International Journal of Surgery 19 (2015) 42–45

Contents lists available at ScienceDirect

International Journal of Surgery

journal homepage: www.journal-surgery.net

Original research

Constipation is not associated with diverticular disease – Analysis of 976 patients

Tamara Braunschmid [a], Anton Stift [a], Martina Mittlböck [b], Amy Lord [c], Friedrich Anton Weiser [d], Stefan Riss [a, *]

[a] Medical University of Vienna, Department of Surgery, Austria
[b] Medical University of Vienna, Center for Medical Statistics, Informatics and Intelligent Systems, Austria
[c] Southampton University Hospital, UK
[d] Endoscopic Center, Anton-Baumgartner-Straße 44, 1230 Vienna, Austria

HIGHLIGHTS

- Large population based study, which include validated scoring systems.
- The SF-12 quality of life score revealed a significant reduction in quality of life in patients with diverticulosis.
- Symptoms of constipation are not increased in patients with diverticulosis.

ARTICLE INFO

Article history:
Received 15 November 2014
Received in revised form
9 April 2015
Accepted 13 April 2015
Available online 15 May 2015

Keywords:
Diverticulosis
Diverticular disease
Constipation
Quality of life
Obesity

ABSTRACT

Background: In the light of controversial data in the literature, the present study was designed to evaluate potential associations between colonic diverticular disease, constipation and quality of life.
Design: We prospectively enrolled 976 consecutive patients, who participated in the nationwide colorectal cancer screening program in four medical centers between 2008 and 2009. All patients underwent full colonoscopy and completed a standardized questionnaire. The severity of constipation was assessed by the validated Wexner constipation score. Quality of Life (QOL) was evaluated by the SF-12 health score.
Results: The median age was 62 years (range 22–90) and the male to female ratio was 1:1. Colonic diverticular disease was found in 290 participants (30%). Age, body mass index and diabetes mellitus were significantly associated with the presence of diverticular disease ($p < 0.0001$, $p = 0.0007$ and $p = 0.0178$).
The median constipation score in patients with diverticular disease was 3 (range 0–18), and comparable to patients without diverticula ($p = 0.1073$). The physical component summary of the SF-12 was significantly reduced in patients with diverticular disease ($p = 0.0038$).
Conclusion: This large population based study revealed no association between colonic diverticular disease and constipation. Notably, the presence of diverticular disease significantly impacts quality of life.

1. Introduction

Colonic diverticular disease occurs frequently in western countries with an estimated prevalence of 50% among those aged over 70 years [1,2]. Notably, the vast majority of affected patients remain asymptomatic and only a small percentage will develop symptoms such as abdominal pain, bleeding or perforation [2].

Despite its high prevalence, the pathophysiology of diverticular disease is only poorly understood. Some studies have reported that age related changes in collagen composition led to the formation of diverticular disease [3]. In addition, abnormalities in myoelectrical and motor function in the large bowel were considered as potential etiological factors [4]. In particular, recent investigations observed significantly decreased numbers of Cajal

* Corresponding author. Medical University of Vienna, Department of Surgery, Währinger Gürtel 18-20, A-1090 Vienna, Austria.
E-mail address: stefan.riss@meduniwien.ac.at (S. Riss).

http://dx.doi.org/10.1016/j.ijsu.2015.04.045
1743-9191/

cells in colonic diverticular specimen [5]. Low fiber diet represents another risk factor for diverticular disease due to a reduced colonic transit time and small stool volume resulting in high intraluminal pressure with formation of diverticula [6]. These findings have led to the widely accepted theory that colonic diverticular disease is strongly related to constipation. Interestingly, there exists a paucity of studies in the literature, which address the correlation of constipation symptoms with the occurrence of diverticular disease [7].

Recently, Perry et al. challenged this assumption, as they found no association between low fiber diet, constipation and diverticular disease in a cross-sectional colonoscopy-based study [7].

In the light of controversial data, the aim of the present study was to examine whether constipation symptoms are associated with diverticular disease of the colon by using validated questionnaires in consecutive patients undergoing routine colonoscopy for bowel cancer screening. Additionally, we assessed health related quality of life in this cohort of patients.

2. Methods

The present prospective study comprised 976 consecutive patients, who participated in the Austrian nationwide screening program for colorectal cancer between 2008 and 2009. The study was conducted in four institutions, which offered screening colonoscopy as part of the health care program.

In Austria, screening for colorectal cancer is generally recommended to start at the age of 50 years. Since 2005 this has been officially integrated into the Austrian preventive examination program.

Patients aged below 50 years with previously identified risk factors were also included in the screening program. All colonoscopies were conducted by experienced colorectal surgeons.

The study protocol was approved by the local ethics committee with participants giving written informed consent. The study was initially performed to investigate the prevalence of hemorrhoids and associated diseases [8–10]. As other data were collected as well, the present study was designed.

Demographic data of each patient were recorded by a standardized questionnaire. Constipation was assessed by using a validated self-administered scoring system as previously recommended by Agachan et al. [11] The questionnaire contains 8 questions to evaluate frequency of bowel movements, difficulty or painfulness of evacuation, completeness of evacuation, abdominal pain, time (minutes) per attempt to evacuate, type of assistance needed to evacuate (laxatives, digitation or enema), number of unsuccessful attempts to evacuate per 24 h and duration of constipation (years). The score ranges from 0 to 30 points, where a lower score indicates a lower level of constipation symptoms.

The validated SF-12 Health Survey (SF-12) was used to examine health-related quality of life. It was developed to provide a shorter alternative to the SF-36 and contains a subset of 12 items from the SF-36, including one or two items from each of the eight SF-36 scales. This information is then used to construct physical and mental component summary measures (PCS and MCS) [12].

The overall constipation score as well as each single item was correlated with the presence of diverticular disease. In addition, the impact of diverticular disease on the PCS and MCS of the SF-12 was analyzed.

Diverticular disease was defined as any diverticulum in the entire colon.

Symptoms of diverticulosis were not recorded due to the broad spectrum of patients' complaints and subsequent difficulty in categorization and comparison if this was the problem.

3. Statistical analysis

All statistical analyzes were performed by SAS version 9.3 (SAS Institute Inc., Cary, NC, USA). All P values are two-sided and P values ≤ 0.05 were considered as statistically significant.

Continuous variables were summarized by mean and standard deviation (±SD) in case of normal distribution or by median, minimum and maximum, otherwise. The t-test was used to test differences between two groups in normally distributed data. For ordinal and skewed data the Wilcoxon rank sum test was applied instead. Categorical data were described by absolute frequencies and percentages. Group differences were tested with the χ^2 test. The trend version of the χ^2 test was used for ordinal data and an exact version was used in case of small expected cell frequencies.

4. Results

Demographic data of the 976 enrolled patients are described in Table 1. The male to female ratio was 1:1 with a median age of 62 years (range: 22–90 years).

Diverticular disease of the colon was observed in 290 participants (30%), with similar gender distribution. In 248 patients (85.5%) diverticular formations were located in the left colon, 37

Table 1
Demographic data of patients with and without colonic diverticular disease.[a]

		Diverticular disease		
		Yes	No	P-value
Sex	Male	147 (30.1%)	341 (69.9%)	p = 0.7793
	female	143 (29.3%)	345 (70.7%)	
Age		65.3 (±7.9)	60.1 (±9.3)	**p < 0.0001**
BMI		27.2 (18.6–48.7)	26.2 (17.4–61.3)	**p = 0.0007**
Family status		278 (29.3%)	671 (70.7%)	
- Single		12 (20%)	48 (80%)	**P = 0.0403**
- Married		212 (30.5%)	484 (69.5%)	
- Divorced		35 (23.8%)	112 (76.2%)	
- Widowed		19 (41.3%)	27 (58.7%)	
Educational status		282 (29.6%)	671 (70.4%)	
- Grade school		176 (31.1%)	389 (68.9%)	p = 0.3084
- High school		63 (26.7%)	173 (73.3%)	
- College		42 (28.3%)	109 (71.7%)	
Professional status		285 (29.6%)	679 (70.4%)	
- Employed		59 (16.5%)	298 (83.5%)	**p < 0.0001**
- Unemployed		3 (10.3%)	26 (89.7%)	
- Retired		215 (39.9%)	324 (60.1%)	
- At home		8 (20.5%)	31 (79.5%)	
Childbirth		147 (30.12%)	341 (69.88%)	
- 0		30 (32.26%)	63 (67.74%)	p = 0.7550
- 1		44 (28.76%)	109 (71.24%)	
- 2		53 (28.96%)	130 (71.04%)	
- 3		11 (32.35%)	23 (67.65%)	
- 4		6 (35.29%)	11 (64.71%)	
- ≥5		3 (37.50%)	5 (62.50%)	
Type of delivery		146 (30.54%)	332 (69.45%)	
- none		30 (32.26%)	63 (67.74%)	p = 0.8313
- cesarean section		5 (22.73%)	17 (77.27%)	
- vaginal delivery		107 (30.75%)	241 (69.25%)	
- cesarian and vaginal delivery		4 (26.67%)	11 (73.33%)	
Liver cirrhosis		290 (29.71%)	686 (70.29%)	
- yes		7 (38.89%)	11 (61.11%)	p = 0.3899
- no		283 (29.54%)	675 (98.40%)	
Diabetes		290 (29.71%)	686 (70.29%)	
- yes		41 (39.81%)	62 (60.19%)	**p = 0.0178**
- no		249 (28.52%)	624 (71.48%)	
Previous pelvis base surgery		290 (29.71%)	686 (70.29%)	
- yes		90 (34.35%)	172 (65.65%)	p = 0.0548
- no		200 (28.01%)	514 (71.99%)	

Bold indicates P values ≤ 0.05 were considered as statistically significant.
[a] Categorical variables are described as absolute numbers with percentages; continuous data are either described by mean and standard deviation (±SD) or by median (minimum–maximum).