

The Treatment of Stercoral Peritonitis Caused By Colorectal Carcinoma

Dr. Ivana Djordjevic¹ and Goran Stanojevic²

¹ University of NiA

Received: 24 September 2011 Accepted: 24 October 2011 Published: 7 November 2011

Abstract

Introduction: Stercoral peritonitis (SP) caused by perforation of the colon due to colorectal carcinoma (CRC) represents one of the most difficult types of peritoneal inflammation with complex clinical presentation. Aim of the study was to establish frequency of CRC as a cause of stercoral peritonitis, type of treatment, postoperative complications, length of hospital stay and mortality among our patients. **Methods:** Retrospectively we have analyzed two groups of patients. Group A: patients treated in period from 01.01.2001 to 31.12.2006, and group B consisted of patients treated from 01.01. 1995 to 31.12.2001. Surgical approach was different in those groups since we have accepted new strategies in the treatment of colonic perforations caused by CRC from the year 2000. **Results:** In group A we have operated 56 patients, median age 62.9, in most of the cases (35.71

Index terms— stercoral peritonitis (SP), colorectal carcinoma (CRC)

operisano 65 bolesnika prose?ne starosti 60,5 god., najvi?e sa karcinoma levog kolona -25 (38,46%) Hirur?ki postupci kod ovih bolesnika su se razlikovali ?to je rezultovalo vi ?om stopom komplikacija i smrtnosti. U A i B grupi lak?ih komplikacija je bilo oko 60%, dok je te?ih komplikacija u A grupi bilo oko 53% , a u B grupi oko 96%. Visok procenat te?ih komplikacija u B grupi odrazio se i na stopu smrtnosti koja je u B grupi iznosila60%, dok je u A grupi bila duplo ni?a. Po?tovanjem algoritama le?enja CRC i SP skra?uje se du?ina hospitalizacije bolesnika, smanjuje nastanak komplikacija ii mortalitet.

Klju?ne re?i : stercoralni peritonitis, kolorektalni karcinom

1 I. INTRODUCTION

tercoral peritonitis (SP) represents inflammation of visceral and parietal peritoneum caused by various bacterial species. This is a secondary peritonitis and it represents severe type of intraabdominal infection and abdominal related sepsis. Due to surgery and effective modalities of medical treatment, extremely high mortality rate of 90% from the beginning of the century has reduced to 15-40%.

The aim of our study is to establish colorectal carcinoma (CRC) as a cause of SP, type of surgery, postoperative complications, hospital stay and mortality during two periods. We'll analyze weather following new strategies in the treatment of stercoral peritonitis caused by CRC in recent years, we have managed to reduce rate of postoperative complications and mortality as well as hospital stay among these patients.

2 II.

3 MATERIAL AND METHODS

This is retrospective-prospective study of our patients treated for stercoral peritonitis caused by CRC at Surgical Clinic, Clinical Center Nis. We have analyzed two groups of patients. Group A: patients treated in period from 01.01.2001 to 31.12.2006, and group B: patients treated from 01.01.1995 to 31.12.2001. We analyzed type of treatment, hospital stay, postoperative complications and mortality. Surgical approach was different in those

4 DISCUSSION

42 groups since we have accepted new strategies in the treatment of colonic perforations caused by CRC from the
43 year 2000.

44 to 18(32.14%) women, mean age 62.9 years (51-76). In group B we recorded 326 patients with peritonitis,
45 65(19.23%) of them had SP caused by CRC. There were 37(56.92%) men and 28(43.07%) women, mean age 60.5
46 years (37-84 years). In both groups most of patients had left-sided CRC: group A 20 pts (35.71%) and in group
47 B 25 (38.46%) (Table ??). With further analysis of our results we established significant difference in type of
48 surgery among those groups (Table 2a, 2b and 2c).

49 There is difference in rates of postoperative complications among groups. We recorded minor complications
50 as: wound infection, peristomal abscess, stomal necrosis, parastomal skin irritation, and major complications
51 as: wound dehiscence, anastomotic leakage, postoperative abscesses of abdomen, stercoral fistula formation and
52 retraction of stoma (Table 3). Average hospital stay in group A was 16 days (10-22 days), and in group B 21 day
53 ??11-31 day). Mortality in group A and group B according to type of surgery is described in Table ??.

54 IV.

55 4 DISCUSSION

56 Stercoral Peritonitis (SP) is a severe disease with an uncertain prognosis. Due to high concentration of aerobic,
57 endotoxins of Gram-negative and especially egzotoxins of anaerobic bacteria, a quick penetration of these
58 components occurs resolving in diffuse peritonitis, systemic infection and sepsis. Toxins primarily affect heart
59 cells, endothelium, hepatocytes, kidney cells, and cells of immune system. Because of the ischemic, toxic and
60 metabolic damage, cell necrosis occurs leading to septic shock and multiple organ failure in the end. Acute
61 Physiology Score (APS) is commonly used to describe the intensity of pathophysiological disorder, while APACHE
62 II score helps in describing the incidence, morbidity and mortality rate. Patients with SP are placed in the third
63 group with mortality rate of over 40% according to this score.

64 Treatment of SP caused by colonic carcinoma considers:

65 A. Permanent and successful elimination of septic source (respecting oncology principles) B. Evacuation of
66 necrotic and purulent content out of abdominal cavity

67 Removing the cause of infection is basically the most important step in surgical treatment of SP. CRC is the
68 third most common form of cancer, equally distributed in both gender. Etiology of origin is unknown and risk
69 factors are various (2). Complications aside, this cancer is followed by a high rate of mortality, and 5year rate of
70 survival correlates to the stage of carcinoma (Dukes A -about 90%: Dukes C -less then 60%) in case of elective
71 surgery.

72 The very first principles of diagnosis and treatment of SP were noted during Hippocrates's era, while the first
73 principles of surgical treatment were set by Martin Kirschner in 1926. SP is an acute condition, demanding
74 an urgent surgical treatment. Reanimation and preoperative treatment consider besides the correction of
75 hypovolemic and acidobase balance, a prophylactic use of antibiotics. The presence of CRC is often discovered
76 during operation; therefore the surgeon is forced to decide about the type of operation according to the
77 pathological finding and patient's condition.

78 The first colostomy used as a procedure to resolve intestine perforation caused by CRC, was created in 18
79 th century. The basic principles of this treatment were set by Mikulicz (Vorlagerungs methods). This way of
80 treatment was preformed for decades, until two stage procedure and the immediate anastomosis were introduced.
81 If the SP is caused by perforation of the right colon affected by carcinoma, right hemicolectomy with Brook's
82 unipolar ileostoma is the common treatment. Immediate anastomosis is acceptable only if protective ileostoma
83 was made. Right hemicolectomy without anastomosis is preformed far more often. Performing immediate
84 anastomosis is related to a high risk of postoperative complications.

85 Carcinoma of the left colon and rectum resulting in SP is a special problem. It is recommended not to perform
86 coloanoanastomosis during first stage of procedure, but to create a colostomy. Nowadays, reconstructive surgeons
87 support immediate anastomosis of left colon even with presence of diffuse peritonitis and perforation, in strictly
88 selected cases, explaining that this maneuver do not effect mortality and morbidity in patients (5).

89 It is considered that the risk of immediate anastomosis of right and left colon is the same if the patients
90 are hemodynamically stable. Immediate anastomosis should not be considered only in hemodynamically unstable
91 patients, whether obstruction or perforation of colon is involved (6).

92 Localization of carcinoma do not affect postoperative mortality and 5-year rate of survival (7,8), but patient's
93 general condition, severity of SP, the promptness of preformed procedure, surgeon's skill (9), and whether
94 oncological principles are respected(total lymphadenectomy) (10). Regardless of the procedure extensiveness, a
95 5-year rate of survival is 20-30%.

96 According to many colorectal surgeons of GBA (Grate Britain Association) it is possible to determine the
97 risky patients (RIX-risk-stratification index) which would help in survival prognosis (11,12, ??3). The methods
98 of treatment of SP caused by colorectal origin are still a subject of discussion: one or two stage operation. High
99 rate of mortality in these patients (over 40%) leaves the question: (16,17).

100 After removing the source of infection the treatment is continued with evacuation of necrotic and purulent
101 content out of abdominal cavity: mechanical cleaning, debridment, intraoperative lavage with ceftriaxon, and
102 drainage of abdominal cavity. Some recent studies show that intraoperative lavage with ceftriaxon or metronidasol
103 completely exclude the possibility of postoperative abscess development. According to some other authors,

104 performing lavage with 20 l of saline solution decreases development of postoperative complications, abscesses
105 and the need for reintervention.

106 Special attention should be paid to severe forms of SP when it is recommendable to proceed with closed
107 postoperative lavage, which actually represents the continuum of intraoperative lavage. Using this method, the
108 risk of developing adhesive ileus is decreasing. The method of choice in treatment of highly severe forms of SP is
109 staging lavage with temporary abdomen closure, which avoids the negative effect of increased abdominal pressure
110 and the risk of intestine perforation.

111 According to many authors, there is no difference in postoperative mortality between planned and relaparotomy
112 on demand (18,19). Second-look operations can be quite useful in case of severe SP followed by expressed organ
113 necrosis, and in patients that developed septic shock with consecutive coagulopathy.

114 Knowing and respecting the principles of medical approach in stercoral peritonitis caused by colonic cancer
115 perforation, patients in group A were treated with following surgical procedures:

116 ? Solving SP, which was presented as a late diffuse peritonitis in majority of patients. ? Removal of tumor,
117 which was often perforated (regarding the oncological principles) ? Performing immediate anastomosis only in
118 selected cases. The majority of patients underwent ileo and colostoma creation as well as Hartmann's procedure.

119 In patients in group A suffering from right colon carcinoma, right hemicolectomy with Brook's unipolar
120 ileostoma was performed in 47.05%, while only 29.41% of patients underwent right hemicolectomy with immediate
121 anastomosis. In patients with left colon carcinoma, the most performed procedure was colon resection with
122 unipolar colostoma (45%) and left hemicolectomy with bitubular colostoma (25%), while immediate anastomosis
123 were not created. All patients suffering from rectal carcinoma underwent Hartmann's procedure (100%) (Table
124 2a).

125 Much more various procedures were performed in patients in group B. In patients with right colon carcinoma,
126 right hemicolectomy with immediate anastomosis was used more often (54,16%), while right hemicolectomy with
127 Brook's ileostoma was performed rarely (8, ??3). In patients with left colon carcinoma, colostomas were created
128 the most (13,8%), while left hemicolectomy with immediate anastomosis was performed rather often (9,23%).
129 Rectal carcinoma was solved equally by colostoma creation and Hartmann's procedure (43,75%) (Table 2b).

130 During this study, special attention was paid to the number and type of complications after the first stage of
131 procedure. The study showed that patients were in terminal phase of disease, with poor preoperative condition
132 and signs of systemic infection. Very often, surgical procedures had to be performed without adequate colon
133 preparation, after brief and urgent preoperative reanimation.

134 Postoperative complications (such as accretion of laparotomy "per secundam", laparotomy and anastomosis
135 dehiscence, stercoral fistula) were rather the result of poor general condition in patients than inadequate
136 operative technique (stoma complications, postoperative abscess, or other liquid collections in abdominal cavity,
137 etc.).

138 According to results, about 60% of patients in Group A suffered from minor complications which were
139 treated using conservative procedures, while 50% of patients suffered from serious complications treated both
140 conservatively and operatively. The percentage of patients with minor complications were rather similar in Group
141 B, while harder complications occurred far often -96,92% of patients, among which 70% underwent reintervention
142 (Table ??).

143 Cause of death was closely related to general condition of patients (azothemia, cardiovascular, renal or multiple
144 organ dysfunction) and severity of primary disease. SP and CRC occurring separately are related to a high
145 mortality rate, therefore this rate increases when they need to be treated at the same time. Mortality rate in
146 group A was 32.14%, and 60% in group B. There is a significant difference between mortality rate in relation
147 to the type of performed surgical procedure: in right hemicolectomy with unipolar ileostoma it was 37,5% in
148 patients within group A, and 50% in group B; Hartmann's procedure, as a most frequently used procedure in rectal
149 carcinoma, was related to a mortality rate of (score 8), MOF (score 7), Mannheim Peritonitis Index (MPI score
150 30), age of patients (over 65y.) -26.9 % (20). According to results from 1994, mortality rate was 19.6 % (21),
151 while in 2002, it was 16.9 %, although that's closely related to the type of procedure. When primary resection
152 with anastomosis had been performed, mortality rate was 11.1%, though it was 22,2% when anastomosis was not
153 included. Not one patient with MPI less than 25 passed away, while in patients with MPI from 26-36, mortality
154 rate was 38.5 % (22). Localization of carcinoma also affects mortality rate. In left colon carcinoma it was 22.4
155 %, and if it had been associated to a high Peritonitis Severity Score (PSS) it was increased by 15.4 % (23).
156 Mortality rate during the first 30 postoperative days, according to the results from 2001, was 14%, while one year
157 survival was 55% and 5 year -14%. Intestine perforation located proximal then carcinoma was related to a higher
158 morbidity and mortality rate than perforation located on tumor itself (24). Intrahospital mortality during 30 days
159 was 40.5 % in 2006, while during 2 years it was 64.3% (25). Further studies were performed trying to determine
160 the difference between mortality and survival rate with perforative and non-perforative CRC. Mortality rate as
161 well as metastasing in first 30 days was extremely high, while according to the results from 2008, 2 year survival
162 was 47% in perforative and 54% in non-perforative carcinoma, and 5 year survival was 28% versus 33% (26).

163 Comparing these results to ours, which imply only for intrahospital mortality, results gained in group A were
164 similar to the ones presented in literature, while results within group B were high above average.

5 V.

6 CONCLUSION

SP caused by CRC is one of the most severe secondary peritonitis, and still is a great surgical issue. During examination period (group A) it was noticed in 12% of all peritonitis, while during control period (group B) it was rather often -19%.

Surgical procedures used during treatment of patients in group A considered immediate anastomosis in 8.92%, while creation of unipolar ileostomy and colostomy were present in about 53%. In group B, immediate anastomoses were created in 30% of patients, and unipolar ileostomy and colostomy in nearly 60%. Total amount of minor complications in both groups was around 60%, while serious complications were presented with 53% in group A and 96% in group B. This significant difference between results referring to serious complications in our groups affected mortality rate, which was much higher in group B.

Considering that this were patients dealing with late stage of malignant disease, complicated with severe systemic disorders, shown results represent a fine success in treatment of this patients as well as the improvement of surgical and reanimation procedures comparing to earlier results.

2a

	Total	Type of surgery	N	%
		RH with anastomosis	5	29,41
Right colon	17	RH with unipolar ileostomy and transverse colostomy	8	47,05
		Cecostomy	2	11,76
		LH with unipolar colostomy	4	20
Left colon	20	LH with bipolar colostomy	5	25
		Cecostomy	2	10
		Resection with unipolar colostomy	9	45
Rectum	19	Hartmann' procedure	19	100

RH-right hemicolectomy; LH-left hemicolectomy

Figure 1: Table 2a :

2b

	Total	Type of surgery	N	%
		RH with anastomosis	13	54,16
		RH with unipolar ileostomy sec Brooke	2	8,33
Right colon	24	RH with ileostomy and transverse colostomy	4	16,66
		Colostomy	2	8,33
		Cecostomy	3	12,5
		LH with anastomosis	6	9,23
Left colon	25	Cecostomy	2	8
		Colostomy	9	13,84
		Resection with unipolar colostomy	8	12,3
		Exteorisation of transverse colon	2	12,5
Rectum	16	Colostomy	7	43,75
		Hartmann' procedure	7	43,75

RH-right hemicolectomy; LH-left hemicolectomy

Figure 2: Table 2b :

2c

Type of surgery	Group		p
	A	B	
RH with anastomosis	5	13	0,147
RH with unipolar ileostomy Brook-u	8	2	0,043
Right colon RH with ileostomy and transverse colostomy	2	4	0,685
Colostomy	0	2	0,499
Cecostomy	2	3	0,999
LH with anastomosis	0	6	0,03
LH with unipolar colostomy	4	0	0,043
Left colon LH with bipolar colostomy Cecostomy	5	2	0,019
Resection with unipolar colostomy	9	8	0,74
Colostomy	0	9	0,004
Exteorization of transverse colon	0	2	0,499
Rectum Colostomy	0	7	0,015
Hartmann' procedure	19	7	0,004
RH-right hemicolectomy; LH-left hemicolectomy			

Figure 3: Table 2c :

3

Complication	Group A		Group B		group A Total	group B Total	p
	n	(%)	n	(%)			
Wound infection	10	(17,85%)	11	(16,92%)			
Peristomal abscess	3	(5,35%)	5	(7,69%)	6	34	0,085
Stomal necrosis		(8,92%)		(9,23%)		39	
Parastomal skin irritation	16	(28,57%)	19	(33,92%)			
Wound dehiscence	8	(14,28%)	13	(20%)			
Anastomotic leakage	3	(5,35%)	10	(15,38%)			
Postoperative abscess	8	(14,28%)	14	(21,53%)	30	63	0,085
							(53,57%)(96,92%)
Stercoral fistula	6	(10,71%)	15	(23,07%)			
Retraction of stoma	5	(8,92%)	11	(16,92%)			
Total	64		102				

Figure 4: Table 3 :

¹© 2011 Global Journals Inc. (US) 2011 December

²© 2011 Global Journals Inc. (US)

³December

⁴© 2011 Global Journals Inc. (US)The Treatment of Stercoral Peritonitis Caused By Colorectal Carcinoma

⁵DecemberVolume XI Issue IV Version I

178 The Treatment of Stercoral Peritonitis Caused By Colorectal Carcinoma

179 [Takeuchi et al.] , K Takeuchi , Tsuzuki , M Yasushi , T Ando , * Sekiharam , T Hara . *Patients Over* p. 85.

180 [Mikhailov et al.] , A P Mikhailov , A M Danilov , A N Napalkov , V V Strizheletskii , V A Ignatenko , G A
181 Mikhailov . (Acute tumorous obstruction of the colon in elderly and senile patients)

182 [Holzer and Schiessel] , B Holzer , R Schiessel . (Single and multiple interventions in ileus of the large intestine
183 due to carcinoma)

184 [Maurer et al. ()] , C A Maurer , P Renzulli , M Naef , C A Seiler , W Uhl , U Klippel , M W Buchler . *Zentralbl*
185 *Chir* 1998. 123 (12) p. . (Surgical therapy of ileus of the large intestine)

186 [Chirurg (2001)] , *Chirurg* 2001 Aug. 72 (8) p. .

187 [Vestn Khir Im and Grek ()] , Vestn Khir Im , Grek . 2003. 162 p. .

188 [Klin Khir (2004)] , *Klin Khir* 2004 Sep. (9) p. .

189 [Khan et al. (2001)] ‘Acute colonic perforation associated with colorectal cancer’. S Khan , S E Pawlak , J C
190 Eggenberger , C S Lee , E J Szilagy , D A Margolin . *Am Surg* 2001 Mar. 67 (3) p. .

191 [Solov’ev et al.] *Application of meloxicam in scheme of prophylaxis of postoperative complications in patients with*
192 *an acute ileus of tumoral etiology*, Solov’ev , Solov’eva Ie , Oa .

193 [Ascanelli et al. (2003)] ‘Early and late outcome after surgery for colorectal cancer: elective versus emergency
194 surgery’. S Ascanelli , G Navarra , G Tonini , C Feo , A Zerbinati , E Pozza , P Carcoforo . *Tumori* 2003
195 Jan-Feb. 89 (1) p. .

196 [Lee et al. (2001)] ‘Emergency surgery for obstructing colorectal cancers: a comparison between right-sided and
197 left-sided lesions’. Y M Lee , W L Law , K W Chu , R T Poon . *J Am Coll Surg* 2001 Dec. 193 (6) p. 717.

198 [Runkel et al. (1998)] ‘Improved outcome after emergency surgery for cancer of the large intestine’. N S Runkel
199 , U Hinz , T Lehnert , H J Buhr , Herfarth Ch . *Br J Surg* 1998 Sep. 85 (9) p. .

200 [Abdelrazeq et al. ()] ‘Jayne DG The impact of spontaneous tumour perforation on outcome following colon
201 cancer surgery’. A S Abdelrazeq , N Scott , C Thorn , C S Verbeke , N S Ambrose , I D Botterill . *Colorectal*
202 *Dis* 2008.

203 [Biondo et al. (2004)] ‘Large bowel obstruction: predictive factors for postoperative mortality’. S Biondo , D
204 Pares , R Frago , J Marti-Rague , E Kreisler , De Oca , J Jaurrieta , E . *Dis Colon Rectum* 2004 Nov. 47
205 (11) p. .

206 [Bielecki et al. (2002)] ‘Large bowel perforation: morbidity and mortality’. K Bielecki , P Kami?ski , M Klukowski
207 . *Tech Coloproctol* 2002 Dec. 6 (3) p. .

208 [Chen and Sheen-Chen (2000)] ‘Obstruction and perforation in colorectal adenocarcinoma: an analysis of
209 prognosis and current trends’. H S Chen , S M Sheen-Chen . *Surgery* 2000 Apr. 127 (4) p. .

210 [McCabe et al. ()] *Obstruction, Large Bowel*, Charles McCabe , Joseph J Md , M D Sachter , Francisco Talavera
211 , Eugene Hardin , John Halamka , Jonathan Adler . *Medicine* APR.2005.

212 [Anwar et al. (2006)] ‘Outcome of acutely perforated colorectal cancers: experience of a single district general
213 hospital’. M A Anwar , D Souza , F Coulter , R Memon , B Khan , I M Memon , MA . *Surg Oncol* 2006 Aug.
214 2006 Oct 17. 15 (2) p. .

215 [Komatsu et al. (2005)] ‘Prognostic factors and scoring system for survival in colonic perforation’. S Komatsu ,
216 T Shimomatsuya , M Nakajima , H Amaya , T Kobuchi , S Shiraishi , S Konishi , S Ono , K Maruhashi .
217 *Hepatogastroenterology* 2005 May-Jun. 52 (63) p. .

218 [Biondo et al. (2000)] ‘Prognostic factors for mortality in left colonic peritonitis: a new scoring system’. S Biondo
219 , E Ramos , M Deiros , J M Ragué , De Oca , J Moreno , P Farran , L Jaurrieta , E . *J Am Coll Surg* 2000
220 Dec. 191 (6) p. .

221 [Kriwanek et al. (1994)] ‘Prognostic factors for survival in colonic perforation’. S Kriwanek , C Armbruster , P
222 Beckerhinn , K Dittrich . *Int J Colorectal Dis* 1994 Aug. 9 (3) p. .

223 [Law et al. (2002)] ‘Randomized clinical trial comparing loop ileostomy and loop transverse colostomy for faecal
224 diversion following total mesorectal excision’. W L Law , K W Chu , H K Choi . *Br J Surg* 2002 Jun. 89 (6)
225 p. .

226 [Holzheimer and Gatof ()] ‘Re-operation for complicated secondary peritonitis-how to identify patients at risk
227 for persistent sepsis’. R G Holzheimer , B Gatof . *Eur J Med Res* 2003. 8 p. .

228 [Koperna and Schulz ()] ‘Relaparotomy in peritonitis: prognosis and treatment of patient with persisting
229 intraabdominal infection’. T Koperna , F Schulz . *World J Surg* 2000. 24 (1) p. .

230 [Zorcolo et al. (2003)] ‘Safety of primary anastomosis in emergency colorectal surgery’. L Zorcolo , L Covotta ,
231 N Carlomagno , D C Bartolo . *Colorectal Dis* 2003 May. 5 (3) p. .

6 CONCLUSION

- 232 [Jeremic et al. (2005)] *Specijalna hirurgija I. Dijagnostika i terapija:4-2 do 4-28*, M Jeremic , Intraabdominalne
233 , W S El-Deiry , P Schulman , F Talavera , M J Kahn , R Mckenna , J S Macdonald . Medicine feb. 2005. 2.
234 (Colon Cancer, Adenocarcinoma)
- 235 [Tekkis et al. (2004)] 'The Association of Coloproctology of Great Britain and Ireland study of large bowel
236 obstruction caused by colorectal cancer'. P P Tekkis , R Kinsman , M R Thompson , J D Stamatakis . *Ann*
237 *Surg* 2004 Jul. 240 (1) p. .
- 238 [The Treatment of Stercoral Peritonitis Caused By Colorectal Carcinoma] *The Treatment of Stercoral Peritoni-*
239 *tis Caused By Colorectal Carcinoma,*
- 240 [Years Old Be Operated on for Colorectal Cancer?] *Years Old Be Operated on for Colorectal Cancer?*,