

Enteroceles demonstrated by defaecography is associated with other pelvic floor disorders

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Accepted: 16 February 1994

Abstract. Sixty-nine patients with enterocele on defaecography, and 128 patients without enterocele but with other abnormal findings were investigated to identify concomitant colorectal disorders and their relationship with enterocele. Of the 69 patients with enterocele, 38 (55%) had concomitant rectal intussusception and 26 (38%) rectal prolapse. Abnormal physiological findings on anorectal manometry and electrophysiology were more common in patients with enterocele. Previous hysterectomy increased the risk of enterocele formation. The study has demonstrated that patients with enterocele should be investigated thoroughly for other lesions before treatment is planned. Further investigation of the role of enterocele in patients with defaecation disorders is required.

Résumé. Soixante-neuf patients présentant des entéroccèles à la défécographie et 128 patients sans entéroccèle mais avec d'autres anomalies ont été investigués afin d'identifier les troubles fonctionnels colo-rectaux concomittants et leur relation avec l'entéroccèle. De 69 patients avec entéroccèle, 38 (55%) présentent simultanément une intussusception et 26 (38%) un prolapsus du rectum. Des anomalies physiologiques lors de manométries et d'investigations électrophysiologiques sont plus fréquentes chez des patients porteurs d'une entéroccèle. Une hystérectomie préalable augmente le risque de la formation d'une entéroccèle. Cette étude démontre que les patients porteurs d'une entéroccèle doivent faire l'objet d'investigations minutieuses pour exclure toute autre lésion avant d'envisager un traitement. Des investigations ultérieures devront être envisagées pour démontrer le rôle de l'entéroccèle chez des patients souffrant de troubles de l'exonération.

Enterocoele is peritoneal sac containing intestine which in women lies between the posterior vaginal wall and the anterior rectal wall. It is found in 19% of patients with defecation disorders [3, 4]. The diagnosis is sometimes difficult on clinical examination (5), but can be made by defecography, preferably by giving the patient a barium meal prior to the investigation [3, 5, 6]. In 1952 Wallden suggested that mechanical compression on the rectum by an enterocele might cause constipation [7]. However, the role of enterocele as a cause of difficult defaecation is unclear and patients often have a combination of different abnormalities [8–10]. Enterocoele is rarely taken into account when treatment is decided. It is often accompanied by other forms of genital prolapse. Previous studies have focused on gynecological symptoms [11–13] and surgical correction has been performed without radiological or physiological evaluation. Timmons et al. [14] reported that 39% of the patients with post-hysterectomy enterocele had defaecation difficulties.

The aim of the present study was to investigate patients with enterocele, in order to identify concomitant colorectal disorders and their correlation to enterocele.

Materials and methods

Patients

Between 1985 and 1991, 295 patients underwent defaecography in the investigation of rectal emptying difficulties, severe constipation, fecal incontinence or other anorectal symptoms. One hundred and ninetyseven (67%) patients had pathological findings such as rectal intussusception, rectal prolapse, rectocele and/or enterocele at defaecography. These patients were evaluated further and were divided into two groups based on the presence or absence of enterocele (Ec).

Group 1 (Ec). These were 69 patients, including 66 women and 3 men, with enterocele (Table 1). Mean age 54.3 (range 18–95). Of the female patients 17 had previously undergone hysterectomy and 42 were postmenopausal. Thirty-one patients complained of rectal emptying difficulties, 10 patients of severe constipation, 22 patients of fecal incontinence and 6 patients of other symptoms such as pelvic pain or a sensation of heaviness.

Defecation disorders including constipation or fecal incontinence give distress to many patients. In the last decade research has identified certain different causes for these symptoms and with careful investigation therapeutic options have increased [1, 2].

Table 1. Abnormal radiological features on defecography in 197 symptomatic patients

Defaecographic findings	No. of patients
Rectal intussusception alone (RI)	55 (28%)
Rectal prolapse alone (RP)	8 (4%)
Rectocele alone (Rc)	44 (22%)
Enterocele alone (Ec)	1 (1%)
RI + Rc	19 (10%)
RI + Ec	35 (18%)
RP + Rc	2 (1%)
RP + Ec	25 (13%)
Rc + Ec	4 (2%)
RI + Rc + Ec	3 (2%)
RP + Rc + Ec	1 (1%)
Total	197

Group 2 (No Ec). There were 128 patients including 118 women and 10 men, with other abnormal radiological findings, but no enterocele (Table 1) of mean age 54.1 years (range 17–85 years). Of the female patients, 10 had previously undergone a hysterectomy and 68 were postmenopausal. Fifty-six patients complained of rectal emptying difficulties, 22 patients of severe constipation, 43 patients of fecal incontinence and 7 patients of other symptoms including pelvic pain or a sensation of heaviness.

Defaecography

We used a modification of the technique described by Broden and Snellman [6].

The patient had a barium meal 1.5 hours prior to the examination. When this reached the small bowel, thick contrast medium with a consistency similar to feces was injected into the rectum with a pistol injector in female patients a viscous contrast medium was introduced in the vagina.

The patient was seated on a commode placed on the footrest of an upright positioned examination table in front of a fluoroscopic unit. Iron plates were used for contrast levelling. Left lateral views of the pelvis were recorded during fluoroscopy with video.

Rectal intussusception was defined as a circumferential descent of the entire thickness of the rectal wall, extend to the anal canal but not beyond the anal verge. Rectal prolapse was defined as a circumferential descent of the entire thickness of the rectal wall seen coming out through the anal verge.

Enterocele was diagnosed in females when contrast filled loops were present between the vagina and rectum. In males it was diagnosed by the presence of bowel within a rectal intussusception or a rectal prolapse.

Rectocele was diagnosed when the anterior rectal and posterior vaginal wall herniated into the lumen of the vagina.

Anorectal manometry

The procedure has been previously described by Holmström et al. [15]. With this method a maximal anal pressure (MAP) less than 50 mm Hg and a maximal squeeze pressure (MSP) less than 65 mm were considered to be abnormal.

Electrophysiology

Electrophysiological assessments was carried out according to the method described by Swash et al. [16, 17]. Conventional needle

electromyography (EMG) was performed in the external anal sphincter (EAS) bilaterally and in the puborectalis muscle. EMG was considered as pathological and indicating a peripheral nerve lesion if: 1) the activity during maximal voluntary contraction (squeeze) was reduced to such an extent that only single discharges of motor unit potentials were recorded instead of a normal interference pattern, or 2) a moderately reduced interference pattern contained a considerable amount of polyphasic motor unit potentials of high amplitude (> 2 mV). A paradoxical sphincter reaction (PSR) was present if: 1) maximal straining increased the on-going EMG activity, or 2) maximal straining did not decrease the on-going EMG-activity and no closing reflex was seen after completed straining. Fibre density (FD) was measured in the EAS by single fibre EMG recordings at 20 different locations on each side. Normal values were taken from the literature [16, 18, 19]. The upper normal limits (mean + 2 SD) for different age groups were 1.52 (< 30 years), 1.82 (30–65 years), 1.88 (66–70 years) and 2.20 (71–85 years). Pudendal nerve terminal motor latency (PNTML) was determined on both sides using a special electrode (Dantec St. Mark's Pudendal Electrode 13L40). The upper limit of normal was 2.5 ms.

Colon transit time

Colon transit time was estimated according to a modification of the methods of Hinton et al. [20] and Keighley and Shouler [21].

The patients ingested markers with a meal and five days later a plain X-ray film of the abdomen was taken. The number of markers in the colon was estimated and retention of more than 40% was considered pathological. This investigation was not routinely performed in the incontinent patients.

Statistical methods

χ^2 analysis was used when comparing defaecographic findings, electrophysiological findings and frequencies of symptoms, previous hysterectomy and delayed colon transit time in patients with and without enterocele.

Normal distribution of the data was checked and Student's unpaired t-test was used when comparing MAP and MSP in patients with and without enterocele.

Results

There were no statistical differences in the incidence of rectal emptying difficulties, severe constipation and fecal incontinence between the two groups of patients. Previous hysterectomy was more common among women with enterocele (26%) than in women without enterocele (8%) ($p < 0.01$).

Defaecography

Ninety-nine percent (68/69) of the patients with enterocele had additional findings on defecography (Table 1). The frequency of rectal prolapse was higher in patients with enterocele (38%) than in patients without enterocele (8%) (Table 2). The frequency of rectocele was higher in the patients without enterocele (51%) than in patients with enterocele (12%) (Table 2). There was no statistical difference of the incidence of rectal intussusception between the two groups (Table 2).

Table 2. The incidence of radiological rectal intussusception, prolapse and rectocele in patients with and without enterocele

	Patients with enterocele (group 1) (n=69)	Patients without enterocele (group 2) (n=128)	P value
Rectal intussusception	38 (55%)	74 (58%)	NS
Rectal prolapse	26 (38%)	10 (8%)	P<0.001
Rectocele	8 (12%)	65 (51%)	P<0.001

Table 3. Anal Sphincter pressures: patients with and without enterocele

	Patients with enterocele (group 1) (n=59)	Patients without enterocele (group 2) (n=105)	P value
MAP (mmHg) (mean \pm SD)	53 \pm 24	65 \pm 21	P<0.01
MSP (mmHg) (mean \pm SD)	61 \pm 29	63 \pm 25	NS

Table 4. Pelvic floor electromyographic parameters: patients with and without enterocele

	Patients with enterocele (group 1)	Patients without enterocele (group 2)	P value
Both EMG and FD indication of pudendal nerve damage	42% (20/48)	22% (16/72)	P<0.05
PSR	28% (16/57)	40% (36/91)	NS
Increased PNTML	38% (15/40)	22% (14/65)	NS

FD, fibre density; PSR, paradoxical sphincter reaction; PNTML, pudendal nerve terminal motor latency

Anorectal manometry

MAP was reduced in 39% (23/59) of the patients with enterocele. It was lower in patients with enterocele (53 \pm 24 mmHg) than in patients without (65 \pm 21 mmHg). There was no statistical difference of MSP between the two groups (Table 3).

Electrophysiology

EMG and FD indicated a peripheral nerve lesion more often in patients with enterocele (42%) than in patients without (22%) (Table 4). There were no statistical differences in the incidence of paradoxical sphincter peach and PNTML between the two groups of patients (Table 4).

Colon transit time

There was no statistical difference in colon transit time between the two groups of patients; 16% (8/51) of the patients with enterocele had delayed colon transit time compared with 29% (19/66) of those without.

Discussion

The study demonstrated that patients with enterocele often have a concomitant colorectal disorder. One third of the patients with enterocele were incontinent of feces and we found a high incidence of abnormal MAP, EMG, FD and PNTML in these patients. One reason for these findings might be the high frequency of concomitant rectal prolapse and rectal intussusception in patients with enterocele (Table 1). Enterocele might be a part of a general insufficiency of the pelvic floor, which should be considered when treating these patients. Several reasons for this are suggested including obstetric trauma leading injury to the pelvic floor [22, 23]. This is supported by the fact that almost all patients with pelvic prolapse are women. Another possibility is that the pelvic floor can be weakened by lack of estrogen in postmenopausal women [24].

A close association between enterocele and rectal prolapse is supported by the present study and 93% of the patients with enterocele had concomitant rectal intussusception or rectal prolapse (Table 2). Ahlbäck and Brodén [25] reported the same frequency and divided enteroceles into two groups depending on whether they were situated in or outside a rectal intussusception or rectal prolapse. At clinical examination four types of enterocele are described [13] but there is a need for an improved classification in which radiological and clinical features should correspond with each other. The radiological assessment can be improved by simultaneous use of peritoneography and defecography (unpublished observations).

Previous hysterectomy was more common in women with enterocele, in accordance with previous studies [23, 26]. The normal vaginal axis is almost horizontal [23] and it is important to use the cardinal and uterosacral ligaments at hysterectomy, to hold the cervix and vagina in their proper position. Failure to do so might promote the formation of enterocele [23]. Previous studies on enterocele have mainly concerned patients after hysterectomy [12, 14, 26]. Only 26% (17/66) of the patients in the present study had undergone hysterectomy, which is therefore not obligatory for enterocele formation.

It is interesting to note that in the present study rectocele was more common in patients without than with an enterocele (Table 2). Only 12% of the patients with enterocele had a concomitant rectocele. In a report employing clinical examination only a combination of rectocele and enterocele was frequently observed [27]. However, defaecography was not used and it is not always easy to distinguish between enterocele and rectocele by clinical examination [5]. It might be that, since both rectocele and enterocele occur owing to a weakness in the recto-vaginal septum, both occupy the same anatomical space and are therefore mutually exclusive to a degree.

The importance of correcting enterocele surgically has been stressed on the grounds that it will grow in size requiring a more major procedure [22]. However, the present study indicates that enterocele is a frequent finding and is often associated with other concomitant colorectal disorders and it is unclear whether repair of the enterocele will relieve the patients' symptoms. We suggest therefore that possible concurrent pathology must be considered before deciding on the appropriate treatment.

Conclusions

An enterocele is a frequent finding in patients complaining defaecation disorders. Previous hysterectomy increases the risk. Patients with enterocele often have concomitant colorectal abnormalities. Patients with defaecation disorders and those with potential enteroceles at clinical examination should therefore be investigated thoroughly before planning treatment.

Further studies on the role of enterocele in patients with defaecation disorders are required.

Acknowledgements. We are indebted to Elisabet Berg, Department of Medical Information Processing, Karolinska Institutet, Stockholm for help with the statistical analyses.

References

- Kuijpers HC, Bleijenberg G (1990) Assessment and treatment of obstructed defecation. *Ann Med* 22:405–411
- Wexner SD, Daniel N, Jagelman DG (1991) Colectomy for constipation: physiologic investigation is the key to success. *Dis Colon Rectum* 34:851–856
- Ekberg O, Nylander G, Fork FT (1985) Defecography. *Radiology* 155:45–48
- Mellgren A, Bremmer S, Johansson C, Dolk A, Udén R, Ahlbäck S-O, Holmström B (1993) Defecography, results of investigations in 2816 patients. *Dis Colon Rectum* (in press)
- Kelvin FM, Maglinte DD, Hornback JA, Benson JT (1992) Pelvic prolapse: assessment with evacuation proctography (defecography). *Radiology* 184:547–551
- Brodén B, Snellman B (1968) Procidencia of the rectum studied with cineradiography: a contribution to the discussion of causative mechanism. *Dis Colon Rectum* 11:330–347
- Walldén L (1952) Defecation block in cases of deep rectogenital pouch. *Acta Chir Scand* 165:1–121
- Dolk A, Brodén G, Holmström B, Johansson C, Nilsson BY (1990) Slow transit of the colon associated with severe constipation after the Ripstein operation. A clinical and physiologic study. *Dis Colon Rectum* 33:786–790
- Johansson C, Nilsson BY, Holmström B, Dolk A, Mellgren A (1992) Association between rectocele and paradoxical sphincter response. *Dis Colon Rectum* 35:503–509
- Johansson C, Nilsson BY, Mellgren A, Dolk A, Holmström B (1992) Paradoxical sphincter reaction and associated colorectal disorders. *Int J Colorect Dis* 7:89–94
- Holland J (1972) Enterocele and prolapse of the vaginal vault. *Clin Obstet Gynecol* 15:1145–1154
- Addison WA, Livengood C, Sutton GP, Parker RT (1985) Abdominal sacral colpopexy with Mersilene mesh in the retroperitoneal position in the management of posthysterectomy vaginal vault prolapse and enterocele. *Am J Obstet Gynecol* 153:140–146
- Nichols DH, Randall CL (1989) *Vaginal Surgery*. 3rd edn. Williams & Wilkins, Baltimore
- Timmons MC, Addison WA, Addison SB, Cavenar MG (1992) Abdominal sacral colpopexy in 163 women with posthysterectomy vaginal vault prolapse and enterocele. Evolution of operative techniques. *J Reprod Med* 37:323–327
- Holmström B, Brodén G, Dolk A, Frenckner B (1986) Increased anal resting pressure following the Ripstein operation: a contribution to continency? *Dis Colon Rectum* 29:486–487
- Neill ME, Swash M (1980) Increased motor unit fibre density in the external anal sphincter muscle in anorectal incontinence: a single fibre EMG study. *J Neurol Neurosurg Psychiatry* 43:343–347
- Kiff ES, Swash M (1984) Slowed conduction in the pudendal nerves in idiopathic (neurogenic) faecal incontinence. *Br J Surg* 71:614–616
- Henry MM, Snooks SJ, Barnes PRH, Swash M (1985) Investigation of disorders of the anorectum and colon. *Ann R Coll Surg Engl* 67:355–360
- Percy JP, Neill ME, Kandiah TK, Swash M (1982) A neurogenic factor in faecal incontinence in the elderly. *Age Ageing* 11:175–179
- Hinton JM, Lennard-Jones JE, Young AC (1969) A new method for studying gut transit time using radioopaque markers. *Gut* 10:842–847
- Keighley MRB, Shouler PJ (1984) Abnormalities of colonic function in patients with rectal prolapse and fecal incontinence. *Br J Surg* 71:892–895
- Ranney B (1981) Enterocele, vaginal prolapse, pelvic hernia: recognition and treatment. *Am J Obstet Gynecol* 140:53–61
- Cruikshank SH (1987) Preventing posthysterectomy vaginal vault prolapse and enterocele during vaginal hysterectomy. *Am J Obstet Gynecol* 156:1433–1440
- Smith P (1993) Estrogens and the urogenital tract. *Acta Obstet Gynecol Scand* 72:1–26
- Ahlbäck S-O, Brodén B (1978) Defecography in invagination and prolapse of the rectum. *Läkartidningen* 75:668–673 (in Swedish)
- Symmonds RE, Williams TJ, Lee RA and Webb MJ (1981) Posthysterectomy enterocele and vaginal vault prolapse. *Am J Obstet Gynecol* 140:852–859
- Nichols D (1972) Types of enterocele and principles underlying choice of operation for repair. *Am J Obstet Gynecol* 40:257–263

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