

Original Research Article

Characteristics of Fecal Incontinence in Male Patients in Japan

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Abstract

Objectives: Although community studies have shown no difference between the sexes in the prevalence of fecal incontinence (FI), few direct comparisons of disease characteristics between male and female patients have been reported. The aim of this study was to determine whether characteristics of FI differ between male and female patients in Japan.

Methods: Included in the study were 408 (149 men, 259 women) patients with FI who visited the Matsushima Hospital Coloproctology Center between October 2016 and September 2017. We retrospectively evaluated data on age, number of bowel movements, Bristol stool form scale, number of FI, incontinence scores, anorectal manometry, comorbidities, and history of anal surgery.

Results: Maximum resting pressure and maximum squeeze pressure were found to be within normal range in significantly more male than female patients (34.9% vs. 12.4%, respectively; $p < 0.0001$). Irritable bowel syndrome (IBS, 20.1% vs. 9.3%; $p = 0.003$) and a history of anal surgery (29.5% vs. 17.5%; $p = 0.02$) were more prevalent among male patients than among female patients. Use of mepenzolate as treatment was significantly more common among male patients than among female patients (16.8% vs. 6.6%, respectively; $p = 0.005$). Responses to the various treatments were good, regardless of sex.

Conclusions: FI appears to be more commonly accompanied by normal anal sphincter pressures in male patients than in female patients, and IBS and previous anal surgery appear to be more common among male patients than among female patients. FI appears to be controllable in most patients, regardless of sex.

Keywords

fecal incontinence, gender, characteristics

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Introduction

With the main symptom of fecal incontinence (FI) being involuntary leakage of liquid and/or solid stools, FI is a disorder that negatively affects the daily quality of life[1,2]. Several reported investigations have shown that FI is more prevalent among women than among men[3-5]. However, at least one report has indicated the prevalence of FI in Japan to be 8.7% for men aged 65 years or older but 6.6% for women aged 65 or older[6]. Thus, it cannot be stated con-

clusively that the prevalence is higher among Japanese women than among Japanese men. Globally, there are fewer reports on FI in men than in women[7], and there are no reports of differences in background factors and characteristics of FI that exist between sexes in Japan.

Although FI has various causes[8], injury to the anal sphincter during childbirth, i.e., obstetric trauma, is considered to be the most common cause in women[9]. For men, the reported causes and characteristics of FI vary[7,10,11]. Because there has been little direct comparison of FI be-

tween sexes, we performed a retrospective, single-center comparison of the clinical and physiologic characteristics of FI in men vs. women in Japan.

Methods

Study subjects

Our study subjects were 408 (149 men, 259 women) patients aged 20 years or older who, with a chief complaint of FI, underwent anal manometry at Matsushima Hospital between October 2016 and September 2017. Although our hospital specializes in anal diseases, we also have the defecation function outpatient facility, so many patients with non-anal diseases also visit the hospital. We used unidentifiable data. All patients had been informed of the possibility of their anonymized clinical information being used for research purposes and of the opportunity to opt-out of the data collection, both through the hospital's website.

The study was conducted according to the Ethical Guidelines Related to Medical Research on Humans stipulated by the Japanese Ministry of Health, Labor and Welfare, and approval for the study was obtained from the Matsushima Hospital Ethics Committee (approval number: 2021-005).

Examinations

Anorectal manometry was performed on the patient's initial visit and subsequently at 6-month intervals by inserting an 8 Fr single-channel indwelling catheter, and measurements were obtained by means of the water perfusion technique. Normal internal pressure was defined as a maximum resting pressure (MRP) of ≥ 50 mmHg and maximum squeeze pressure (MSP) of ≥ 150 mmHg for men and an MRP of ≥ 45 mmHg and MSP of ≥ 130 mmHg for women. For a definitive diagnosis of sphincter injury, transanal ultrasonography was performed with a Flex Focus 400 ultrasound system (BK Medical, Herlev, Denmark).

Treatment and follow-up

Treatment of the FI depended on the etiology of the FI. Surgery was performed in cases of rectal prolapse. Biofeedback therapy or oral medication was used in cases of sphincter injury, and if such treatment did not resolve or reduce the FI, surgery was performed. Most other cases were treated by biofeedback or oral medication. Surgical treatment comprised sphincter repair or rectal prolapse repair (if a patient's general condition allowed). Intended follow-up was at least 6 months after the patients' initial visit.

Study data

For the purpose of the study, patients' records were reviewed, and the following data were obtained: patients' clinical characteristics at the start of treatment, including

age, Cleveland Clinic Florida Fecal Incontinence Score (CCF-FIS) and Fecal Incontinence Severity Index (FISI), Bristol stool type, number of incontinence episodes per day, anorectal pressure test findings, causes of or conditions associated with the FI, any previous anal surgery, treatment of the FI, follow-up time, and the number of incontinence episodes 6 months after the start of treatment. Items considered as potential risk factors for FI according to the Japanese Guidelines for Fecal Incontinence Management[12], i.e., patients' medical history and causes of or conditions associated with the FI, were also tabulated.

Statistical analysis

Study variables are expressed as median (interquartile range) values or number of patients, percentage of patients, or both number and percentage of patients. The Kolmogorov-Smirnov test was used to evaluate whether the distribution of continuous variables was normal. Differences in continuous variables were analyzed by Mann-Whitney U-test, and differences in categorical variables were analyzed by chi-square test. Change in the number of incontinence episodes between the start of treatment and 6 months later was analyzed by Wilcoxon rank-sum test. EZR, a statistical analysis software that extends the functions of R and R Commander[13], was used for all statistical analyses. All tests were two-sided, and a p-value < 0.05 was considered significant.

Results

Patients' clinical characteristics

Clinical characteristics of the 408 patients at the start of treatment are shown in Table 1. Median age of the male patients was 73 (65-79) years, and that of the female patients was 74 (65-79) years; there was no significant difference between the two groups ($p = 0.79$). Median CCF-FIS score was 6 (4-9) for the male patients and significantly higher at 9 (6-12) for the female patients ($p < 0.0001$). Median FISI score was also higher for the female patients at 23 (16-31) than for the male patients at 20 (12-31) ($p = 0.02$). Bristol type 6/7 stools, i.e., diarrheal stools, were significantly more prevalent among the male patients than among the female patients at 26.8% vs. 16.2%, respectively ($p = 0.01$). Incontinence episodes numbered 0.28 (0.1-1) per day for the men and 0.28 (0.1-1) per day for the women, with no significant between-group difference ($p = 0.4$).

Results of examinations

Anorectal pressure tests were performed on 149 male patients and 259 female patients. Median MRP was 44.5 (30.9-63.7) mmHg for the men and 32.6 (22.8-44.5) mmHg for the women, and MSP was 207 (142-269) mmHg for the

Table 1. Clinical Characteristics of Patients before the Start of Treatment, per Study Group.

	Male patients (n = 149)	Female patients (n = 259)	p-value
Age, years	73 (65–79)	74 (65–79)	0.79
Disease duration, months	12 (5–36)	12 (5–36)	0.91
CCF-FIS score	6 (4–9)	9 (6–12)	<0.0001
FISI	20 (12–31)	23 (16–31)	0.02
Bristol stool type			
Type 1/2	6 (4.0)	5 (1.9)	0.34
Type 3/4/5	103 (69.1)	212 (81.8)	0.004
Type 6/7	40 (26.8)	42 (16.2)	0.01
No. of bowel movements per day	2 (1–3)	1.5 (1–2.5)	0.02
No. of incontinence episodes per day	0.28 (0.1–1)	0.28 (0.1–1)	0.4

Median (interquartile range) value or number (%) of patients is shown.

CCF-FIS, Cleveland Clinic Florida Fecal Incontinence Scale; FISI, Fecal Incontinence Severity Index

P < 0.05 was considered significant.

Table 2. Results of Examinations before the Start of Treatment, per Study Group.

	Male patients (n = 149)	Female patients (n = 259)	p-value
Anorectal manometry			
Patients examined	149 (100)	259 (100)	–
MRP, mmHg	44.5 (30.9–63.7)	32.6 (22.8–44.5)	<0.0001
MSP, mmHg	207 (142–269)	118 (92–159)	<0.0001
Normal pressures*	52 (34.9)	32 (12.4)	<0.0001
Endoanal ultrasonography			
Patients examined	27 (18.1)	68 (26.3)	–
Sphincter defect	1 (0.7)	8 (3.1)	0.1
Rectal sensation			
Patients examined	23 (15.4)	48 (18.5)	–
DDV, mL	82.5 (70–145)	70.0 (50–100)	0.05
MTV, mL	140 (125–185)	157.5 (117–230)	0.35

Number (%) of patients or median (interquartile range) value is shown.

DDV, defecatory desire volume; MTV, maximum tolerable volume

*Normal MRP = 50 mmHg for men and 45 mmHg for women; normal MSP = 150 mmHg for men and 45 mmHg for women.

P < 0.05 was considered significant.

men and 118 (92–159) mmHg for the women, with both MRP and MSP being significantly higher among the men ($p < 0.0001$ for both). Normal internal pressure was observed in 34.9% ($n = 52$) of the male patients and 12.4% ($n = 32$) of the female patients, with that of the male patients being significantly higher ($p < 0.0001$). Transanal ultrasonography was performed in 27 (18.1%) male patients and 68 (26.3%) female patients, and it revealed sphincter injury in 1 (0.7%) male patient and 8 (3.1%) female patients. Rectal sensation was tested in 23 (15.4%) male patients and 48 (18.5%) female patients, and there was no between-group difference in urge volume or maximum tolerable volume (Table 2).

Causative and associated conditions

Of the conditions that can cause or are associated with FI, irritable bowel syndrome (IBS) was significantly more

prevalent among the male patients than among the female patients, affecting 30 (20.1%) male patients and 24 (9.3%) female patients ($p = 0.003$). There was no between-group difference in the prevalence of other causative/associated conditions, such as diabetes, inflammatory bowel disease, rectal prolapse, or sphincter injury. Perineal scars (resulting from vaginal tearing during obstetric trauma) were found in 7 (2.7%) female patients (Table 3).

History of surgery

Prior anal fistula, hemorrhoids, and/or anal fissure were collectively referred to as a history of anal surgery. Forty-four (29.5%) male patients and 45 (17.5%) female patients had a history of anal surgery ($p = 0.02$). Many of the male patients had undergone anal fistula surgery (fistulectomy, fistulotomy, or sphincter-sparing surgery) ($p = 0.0006$). There

Table 3. Associated Conditions and Previous Anorectal Surgeries, per Study Group.

	Male patients (n = 149)	Female patients (n = 259)	p-value
Associated conditions			
Diabetes	18 (12.1)	24 (9.3)	0.46
Irritable bowel syndrome	30 (20.1)	24 (9.3)	0.003
Inflammatory bowel syndrome	1 (0.7)	1 (0.4)	1
Urinary incontinence	5 (3.4)	17 (6.6)	0.24
Stroke	9 (6.0)	6 (2.3)	0.09
Delivery history	–	191 (73.7)	–
Sphincter rupture	1 (0.7)	1 (0.3)	1
Perineal tears	0 (0.0)	7 (2.7)	–
Anal surgery	44 (29.5)	45 (17.4)	0.02
For fistula	16 (10.7)	6 (2.3)	0.0006
For fissure	24 (16.8)	34 (13.1)	1
For hemorrhoid	3 (2.0)	5 (1.9)	0.38
Rectal prolapse surgery	1 (0.7)	6 (2.3)	0.4

Number (%) of patients is shown.

P < 0.05 was considered significant.

Table 4. Treatment, per Study Group*.

	Male patients (n = 119)	Female patients (n = 195)	p-value
Biofeedback	28 (23.5)	128 (65.3)	<0.0001
Polycarbophil calcium	84 (70.6)	123 (62.8)	0.29
Trimebutine maleate	99 (83.2)	149 (76.0)	0.3
Probiotic supplementation	21 (17.6)	34 (17.3)	0.6
Mepenzolate bromide	20 (16.8)	13 (6.6)	0.005
Antidiarrheal medication	3 (1.5)	6 (5.0)	0.11
Laxative	26 (21.8)	61 (31.1)	0.41
Sphincteroplasty	1 (0.8)	5 (2.6)	0.55
Surgery for rectal prolapse	2 (1.7)	4 (2.0)	0.96

Number (%) of patients is shown.

*Only patients who maintained regular follow-up visits for at least 6 months are included.

P < 0.05 was considered significant.

was no between-group difference in a history of rectal prolapse surgery (Table 3).

Treatment

Mepenzolate bromide was used to treat IBS in 20 (16.8%) male patients vs. 13 (6.6%) female patients. None of the other drug treatments, such as use of antidiarrheal agents and laxatives, differed in prevalence between the male and female patients (Table 4). Biofeedback training was given as treatment for FI to 28 (23.5%) male patients and 128 (65.3%) female patients, that is, to significantly more female patients than male patients ($p < 0.0001$).

Follow-up and outcomes at 6 months

The 408 study patients were followed up for an approximate median of 8 months, with 119 male patients and 195 female patients having continued with regular follow-up vis-

its for at least 6 months after the start of treatment. The median number of incontinence episodes among these 119 male patients and 195 female patients was 0.03 (0-0.28) per day and 0.03 (0-0.16) per day, respectively. The number of incontinence episodes decreased significantly from the start of treatment to 6 months after treatment among both these male and female patients ($p < 0.0001$ for both groups).

History of anal fistula surgery and IBS

Because a history of anal fistula surgery was very common among the male patients, we investigated this characteristic further. We reviewed pressure values in the male patients only and compared anorectal pressure test results among those who underwent anal fistula surgery and those who did not. We found no significant differences (Table 5). We also reviewed data for male patients according to whether or not they had been diagnosed with IBS and found

Table 5. Anorectal Pressures in Male Patients Who Underwent Previous Fistula Surgery and Those Who Did Not.

	Previous fistula surgery (n = 16)	No previous fistula surgery (n = 133)	p-value
MRP, mmHg	43.7 (30.8–50.9)	45.0 (32.3–65.0)	0.46
MSP, mmHg	205 (134–245)	208 (144–270)	0.61
Normal pressures*	3 (18.7)	49 (36.8)	0.33

Median (interquartile range) value or number (%) of patients is shown.

MRP, maximum resting pressure; MSP, maximum squeeze pressure

*Normal MRP = 50 mmHg for men and 45 mmHg for women; normal MSP = 150 mmHg for men and 130 mmHg for women.

Table 6. Reported Studies Characterizing Anorectal Disorders in Male Patients (vs. Female Patients) and Study Findings.

Authors	Year	Male patients (case group)	Female patients (control group)	Anorectal manometric findings in the male vs. female patients	Etiology of the disorder
Lunnis et al. [17]	2004	n = 154 (FI)	n = 475 (FI)	–	Anal surgery
Maeda et al. [23]	2009	n = 34 (FI)	n = 75 (FI)	Higher MSP	–
Christoforidis et al. [11]	2011	n = 85 (FI)	n = 408 (FI)	Higher MRP and MSP	Anal surgery, prostate cancer therapy, spinal injury
Muñoz-Yagüe et al. [10]	2014	n = 119 (FI)	n = 645 (FI)	Higher MSP, normal MRP, and MSP	Anorectal surgery
Cohan et al. [24]	2015	n = 144 (FI)	n = 897 (FI)	*Normal MRP and MSP	Constipation
Townsend et al. [25]	2016	n = 100 (FI)	n = 100 (FI)	*Normal MRP and MSP	–
Mazor et al. [7]	2017	n = 73 (FI)	n = 596 (FI)	Higher MRP and MSP	–
Tokay Tarhan et al. [26]	2019	n = 321 (anorectal complaint)	n = 562 (anorectal complaint)	Higher MSP	Spinal cord trauma and neurological disease
Our group	–	n = 149 (FI)	n = 259 (FI)	Higher MRP and MSP, *Normal MRP and MSP	IBS anal surgery

FI, fecal incontinence; MSP, maximum squeeze pressure; MRP, maximum resting pressure; IBS, irritable bowel syndrome

–: Item not investigated. *Normal MRP = 50 mmHg for men and 45 mmHg for women; normal MSP = 150 mmHg for men and 130 mmHg for women.

no difference in disease severity or anorectal pressure test results. However, we noticed that those with IBS tended to more commonly pass Bristol type 6/7 diarrheal stools and defecate more frequently.

Discussion

Various factors, such as a weak anal sphincter; reservoir dysfunction due to decreased rectal sensation, volume, and/or compliance; stool characteristics; and neurologic abnormalities, are involved in FI[14,15]. While obstetric trauma is the most common cause of FI in women, reported causes in men include a history of anal surgery, spinal cord injury, and prostate cancer[16-18]. The purpose of our retrospective study was to clarify differences between male and female patients in characteristics of FI.

Some investigators have provided evidence of a female predominance for FI[19], whereas others have shown occurrence of the disorder to be equal between men and women[20,21]. Of patients visiting our defecation function outpatient clinic over a certain period, 36.5% were men, and

63.5% were women, with the percentage of women being significantly higher than that of men. Taking other reports into consideration[19,22], we have concluded that more women than men with FI visit hospitals for this condition.

Results of anorectal pressure tests recorded for studies similar to ours are given in Table 6. As in our study, MRPs and MSPs were higher in male patients than in female patients[7,11], or MRPs and MSPs were normal in the male patients[10,24,25]. There are also two reports indicating that a history of anal surgery is common[11,17], and these are the only reports that discuss the high prevalence of IBS in patients with FI.

Anorectal pressures were higher in our male patients than in our female patients, and male patients' pressures were more commonly normal. This was largely because 73.7% of our female patients had a history of obstetric trauma. Such trauma and other conditions, such as pudendal neuropathy, can weaken the anal sphincter. In addition, women tend to have a lower MSP[27], and these sex-based differences are thought to be related to the etiology of incontinence.

Some investigators have concluded that a history of anal

Table 7. Clinical Characteristics of Male Patients with and without IBS.

	IBS (n = 30)	No IBS (n = 119)	p-value
Age, years	71 (63.2–77.7)	73 (65.0–80.0)	0.14
CCF-FIS	6.5 (4–9)	6 (4–9)	0.68
FISI	22 (12–31)	20 (13–28)	0.6
Bristol stool type			
Type 1/2	0 (0.0)	6 (5.0)	0.46
Type 3/4/5	12 (40.0)	91 (76.5)	0.0002
Type 6/7	18 (60.0)	22 (18.5)	<0.0001
No. of bowel movements per day	1.5 (1.0–2.5)	2.75 (1.75–4.0)	0.001
MRP, mmHg	45.3 (31.3–59.9)	44.2 (31.6–66.2)	0.74
MSP, mmHg	205.7 (140.9–270.1)	209.1 (150.4–268.4)	0.73
Normal pressures*	10 (33.3)	41 (34.5)	1

Median (interquartile range) value or number (%) of patients is shown.

IBS, irritable bowel syndrome; CCF-FIS, Cleveland Clinic Florida Fecal Incontinence Score; FISI, Fecal Incontinence Severity Index; MRP, maximum resting pressure; MSP, maximum squeeze pressure

*Normal MRP = 50 mmHg for men and 45 mmHg for women; normal MSP = 150 mmHg for men and 130 mmHg for women.

surgery is commonly associated with FI in men[11,17,28], and we found a history of general anal surgery and a history of anal fistula surgery, in particular, to be more common among our male study patients than among our female study patients. The data indicate that the prevalence of anal fistula is higher among men, although over the course of 3 years at our hospital, 1670 (90.7%) men and 171 (9.3%) women underwent anal fistula surgery. Therefore, it is possible that the higher prevalence of surgery for anal fistula among our male study patients reflects the increased prevalence of anal fistula among men in general.

When we examined FI with respect to IBS (Table 7), we observed a higher incidence among male patients in our study, despite IBS being 1.2-fold more prevalent among women than among men in Japan[29]. IBS is considered a risk factor for FI[30] due to the loose stools, frequent defecation, and urgency resulting from rectal hyperesthesia[31]. Our male study patients with IBS passed stools more frequently than those without IBS, and especially Bristol type 6/7 stools, which may have contributed to their FI. Rectal sensation tests were performed in three patients with IBS, but the size of our total study group did not allow for physiologic evaluation of rectal hyperesthesia. However, IBS can be thought of as the characteristics of FI in men.

Biofeedback training was often given to our female study patients to treat their FI. The reason why there were fewer cases of biofeedback in male patients might be because many of the men had normal anal pressure. The greater use of mepenzolate bromide among our male study patients might have been due to the increased prevalence of IBS seen among male versus female patients at our hospital. Mepenzolate bromide is an anticholinergic drug that has been shown to improve abdominal pain and other symptoms

of IBS through its smooth muscle relaxant effect. Surgery, such as sphincter or rectal prolapse repair, was performed in only a small number of patients, but by 6 months after the surgery, the episodes of incontinence had decreased in frequency in both the male and female patients. FI may also be controlled by conservative treatment, such as drug treatment and biofeedback, indicating that FI is indeed amenable to treatment.

Our hospital specializes in anal disorders, so most of our patients had no physical disability and were able to perform activities of daily living independently. In patient background of this study, the median symptom score was mild to moderate, and further studies are needed to treatment options in patients with severe FI.

This study has two limitations. First, it was conducted retrospectively in patients with FI at a single institution and is thus subject to limitations inherent to such studies. We intend to conduct additional studies to identify the true risk factors for FI in men. Second, although this study assessed the frequency of FI before and after treatment, it did not assess whether there was improvement in the FI score.

In conclusion, our data indicate that men with FI tend to have more normal internal pressures than women with FI, and a history of IBS or anal surgery is more common among male patients with FI than among female patients. Treatment is based on these variables, and disease control can be achieved by means of conservative treatment in many patients. Further studies are needed comparing patients with and without FI to determine whether IBS and a history of anal surgery are risk factors for FI.

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Conflicts of Interest

There are no conflicts of interest.

Author Contributions

Joji Kuromizu and Nobuyoshi Miyajima were involved in the study design and data interpretation. All authors critically revised the report, commented on drafts of the manuscript, and approved the final report.

Approval by Institutional Review Board (IRB)

The study was conducted according to the Ethical Guidelines Related to Medical Research on Humans stipulated by the Japanese Ministry of Health, Labor and Welfare, and approval for the study was obtained from the Matsushima Hospital Ethics Committee (approval no. 2021-005).

Disclaimer

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