SCIE DOI: 10.14744/scie.2020.99705
South. Clin. Ist. Euras. 2021;32(1):8-12

Original Article

Quality of Life After Rectal Cancer Surgery: Comparison of Open and Laparoscopic Approaches

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Submitted: 01.10.2020
Accepted: 30.11.2020

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Keywords: EORTC QLQ-CR29; EORTC QLQ-C30; life quality; rectal cancer.

ABSTRACT

Objective: The aim of this study was to compare the health-related quality of life (HRQoL) results of the open and laparoscopic approaches in patients who underwent a sphincter-preserving resection for rectal cancer.

Methods: A total of 122 patients who underwent surgery for rectal cancer at a single center between January 2017 and December 2018 were included in this prospective study. The patients were divided into 2 groups according to the type of surgical procedure: open (n=85) or laparoscopy (n=37). The HRQoL questionnaires employed were the European Organization for Research and Treatment of Cancer Quality of Life Core Questionnaire 30 (EORTC QLQ-C30) and the European Organization for Research and Treatment of Cancer Quality of Life Questionnaire-Colorectal Cancer 29 (EORTC QLQ-CR29).

Results: The EORTC QLQ-C30 questionnaire revealed statistically significant differences with better results in the laparoscopic group for the following items: global status (p=0.008), role functioning (p=0.003), and nausea/vomiting (p=0.005). A significant difference was seen on the EORTC QLQ-CR29 questionnaire only for the flatulence item, with a better score recorded in the laparoscopic group (p=0.02).

Conclusion: The laparoscopic approach in rectal cancer surgery was superior to the open approach in terms of HRQoL in the early period. However, long-term results indicated that HRQoL was independent of surgical approach.

INTRODUCTION

A laparoscopically-assisted colectomy was first described in 1991 by Jacobs et al.[1] After the first report, various controlled studies and analyses demonstrated that laparoscopic colorectal surgery (LCRS) lead to faster recovery of intestinal transit, less pain, and shorter hospital stays when compared with conventional surgery.[2–4] It has been suggested that these short-term benefits of LCRS may be related to a decreased inflammatory response.[5]

Following colorectal surgery, most patients face various problems, both physical and emotional, for some time. Unfortunately, pain, fatigue, and bowel as well as sexual function disorders, have a negative effect on the patients' social roles and activities. Therefore, evaluation of self-reported life quality (QoL) is important in analytical studies designed to assess the cost and effectiveness of laparoscopy.

The European Organization for Research and Treatment of Cancer (EORTC) questionnaires are a comprehensive system that evaluates the health-related QoL (HRQoL) of patients with cancer. The EORTC QLQ-C30 is the basic survey tool used to assess the QoL in cancer patients.[6] It has gained worldwide acceptance as a means to evaluate QoL in cancer patients and it has been reported to be quite sensitive in several studies.[7] The QLQ-CR38 questionnaire was designed to obtain more specific information about QoL in patients with colorectal cancer. Revision of the QLQ-CR38 led to the development of the QLQ-CR29, which demonstrated enough validity and stability to be recommended for international use. The EORTC QLQ-C30 is also used to clinically evaluate patient-reported treatment results in colorectal cancer trials and other environments.[8,9]

The objective of this prospective study was to compare early and long-term HRQoL results of the open approach and the laparoscopic approach in patients who underwent sphincter-preserving resection for rectal cancer.

MATERIALS AND METHODS

All of the patients who underwent surgery for rectal cancer in the general surgery department of a tertiary referral

hospital between January 2017 and December 2018 were assessed for study eligibility. The patients were prospectively divided into 2 groups according to type of operation: open or laparoscopic surgery. This study was approved by the Kartal Dr. Lutfi Kirdar Training and Research Hospital Clinical Research Ethics Committee on May 30, 2017 (no: 2017/514/108/12) and registered with the US National Library of Medicine at ClinicalTrials.gov. Written, informed consent was obtained from the participating patients before the operation. The clinical data of the patients to be analyzed were retrieved from the hospital database program. The surgical method (laparoscopic or open) was determined by the surgeon according to the tumor features, the patient's comorbidity status, and the patient's preference.

The location of the tumor was categorized based on the distance from the anal verge: low (0–5 cm), mid (6–10 cm), or upper (11–15). Total mesorectal excision with a protective loop ileostomy is standard for low and mid rectal cancer. A protective ileostomy for upper rectal cancer was performed according to the perfusion of the intestine, tensile strength of the anastomosis and the surgeon's preference.

All of the patients included in this study underwent sphincter-preserving total mesorectal excision due to rectal cancer.

Exclusion criteria

- Patients whose oncological treatment had not been completed at least 6 months prior
- Patients with an American Society of Anesthesiologists IV score
- Patients with previous abdominal surgery
- Patients who had developed major surgical complications (such as, anastomosis leakage, required re-laparotomy, evisceration)
- Patients who underwent a new abdominal surgery except for stoma closure
- Patients with local recurrence or distant metastases
- Patients who still had a stoma
- Patients who elected not to take part in the study
- Patients with incomplete follow-up

The EORTC QLQ-C30 and QLQ-CR29 questionnaires were used to collect study data. The EORTC QLQ-C30 was self-administered by the patients during the first week after surgery. The EORTC QLQ-CR29 was conducted 1 year after the operation in a face-to-face interview.

The data were analyzed using IBM SPSS Statistics for Windows, Version 21.0 (IBM Corp., Armonk, NY, USA). Continuous variables were expressed as mean and SD or median and range, according to the distribution. Continuous normally distributed variables were compared using Student's t test. The Mann-Whitney U test was used to compare the means of variables that were not normally distributed. The frequency of categorical variables was compared using the Pearson chi-squared or Fisher's exact test, as appropriate. A value of $p<0.05$ was considered significant.

RESULTS

During the research period, a total of 165 patients underwent surgery (open or laparoscopic) for rectal cancer in

Table 1. Demographic and clinical characteristics of the groups

Characteristics	Open group (n=85)	Laparoscopic group (n=37)	p-value
Age (years, mean±SD)	62.8±10.5	61.7±11.8	0.66
Gender (F/M)	42/43	15/22	0.37
Body mass index (kg/m^2, mean±SD)	26.7±4.3	27.6±5.5	0.74
Comorbidities	54 (63.5)	15 (40.5)	0.43
Tumor localization (upper/mid/low)	55/17/13	23/11/3	0.97
Temporary Ileostomy (closed), n (%)	52 (61.2)	18 (48.6)	0.20
Neoadjuvant treatment, n (%)	29 (34.1)	17 (49.9)	0.22
Adjuvant treatment, n (%)	60 (70.6)	21 (56.8)	0.14
Pathologic stage, n (%)			0.37
1	21 (24.7)	9 (24.3)	
2	30 (35.3)	15 (40.6)	
3a	8 (9.4)	2 (5.4)	
3b	18 (21.2)	10 (27)	
3c	8 (9.4)	1 (2.7)	
ASA score, n (%)	0.67		
II	31 (36.4)	15 (40.5)	
III	54 (63.6)	22 (59.5)	
Postoperative complication, n (%)	37 (43.5)	10 (27)	0.22

ASA: American Society of Anesthesiologists; F: Female; M: Male; SD: Standard deviation.

Table 2. Comparison of EORTC QLQ-C30 scores between groups

EORTC QLQ-C30*	Open group	Laparoscopic group	p-value
Functional scales			
Global QoL	68.69	76.86	**0.008**
Physical functioning	85.65	90.63	0.078
Role functioning	92.55	97.30	**0.005**
Cognitive functioning	90.39	94.14	0.209
Social functioning	91.76	95.95	0.210
Symptom scales/items			
Fatigue	14.35	9.37	0.078
Nausea and vomiting	7.45	2.70	**0.005**
Pain	9.61	5.86	0.209
Dyspnea	8.24	4.05	0.210
Insomnia	19.48	14.11	0.069
Appetite loss	2.55	1.35	0.754
Constipation	11.77	6.31	0.100
Diarrhea	7.84	7.21	0.990
Financial difficulties	10.59	6.31	0.325

*A higher score on a functional scale indicates better functioning. whereas a higher score on a symptom scale indicates a higher degree of symptoms. Scores in the laparoscopic and open groups were compared using Student's t test. EORTC QLQ-C30: European Organization for Research and Treatment of Cancer Quality of Life Core Questionnaire 30; QoL: Quality of life.

Table 3. Comparison of EORTC QLQ-CR29 scores between groups

EORTC QLQ-CR29*	Open group	Laparoscopic group	p-value
Functional scales			
Body image	89.61	93.24	0.378
Future projections	88.24	90.99	0.358
Weight	91.76	96.40	0.445
Sexual interest	55.04	45.45	0.311
Sexual interest (w)	69.84	66.67	0.663
Symptom scales/items			
Urinary frequency	22.52	23.73	0.423
Blood and mucus in stool	4.96	4.12	0.601
Stool frequency*	13.96	14.90	0.885
Urinary incontinence	9.01	10.59	0.835
Dysuria	0.00	1.96	0.182
Abdominal pain	0.00	1.96	0.182
Buttock pain	9.91	9.02	0.902
Bloating	18.02	22.35	0.394
Dry mouth	9.01	14.90	0.187
Hair loss	4.50	7.45	0.839
Taste	9.91	7.06	0.607
Flatulence*	35.14	18.43	**0.020**
Fecal incontinence	12.61	12.55	0.632
Sore skin*	8.11	5.10	0.299
Embarrassment	18.92	13.33	0.379
Impotence	34.85	30.23	0.776
Dyspareunia	33.33	26.19	0.389

*A higher score on a functional scale indicates better functioning. whereas a higher score on a symptom scale indicates a higher degree of symptoms. Scores of the laparoscopic and open groups were compared using Student's t test. EORTC QLQ-CR29: European Organization for Research and Treatment of Cancer Quality of Life Questionnaire-Colorectal Cancer 29.

general surgery department. Thirty-three (20%) were excluded due to the study design or the indicated exclusion criteria. Ten patients (6%) chose not to participate in the study. In total, 122 patients were included in this study (85 open and 37 laparoscopic procedures). Fifty-seven of the patients were female (47%), while 65 were male (53%), with a mean age of 62.2±10.9 years. Temporary ileostomies were closed without any need for a laparotomy in 3 months. The demographic and clinical characteristics were similar in both groups. Detailed findings are shown in Table 1.

The EORTC QLQ-C30 questionnaire revealed statistically significant differences, with better results in the laparoscopic group for the following items: global health status (p=0.008), role functioning (p=0.003), and nausea/vomiting (p=0.005) (Table 2). On the EORTC QLQ-CR29 questionnaire, a significant difference was observed only for the flatulence item, again with a better score in the laparoscopic group (p=0.02) (Table 3).

DISCUSSION

Cancer and its treatment usually have a negative effect on patient QoL. The maintenance of QoL has become a critical strategy in the management of these patients. Rectal cancer and its treatment primarily affect the patients' life in 3 areas. Briefly, these are physical functions (for example, frequent and irregular bowel movements, urgency to defecate or urinate, gas, fecal incontinence, other alterations of bowel and urinary habits, etc.), functions related to sexual status (dysfunction on erection, ejaculation failure, and orgasm incapability in females because of dyspareunia, less sexual intercourse, and receding orgasm) and social activity (frequency of need or rate of bowel movement/urination). Patients with a colostomy were particularly at risk for dangerous levels of distress because of the "double stigma" of cancer and/or a colostomy.[10]

This study examined the change in QoL at 1 week and 1 year after surgical treatment for rectal cancer according to the surgical approach used. There were some significant differences after 1 week following laparoscopy but there was no significant difference in HRQL between the 2 types of procedure at the 12th month. This is valuable, however, the assessment of which differences are clinically meaningful is complex. Some studies have shown that minimal important differences (MIDs) in the EORTC QLQ-C30 are clinically meaningful. Osoba[11] has suggested that the MID is 5–10 points on a 100-point scale, while >20 points signals a substantial difference.

There is a limited number of studies in the literature comparing QoL results of laparoscopic and open approaches for rectal cancer. Our findings indicated that laparoscopic surgery yielded better EORTC QLQ-C30 scores in terms of global QoL. Superiority was observed for performance status and nausea/vomiting items when compared with the open surgery group. The EORTC QLQ-CR29 scores revealed a better score for the flatulence item in the laparoscopic group. Braga et al.[12] reported that the QoL of patients who underwent laparoscopic rectal surgery was better than that of those who underwent open surgery at postoperative 1 year. Li et al.[13] found that the patients in the laparoscopic arm of their research had a better overall health status and less pain a week after surgery and a better body image 1 year after the operation. However, they concluded that the QoL benefits of minimally invasive laparoscopic surgery were apparent only in the immediate postoperative period and that it provided only a better cosmetic benefit over the long term. We observed that the cosmetic results after surgery were similar in the long-term follow-up of both groups. In the COREAN (Comparison of open versus laparoscopic surgery for mid and low rectal cancer after neoadjuvant chemoradiotherapy) trial, laparoscopic and open groups were compared and a better QoL was reported in the laparoscopic group at the third month for low and mid rectal cancer following neoadjuvant chemoradiotherapy.[14] Our results revealed no significant difference between the 2 surgical groups in the long term.

Yang et al.[15] reported that male patients experienced better sexual function and fewer sexual problems 12-18 months after laparoscopic total mesorectal excision compared with an open surgery group, and better sexual satisfaction was observed in the laparoscopic group 24 months after surgery. In addition, Ng et al.[16] observed that in the first year after rectal cancer surgery, a laparoscopic approach was associated with a higher QoL and fewer sexual problems than an open approach. In their study, a laparoscopy also had other short-term benefits that included fewer indications of micturition and gastrointestinal problems, as well as better physical functioning. We did not find any difference in sexual functioning between the 2 groups in the long term.

The COLOR II (Colorectal cancer laparoscopic or open resection II) study group reported no statistically significant differences between the laparoscopic and open arm results of the EORTC QLQ-CR30 scale before and up to 12 months after the operation. They found the most difference in functional scales and symptoms between baseline and 4 weeks after surgery in both groups. The study also reported that there was no significant difference between the 2 groups in the EORTC QLQ-CR38 data at any time frame, and the future expectation scores increased over time in both groups.[17]

Our study has several important limitations, which should be acknowledged. First, we did not have baseline QoL scores recorded prior to the surgery to compare with the postoperative scores. Second, our sample size was small, primarily due to the strict selection criteria. Also, though the mean age of the 2 groups was similar, young patients with better general condition were more often assigned to the laparoscopic group, and so the results might be expected to be better in that group.

CONCLUSION

The findings of our study demonstrated that laparoscopic sphincter-preserving rectal cancer surgery offered to superior QoL in comparison with open surgery in the early period. However, the results of both procedures were similar in the long term. These findings should be interpreted carefully due to the use of a population with similar characteristics and the small sample size of the study.

Ethics Committee Approval

This study was approved by the Kartal Dr. Lutfi Kirdar Training and Research Hospital Clinical Research Ethics Committee on May 30, 2017 (no: 2017/514/108/12).

Peer-review

Internally peer-reviewed.

Authorship Contributions

Concept: S.K.; Design: R.S.; Supervision: S.K.; Fundings: S.K.; Materials: R.S.; Data: S.K.; Analysis: R.S.; Literature search: S.K.; Writing: R.S.; Critical revision: S.K.

Conflict of Interest

None declared.

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Rektum Kanseri Cerrahisinde Laparoskopik ve Açık Yaklaşımın Yaşam Kalitesi Sonuçlarının Karşılaştırılması

Amaç: Rektal kanser nedeniyle sfinkter koruyucu rezeksiyon yapılan hastalarda açık ile laparoskopik yaklaşımın yaşam kalitesi sonuçlarını karşılaştırmayı amaçladık.

Gereç ve Yöntem: Ocak 2017–Aralık 2018 tarihleri arasında kliniğimizde rektum kanseri nedeniyle ameliyat edilen 122 hasta çalışmaya alındı. Hastalar cerrahi tekniğe göre iki gruba ayrıldı; açık (n=85) ve laparoskopi (n=37). Yaşam kalitesi anketi, European Organization for Research and Treatment of Cancer Quality of Life Core Questionnaire 30 (EORTC QLQ-C30) ve European Organization for Research and Treatment of Cancer Quality of Life Questionnaire-Colorectal Cancer 29 (EORTC QLQ-CR29) formlarını içermektedir.

Bulgular: EORTC QLQ-C30 anketinde, genel durum (p=0.008), fiziksel aktivite (p=0.003) ve bulantı/kusma (p=0.005) öğelerinde laparoskopik grupta istatistiksel olarak anlamlı daha iyi sonuçlar elde edildi. EORTC QLQ-CR29 anketinde, sadece şişkinlik değerlendirmesinde laparoskopik grupta istatistiksel olarak anlamlı daha yüksek değerler saptandı (p=0.02).

Sonuç: Rektal kanser cerrahisinde laparoskopik yaklaşım, erken dönemde yaşam kalitesi açısından açık yaklaşımdan üstündür. Bununla birlikte uzun dönem sonuçlarda cerrahi tekniğin yaşam kalitesini değiştirmediği saptandı.

Anahtar Sözcükler: EORTC QLQ-CR29; EORTC QLQ-C30; rektal kanser; yaşam kalitesi.