

Original Research

Inflammatory bowel disease is an independent risk factor for male erectile dysfunction

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Background and objective: Inflammatory bowel diseases (IBD) are chronic diseases involving the gastrointestinal system, including ulcerative colitis (UC) and Crohn's disease (CD). Studies have shown a relationship between inflammatory bowel diseases and sexual dysfunction in men but it has been reported that this is due to surgery or the patient's psychological state. In our study, we aimed to assess the impact of IBD on the sexual functioning of male patients who has no previous pelvic surgery by evaluating the depression status of the patients.

Materials and methods: The 334 patients who were followed up in our gastroenterology outpatient clinic between January 2021 and March 2021 were included in the study and they were divided into 2 groups as with (n = 146) and without IBD (n = 188). None of the patients had a history of pelvic surgery or pelvic radiotherapy due to IBD or any other disease. The two groups were compared in terms of demographic data, comorbidities, sexual function, depression status and blood tests. International Index of Erectile Function (IIEF) was used in the evaluation of sexual functions, and the Beck Depression Inventory (BDI) was used in the evaluation of depression. Risk factors for erectile dysfunction (ED) were determined.

Results: The mean Beck depression test scores of the two groups were found to be similar ($p = 0.361$). ED was detected in 52.7% of patients with IBD and 32.4% of patients without IBD ($p < 0.0001$). In multivariate regression analysis, age ($p = 0.008$), smoking ($p < 0.001$), presence of diabetes mellitus ($p = 0.02$) and presence of IBD ($p < 0.001$) were determined as independent risk factors for ED.

Conclusion: Inflammatory bowel diseases can cause ED regardless of the pelvic surgery performed and the psychological status that occur in these patients.

Keywords

Erectile dysfunction; Depression; Inflammatory bowel diseases; Pelvic surgery

1. Introduction

Inflammatory bowel disease (IBD) is a chronic inflammatory disorder of the gastrointestinal tract that presents itself in two major types: Ulcerative Colitis (UC) and Crohn's Disease (CD). It causes immunological responses and inflammation in the intestine as a result of the interactions of environmental and genetic factors [1]. IBD mainly affects people between 20 and 40 years of age. The second peak of the disease

is observed after the age of 60 years. Several studies have tried to evaluate several aspects of quality of life (QoL) and treatment options that may favorably modify this status in patients with IBD [2, 3].

Sexual function (SF) is likely to be impaired in IBD patients because of the following symptoms: diarrhoea, fatigue, abdominal pain, rectal bleeding, and weight loss [2]. Recent data shows that sexual dysfunction (SD) in female patients is

more frequent than in males, with reported rates of 40–60% and 10–50%, respectively [4]. Although SD is a serious concern among many female patients with IBD that is associated with infertility and other pregnancy-related complications, only a few studies have described SD in men with IBD [5]. In addition, these studies showed that sexual dysfunction seen in patients with IBD is due to previous pelvic surgery or depression status [6, 7].

In our study, we aimed to assess the data regarding the impact of IBD on the sexual functioning of male patients who had no previous pelvic surgery by taking into account the depression status of the patients.

2. Materials and methods

After obtaining ethics committee approval for the study, 334 male patients who were followed up in our gastroenterology outpatient clinic between January 2021 and March 2021 were included in the study. 146 patients were diagnosed with IBD (49 of them had CD, 97 were diagnosed with UC). The patients were divided into 2 groups as with and without IBD. Age, body mass index, smoking, comorbidities, SF, depression status and blood tests of patients were evaluated. The 2 groups were compared in terms of these characteristics. Then, risk factors for erectile dysfunction (ED) were determined. None of the patients had a history of pelvic surgery or pelvic radiotherapy due to IBD or any other disease.

International Index of Erectile Function (IIEF) was used to assess the patients' SF. The IIEF comprises 15 questions categorized into 5 domains of SF as follows: erectile function, orgasmic function, sexual desire, satisfaction during intercourse, and overall satisfaction. Each question is given a score between 0 and 5. Most questions (6/15) are associated with erectile function. ED is characterized according to the total score as severe (score 0 to 10), moderate (score 11 to 16), mild-moderate (score 17 to 21), mild (score 22 to 25), and absent (score 26 to 30) [8].

Beck depression inventory (BDI) is used to evaluate the depression status of patients. It consists of 21 questions and shows the severity of depression, which is correlated with the increase in scores. Patients are scored between 0 and 61 points [9].

Statistical analysis: Coding and statistical analysis of the data were done by using the SPSS 22.0 software (IBM Corp., Chicago, IL, USA) package program. The descriptive statistics data for continuous variables were expressed as mean and median and categorical variables were expressed in terms of frequency and percentage. Normality test was performed using the Shapiro-Wilk test. The Chi-square test was used to compare smoking status, comorbidities and presence of ED among the groups, and the Mann-Whitney U test was used to compare other parameters. The univariate regression analysis was used to determine the risk factors for ED. The parameters found as risk factors were evaluated by multivariate regression analysis.

3. Results

A total of 334 male patients were included in the study. The mean age of the patients was 48.6 ± 13.1 years. 29% of the patients were smoking. 12.9% of the patients had HT and 6.3% had diabetes mellitus. According to the cut-off value of IIEF, 41.3% of the patients were diagnosed with ED. Demographic, clinical and laboratory findings of the patients are shown in Table 1. The patients were divided into two groups as those with ($n = 146$) and without ($n = 188$) the diagnosis of IBD. In the IBD group, 49 patients had CD and 97 patients had UC. The mean Beck depression test scores of the two groups were found to be similar ($p = 0.361$). ED was detected in 52.7% of patients with IBD and 32.4% of patients without IBD, and the difference between them was statistically significant ($p < 0.001$). The non IBD group had more hypertensive patients ($p = 0.07$) and serum platelet counts ($p < 0.001$) and neutrophil counts ($p = 0.013$) were higher in the IBD group. According to univariate regression analysis performed to determine risk factors for ED, age ($p = 0.026$), smoking ($p < 0.001$), presence of HT ($p = 0.008$), presence of DM ($p = 0.002$) and presence of IBD ($p < 0.001$) were identified as risk factors. As a result of evaluating these risk factors by multivariate regression analysis, age ($p = 0.008$), smoking ($p < 0.001$), presence of diabetes mellitus ($p = 0.02$) and presence of IBD ($p < 0.001$) were determined as independent risk factors for ED (Table 2).

4. Discussion

Although there are studies evaluating the relationship between SF and IBD after pelvic surgery, there are few studies evaluating these functions in male patients with IBD who have not undergone surgery [6]. In addition, it has been reported that the relationship of ED with IBD is associated with anxiety and depression caused by the disease itself [7]. In our study examining the effects of IBD on male sexual functions, more ED was observed in patients with IBD, although Beck depression test scores of groups with and without IBD were similar. Patients with IBD who did not undergo pelvic surgery were included in our study. It was concluded that IBD is an independent risk factor for ED, as well as advanced age, smoking and the presence of diabetes mellitus.

Erectile dysfunction is a major complication after radical pelvic surgeries due to pelvic plexus injury [10]. Proctocolectomy operations performed for benign diseases such as IBD are common, especially in patients over 50 years of age. In addition, especially in surgeries performed for IBD, it was reported that sexual functions are improved in relation to the improvement of the psychological state [11].

There are studies using different questionnaires and/or indexes, including questions on SF, to assess QoL in patients with IBD [12]. However, this question seems to be insufficient in evaluating patients' symptoms. IIEF provides detailed information on SF; therefore, it was administered to patients with IBD. In our study, the psychological evaluation of the patients was made using the "Beck Depression Score".

Studies have shown that there is a relationship between

TABLE 1. Demographic, clinical and laboratory findings of patients with and without inflammatory bowel diseases.

	IBD		Non IBD		p value
	(n = 146, 43.7%)		(n = 188, 56.3%)		
Age (mean ± SD) year	48.3 ± 13.1		48.9 ± 13		0.241 ^m
BMI (median (min-max)) kg/m ²	26 (12-36)		26 (17-45)		0.584 ^m
Smoking, n (%)	43 (29.5%)		54 (28.7%)		0.904 ^c
Presence of hypertension, n (%)	13 (8.9%)		30 (16%)		0.07 ^c
Presence of diabetes mellitus, n (%)	8 (5.5%)		13 (6.9%)		0.703 ^c
Presence of ED, n (%)	77 (52.7%)		61 (32.4%)		<0.001 ^c
Presence of severe ED, n (%)	30 (39%)		13 (21.3%)		0.028 ^c
Beck depression test score (mean ± SD)	11.8 ± 8.4		11.3 ± 8.9		0.361 ^m
Orgasmic function (median (min-max))	9 (0-10)		9 (0-10)		0.212 ^m
Sexual Desire (median (min-max))	7 (0-11)		7 (0-11)		0.406 ^m
Satisfaction during intercourse (median (min-max))	11 (0-15)		11 (0-15)		0.274 ^m
Overall satisfaction (ortanca (min-max))	8 (0-10)		8 (0-10)		0.443 ^m
Urea (ortanca (min-max)), mg/dL	28 (14-82)		29.5 (14-59)		0.077 ^m
Creatinine (median (min-max)), mg/dL	0.89 (0.41-1.52)		9 (0.56-1.47)		0.318 ^m
Hemoglobin (median (min-max)), g/dL	15.4 (7.5-17.7)		15.4 (7.5-19.1)		0.518 ^m
Hematocrit (median (min-max)), %	46 (24.2-54.4)		45.8 (24.2-54.5)		0.556 ^m
WBC count × 10 ⁶ /L (mean ± SD)	7415 (140-15520)		7155 (2270-745000)		0.149 ^m
Platelet count × 10 ⁶ /L (mean ± SD)	260000 (69000-814000)		237500 (37000-814000)		<0.001 ^m
Neutrophil count × 10 ⁶ /L (mean ± SD)	4410 (1560-11910)		3960 (1350-10700)		0.013 ^m
Lymphocyte count × 10 ⁶ /L (mean ± SD)	2175 (620-4850)		2125 (610-6130)		0.817 ^m

IBD, Inflammatory Bowel Disease; BMI, Body Mass Index; ED, Erectile Dysfunction; WBC, White Blood Cell; ^m, Mann Whitney U test; ^c, Chi-squared test; Bold characters indicate statistically significant values.

TABLE 2. Univariate and multivariate logistic regression analyzes of the factors associated with the presence of erectile dysfunction.

	Univariate logistic regression analysis				Multivariate logistic regression analysis			
	OR	95% CI		p values	OR	95% CI		p values
		Lower	Upper			Lower	Upper	
Age (year)								
≤50	1				1			
>50	1.7	1.1	2.6	0.026	2	1.2	3.3	0.008
BMI (kg/m ²)								
≤25	1							
>25	1.2	0.7	1.8	0.523				
Smoking								
No	1				1			
Yes	2.4	1.5	3.9	<0.001	2.5	1.5	4.2	<0.001
Presence of HT								
No	1				1			
Yes	2.4	1.3	4.7	0.008	1.9	0.9	4.1	0.068
Presence of DM								
No	1				1			
Yes	5	1.8	14	0.002	3.6	1.2	10.7	0.02
Presence of IBD								
No	1				1			
Yes	2.3	1.5	3.6	<0.001	3.1	1.9	5.2	<0.001
Presence of depression								
Minimal	1							
Mild	0.7	0.4	1.2	0.235				
Moderate	1.4	0.7	2.6	0.308				
Severe	0.6	0.2	1.7	0.346				

IBD, Inflammatory Bowel Disease; BMI, Body Mass Index; HT, Hypertension; DM, Diabetes Mellitus; Bold characters indicate statistically significant values.

disease activity and psychological state. Mood disorders are the main cause of sexual dysfunction in patients with IBD [13, 14]. In a study of 285 patients by Bel *et al.* [15], depression was found to be a risk factor for sexual dysfunction in IBD. In the study of Timmer *et al.* [16], 153 patients with IBD and a healthy control group were compared. In this study, a relationship was found between depression and low sexual desire, ED, and low satisfaction [16]. In the study of Shmidt *et al.* [17], 69 patients with IBD were evaluated and it was found that 39% of the patients had global sexual dysfunction and 94% had ED. In this study, it was shown that ED is associated with advanced age and low physical and mental status scores. In a review, it was emphasized that patients with IBD have more sexual dysfunction and infertility than the normal population, and this was associated with depression and IBD activity [18]. In another review, it was stated that the IIEF score was mostly used in the evaluation of sexual functions in patients with IBD, and the most important risk factors for ED in these patients were depression, disease activity, and history of surgery [19]. In our study, it has been shown that IBD was a risk factor for ED, regardless of the history of surgery and depression.

There are limited studies in the literature demonstrating the relationship between systemic inflammation and ED. Proinflammatory cytokines such as tumor necrosis factor- α (TNF- α), interleukin-6 (IL-6) and interleukin-8 (IL-8) have been reported to increase in both ED and heart failure, which are known to be etiologically related [17]. It has been emphasized that the inflammatory markers act as important active agents in the development of ED. In a cohort study conducted by Wilton *et al.* [18], it was shown that ED was detected 1.45 times more in patients with psoriatic arthritis compared to the normal group. In a similar recent article, it has been shown that psoriasis negatively affects male sexual functions [19]. In their animal experiment, Carneiro *et al.* [20] showed that rats developed endothelial dysfunction and cavernosal smooth muscle hypercontractility after infusion of TNF- α . Similarly, Wilton *et al.* [21] reported an increase in proinflammatory cytokine gene expression (IL-1b, IL-6 and TNF- α) and macrophage infiltration in the major pelvic ganglion in a rat model in which they induced ED through bilateral cavernous nerve damage. In another study, it was revealed that overexpression of IL-6 and TNF- α in the corpus cavernosum tissue caused ED in Type 2 diabetic rats [22]. In another study by Chao *et al.* [23], a relationship was found between high serum C-reactive protein and erectile dysfunction. All these data support the results of our study and show that the systemic inflammatory process in IBD can trigger ED regardless of the pelvic surgery and depressive state.

There are some limitations in our study. First of all, it is a retrospective study. The erectile functions of patients with IBD before and after diagnosis could not be questioned separately. In addition, the medication status of the patients could not be included in the study due to insufficient data. Nevertheless, in the light of the literature examining the relationship between the inflammatory process and ED, knowing

that inflammatory diseases such as IBD affect sexual functions regardless of the psychological state they cause in patients, will contribute to the literature in terms of revealing new methods in the treatment of ED.

5. Conclusions

Inflammatory bowel diseases can cause ED regardless of the pelvic surgery performed and the psychological status that occur in these patients. When evaluating patients for ED and planning treatment, possible inflammatory events should also be taken into account. Treating the inflammatory process may be a method for treating ED in patients with IBD.

Author contributions

ST, YK, SS and BY designed the data collection method, collected the data, analyzed the data and reviewed drafts of the paper. ST, YK, SS and BY wrote the paper and prepared tables. ST, YK, SS and BY read and approved the final manuscript.

Ethics approval and consent to participate

All subjects gave their informed consent for inclusion before they participated in the study. The study was conducted in accordance with the Declaration of Helsinki, and the protocol was approved by the No.2 Clinical Research Ethics Committee of Ankara City Hospital (Approval number: E2-20-82).

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Conflict of interest

The authors declare no conflict of interest.

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