■ Research Article

Correlation of two different bowel dysfunction questioneria on the Psychological State of the rectal cancer patients

İki farklı bağırsak disfonksiyonu anketinin rektal kanser hastalarının psikolojik durumu üzerindeki korelasyonu

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Abstract

Aim: Most patients have impaired bowel function after sphincter-sparing surgery (SPS) combined with total mesorectal excision (TME). This study evaluated bowel dysfunction's effect on a patient's psychological state using the LARS Questionnaire (LARS-Q) and the Memorial Sloan Kettering Bowel Function Instrument (MSK-BFI).

Material and Methods: Between June 2019 and June 2022, 127 patients operated on for rectal cancer with TME and SPS were examined regarding bowel dysfunction in the sixth postoperative month. The LARS score and MSK-BFI assessed bowel function. Beck anxiety inventory (BAI), Beck depression inventory (BDI), and Beck hopelessness inventory (BHI) were also applied to the patients. The correlation of LARS-Q and MSK-BFI questionnaire scores was examined with each other and the other three questionnaire scores.

Results: Major LARS was seen in 29.9% of the patients. MSK-BFI scores were found to be 60. The median MSK-BFI scores for no LARS, minor LARS, and major LARS were 77, 68, and 52, respectively. Strong correlations were found between MSK-BFI and LARS-Q (rs -0.63). When the correlation between LARS-Q and BAI, BDI, and BHI was evaluated, rs 0.38, rs 0.49, and rs 0.56 were found, respectively. When the correlation between MSK-BFI and BAI, BDI, and BHI was evaluated, rs -0.67, -0.71, and -0.74 were found, respectively.

Conclusion: Bowel dysfunction is a prevalent condition after sphincter-sparing rectal cancer surgery. Impaired sphincter functions significantly affect patients' social and emotional aspects and negatively affect their quality of life.

Keywords: Anorectal function, MSK-BFI, LARS-Q, bowel dysfunction, low anterior resection syndrome.

Öz

Amaç: Sfinkter koruyucu cerrahi ile birlikte total mezorektaleksizyon (TME) sonrasında hastaların çoğunda barsak fonksiyonları bozulur. Bu çalışma, LARS Anketi (LARS-Q) ve MemorialSloanKettering Bağırsak Fonksiyonu Ölçeği (MSK-BFI) kullanılarak bağırsak disfonksiyonunun hastanın psikolojik durumu üzerindeki etkisini değerlendirmeyi amaçladı.

Gereç ve Yöntemler: Haziran 2019-Haziran 2022 tarihleri arasında rektum kanseri nedeniyle TME ve SPS ile opere edilen 127 hasta postoperatif 6. ayda barsak disfonksiyonu açısından incelendi. LARS skoru ve MSK-BFI bağırsak fonksiyonunu değerlendirdi. Hastalara Beckanksiyete envanteri (BAI), Beck depresyon envanteri (BDI) ve Beckumutsuzluk envanteri (BHI) de uygulandı. LARS-Q ve MSK-BFI anket puanlarının birbirleriyle ve diğer üç anket puanları ile korelasyonu incelenmiştir.

Bulgular: Majör LARS hastaların %29.9'unda görüldü. MSK-BFI skorları 60 bulundu. LARS olmayan, minör LARS ve majör LARS için ortanca MSK-BFI skorları sırasıyla 77, 68 ve 52 idi. MSK-BFI ve LARS-Q arasında güçlü korelasyonlar bulundu (rs -0.63). LARS-Q ile BAI, BDI ve BHI arasındaki korelasyon değerlendirildiğinde sırasıyla rs 0.38, rs 0.49 ve rs 0.56 bulundu. MSK-BFI ile BAI, BDI ve BHI arasındaki korelasyon değerlendirildiğinde sırasıyla rs -0,67, -0,71 ve -0,74 bulundu.

Sonuç: Sfinkter koruyucu rektal kanser cerrahisi sonrası barsak disfonksiyonu sık görülen bir durumdur. Bozulmuş sfinkter fonksiyonları hastaların sosyal ve emosyonel yönlerini önemli ölçüde etkilemekte ve yaşam kalitelerini olumsuz etkilemektedir.

Anahtar Kelimeler: Anorektal fonksiyon, MSK-BFI, LARS-Q, bağırsak fonksiyon bozukluğu, lowanterior rezeksiyon sendromu.

Introduction

Although there are various treatment modalities in the treatment of rectal cancer, surgery is the backbone of the treatment. In the treatment of rectal cancer, low anterior resection (LAR) combined with total mesorectal excision (TME) is a standard and common approach [1]. In this technique, the patients' quality of life is increased by preserving the sphincter. In some patients, intestinal, sexual, and urinary complications are seen, which seriously affect the long-term quality of life [2]. However, the relationship between health-related quality of life and bowel functions after rectal cancer surgery is complex [3]. All findings, such as fecal incontinence, increased bowel frequency, urgency, clustering, difficulty in discriminating between gas and stool, and nocturnal defecation, are seen in a wide range of symptoms after rectal resection, are called Low anterior resection syndrome (LARS) [4]. These symptoms can be seen immediately after resection and after ileostomy reversal. Over time, some patients return to normal bowel functions or decrease the severity of symptoms; in some patients, these symptoms continue permanently [5]. Unfortunately, patients often see this as an inevitable part of rectal cancer treatment and tend to hide their symptoms, in which case patients should be questioned proactively as a clinician [6]. The questionnaire used to evaluate bowel functions after rectal resection has been examined in many studies primarily focused on incontinence, and no questionnaire evaluates bowel dysfunction completely [7, 8]. The LARS Questionnaire [9] and the Memorial Sloan Kettering Cancer Center Bowel Function Instrument (MSK-BFI) [10] are the two most commonly validated questionnaires used in the evaluation of bowel dysfunctions. Although both Questionnaires were developed to assess bowel dysfunction, they differ significantly in their clinical applicability and scope. Although the applicability of the LARS Questionnaire is faster and easier, MSK-BFI provides more comprehensive information in evaluating LARS [11]. The present study aims to evaluate the effect of two different Questionnaires on quality of life to evaluate bowel dysfunction after rectal resection.

Material and Methods

Patient Selection and Data collection

Between June 2019 and June 2022, patients who underwent sphincter-sparing mesorectal excision with the diagnosis of rectum cancer in a tertiary health center were examined with the Nested Case-Control design. Patients diagnosed with rectal cancer during the study underwent low anterior resection, came to the follow-up examination, agreed to participate when they came for the follow-up, and whose data were not missing were included in the study. Patients with a diagnosis of rectosigmoid, colon, or anal canal tumor, who underwent end-colostomy without anastomosis after LAR, who did not attend the follow-up examination, whose data were missing, and who refused to participate in the study were excluded from the study. Ethics committee approval of the study was obtained from a tertiary university hospital, and the Declaration of Helsinki designed the study.

Demographic data of the patients (age, gender), comorbid disease, ASA score, tumor location and distance to anal canal (cm), presence of synchronous tumor, neoadjuvant chemoradiotherapy, cancer stage (AJJC), adjuvant chemotherapy or radiotherapy data were recorded. As surgical information, the timing of the operation (emergency, elective), type of operation (open, laparoscopy), surgical technique (LAR, data LAR), anastomosis technique (manual, stapler), and ileostomy data were recorded.

Study Design

The patients were called for routine control examination at six months postoperatively. The LARS-Q and MSK-BFI were used to evaluate bowel dysfunction after LAR. In addition, the Beck Anxiety Inventory (BAI), Beck depression inventory (BDI), and Beck Hopelessness Inventory (BHI) were used to evaluate the mood of the patients. The data from the questionnaires were recorded.

The patients were grouped as non-LARS, minor, and major LARS according to their LARS score and compared. In addition, the correlation of LARS-Q and MSK-BFI questionnaire scores and the other three questionnaire scores (BAI, BDI, BHI) were also examined.

LARS-questionnaire

The LARS-Q is a questionnaire evaluating bowel function after sphincter-sparing surgery for rectal cancer [12]. According to the questionnaire results, it can be divided into severity categories (0-20 = non-LARS, 21-29 = minor-LARS, and 30-42 = major-LARS). The LARS-Q questionnaire does not use incremental scoring with equal weights. Higher scores indicate worse bowel function.

Memorial Sloan Kettering Bowel Function Instrument (MSK-BFI)

The core strength of MSK-BFI is the detailed and comprehensive evaluation of LARS. Urgency, diet, and frequency subscales allow the interpretation of different dimensions of LARS. There are 18 items in total. MSK-BFI uses four weeks of recall and an equally weighted scoring system. Higher scores indicate better bowel function [13].

Statistical Analysis

The conformity of the data to the distribution with the norm was examined using visual (histogram and probability plots) and analytical methods (Kolmogorov-Smirnov/Shapiro-Wilk tests). Mean and standard deviation were used for continuous data statistics. Median, minimum, and maximum values were used for ordinal variables. Frequency and percentage values were used to define categorical variables. One Way ANOVA test statistic was used to compare the means of more than two independent groups. Tukey was used as a Post Hoc test in case of difference detected by ANOVA. Chi-square test statistics were used to evaluate the relationship between categorical variables. The correlation coefficients and statistical significance of the LARS-Q and MSK-BFI questionnaires with each other and with the other questionnaires were calculated using the Spearman correlation test. The statistical significance level of the data was taken as $p<0.05$. The software www.e-picos.com (New York) and the MedCalc statistical package program were used to evaluate the data.

Results

During the study, our clinic applied LAR to 164 patients diagnosed with rectal cancer. Fifteen patients with rectosigmoid colon tumors, four patients underwent end-colostomy after LAR, seven did not attend the follow-up examination, nine did not want to participate in the study, and two with missing data were excluded from the study. One hundred twenty-seven patients who met the inclusion criteria were included in the study.

The mean age of the patients was 57.87+17.11 years. 49 (38.6%) of the patients were female, and 78 (61.4%) were male. Comorbidity was present in 76 (59.8%) patients. The mean anal verge distance of the tumor was 8.26+6.03 cm. Tumor localization was in the upper rectum in 49 (38.6%), middle in 44 (34.6%), and lower in 34 (26.8%) patients. The synchronous tumor was present in 15 (12.6%) patients. Neoadjuvant CRT was administered to 72 (56.7%) patients (Table 1).

The median values of the patients on the questionnaire were LARS-Q 15 (0-42), MSK-BFI 60 (42-86), BAI 27 (12-54), BDI 20 (4-47), and BHI 6 (0-20). When the patients were evaluated according to the LARS score, 73 (57.5%) patients were found in the non-LARS group, 16 (12.6%) patients in the minor LARS group, and 38 (29.9%) patients in the major LARS group. There was a statistically significant difference between the mean age groups (p=0.016). The mean age of the major and minor LARS groups was similar. The mean age of the non-LARS group was statistically lower than the other groups.

There was no statistical difference between the groups in terms of gender distribution, comorbid disease, mean distance from the anal verge of the tumor, and presence of synchronous tumor (p>0.05). There was a statistically significant difference between the groups regarding ASA score (p=0.012). Major and minor LARS group results were similar. The ASA score of the minor and major LARS groups was higher in stages III and IV than in the non-LARS group. There was a statistically significant difference between the tumor localization groups (p=0.003). This difference was because the non-LARS group was primarily in the upper rectum. There was a significant difference between the groups regarding neoadjuvant CRT (p=0.014). This difference was due to the use of neoadjuvant CRT in the major-LARS group (Table 1).

In the postoperative evaluation, there was a significant difference between the groups regarding all questionnaires (p<0.001). The median value of the MSK-BFI score was significantly higher than the other two in the major-LARS group and significantly higher than the non-LARS in the minor LARS group (Figure 1 and Figure 2). In all other questionnaires, the median value of the questionnaire score was significantly higher than the other two in the major-LARS group and significantly higher than the non-LARS in the minor-LARS group (Table 2).

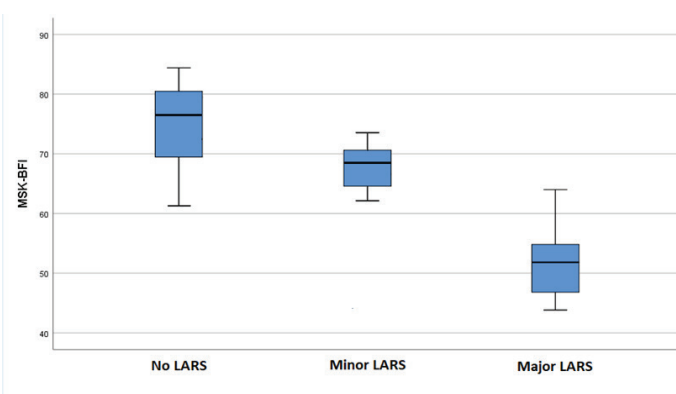| Table1. Preoperativeclinicopathologicalfeaturesofthepatients					
	All patient (n=127)	Non-LARS (n=73)	MinorLARS (n=16)	MajorLARS (n=38)	p value
	x±SD	x±SD	x±SD	x±SD	
Age (years)	57.87±17.11	54.22±13.53	60.73±14.49	61.54±13.21	0.016
Anal verge distance (cm)	8.26±6.03	8.59±4.95	8.71±5.05	6.59±5.88	0.143
	n (%)	n (%)	n (%)	n (%)	
Gender					
Male	78 (61.4)	39 (53.4)	11 (68.7)	28 (73.7)	0.093
Female	49 (38.6)	34 (46.6)	5 (31.3)	10 (26.3)	
Comorbid disease					
Yes	76 (59.8)	39 (53.4)	10 (62.5)	27 (71.1)	0.193
No	51 (40.2)	34 (46.6)	6 (37.5)	11 (28.9)	
ASAscore					
ASAI	32 (25.2)	24 (32.9)	1 (6.3)	7 (18.4)	0.012
ASAII	56 (44.1)	36 (49.3)	8 (50)	12 (31.6)	
ASAIII	30 (23.6)	10 (13.6)	5 (31.2)	15 (39.5)	
ASAIV	9 (7.1)	3 (4.2)	2 (12.5)	4 (10.5)	
Tumor location					
Upper	49 (38.6)	37 (50.7)	6 (37.4)	6 (15.8)	0.003
Middle	44 (34.6)	24 (32.9)	5 (31.3)	15 (39.5)	
Lower	34 (26.8)	12 (16.4)	5 (31.3)	17 (44.7)	
Synchronoussurgery					
Yes	15 (12.6)	5 (6.8)	4 (25)	6 (15.8)	0.084
No	112 (87.4)	68 (95.2)	12 (75)	32 (84.2)	
Neoadjuvant CRT					
Yes	72 (56.7)	35 (47.9)	8 (50)	29 (76.3)	0.014
No	55 (43.3)	38 (52.1)	8 (50)	9 (23.7)	
ASA: American Society of Anesthesiologists, CRT: neoadjuvant chemoradiotherapy, LARS: Low Anterior Resection Syndrome					

Figure 1. Box-and-whiskers plot of the MSK-BFI total score when patients were divided into 3 groups, defined as no LARS (57.5%,), minor LARS (12.6%), and major LARS (29.9%).

There was a significant difference between the groups in terms of operation time and operation type (p=0.022 and p=0.007, respectively). This difference was due to the greater use of emergency surgery and VLAR in the major-LARS group. There was no difference between the groups in terms of surgical technique, anastomosis technique, ileostomy opening, tumor stage, chemotherapy, or radiotherapy (p>0.05) (Table 2).

A good correlation was found between LARS-Q and MSK-BFI (rs=-0.63). The correlation was found between LARS-Q and BAI, BDI, and BHI (rs=0.38, rs=0.49, rs=0.56, respectively). A good correlation was found between MSK-BFI and BAI, BDI, and BHI (rs=-0.67, rs=-0.71, rs=-0.74, respectively) (Table 3).
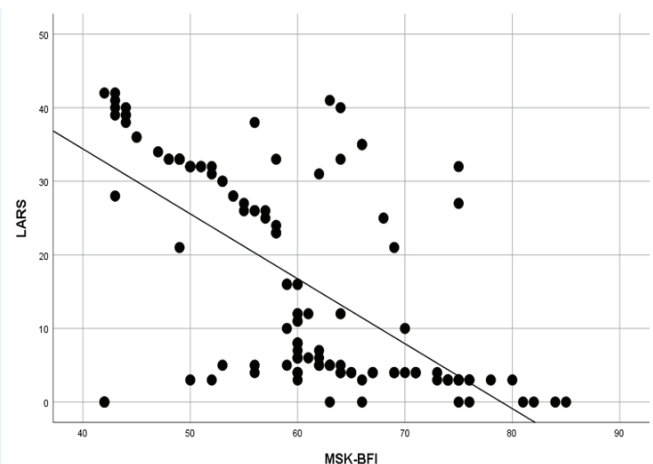

Figure 2. MSK-BFI and LARS-Q score scatter plot. A strong negative correlation was observed between the two questionnaires (rs −0.63).

Table2. Postoperative clinicopathological features of the patients and their difference between groups with LARS.					
	All patient n=127	Non-LARS n=73	MinorLARS n=16	MajorLARS n=38	pvalue
	Mean (min-max)	Mean (min-max)	Mean (min-max	Mean (min-max)	
LARS-Q	15 (0-42)	4 (0-16)	26 (21-28)	33 (30-42)	<0.001
MSK-BFI	60 (42-86)	77 (54-86)	68 (58-74)	52 (42-66)	<0.001
BAI	27 (12-54)	23 (12-31)	36 (26-49)	41 (29-54)	<0.001
BDI	20 (4-47)	11 (4-20)	24 (13-32)	36 (25-47)	<0.001
BHI	9 (0-20)	2 (0-13)	9 (2-15)	15 (6-20)	<0.001
	n (%)	n (%)	n (%)	n (%)	
Operation timing					
Urgent	11 (8.7)	2 (2.7)	2 (12.5)	7 (18.4)	0.022
Elective	116 (91.3)	71 (97.3)	14 (87.5)	31 (81.6)	
Type of operation					
VLAR	15 (11.8)	3 (4.1)	3 (18.8)	9 (23.7)	0.007
LAR	112 (88.2)	70 (95.9)	13 (81.2)	29 (76.3)	
Surgical Technique					
Open	78 (61.4)	42 (57.5)	9 (56.3)	28 (73.7)	0.224
Laparoscopy	49 (38.6)	31 (42.5)	7 (43.7)	10 (26.3)	
Anastomosis technique					
Handsewn	12 (9.4)	5 (6.8)	2 (12.5)	5 (13.2)	0.512
Stapler	115 (90.6)	68 (93.2)	14 (87.5)	33 (86.8)	
Ileostomy					
Yes	99 (77.9)	53 (72.6)	12 (75)	34 (89.5)	0.119
No stoma	28 (22.1)	20 (27.4)	4 (25)	4 (10.5)	
AJCC stage					
Stage 1	18 (14.2)	11 (15.1)	2 (12.5)	5 (13.2)	0.091
Stage 2	56 (44.1)	35 (47.9)	7 (43.8)	14 (36.8)	
Stage 3	42 (33.1)	25 (34.2)	6 (37.5)	11 (28.9)	
Stage 4	11 (8.6)	2 (2.7)	1 (6.2)	8 (21.1)	
Chemotherapy					
Yes	95 (78.8)	57 (78.1)	12 (75)	26 (68.4)	0.539
No	32 (21.2)	16 (21.9)	4 (25)	12 (31.6)	
Radiotherapy					
Yes	71 (55.9)	38 (52.1)	10 (62.5)	23 (60.5)	0.591
No	56 (44.1)	35 (47.9)	6 (37.5)	15 (39.5)	

AJCC: American Joint Committee on Cancer, BAI: Beck anxiety inventory, BDI: Beck depression inventory, BHI: Beck hopelessness inventory, LAR: Low Anterior Resection, LARS: Low Anterior Resection Syndrome, LARS-Q: Low anterior resection syndrome-questionnaire, VLAR: Very Low Anterior Resection, MSK-BFI: Memorial Sloan Kettering Bowel Function Instrument

Discussion

In line with the data we have shown in this study, most patients who underwent sphincter-preserving surgery (SPS) for rectal cancer had various degrees of bowel dysfunction. Among the most critical factors about bowel dysfunction after SPS are tumor localization, type of operation, and chemoradiotherapy status. To our knowledge, this study is critical because it is among the only studies created using two different bowel dysfunction questionnaires. These questions evaluate the general psychological state of patients related to anxiety, depression, and hopelessness.

This study indicated that 29.9% of patients have major LARS. In a meta-analysis conducted in 2018, the prevalence of major LARS after oncologic rectal cancer surgery was 41% [14]. However, since most studies on LARS do not include an evaluation of the bowel functions of the patients before the operation, it needs to be evaluated whether the dysfunction occurs after treatment. Therefore, it is not appropriate to reach a definite conclusion about the prevalence of LARS without evaluating the sphincter functions of the patients before treatment [15].

Tablo 3. Correlation of LARS and MSK-BFI with Beck inventory of anxiety, depression and hopelessness

	LARS-Q	MSK-BFI
LARS-Q	-	0.63
MSK-BFI	0.63	-
BAI	0.38	0.67
BDI	0.49	0.71
BHI	0.56	0.74

LARS-Q: Low anterior resection syndrome-questionnaire, MSK-BFI: Memorial Sloan Kettering Bowel Function Instrument, BAI: Beck anxiety inventory, BDI: Beck depression inventory, BHI: Beck hopelessness inventory.

In this study, it was shown that there is a strong correlation between MSK-BFI and LARS-Q in terms of assessing bowel function. It was observed that most patients in the major LARS group had a lower score in MSK-BFI score. Similar to our study, in a study evaluating these two questiniores, it was found that LARS scores were high and MSK-BFI scores were found to be low in distal tumors according to tumor localization, and there was a positive correlation in the evaluation of bowel functions [16].

According to the bowel dysfunction symptoms demonstrated in our study, the localization of the tumor and the distance of the anastomosis line from the anal canal are among the most critical factors affecting bowel dysfunction, secondary to the operation performed accordingly, similarly according to both MSK-BFI and LARS-Q. The most significant disadvantage of the distal anastomosis level is decreased neorectal compliance and capacitance [17]. In the literature, similar to our study, it has been shown by various studies that low anastomosis level is directly related to bowel dysfunction [18, 19].

Sphincter problems that occur after rectal cancer surgery directly affect patients' quality of life (QoL) [20, 21]. Psychiatric symptoms such as anxiety, depression, and hopelessness are common in patients whose quality of life is affected. In line with the data we had shown in our study when patients with low MSK-BFI and high LARS-Q were evaluated in terms of anxiety, depression, and hopelessness, higher BAI, BDI, and BHI scores were observed in these patients. These results suggest that bowel dysfunction may not significantly affect all aspects of health-related QoL and that the most affected areas are associated with social and emotional function [22].

Detecting LARS risk factors in the preoperative period provides essential information about how seriously patients will be affected by this condition in the postoperative period [23]. The education given by a multidisciplinary team consisting of a colorectal surgeon, pelvic physiotherapist, psychologist, and nurses specialized in anal incontinence to the patient group at high risk for the development of LARS detected in the preoperative period is of great importance in helping patients combat LARS in case LARS develops in the postoperative period.

Our study had several limitations. First, the MSK-BFI bowel function instrument and LARS-Q have yet to be validated in a Turkish patient. Another limitation is the small number of patients included in the study. Another significant limitation is that the baseline sphincter functions of the patients were not evaluated before treatment. In a study, LARS score ≥ 30 (major LARS) was found to be high in the non-operated population, especially between the ages of 50 and 79 [24]. Another limitation is the nonrandomized design of the study due to sample size inadequacy and the heterogeneity of the groups.

In conclusion, LARS-Q and MSK-BFI show similar properties in demonstrating bowel dysfunction after sphincter-sparing TME. Similarly, patients with low MSK-BFI and high LARS-Q scores have higher BAI, BDI, and BHI scores. Therefore, detecting this situation and providing the necessary psychological support to the patients are very effective in their adherence to treatment and quality of life.

Conflict of Interest statement

The authors declared no conflicts of interest with respect to the authorship and/or publication of this article.

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