



The importance of training and education in performing total mesorectal excision in rectal cancer surgery

Značaj obuke i obrazovanja u izvođenju totalne mezorektalne ekscizije u hirurgiji karcinoma rektuma

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Abstract

Background/Aim. In the last two decades there has been a significant progress in rectal cancer surgery. Preoperative radiotherapy, the introduction of staplers and largely improved surgical techniques have greatly contributed to better treatment outcomes, primarily by reducing the frequency of early surgical complications and the rate of local recurrence. The aim of this study was to compare operative and postoperative results in the treatment of rectal cancer between the two groups of surgeons – those who are closely engaged in colorectal surgery and those who deal with these issues sporadically. **Methods.** This retrospective study included 146 patients who had undergone rectal cancer surgery at the Institute of Oncology of Vojvodina in the period from January 1, 2008 to December 31, 2010. The patients were divided into two groups, the group N1 of 101 patients operated on by trained colorectal surgeons, and the group N2 of 45 patients operated on by surgeons without training in total mesorectal excision (TME). **Results.** Preoperative chemoradiotherapy was received by 49 (33.56%) of the patients. A statistically significant difference between the two groups was noted in the duration of surgery and the need for blood transfusion during surgery. Anastomotic leakage occurred in 3 patients from the group N1 and in 10 patients from the group N2. Seven (4.79%) of the patients developed local recurrence after surgical treatment. There were significant differences in local recurrence rate and anastomotic leakage rate between the compared groups. **Conclusion.** It is necessary to continue education and training in surgery for rectal cancer to master new technologies and surgical techniques and to improve the results of surgical treatment.

Key words:

rectal neoplasms; carcinoma; digestive system surgical procedures; surgeons; education, professional; treatment outcome.

Apstrakt

Uvod/Cilj. U poslednje dve decenije postignut je značajan napredak u hirurgiji karcinoma rektuma. Preoperativna radioterapija, uvođenje staplera kopči i ponajviše unapređena hirurška tehnika umnogome su doprineli boljim rezultatima lečenja, pre svega smanjivanjem učestalosti ranih hirurških komplikacija i stope lokalnih recidiva. Cilj ovog istraživanja bio je da se uporede operativni i postoperativni rezultati u lečenju karcinoma rektuma između dve grupe hirurga – onih koji se usko bave kolorektalnom hirurgijom i onih koji se ovom problematikom bave sporadično. **Metode.** Ova retrospektivna studija obuhvatila je 146 bolesnika koji su operisani na Institutu za onkologiju Vojvodine u periodu od 1. 1. 2008. do 31. 12. 2010. godine. Bolesnici su bili podeljeni u dve grupe. U prvoj grupi N1 bio je 101 bolesnik koje su operisali visoko edukovani hirurzi za totalnu mezorektalnu eksciziju (TME), a u drugoj N2 bilo je 45 bolesnika koje su operisali hirurzi bez edukacije iz TME. **Rezultati.** Preoperativnu hemioiradijaciju primilo je 49 (33,56%) bolesnika. Utvrđena je statistički značajna razlika između dve grupe u trajanju operacije i potrebi za krvnim derivatima tokom operacije. Dehiscenciju anastomoze indentifikovali smo kod 3 bolesnika iz N1 grupe i kod 10 bolesnika iz N2 grupe. Sedam (4,79%) bolesnika razvilo je lokalni recidiv nakon operativnog lečenja. Statistički značajna razlika ustanovljena je u broju lokalnih recidiva i dehiscencije anastomoze između dve upoređivane grupe. **Zaključak.** Neophodno je kontinuirano obrazovanje i obuka u hirurgiji karcinoma rektuma kako bi se savladale nove tehnologije i hirurške tehnike, te unapredili rezultati hirurškog lečenja.

Ključne reči:

rektum, neoplazme; karcinomi; hirurgija digestivnog sistema, procedure; hirurzi; edukacija, profesionalna; lečenje, ishod.

Introduction

Preoperative staging, use and timing of neoadjuvant and adjuvant chemioradiotherapy (CRT), surgical technique, reconstructive options and protocols in the management of rectal cancer have evolved over the past two decades¹⁻⁵.

As a result, the management of patients with rectal cancer has become highly complex, so it is essential that surgeons acquire and maintain knowledge of rectal cancer treatment issues⁶⁻⁹.

The importance of surgeon knowledge and training was illustrated in a study of Richardson et al.⁶ in which patients with rectal cancer were more likely to receive sphincter-preserving surgery and were less likely to experience local recurrence if they were treated by a surgeon with greater knowledge of rectal cancer care.

The aim of the study was to compare operative and postoperative results of rectal cancer surgical treatment performed by two groups of surgeons, the first one of highly skilled and educated colorectal surgeons, and the second one of surgeons performing colorectal operations sporadically.

Methods

This retrospective study included 146 patients, operated on at Institute of Oncology of Vojvodina in the period from January 1, 2008 to December 31, 2010. The patients were divided into two groups, the group N1 of 101 (69.18%) patients operated on by high educated surgeons in rectal cancer surgery, and in the second group N2 of 45 (30.82%) patients operated on by non-colorectal surgeons (general surgeons without special training in rectal cancer surgery). The average age of the patients in the group N1 was 66.15 (range 43-84), and in the group N2 63.71 (range 39-84). In both groups there were 82 (56.16%) male and 64 (43.84%) female patients.

Preoperative staging included clinical examination, endorectal ultrasonography (ERUS), computed tomography (CT) of the abdomen and pelvic magnetic resonance imaging (MRI) in all the cases.

The presence of operable secondary deposits in the liver and/or lungs did not exclude patients from the study.

Rectal adenocarcinoma (3-18 cm from the anal verge), after colonoscopy and histopathological (HP) examination of the tumor, was verified in all the patients (146, 100.00%).

Preoperative chemoradiation therapy (CRT) was performed with the total dose of 50.4 Gray (Gy) divided into 25 fractions, with the daily dose of 1.8 Gy. Chemotherapy was carried out with radiation therapy in order to increase the sensitivity of tumor tissue to radiation. The patients received calcium 5-fluorouracil and leucovorin (5-FU/LV), on the day 1, 2, 10, 11, 20 and 21 of radiotherapy. Surgery was performed 8 to 10 weeks after the completion of CRT.

We performed low anterior resection (LAR) or high anterior resection (HAR), both with total mesorectal excision (TME) and by using single or double stapler technique for creation of colorectal anastomosis.

Software SPSS V.16. was used for the purposes of statistical analysis. All the data were statistically analyzed (per-

centage, average value, range) and presented in tables. Both Fischer's exact tests and χ^2 tests were used to compare the data between the groups. Values of $p < 0.05$ were considered as statistically significant.

Results

The average distance from the anal verge in the group N1 was 8.72 cm, while in the group N2 it was 9.16 cm. Tumor in the distal rectum (3-7 cm) was present in 52 (35.62%) of the patients. Among the total number of patients, distant metastases were found in 17 (11.64%) of the patients, in the liver (14 patients) and in the lungs (3 patients). A certain number of patients were classified as ASA 2 (49.32%).

Histopathological analysis showed a moderately differentiated tumor (GII) in most of the patients (71.92%). The majority of patients (82 (56.16%)) had no metastases in the lymph nodes (Table 1).

Anastomosis was performed with double stapler technique in 110 (75.34%) of the patients, and by single stapler technique in 36 (24.66%) of the patients in both groups. For the group N1, the mean operation time was 104 min, and in the group N2 136 min (a statistically significant difference with $p = 0.000001$). Fifty-seven of the patients needed blood transfusion, from the group N1 21, and from the group N2 36 ($p = 0.00003$).

Protective transversostomy was performed in 27 of the patients from the group N1 and in 10 patients from the group N2.

Preoperative CRT was received by 49 (33.56%) of the patients, 42 in the N1 and 7 in the group N2 (Table 2).

Anastomotic leakage was noticed in 3 of the patients from the group N1 and in 10 from the group N2. This difference was statistically significant ($p = 0.0004$).

Seven (4.79%) of the patients (2 from the N1 and 5 from the group N2) developed a local recurrence, which is a statistically significant difference between the two groups in the local recurrence rate. Due to the postoperative complications, 6 of the patients died a month after the operation (Table 3).

Discussion

Improved screening, surgical techniques, a more effective chemotherapy, radiation therapy and improved imaging have lead to better results in rectal cancer treatment.

Many authors have shown improved outcomes among patients with rectal cancer who were treated by surgeons with subspecialty training (colorectal surgeons)⁶⁻⁸. This includes increased use of sphincter-preserving surgery, decreased local recurrence⁸, decreased anastomotic leakage⁹, decreased postoperative mortality and improved survival¹⁰. This variation in the outcome may reflect on the differences in surgical technique, especially in the technique of TME¹¹⁻¹³.

Anastomosis distance from the anal verge and preoperative CRT are one of the most important risk factors for anastomotic leakage^{1, 2, 10, 14-16}.

In their study on 1,014 patients, Vignali et al.¹⁵ determined clinical signs of anastomosis leakage in 2.9% of cases

Table 1

Tumor characteristics			
Characteristics	N ₁	N ₂	Total N ₁ + N ₂
Tumor distance from the anal verge, (cm) mean (range)	8.72 (3–18)	9.16 (3–16)	8.86 (3–18)
3–7 cm, n (%)	39 (26.71)	13 (8.90)	52 (35.62)
8–16 cm, n (%)	62 (42.47)	32 (21.92)	94 (64.38)
Pathological tumour stage, n (%)			
I	15 (10.27)	5 (3.42)	20 (13.70)
II	73 (50.00)	36 (24.66)	109 (74.66)
III	13 (8.90)	4 (2.74)	17 (11.64)
T – tumor, n (%)			
0	9 (6.16)	1 (0.68)	10 (6.85)
1	10 (6.85)	3 (2.05)	13 (8.90)
2	24 (16.44)	8 (5.48)	32 (21.92)
3	55 (37.67)	30 (20.55)	85 (59.22)
4	3 (2.05)	3 (2.05)	6 (4.11)
N – nodes, n (%)			
0	55 (37.67)	27 (18.49)	82 (56.16)
1	24 (16.44)	11 (7.53)	35 (23.97)
2	22 (15.07)	7 (4.79)	29 (19.86)
M – metastases, n (%)			
0	88 (60.27)	41 (28.08)	
1	13 (8.09)	4 (2.74)	
liver	10 (6.85)	4 (2.74)	
lungs	3 (2.05)	0 (0.00)	
Average number of extirpated lymphnodes, mean (range)	11.26 (0–40)	10.82 (0–28)	11.12 (0–40)
1–3, n (%)	31 (21.23)	11 (7.53)	42 (28.77)
≤ 3, n (%)	15 (10.27)	7 (4.79)	22 (15.07)

N₁ – group of patients operated on by trained colorectal surgeon;

N₂ – group of patients operated on by general surgeon;

n – number of patients.

Table 2

Preoperative, operative and postoperative data				
Parameters	N ₁	N ₂	Total N ₁ +N ₂	<i>p</i>
Type of stapler anastomosis, n (%)				
single	11 (7.53)	25 (17.12)	36 (24.66)	2.788
double	90 (61.64)	20 (13.70)	110 (75.34)	
Mean operation time (min)	103.91	135.67	113.7	0.000001
Protective colostomy, n (%)				
yes	27 (18.49)	10 (6.85)	37 (25.34)	0.36
no	74 (50.68)	35 (23.97)	109 (74.66)	
ASA classification, n (%)				
1	6 (4.11)	4 (2.74)	10 (6.85)	
2	50 (34.25)	22 (15.07)	72 (49.32)	
3	45 (30.82)	19 (13.01)	64 (43.84)	
Blood transfusion, n (%)	21 (14.38)	36 (24.66)	57 (39.00)	0.00003
Mean hospital stay in days (range)	15.9 (10–28)	15.3 (9–50)	15.7 (9–50)	0.684
Preoperative CRT, n (%)				
yes	42 (28.77)	7 (4.79)	49 (33.56)	0.0014
no	59 (40.41)	38 (26.03)	97 (66.44)	

ASA – American Society of Anesthesiology; CRT – chemioradiation therapy;

N₁ – group of patients operated on by trained colorectal surgeon;

N₂ – group of patients operated on by general surgeon;

n – number of patients.

Table 3

Postoperative complications, local relapses and early postoperative mortality

Postoperative complications	N ₁ n (%)	N ₂ n (%)	Total n (%)	<i>p</i>
Anastomosis leakage				
yes	3 (2.05)	10 (6.85)	13 (8.90)	0.0004
no	98 (67.12)	35 (23.97)	133 (91.06)	0.029
Local relapses	2 (1.37)	5 (3.42)	7 (4.79)	
Early postoperative mortality	2 (1.37)	4 (2.74)	6 (4.11)	0.072

N₁ – group of patients operated on by trained colorectal surgeon;

N₂ – group of patients operated on by general surgeon;

Total – N₁ + N₂; n – number of patients.

in the entire group. However, for tumors localized less than 7 cm from the anal verge, clinical signs of anastomosis leakage had 7.7%, and for tumors localized in the proximal portion of the rectum in 1% of cases¹⁵. Our results are compatible to the results of other authors^{10, 13-17}.

Anastomotic leakage rate in the group N1 of the patients was low, despite the fact that they were far more radiated than the patients in the group N2 (42% vs 15%). Therefore, hypothetically speaking the group N2 had pointed to the more inferior results in the rate of anastomotic leakage than the group N1.

The importance of training and education in TME is particularly reflected on the duration time of surgery. We found a statistically significant difference in the mean time of the operation between the two groups of surgeons. Other authors came to the same conclusions^{6-10, 18}. This can also be used when the need for intraoperative blood transfusion is concerned⁶⁻¹⁰.

The single and double stapling techniques are equally safe. Radovanovic et al.¹⁶ in their study found no significant difference in the anastomotic leakage rate between these techniques¹⁶. However, double stapling technique allows the anastomosis to be performed very low in the pelvis and operative time is shortened than in single stapling technique^{15, 16}.

Protective stomas do not prevent anastomosis leakage. However, stomas reduce the consequences of complications in terms of reoperations. Also, they reduce the clinical manifestations of anastomotic leakage. Norwegian multicentric randomized study, Rectal Cancer Trial On Defunctioning Stoma (REKTODES) has clearly demonstrated that protective stoma significantly reduces the incidence of symptoms of

anastomotic leakage¹⁷. We believe that we should create protective stoma in the following cases: at very low rectal resection, when rings of staples are incomplete after resection, when the water test is positive and in patients with severe general condition.

According to our institutional protocol for rectal cancer treatment, all patients with locally advanced tumors should receive preoperative CRT. Preoperative CRT can improve local control of the disease¹⁻⁵. In a Swedish rectal cancer trial, the reduction in the rate of local recurrence from 27% in the surgery-only group, to 11% in the radiotherapy-plus-surgery group. Also, the rate of overall survival is improved from 48% in the surgery-only group to 58% in the combined-treatment group¹⁹. Local recurrences after surgery only performed by general surgeons vary widely from 15% to 45%, and by contrast, surgeons who specialize in TME (dedicated colorectal surgeons) report local-recurrence rates of 7% or less^{6-12, 18, 20}. Accordingly, our study shows 3.42% vs 1.37% local recurrence rate, respectively.

Postoperative mortality did not increase with preoperative CRT^{1, 2, 19}. In our study, there was no difference in early postoperative mortality between the two observed groups of patients. Other authors also have similar results⁶⁻¹³.

Conclusion

It is necessary to continue professional development in rectal cancer surgery in order to maintain existing, and also to acquire new knowledge. Therefore, it is essential to be familiar with new technologies and surgery techniques to offer maximum quality of surgical treatment to rectal cancer patients.

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