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Associations of defecography and physiologic findings in male patients with rectocele

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Abstract This study evaluated the incidence and physiological findings in male patients with rectoceles. All defecographic studies were evaluated by a single colorectal surgeon. After diagnosis of rectocele in male patients, the patient's history, symptoms, and physiologic tests (anal manometry, pudendal nerve terminal motor latency [PNTML], assessment and electromyography [EMG]) were studied. A prominent rectocele was defined as one that did not empty during defecography and was associated with outlet obstructive syndrome. Forty (17%) rectoceles were diagnosed in 234 male patients with evacuatory disorders who underwent defecography. Rectoceles were anterior in 19 (48%) and posterior in 21 (52%) patients. The main complaint was constipation with difficult defecation in 33 (83%), followed by rectal pain in 5 (13%), rectal prolapse in 1 (3%), and incontinence in 1 (3%). Previous prostatic surgery had been performed in 16 (40%) patients. The mean age and duration of symptoms were 72.4 years (range, 30–88) and 10.3 years (range, 0.5–70), respectively. Excessive straining during evacuation was noted in 73%, unilateral or bilateral pudendal neuropathy in 24.5%, paradoxical puborectalis contraction in 49% and abnormal EMG in 11% of patients. Higher resting pressures with a mean 3.9 cm high pressure zone were noted in 29% of patients. The accompanying findings in defecography were, non-relaxing or partially relaxing puborectalis muscle (66%), perineal descent (65%), intussusception (23%), and sigmoidocele (15%). None of the patients underwent surgery for rectocele alone. In conclusion, rectocele is uncommon in males; it rarely appears as an isolated dysfunction as it is often associated with functional disorders of the pelvic floor. There is a frequent association between rectocele and prostatectomy. Clinical significance and therapeutic strategy remain unknown.

Key words Rectocele • Males • Defecography • Evacuatory disorders • Constipation

Introduction

Defecography is a method of examining the defecation process under physiologic conditions. It can reveal the presence of anatomic abnormalities in the colon frequently related to defecation disorders. Many reports have discussed rectoceles in women and its relationship to symptoms [1], anorectal physiology [2], perineal descent [1–3], paradoxical puborectalis contraction [4, 5], and surgical repair [6–8]. However, only one publication [9] has mentioned rectoceles in male patients and no report has discussed the details of rectoceles in men with evacuatory disorders.

This study was designed to evaluate the incidence and anorectal physiologic results [anorectal manometry, electromyography (EMG), pudendal nerve terminal motor latency (PNTML)] in male patients with rectoceles.

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Materials and methods

All patients with evacuatory disorders who underwent defecography using a previously described technique [10–12] were assessed. A rectocele was defined as a bulge outside the line of the rectal wall that increases in size during the pushing/evacuatory phase. Any rectocele that did not completely empty after evacuation and was associated with outlet obstructive findings was considered prominent. Concomitant anatomic abnormalities in defecography were also recorded. These abnormalities included sigmoidocele, defined as relevant to the lowest portion of the sigmoid loop during maximal pushing with relation to the pubis, coccyx and ischium [13], nonrelaxing puborectalis syndrome (including partial relaxation), defined as failure to sufficiently flatten the anorectal angle (ARA) with persistence of the puborectalis impression during attempted evacuation [14, 15]; increased fixed (resting) perineal descent (PD), defined as PD >4.0 cm at rest, and increased (dynamic) perineal descent which was defined as a value 3.0 cm higher than the resting value during a maximal push effect [16, 17].

The patients' history, symptoms and physiological tests including anal manometry, EMG and PNTML were studied. Patients underwent anorectal manometry using a flexible four-channel water-perfused catheter with a stationary pull-through technique as previously described [18, 19]. Measurements of the anal canal high-pressure zone (HPZ), which is related to the length of the functional internal sphincter, the mean and maximal resting pressures, which are related to the tone of the internal anal sphincter, and the mean and maximal pressures, which represent the external anal sphincter (EAS) function, were analyzed. The methods of measuring HPZ and calculating mean and maximal resting and squeeze pressures were as previously described [20, 21]. The method of determining pudendal nerve terminal motor latency has been previously described [21]; values higher than 2.2 ms were considered as an indication of pudendal neuropathy (PN). Electromyographic techniques were used as previously described [11, 22]. Both the right and left halves of the EAS were examined separately in constipated patients and in patients with rectal pain; all four quadrants were assessed in patients with incontinence. Recruitment of motor unit potentials (MUPS) was recorded with the patient at rest, during contraction of the EAS, and during simulated defecation. Abnormalities in the duration and configuration of motor unit potentials (MUPs), such as fasciculations, fibrillations, or positive waves, were considered evidence of neuropathic change [23]. One patient underwent magnetic resonance imaging examination to study the connection between a rectocele and the pelvic floor.

Results

Forty (17%) male patients with a mean age of 72.4 years (range, 30–88) with rectocele were diagnosed from 234 patients with evacuatory disorders who underwent defecography. Nineteen (48%) of the rectoceles were anterior (Fig. 1) and 21 (52%) were posterior (Figs. 2 and 3). The chief complaint was constipation with difficult defecation in 33 (83%) patients, followed by rectal pain in 5 (13%), rectal prolapse in 1 (3%), and incontinence in 1 (3%). The mean

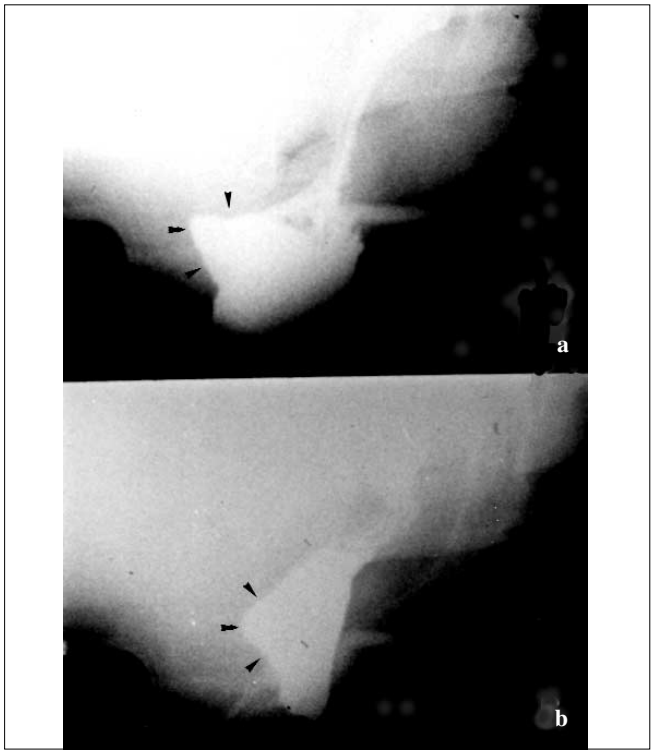

Fig. 1 *Defecography of an anterior rectocele in a male patient*. **a** An anterior rectocele (*arrowhead*) in the pushing phase. **b** This prominent anterior rectocele (*arrowhead*) did not empty after evacuation

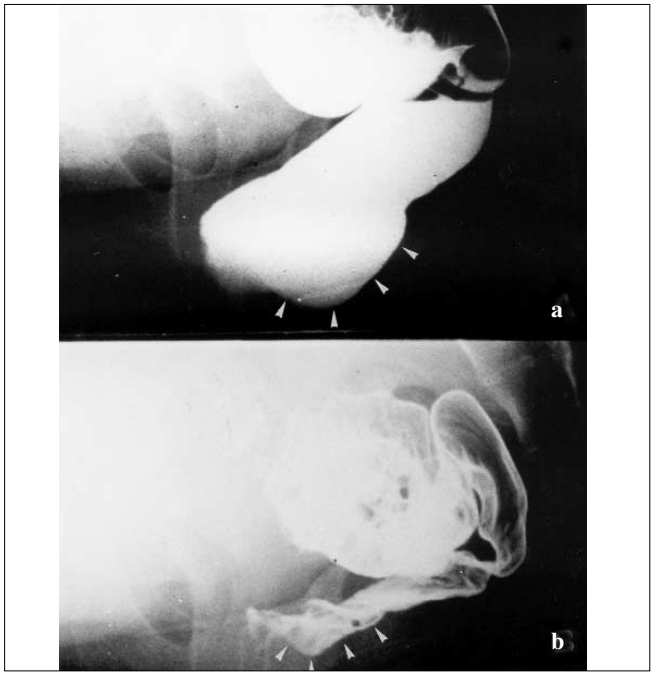

Fig. 2 *Defecography in a male patient with posterior rectocele*. **a** A posterior rectocele (*arrowhead*) in the pushing phase. **b** The defecography revealed emptying of the posterior rectocele (*arrowhead*) after evacuation

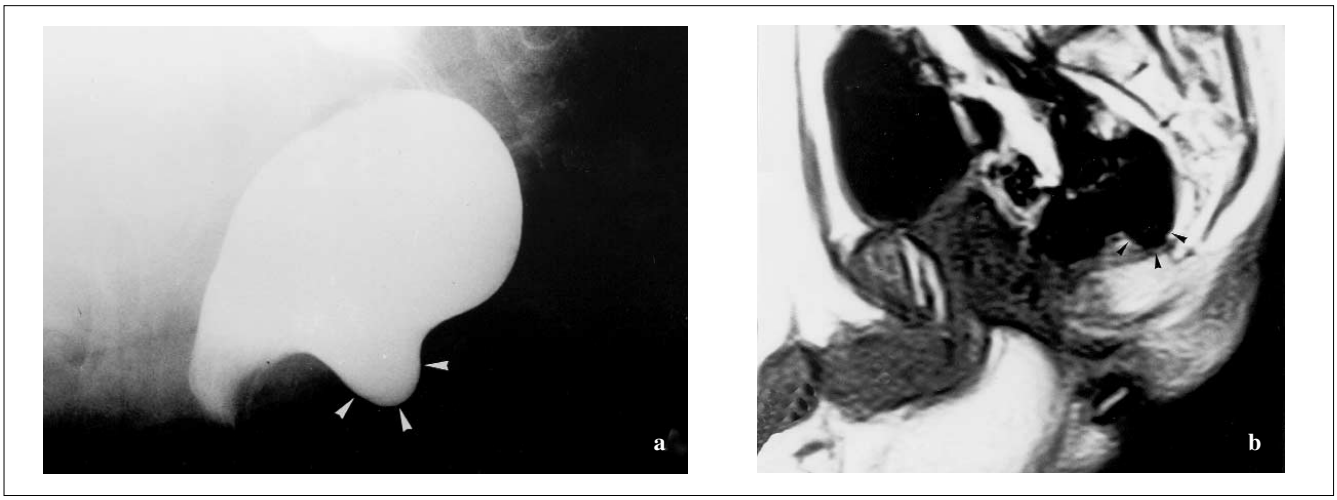

Fig. 3 a A posterior rectocele (*arrowhead*) between the puborectalis and coccyx in the pushing phase. **b** MRI also revealed this posterior rectocele (*arrowhead*) between the puborectalis and coccyx

duration of symptoms was 10.3 years (range, 6 months to 70 years). Of the 40 patients, 29 (73%) patients had excessive straining during evacuation and 28 (70%) patients required an enema or digitation in order to evacuate. Sixteen patients (40%), including 8 with anterior and 8 with posterior rectoceles, had previous prostatic surgery. The characteristics of rectoceles in these patients are shown in Table 1. Eleven percent of patients had bilateral pudendal neuropathy and 13.5% had unilateral pudendal neuropathy; 49% and 11% had paradoxical puborectalis contraction or other abnormalities on EMG, respectively.

Anorectal manometry results are listed in Table 2. A high resting pressure with a mean 3.9 cm high pressure zone was found in 29% of patients. Accompanying findings on defecography were incomplete or non-relaxation of the puborectalis muscle in 26 (66%), perineal descent (fixed or dynamic) in 26 (65%), intussusception in 9 (23%) and sigmoidocele in 6 (15%). However, only 9 (23%) patients had a prominent rectocele. When the rectocele was ≥3 cm (mean, 3.7±0.9; range, 3.0–5.0), 56% (5 of 9) were prominent as compared to only 13% (4 of 31) of the smaller lesions (mean, 1.4±0.5; range, 1.0–2.5; $p<0.001$). When the

Table 1 Characteristics and symptoms

	Rectoceles, n (%)		
	Anterior (n=19)	Posterior (n=19)	Total (n=40)
Chief complaints			
Constipation	17 (43)	16 (40)	33 (83)
Rectal pain	1 (3)	4 (10)	5 (13)
Incontinence	0 (0)	1 (3)	1 (3)
Rectal prolapse	1 (3)	0 (0)	1 (3)
Symptoms			
Difficult evacuation	18 (45)	17 (43)	35 (88)
Incomplete evacuation	16 (40)	13 (33)	29 (73)
Rectal pain	8 (20)	8 (20)	16 (40)
Abdominal pain	5 (13)	6 (15)	11 (28)
Bloating	5 (13)	4 (10)	9 (23)
Anorectal bleeding	1 (3)	4 (10)	5 (13)
Incontinence	0 0)	1 (3)	1 (3)
Evacuation of stool			
Assisted	13 (33)	15 (38)	28 (70)
Unassisted	6 (15)	6 (15)	12 (30)
Prostatectomy	8 (20)	8 (20)	16 (40)

Table 2 Anorectal manometry findings

	Mean	SD	SEM
Resting pressure (mmHg)			
Mean	61.0	22.2	3.7
Maximum	79.6	29.7	5.0
Squeeze pressure (mmHg)			
Mean	99.2	50.0	8.3
Maximum	128.1	61.4	10.2
Rectal sensation (ml)	42.6	30.2	5.0
Rectal capacity (ml)	173.2	98.3	16.4
Rectal compliance	12.1	12.3	2.1
HPZ (cm)	2.9	1.6	0.3

HPZ, high pressure zone; *SD*, standard deviation; *SEM*, standard error of the mean

rectocele was ≥3 cm, 78% (7 of 9) of patients had perineal descent, compared to 61% (19 of 31) in patients with a rectocele <3 cm, although this finding was not statistically significant. Of the 9 patients with prominent rectoceles, 5 (56%) had perineal descent as compared to 71% (22 of 31) of patients with non-prominent rectoceles. Neither size nor prominence of the rectocele was significantly related to perineal descent. None of the rectoceles were operated upon.

Discussion

Defecography is used to define both normal and aberrant function in patients with defecation disorders; it is the best method for evaluation of dynamic change during evacuation [24]. Asymptomatic rectoceles are found in up to 77% of women who undergo defecographic examination [25, 26] and in 27%–41% of patients with evacuatory disorders [3, 14, 24, 27]. However, rectoceles in male patients with evacuatory disorders have rarely been discussed. The current study intimates that prostatectomy may possibly predispose to the development of an anterior rectocele. A proposed pathogenesis involves the empty cavity which, in subjects with excessive straining, allows herniation of the rectum into the rectocele pocket [9]. Meanwhile, a hypertrophied prostate can obstruct the urinary outflow, which further increases excessive straining during urination. In this situation, the pelvic floor weakens, allowing the formation of a posterior rectocele.

Rectoceles in male patients in this study were accompanied by several other anatomic abnormalities. Rectoanal intussusception was found in 23% of patients. Rectoanal intussusception can be found both in asymptomatic subjects [2, 28, 29] and in patients with defecation disorders [30]. Shorvon et al. [25] studied 47 normal adults and found evidence of intussusception in 44% of men and in 45% of women.

The incidence of sigmoidocele or enterocele during defecography was 19% in studies by Ekberg et al. [28] and Mellgren et al. [3] and 16.1% in a report by Agachan et al. [26]. The 15% incidence of sigmoidocele during defecography in our study is similar to these reports. Despite advances in the diagnosis of sigmoidocele, it has been regarded as a cinedefecographic finding, rather than a true entity. The clinical role of sigmoidocele is controversial and its role in the etiology of male rectocele is still unknown.

Rectocele in female patients has reportedly been associated with a high incidence of PD [1–3]. In the present study, 65% of patients had PD. Thus, it seems that PD is a common phenomenon in cases of male rectocele as well. The high incidence of PD suggests that the etiology of male rectocele may involve laxity or weakness of the levator muscle or pelvic floor that is related to perineal descent.

Johansson et al. [5] reported a close relationship between rectocele and paradoxical puborectalis contraction in women with evacuation difficulties. Seventy-one percent of patients with rectocele had concomitant paradoxical puborectalis contraction. The current results showed that 66% of male patients had a non-relaxing or partially relaxing puborectalis muscle. The actions of excessive and repeated straining and expulsion forces over time may weaken both the rectal wall and the perineal floor, increasing perineal descent with the formation of an intraperineal functional rectocele. This is supported by the fact that puborectalis dysfunction was the most common association with rectocele in our study. Not surprisingly, the size of the rectocele is related to its prominence. When the rectocele was ≥3 cm, 56% were prominent compared to only 13% of lesions <3 cm. However, neither size nor prominence of the rectocele was significantly related to perineal descent.

The present study showed that 11% of patients with rectocele had bilateral and 13% had unilateral PN. Vaccaro et al. [31] reported that 12.4% of patients with chronic constipation had bilateral PN and 11.2% had unilateral PN. Vaccaro et al. [32] again reported that PN was not related to nonrelaxing puborectalis syndrome or pelvic outlet obstruction. However, PN may be prevalent in patients with a variety of evacuatory disorders.

The mean resting (MRP) (61±12 mmHg) and mean squeeze pressure (MSP) (99±50 mmHg) in patients with rectocele were within the normal range for the same age group in our institution (MRP, 64.6 mmHg; and MSP, 99.3 mmHg) [33]. There was no significant difference in anal canal pressure between this group and normal patients. This finding confirms the results of Yoshioka et al. [2] who found no significant difference in anal canal pressure between patients with or without rectocele.

Rectoceles are far less prevalent in males than in females. They rarely appear as an isolated dysfunction and are often associated with non-relaxation of the puborectalis muscle or with perineal descent. However, rectoceles in males are frequently associated with prostatectomy. Therefore, the cause

may be a misdirection of evacuatory forces combined with an anterior rectal wall weakness and potential "dead space" after prostatectomy.

References

1. Piccirillo MF, Teoh TA, Yoon KS, Patina-Paul RA, Lucas J, Wexner SD (1996) Rectoceles: the incidence and clinical significance. Tech Coloproctol 2:75–279
2. Yoshioka K, Matsui Y, Yamada O et al (1991) Physiologic and anatomic assessment of patients with rectocele. Dis Colon Rectum 34:704–708
3. Mellgren A, Bremmer S, Johanasson C et al (1994) Defecography: results of investigations in 2816 patients. Dis Colon Rectum 37:1133–1141
4. Siproudhis L, Dautreme S, Ropert A et al (1993) Dyschezia and rectocele – a marriage of convenience? Physiologic evaluation of rectocele in a group of 52 women complaining of difficulty in evacuation. Dis Colon Rectum 36:1030–1036
5. Johansson C, Nilsson BY, Holmstrom B, Dolk A, Mellgren A (1992) Association between rectocele and paradoxical sphincter response. Dis Colon Rectum 35:503–509
6. Karlbom U, Graf W, Nilsson S, Pahlman L (1996) Does surgical repair of a rectocele improve rectal emptying? Dis Colon Rectum 39:1296–1302
7. Janssen LWM, Van Dijke CF (1994) Selection criteria for anterior rectal wall repair in symptomatic rectocele and anterior rectal wall prolapse. Dis Colon Rectum 37:1100–1107
8. Murthy VK, Orkin BA, Smith LE, Glassman LM (1996) Excellent outcome using selective criteria for rectocele repair. Dis Colon Rectum 39:374–378
9. Cavallo G, Salzano A, Grassi R, Zanatta P, Tuccillo M (1991) Rectocele in males: clinical, defecographic, and CT study of singular cases. Dis Colon Rectum 34:964–966
10. Jorge JMN, Wexner SD, Marchetti F et al (1992) How reliable are currently available methods of measuring the anorectal angle? Dis Colon Rectum 35:332–338
11. Wexner SD, Marchetti F, Salanga V et al (1991) Neurophysiologic assessment of the anal sphincters. Dis Colon Rectum 34:606–612
12. Mahieu P, Pringot J, Bodart P (1984) Defecography: I. Description of a new procedure and results in normal patients. Gastrointest Radiol 9:247–251
13. Jorge JMN, Yang Y-K, Wexner SD (1994) Incidence and clinical significance of sigmoidoceles as determined by a new classification system. Dis Colon Rectum 37:1112–1117
14. Nogueras JJ, Wexner SD (1992) Biofeedback for nonrelaxing puborectalis syndrome. Semin Colon Rectal Surg 3:120–124
15. Jorge JMN, Wexner SD, Ger GC, Salanga VD, Nogueras JJ, Jagelman DG (1993) Cinedefecography and electromyography in the diagnosis of nonrelaxing puborectalis syndrome. Dis Colon Rectum 36:668–676
16. Jorge JMN, Ger GC, Gonzalez L, Wexner SD (1994) Patient position during cinedefecography: influence on perineal descent and other measurements. Dis Colon Rectum 37:927–931
17. Mahieu P, Pringot J, Bodart P (1984) Defecography: II. Contribution to the diagnosis of defecation disorders. Gastrointest Radiol 9:253–261
18. Jorge JMN, Wexner SD (1993) A practical guide to basic anorectal physiology investigations. Contemp Surg 43:214–224
19. Wexner SD, James K, Jagelman DG. (1991) The double stapled ileal reservoir and ileoanal anastomosis. A prospective review of sphincter function and clinical outcome. Dis Colon Rectum 34:487–494
20. Jorge JMN, Wexner SD (1993) A practical guide to anal manometry. South Med J 86:924–931
21. Jorge JMN, Wexner SD (1993) Etiology and management of fecal incontinence. Dis Colon Rectum 36:77–97
22. Bartolo DC, Jarratt JA, Read NW (1983) The use of conventional electromyography to assess external sphincter neuropathy in man. J Neurol Neurosurg Psychiatry 45:1115–1118
23. Cheong DM, Vaccaro CA, Salanga VD, Wexner SD, Philips RC, Hanson MR (1995) Electrodiagnostic evaluation of fecal incontinence. Muscle Nerve 18:612–619
24. Finlay IG, Bartolo DCC, Bartram CI et al (1988) Proctography (symposium). Int J Colorectal Dis 3:67–69
25. Shorvon PJ, McHugh S, Somers S, Stevenson GW (1987) Defecography findings in young healthy volunteers: results and implications. Gut 28:A1361–A1362
26. Agachan F, Pfeifer J, Wexner SD (1996) Defecography and proctography: results of 744 patients. Dis Colon Rectum 39:899–905
27. Jorge JM, Wexner SD, Ehrenpresis ED, Nogueras JJ, Jagelman DG (1993) Does perineal descent correlate with pudendal neuropathy? Dis Colon Rectum 36:475–483
28. Ekberg O, Nylander G, Fork FT (1985) Defecography. Radiology 155:45–48
29. Shorvon PJ, McHugh S, Diamant NE, Somers, Stevenson GW (1989) Defecography in normal volunteers: results and implications. Gut 30:1737–1749
30. Wexner SD (1991) Rectal prolapse and intussusception. In: Beck DE, Welling D (eds) Manual of patient care in colorectal surgery. Little Brown, Boston, pp 191–212
31. Vaccaro CA, Cheong DMO, Wexner SD, Salanga VD, Philips RC, Hanson MR (1994) Role of pudendal nerve terminal motor latency assessment in constipated patients. Dis Colon Rectum 37:1250–1254
32. Vaccaro CA, Wexner SD, Teoh TA, Choi SK, Cheong DMO, Salanga VD (1995) Pudendal neuropathy is not related to physiologic pelvic outlet obstruction. Dis Colon Rectum 38:630–634
33. Pfeifer J, Oliveira L, Park UC, Gonzalez A, Nogueras JJ, Wexner SD (1996) The relation of manometry to age and gender. Tech Coloproctol 1:10–13