open surgery (60 mL versus 595 mL; p<0.01) [11]. In the laparoscopic group, both interval until oral intake (five days versus seven days; p<0.01) and postoperative hospital stay (14 days versus 19 days; p<0.01) are statistically significantly shorter, too.

During the period between January 2016 and December 2019, 27 patients at a mean age of 48.67±7.3 years undergo successful *en bloc* multivisceral resections for locally advanced colorectal cancer North-East India [12]. Mean operative time is 268.14±72.2 min. and mean hospital stay is 13.67±3.4 days. There are postoperative complications in seven patients and mortality rate is 7.41% (two lethal cases).

Forthy-three multivisceral resections for locally advanced colorectal cancer (T4b) are carried out during the period from January 2008 to December 2013 in an African referral centre [13]. The abdominal wall is the most commonly resected extracolorectal structure (in 21% of the cases). The median survival rate is 68±13.9 months, the five-year disease-free and overall survival rates are 46% and 55%, respectively.

Between 2004 and 2018, multivisceral colectomy is done in 91 locally advanced colon cancer patients [14]. It is related with statistically significantly greater blood loss (200 mL versus 100 mL; p=0.01), more common blood transfusion (22% versus 8.9%; p=0.01), longer operative time (180 min. versus 140 min.; p<0.01) and postoperative hospital stay (11 days versus 10 days; p<0.01) than the standard colectomy performed in 112 patients.

During the period from January, 2004 to December, 2015, multivisceral resection for locally advanced colon cancer is performed by laparoscopic approach in 69 patients and by open approach in 71 patients [15]. The first group presents with smaller tumours (60 mm versus 80 mm; p<0.001), less blood loss (30 g versus 181 g; p<0.001), and shorter hospital stays (12 days versus 19 days; p<0.001).

Within a multicentre cohort study between 2000 and 2014, 130 pT4bN0-2M0 consecutive colon cancer patients without undergo multivisceral resection [16]. Fufty-five patients undergo gastrointestinal, 47 patients - abdominal wall/omentum/ovaries while 14 patients each - urologic or solid organ multivisceral resection. Gastrointestinal resection is independently related with surgical complications [hazard ratio (HR) of 3.9; between 1.4 and 10.6 at 95% CI] while abdominal wall/omentum/ovaries resection is significantly associated with intraabdominal recurrence (HR of 7.8; between 1.0-57.8 at 95% CI).

Between 2010 and 2017, a colectomy with a multivisceral resection for locally advanced colon cancer is performed in 85 patients [17]. Laparoscopic and open approaches are used in 38 and 47 cases, respectively. The laparoscopic multivisceral resection has a statistically significantly smaller median volume blood loss (25 mL versus 140 mL; p<0.001), a lower complication rate (10.5% versus 29.8%; p=0.036), and shorter hospital stay (12 days versus 15 days; p=0.028).

Between November 2010 and April 2019, 38 out of a total of 72 patients with locally advanced sigmoid colon cancer are managed using multivisceral resections [18]. Multivisceral resections for cT4b colon cancer are successfully performed in six out of 11 Chinese patients [19]. Multivisceral resection is performed in seven out of a total of 76 locally advanced rectal cancer patients [20]. The median survival rate is 32.2 moths. There are wound-related complications in 60% of the cases.

Within a descriptive retrospective cohort study from 2007 to 2014 at a tertiary referral unit for colorectal cancer, 121 consecutive patients with locally advanced primary colon cancer undergo *en bloc* multivisceral resections [21]. R0 and R1 resections are achieved in 112 and in nine patients and the estimated five-year overall survival is 60.8% and 86.9%, respectively. Patients's survival is significantly better after R0

than after R1 resections. Following a median follow-up of 28 months, disease recurrence is observed in 25 patients (in 20.66% of the cases).

In a 37-year-old female patient with locally advanced T4bN0M0 adenocarcinoma of the hepatic colonic flexure invading the duodenum, a multivisceral resection consisting of total laparoscopic *en bloc* right hemicolectomy and pancreaticoduodenectomy with transvaginal specimen extraction is successfully applied [22].

V. Conclusion

During this eight-year period, we have successfully performed multivisceral resection in 79 patients with locally advanced colorectal cancer. This procedure is safe and feasible and warrants an acceptable patient's survival. It requires careful preoperative patient's preparation. The intraoperative blood loss is significant, however, it is not considered a contraindication for this extended surgery. Our own results from the application of this management option are similar to those reported in the recent literature available. The effectiveness of this surgical method is convincingly proved. This substantiated statement allows us to recommend the broader application of the multivisceral resection in timely selected patients with locally advanced colorectal cancer as a promising alternative to the 'wait and see' approach. The siuccessfully accomplished multivisceral resections contribute to the improvement of patient's quality of life and prolongation of patient's survival.

References

[1]. Horvath P, Königsrainer A. Multiviszerale Resektionen mit und ohne HIPEC in der Karzinomchirurgie. *Chirurg*. 2019 Feb; 90(2):87-93. [PubMed].

[2]. Lau YC, Brown KGM, Lee P. Pelvic exenteration for locally advanced and recurrent rectal cancer - how much more? *J Gastrointest Oncol*. 2019 Dec; 10(6):1207-14. [PubMed].

[3]. Chang TP, Chok AY, Tan D, Rogers A, Rasheed S, Tekkis P, et al. The emerging role of robotics in pelvic exenteration surgery for locally advanced rectal cancer: a narrative review. *J Clin Med*. 2021 Apr 5;10(7):1518. [PubMed].

[4]. Piccoli M, Esposito S, Pecchini F, Francescato A, Colli F, Gozzo D, et al. Full robotic multivisceral resections: the Modena experience and literature review. *Updates Surg*. 2021 Jun ;73(3):1177-87. [PubMed].

[5]. Rohila J, Kammar P, Pachaury A, de'Souza A, Saklani A. Evolution of robotic surgery in a colorectal cancer unit in India. *Indian J Surg Oncol*. 2020 Dec; 11(4):633-41. [PubMed].

[6]. Smith N, Murphy DG, Lawrentschuk N, McCormick J, Heriot A, Warrier S, et al. Robotic multivisceral pelvic resection: experience from an exenteration unit. *Tech Coloproctol*. 2020 Nov; 24(11):1145-53. [PubMed].

[7]. Warps AK, de Neree Tot Babberich MPM, Dekker E, Wouters MWJM, Dekker JWT, Tollenaar RAEM, et al.; Dutch ColoRectal Audit. Interhospital referral of colorectal cancer patients: a Dutch population-based study. *Int J Colorectal Dis*. 2021 Jul;36(7):1443-53. [PubMed].

[8]. de Nes LCF, Drager LD, Verstegen MG, Burger JWA, Tanis PJ, de Wilt JHW; Dutch ColoRectal Audit Group. Persistent high rate of positive margins and postoperative complications after surgery for cT4 rectal cancer at a national level. *Dis Colon Rectum*. 2021 Apr 1; 64(4):389-98. [PubMed].

[9]. Detering R, Saraste D, de Neree Tot Babberich MPM, Dekker JWT, Wouters MWJM, van Geloven AAW, et al.; Swedish ColoRectal Cancer Registry and the Dutch ColoRectal Audit. International evaluation of circumferential resection margins after rectal cancer resection: insights from the Swedish and Dutch audits. *Colorectal Dis*. 2020 Apr; 22(4):416-29. [PubMed].

[10]. Zhang X, Wu Q, Gu C, Hu T, Bi L, Wang Z. Comparison of short and long-time outcomes between laparoscopic and conventional open multivisceral resection for primary T4b colorectal cancer. *Asian J Surg*. 2019 Jan; 42(1):401-8. [PubMed].

[11]. Nishikawa T, Nozawa H, Kawai K, Sasaki K, Otani K, Tanaka T, et al. Short- and long-term outcomes of minimally invasive versus open multivisceral resection for locally advanced colorectal cancer. *Dis Colon Rectum*. 2019 Jan; 62(1):40-6. [PubMed].

[12]. Purkayastha J, Singh PR, Talukdar A, Das G, Yadav J, Bannoth S. Feasibility and outcomes of multivisceral resection in locally advanced colorectal cancer: experience of a tertiary cancer center in North-East India. *Ann Coloproctol*. 2020 Jul 3;37(3):174-8. [PubMed].

[13]. Oke OA, Coetzee EDT, Warden C, Goldberg PA, Boutall A. Multivisceral resection of locally advanced colorectal cancer in an African referral centre. *S Afr J Surg*. 2020 Jun; 58(2):64-9. [PubMed].

[14]. Sahakyan AM, Aleksanyan A, Batikyan H, Petrosyan H, Sahakyan MA. Standard and multivisceral colectomy in locally advanced colon cancer. *Radiol Oncol*. 2020 May 28; 54(3):341-6. [PubMed].

[15]. Mukai T, Nagasaki T, Akiyoshi T, Fukunaga Y, Yamaguchi T, Konishi T, et al. Laparoscopic multivisceral resection for locally advanced colon cancer: a single-center analysis of short- and long-term outcomes. *Surg Today*. 2020 Sep; 50(9):1024-31. [PubMed].

[16]. Wasmann KATGM, Klaver CEL, van der Bilt JDW, Nagtegaal ID, Wolthuis AM, van Santvoort HC, et al. Subclassification of multivisceral resections for T4b colon cancer with relevance for postoperative complications and oncological risks. *J Gastrointest Surg*. 2020 Sep; 24(9):2113-20. [PubMed].

[17]. Miyo M, Kato T, Takahashi Y, Miyake M, Toshiyama R, Hamakawa T, et al. Short-term and long-term outcomes of laparoscopic colectomy with multivisceral resection for surgical T4b colon cancer: Comparison with open colectomy. *Ann Gastroenterol Surg*. 2020 Jul 20; 4(6):676-83. [PubMed].

[18]. Niu SQ, Li RZ, Yuan Y, Xie WH, Wang QX, Chang H, et al. Neoadjuvant chemoradiotherapy in patients with unresectable locally advanced sigmoid colon cancer: clinical feasibility and outcome. *Radiat Oncol*. 2021 May 24;16(1):93. [PubMed].

[19]. Li YJ, Wu YL, Cui J, Zhang L, Zheng W, Zhu YL, et al. The efficacy and safety of surgical treatment after neoadjuvant chemotherapy for cT4N+ colon cancer. *Zhonghua Zhong Liu Za Zhi*. 2019 Jun 23; 41(6):454-9 (in Chinese). [PubMed].

[20]. Pandit N, Deo KB, Gautam S, Yadav TN, Kafle A, Singh SK, et al. Extended total mesorectal excision (e-TME) for locally advanced rectal cancer. *J Gastrointest Cancer*. 2021 Jan 8. doi: 10.1007/s12029-020-00562-1. [PubMed].

[21]. Rosander E, Nordenvall C, Sjövall A, Hjern F, Holm T. Management and outcome after multivisceral resections in patients with locally advanced primary colon cancer. *Dis Colon Rectum*. 2018 Apr; 61(4):454-60. [PubMed].

[22]. Meng H, Xu H, Wang X, Chen L, Yang F, Geng R, et al. Total laparoscopic en bloc right hemicolectomy and pancreaticoduodenectomy with transvaginal specimen extraction for locally advanced right colon cancer: a case report. *Gland Surg*. 2021 May; 10(5):1780-5. [PubMed].

Table 1. Gender patients' distribution according to primary malignant neoplasm localization

ICD code	Diagnosis	males	females	total
C 18.0	*Carcinoma coeci*	5	4	9
C 18.2	*Carcinoma colonis ascendens*	2	1	3
C 18.3	*Carcinoma flexurae hepaticae*	2	2	4
C 18.4	*Carcinoma colonis transversi*	5	3	8
C 18.5	*Carcinoma flexurae lienalis*	3	1	4
C 18.6	*Carcinoma colonis descendens*	4	2	6
C 18.7	*Carcinoma sigmae*	10	7	17
C 18.8	*Carcinoma colonis (multiple localization)*	2	1	3
C 19	*Carcinoma recto-sigmae*	9	6	15
C 20	*Carcinoma recti*	6	4	10
total		48	31	79

Table 2. Age patients' distribution according to primary malignant neoplasm diagnosis

Diagnosis	Age (years)						
	31-40	41-50	51-60	61-70	71-80	>81	total
Carcinoma coeci	0	1	4	3	1	0	9
Carcinoma colonis ascendens	0	0	0	1	2	0	3
Carcinoma flexurae hepaticae	0	0	1	1	1	1	4
Carcinoma colonis transversi	1	1	2	1	3	0	8
Carcinoma flexurae lienalis	0	0	3	0	1	0	4
Carcinoma colonis descendens	0	0	2	1	2	1	6
Carcinoma sigmae	0	2	4	7	3	1	17
Carcinoma colonis (multiple localization)	0	0	0	3	0	0	3
Carcinoma recto-sigmae	0	1	4	4	5	1	15
Carcinoma recti	0	0	3	2	4	1	10
total	1	5	23	23	22	5	79

Table 3. Patients' distribution according to primary malignant neoplasm diagnosis and TNM-stage

Diagnosis	TNM-stage			
	II	III	IV	total
Carcinoma coeci	0	6	3	9
Carcinoma colonis ascendens	0	2	1	3
Carcinoma flexurae hepaticae	0	2	2	4
Carcinoma colonis transversi	0	3	5	8
Carcinoma flexurae lienalis	0	3	1	4
Carcinoma colonis descendens	0	3	3	6
Carcinoma sigmae	0	12	5	17
Carcinoma colonis (multiple localization)	1	1	1	3
Carcinoma recto-sigmae	0	11	4	15
Carcinoma recti	1	6	3	10
total	2	49	28	79

Table 4. Patients' distribution according to the affected visceral organs and multivisceral resection types

Affected visceral organs	Multivisceral resection types	n
rectum+sigmoid colon+intestine	low anterior resection of rectum and sigmoid colon+partial intestinal resection	12
rectosignoid junction+intestine	low anterior resection of rectosignoid junction+partial intestinal resection with anastomosis	7
rectosignoid junction+intestine+ appendix	low anterior resection of rectosignoid junction+partial intestinal resection+appendectomy	1
rectosignoid junction+appendix	low anterior resection of rectosignoid junction+ appendectomy	2
rectosignoid junction+intestine+ liver metastasis	low anterior resection of rectosignoid+partial intestinal resection+partial hepatectomy or segmentectomy	2
rectosignoid junction+liver metastases	low anterior resection of rectosignoid +partial hepatectomy or bisegmentectomy	4
rectum+urinary bladder	total pelvic evisceration	3
rectosignoid junction+urinary bladder	low anterior resection of rectosignoid junction+cystectomy	3
rectosignoid junction+urinary bladder	low anterior resection of rectosignoid junction+partial cystectomy	12
rectum+urinary bladder+ uterus+adnexa	total pelvic evisceration	4
rectosignoid junction+uterus+ adnexa	low anterior resection of rectosignoid junction+ hysterectomy and/or adnexectomy	11

rectosignoid junction+adnexa	low anterior resection of rectosignoid junction+adnexectomy	5
left colon+tail of pancreas+spleen	left hemicolectomy+distal pancreatectomy+*en bloc* splenectomy	2
left colon+tail of pancreas+spleen +left kidney	left hemicolectomy+distal pancreatectomy+*en bloc* splenectomy+left nephrectomy	1
left colon+intestine	left hemicolectomy+intestinal resection	3
splenic colon flexura+left kidney +spleen	left hemicolectomy+*en bloc* left nephrectomy+splenectomy	1
splenic colon flexura+tail of pancreas+spleen+stomach	left hemicolectomy+distal pancreatectomy+*en bloc* splenectomy+gastrectomy	1
splenic colon flexura+tail of pancreas+spleen+intestine	left hemicolectomy+distal pancreatectomy+*en bloc* splenectomy+intestinal resection	2
right colon+duodenum	right hemicolectomy+leaf-shaped duodenal excision	3
total		79*

* The number of the single affected organs does not coincide with the corresponding number of multivisceral resections as organs of different number are involved in single surgical intervention types

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