

Longterm and Perioperative Outcomes of Laparoscopic and Open Surgery for Rectal Cancer

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ABSTRACT:

Longterm and perioperative outcomes of laparoscopic and open surgery for rectal cancer

Objective: The necessity of comparing oncologic results with the use of minimally invasive surgery in rectal cancer has arisen. We aimed to evaluate our treatment approach in rectal cancer and compare the outcomes of laparoscopic and open surgery.

Methods: Patients who underwent surgery for rectal carcinoma between January 2006 and January 2016 in our institution were evaluated. The results were compared between two groups according to open or laparoscopic surgery. Clinical characteristics, preoperative and postoperative results; pathologic examination results and disease-free survival rates were compared after the surgical procedure.

Results: A total of 121 patients were included in the study. 50 patients were undergone open and 71 patients were undergone laparoscopic surgery. The median follow-up time was 56.75 months in open surgery group, and the median follow-up time of the patients was 55.2 months in the laparoscopic surgery group. Pathologic examination revealed similar numbers of lymph nodes in both groups ($p>0.05$). Duration of hospital stay was statistically significantly lower than the open surgery group from the laparoscopic group ($p<0.05$). The rate of disease-free survival was 74% in the open surgery group and 82.5% in the laparoscopic group and no statistically significant difference was found ($p>0.05$).

Conclusion: There was no significant difference in complication and recurrence between laparoscopic and open surgery for rectal cancer in our study. Duration of hospital stay of patients in laparoscopic group was statistically significantly lower than open surgery. Laparoscopic or open surgical options could be preferred according to the clinical suitability of patient, experience of surgeon and resources of the center in rectal cancer treatment.

Keywords: Disease-free survival, laparoscopic surgery, open surgery, rectum cancer

ÖZET:

Rektal kanser için laparoskopik ve açık cerrahinin uzun süreli ve perioperatif sonuçları

Amaç: Rektum kanserinde minimal invaziv cerrahinin kullanımı ile onkolojik sonuçların karşılaştırılması gerekliliği ortaya çıkmıştır. Rektum kanserinde tedavi yaklaşımımızı değerlendirmek, laparoskopik ve açık cerrahi sonuçlarını karşılaştırmayı amaçladık.

Gereç ve Yöntem: Ocak 2006- Ocak 2016 yılları arasında kliniğimizde rektum karsinomu nedeniyle ameliyat edilen hastalar değerlendirildi. Sonuçlar açık ve laparoskopik cerrahi olarak iki grup arasında karşılaştırıldı. Cerrahi girişim sonrası klinik özellikler, preoperatif ve postoperatif sonuçlar; patolojik inceleme sonuçları ve hastaliksız sağkalım süreleri karşılaştırıldı.

Bulgular: Çalışmaya toplam 121 hasta dahil edildi. 50 hastaya açık, 71 hastaya laparoskopik cerrahi uygulandı. Açık cerrahi grubunda medyan takip süresi 56.75 ay; laparoskopik cerrahi grubunda hastaların medyan takip süresi 55.2 aydı. Patolojik incelemede her iki grupta benzer sayıda lenf nodu saptandı ($p>0.05$). Hastanede yatış süresi laparoskopik cerrahi grubunda açık cerrahi grubuna göre istatistiksel olarak anlamlı derecede düşük bulundu ($p<0.05$). Hastaliksız takip süresi açık cerrahi grubunda %74, laparoskopik cerrahi grubunda %82.5'idi ve istatistiksel olarak anlamlı farklılık olmadığı görüldü ($p>0.05$).

Sonuç: Çalışmamızda rektum karsinomu için laparoskopik ve açık cerrahi arasında komplikasyon ve rekürrens açısından anlamlı farklılık olmadığı görüldü. Laparoskopik cerrahi grubunda bulunan hastaların hastanede kalış süresi açık cerrahi grubundan istatistiksel olarak anlamlı derecede düşüktü. Laparoskopik veya açık cerrahi seçenekleri, rektal kanser tedavisinde hastanın klinik uygunluğuna, cerrahin deneyimine ve merkez kaynaklarına göre tercih edilebilir.

Anahtar kelimeler: Hastaliksız sağkalım, laparoskopik cerrahi, açık cerrahi, rektum kanseri

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INTRODUCTION

Colorectal cancers are common in worldwide. According to the Turkish Statistical Institute's 2014 data, it is the 4th most common cancer type in our country. The biological structure of colorectal cancers may vary according to the location at colon (1). It is recommended that colorectal cancers be examined in two separate groups, as rectum tumors metastasize to lymph nodes more frequently than colon tumors and complications such as anastomosis leakage after rectal surgery are more frequent (2,3).

The treatment of rectum cancers has always been challenging. With the use of laparoscopic surgery, the necessity of comparing open surgery with oncologic results arises. In recent years, some studies report that laparoscopic surgery for colon carcinoma is associated with earlier postoperative recovery, lower morbidity and with equivalent long-term outcomes (4,5). However, these benefits of laparoscopic surgery for rectum cancer were still controversy. Some studies indicate that there is no significant difference in oncological outcomes between laparoscopic and open surgery in rectal cancer in the meta-analyzes performed (6). However, more research is needed in the literature to compare oncologic outcomes of both techniques.

Our aim is to evaluate the outcomes of patients who underwent laparoscopic and open surgery for rectal cancer in terms of perioperative outcomes and disease-free survival.

MATERIAL AND METHODS

This study was approved by Baskent University Institutional Review Board (Project no: KA17/292) and supported by Baskent University Research Fund. Between January 2006 and January 2016, all consecutive patients who(m) undergone surgery for rectal carcinoma in our hospital were evaluated retrospectively. Patients under 18 years of age, no follow-up information, stage 4 disease, and emergency surgery for obstruction or perforation were excluded from the study. Age, gender, postoperative hemoglobin levels, and C-reactive protein (CRP) levels of the patients who met the

criteria were examined. The patients were divided into two different groups according to surgical method whether laparoscopic or open. The preoperative computed tomography (CT) and magnetic resonance imaging (MRI) findings were evaluated in terms of locally advanced disease and postoperative anastomotic leakage, surgical complication, surgical margin for pathologic evaluation, and number of lymph nodes removed were evaluated. The duration of recurrence or metastases in patients' follow-up and disease-free survival rates of patients were investigated.

After endoscopic diagnosis of the disease, preoperative evaluation was made by CT and MRI scan, and the invasion grade of the rectum wall was determined. Neoadjuvant therapy was applied to the patient with metastatic lymph node in the perirectal fat mass, and the tumor exceeding to the muscularis propria. The patient's underwent open or laparoscopic surgical resection were treated with low anterior and abdominoperineal resection with total mesorectal excision technique as previously described (7-9).

Statistical analysis was performed using SPSS version 21.0 programme (IBM Corp., Armonk, NY, USA). Demographic and clinical characteristics were expressed in frequency or percentage for categorical data, in mean standard deviation (\pm SD) for continuous parametric variables, and in median [interquartile ranges (IQR)] for continuous non-parametric variables. Differences between groups were evaluated by the Pearson's chi-square test, two-sample t-test, Wilcoxon rank sum test, analysis of variance (ANOVA) or Kruskal-Wallis test, as appropriate. Student's test was used to compare two groups, Kaplan-Meier test was used to assess disease-free survival. A value of $p < 0.05$ was considered statistically significant.

RESULTS

A total of 121 patients, 84 of them male, were included in the study. 50 patients were undergone open surgery, 71 patients were undergone laparoscopic surgery. The preoperative data of the patients are shown in Table-1. There were no statistical differences between groups in terms of age, gender, laboratory values and stage ($p > 0.05$). In the

Table-1: Preoperative findings of open and laparoscopic surgery groups

	Open Surgery	Laparoscopic Surgery
Gender (Female/Male)	11/39	26/45
Age (Mean)	67.34±12.16	62.90±13.91
Hemoglobin g/dL (Mean)	12.83±1.07	12.64±1.11
C-Reactive Protein mg/L (Mean)	15.48±32.99	12.59±22.71
Locally Advanced Stage	18 (%36)	24 (%33.8)
Neoadjuvant Chemotherapy	2 (%4)	12 (%16.9)
Neoadjuvant Radiotherapy	4 (%8)	19 (%26.8)

Table-3: Results during follow up

	Open Surgery	Laparoscopic Surgery
Folow-up (month-median)	56.75	55.20
Local Recurrence	3 (%6)	4 (%5.6)
Distant Metastasis	6 (%12)	7 (%9.9)
Disease-Free Survival	%74	%82.5

open surgery group, the mean number of lymph nodes removed during resection was 14.5 (SD±6.6), and the mean number of metastatic lymph nodes was 2.36 (SD±4.8). The mean hospital stay was 7.2 days (SD±4.3). In the laparoscopic surgery group, 45 males and 26 females patients treated. The mean number of lymph nodes removed during resection was 14.55 (SD±4.55), and the mean number of metastatic lymph nodes was 1.48 (SD±3.76). The mean hospital stay was 5.8 (SD±1.7) days. Pathologic evaluation revealed similar numbers of lymph nodes in both groups (p>0.05). The hospitalization period was statistically significantly lower than the open surgery group from the laparoscopic group (p<0.05). Postoperative results are shown in Table-2. The median follow-up period was 56.75 months and 55.2 months in the open surgery group and laparoscopic surgery group respectively. In the open surgery group, local recurrence was seen in 3 patients (6%) and distant organ metastasis in 6 patients (12%); in the laparoscopic surgery group, local recurrence was seen in 4 (5.6%) patients and distant organ metastasis in 7 (9.9%) patients during the follow-up period. The disease-free survival rate was 74% in the open surgery group and 82.5% in the laparoscopic group. No statistically significant difference was found between the two groups (p>0.05) (Table-3).

Table 2: Postoperative findings of open and laparoscopic surgery groups (*p<0.05)

	Open Surgery	Laparoscopic Surgery
Surgery Type		
Low Ant. Res. APR	41	65
Blood transfusion	3 (%6)	12 (%16.9)
Metastatic/Total Lymph Node (Mean)	2.36/14.50	1.48/14.55
Surgical Margin	Negative	Negative
Hospital Stay (day)	7.2±4.3	*5.8±1.7
Complication		
Surgical Site Infection	10	5
Anastomotic leakage	1	5

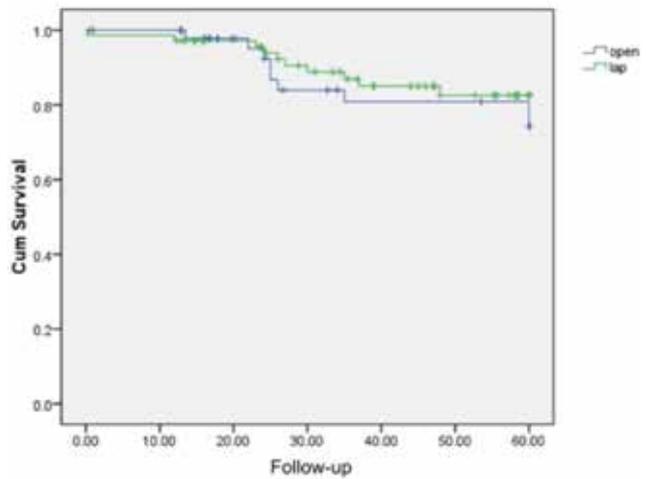


Figure-1: Results during folow-up. Kaplan-Meier survival analysis (p>0.05).

DISCUSSION

In 1991, after the first laparoscopic colon resection was described by Jacobs et al. (10) it is used as an alternative treatment option for colon cancer because of the short-term benefits and similar long-term outcomes when compared with the open surgery technique (11). Despite the improvements in this area, still there is a necessity to compare the laparoscopic and open surgery techniques in terms of oncologic outcomes in the treatment of rectal cancers.

In the present study, we aimed to compare the short-term complication, the length of hospitalization and the number of lymph nodes removed and the duration of disease-free survival in the long term for patients treated with laparoscopic or open surgical

methods for rectal cancer. The number of lymph nodes removed in both patient groups was similar and early complications seen in the first 30 days after surgery were similar. Although, it was observed that wound infection was more frequent in open surgery patients but there was no statistically significant difference. It was observed that the length of hospital stay in patients who underwent laparoscopic surgery was statistically significantly low. There was no statistically significant difference between the long-term disease-free survival of the patients.

Human leukocyte antigen (HLA)-DR that is excreted from monocytes is a measure of immune competence. It is responsible for adequate antigen presentation and antigen-specific immunoreaction in humans. CRP is an indication of the activity of immunological reactions. IL-6 is used as postoperative complications and predictor of morbidity. Veenhof et al. (12) reported that the patients who underwent laparoscopic surgery were affected positively at HLA-DR, CRP and IL-6 levels. Early recovery, early onset bowel motility, and short hospitalization may be associated with these effects in patients undergoing laparoscopic surgery.

It has been reported that there is no difference between wound infection, deep surgical infection and anastomosis between laparoscopic and open surgery in the meta-analyses performed. The meta-analysis of 20 trials did not reveal any statistical difference between the two groups in terms of three

parameters (13). Our study also concluded that patient groups had similar complication rates between laparoscopic and open surgery. Surgical technique and developments in used instruments are thought to help prevent potential complications.

A meta-analysis of 16 randomized controlled trials conducted by Zhang et al. (14) showed that the short-term outcomes of patients undergoing laparoscopic surgery were less blood loss, the onset of earlier bowel movements and the length of hospital stay. In 5-year follow-up, no significant difference was found between the patients who underwent laparoscopic and open surgery in terms of oncologic outcomes.

The retrospective nature of our work is limited by the fact that patients' follow-up cannot be standardized. Another limitation is the heterogeneity of the patients in both groups and the limited number of patients in the groups. Despite these limitations, our results show that there is no significant difference between laparoscopic and open rectal surgery. Particularly when clinical and oncological outcomes were compared and disease-free survival times were compared, it was seen that there was no difference between the two techniques. The length of stay at the hospital can be seen as a brief advantage of laparoscopic technique, but the long-term similarity of oncologic outcomes makes the two techniques almost equivalent. For this reason, more clinical trials are needed to determine in selecting laparoscopic or open surgical procedures.

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