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# Rectocele is associated with paradoxical anal sphincter reaction*

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**Abstract** Rectocele is a frequent finding in constipated patients. However, constipation is not always relieved by rectocele repair, which may be due to other overlooked reasons for constipation. The study was designed to investigate patients with rectocele, in order to elucidate concomitant colorectal disorders and their association with rectocele. One hundred and twelve female patients suffering from severe constipation and rectal emptying difficulties were investigated using defecography, electrophysiology, anorectal manometry and colon transit time. Fifty-six patients with rectocele demonstrated by defecography were compared with 56 patients without rectocele, but with other abnormal findings at defecography. The frequency of paradoxical anal sphincter reaction (PSR) was higher in patients with rectocele (60%) than in patients without rectocele (24%). The present study supports an association between rectocele and PSR. We suggest that constipated patients with a rectocele should be investigated thoroughly before rectocele repair is considered. Further studies on the effect of biofeedback training in patients with rectocele and PSR are indicated.

**Key words** Rectocele · Constipation · Paradoxical and sphincter reaction

**Résumé** La mise en évidence d'une rectocèle est fréquente chez des patientes constipées. Le traitement chirurgical de la rectocèle ne guérit toutefois pas dans tous les cas la constipation qui peut être due à d'autres raisons méconnues. L'étude présente a été entreprise pour étudier chez les patientes porteuses d'une rectocèle s'il existe des lésions colo-rectales concomittantes et dans quelle mesure elles associées à la rectocèle. Cent-douze femmes souffrant de constipation sévère et de troubles de l'évacuation rectale ont été investiguées à l'aide de défécographies, de mesures électrophysiologiques, de manométries ano-rectales et de déterminations du temps de transit colique. Cinquante-six patientes chez lesquelles la défécographie a mis en évidence une rectocèle ont été comparées avec 56 patientes sans rectocèle mais porteuses d'autres anomalies à la défécographie. La fréquence d'une réaction paradoxale du sphincter anal est plus souvent observée chez des patientes porteuses d'une rectocèle (60%) que chez les patientes sans rectocèle (24%). Cette étude supporte l'idée d'une association entre la rectocèle et la réaction paradoxale du sphincter anal. Nous suggérons que des patientes constipées porteuses d'une rectocèle doivent faire l'objet d'investigations complètes avant que l'on envisage la correction chirurgicale de la rectocèle. D'autres études sur l'efficacité du biofeedback en cas de rectocèle et de réactions paradoxales du sphincter anal devraient être entreprises.

Patients with rectocele may present with a variety of symptoms, thereby necessitating consultation with both gynecologists and surgeons. A rectocele may be isolated or part of a complete genital prolapse.

Symptoms of rectocele include a bearing-down sensation, incomplete rectal emptying, a sensation of rectal pressure and sometimes vaginal symptoms from the herniation itself [1, 2]. The role of a rectocele in constipation is controversial. At defecography about 25% of patients with defecation disorders have a rectocele, but many women with rectocele are not constipated [3].

A transvaginal approach for rectocele repair is advocated by several gynecologists [2, 4, 5]. Using this approach gynecologic symptoms are often improved. How-

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ever, if the patient is constipated preoperatively, the outcome is sometimes less favorable. In 1967 Marks [6] reported that correction of the vaginal deformity alone did not provide sufficient relief of constipation. Concomitant surgery of anorectal pathology and repair of rectocele by endorectal approaches have therefore been proposed [1, 6–11].

Arnold et al. [12] however, found no difference in symptomatic outcome regarding constipation after rectocele repair by transvaginal and endorectal approaches. They suggested that patients should be investigated preoperatively by transit studies, anal manometry, and defecography to identify constipation due to slow colonic transit or outlet obstruction caused by reasons other than a rectocele.

The aim of the present study was to determine the degree to which patients with rectocele, have concomitant colorectal disorders and to assess any such association with rectocele.

## Patients and methods

*Patients*

From 1987 to 1991 inclusive 178 female patients prospectively underwent defecography owing to severe constipation and rectal emptying difficulty. One hundred and twelve patients (63%) had radiologic abnormalities rectal intussusception, rectal prolapse, rectocele and or enterocele including. These patients were divided into two groups based on the presence or absence of a rectocele.

*Group 1 (Rc):* This included 56 patients with rectocele (Table 1). The mean age was 50 years (range 19–81 years). Five patients had previously undergone hysterectomy and 32 were postmenopausal.

*Group 2 (No Rc):* In this group there were 56 patients without rectocele who had other abnormalities on defecography (Table 1). The mean age was 53 years (range 29–75 years). Six patients had previously undergone hysterectomy and 30 were postmenopausal.

*Defecography*

A modification of the technique described by Brodén and Snellman [13] was used. The patient had a barium meal 1.5 hours prior to the examination. When this reached the small bowel, thick constrast medium with a consistency similar to feces was injected into the rectum.

**Table 1** Abnormal radiologic findings on defecography in 112 female-patients with rectal emptying difficulties

| Defecographic findings | No of patients | |
|---|---|---|
| Rectal intussusception alone (RI) | 20 | (18%) |
| Rectal prolapse alone (RP) | 3 | (3%) |
| Rectocele alone (Rc) | 36 | (32%) |
| Enterocele alone (Ec) | 0 | (0%) |
| RI + Rc | 14 | (12%) |
| RI + Ec | 22 | (20%) |
| RP + Rc | 0 | (0%) |
| RP + Ec | 11 | (10%) |
| Rc + Ec | 3 | (3%) |
| RI + Rc + Ec | 2 | (2%) |
| RP + Rc + Ec | 1 | (1%) |
| Total | 112 | |

A viscous contrast medium was simultaneously instilled into the vagina. The patient was seated on a commode placed and exposed to a fluoroscopic unit. Iron plates were used for contrast leveling. Left lateral views of the pelvis were recorded during fluoroscopy by video.

A rectocele was diagnosed when the anterior rectal and posterior vaginal wall herniated into the lumen of the vagina an by how much?

Rectal intussusception was defined as a circumferential descent of the entire thickness of the rectal wall, which might extend into the anal canal but not through the anal verge. Rectal prolapse was defined as a circumferential descent of the entire thickness of the rectal wall seen coming out through the anus. An enterocele was diagnosed when small bowel was present between the vagina and rectum.

*Electrophysiology*

Electrophysiologic analysis provides information on the function of the pelvic floor musculature and its innervation. Electrophysiologic assessment was carried out according to the method described by Swash et al. [14, 15]. Conventional needle electromyography (EMG) was recorded in the external anal sphincter (EAS) bilaterally and in the puborectalis muscle. EMG was considered pathologic indicating a peripheral nerve lesion if: 1) the activity during maximal voluntary contraction (squeezing) 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 number of polyphasic motor unit potentials of high amplitude (>2 mV).

A paradoxical anal 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 for FD were derived from the literature [14, 16, 17] and the 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.

*Anorectal manometry*

The procedure has been previously described by Holmström et al. [18]. With this method maximal anal resting pressure (MRP) less than 50 mm Hg, maximal anal squeeze pressure (MSP) less than 65 mm Hg and maximal tolerable volume (MTV) less than 150 ml or more than 400 ml were considered pathologic. Rectal sensibility was considered abnormal if the patient had no sensation of rectal filling following insufflation of the rectal balloon with 150 ml of air.

*Colon transit time*

Colon transit time was estimated according to a modification of the methods of Hinton et al. [19] and Keighley and Shouler [20]. The patients ingested a capsule containing markers with a meal and five days later a plain x-ray of the abdomen was taken. The number of markers in the colon was estimated. A residue of more than 40% in the colon was considered pathologic.

*Statistical methods*

The analyses were performed by the Department of Medical Information Processing, Karolinska Institutet, Stockholm.

Chi-squared analysis was used when comparing defecographic and electrophysiologic findings, frequency of constipation, previous

hysterectomy and delayed colon transit time in patients with and without rectocele.

Normal distribution of the data was checked and Student's unpaired *t*-test was used when comparing MRP and MSP.

## Results

The frequency of previous hysterectomy did not significantly differ between patients with (9%) or without rectocele (11%).

### *Electrophysiology*

The frequency of PSR was higher in patients with rectocele (60%) than in patients without (24%) (Table 2). There were no statistical differences in the frequencies of pathologic PNTML and pathologic findings indicating peripheral neuropathy on EMG or FD between the two groups of patients (Table 2).

### *Defecography*

Thirty-six percent (20/56) of patients with rectocele had additional radiological abnormalities on defecography (Table 1). The frequencies of enterocele, rectal intussusception, and rectal prolapse were lower in patients with rectocele than in patients without (Table 3).

### *Anorectal manometry*

MRP was higher in patients with rectocele than in patients without ($P<0.01$) (Table 4). There was no statistical difference of MSP between patients with and without rectocele (Table 4).

### *Colon transit time*

The proportion of patients with delayed colon transit time did not differ significantly between the two groups. Eleven (30%) of the 31 patients with rectocele had delayed colon transit time compared with 13 (32%) of 41 patients without.

**Table 2** Pelvic floor electromyographic parameters in constipated female-patients with and without rectocele

| | Patients with rectocele | Patients without rectocele | |
|---|---|---|---|
| PSR[a] | 60% (26/43) | 24% (10/41) | $P<0.001$ |
| Pathologic PNTML[b] | 16% (5/31) | 32% (8/25) | N.S. |
| Both EMG and FD[c] indicate peripheral nerve damage | 17% (6/35) | 29% (9/31) | N.S. |

[a] Paradoxical and sphincter reaction
[b] Pudendal nerve terminal motor latency
[c] Fibre density

**Table 3** The incidence of rectal intussusception, rectal prolapse, and enterocele in constipated female-patients with and without rectocele

| | Patients with rectocele ($n=56$) | Patients without rectocele ($n=56$) | |
|---|---|---|---|
| Rectal intussusception | 29% | 75% | $P<0.001$ |
| Rectal prolapse | 2% | 25% | $P<0.001$ |
| Enterocele | 11% | 59% | $P<0.001$ |

**Table 4** Anal sphincter pressures in patients with and without rectocele

| | Patients with rectocele ($n=56$) | Patients without rectocele ($n=56$) | |
|---|---|---|---|
| MRP (mm Hg) (mean±SD) | 72±19 | 61±23 | $P<0.01$ |
| MSP (mm Hg) (mean±SD) | 72±26 | 64±26 | N.S. |

## Discussion

Patients with rectocele often complain of constipation [3, 9] as the present study has also demonstrated. The vector force created by the valsalva manoeuvre is partially dissipated through the rectovaginal septum [9], and as a result the patients must strain harder to defecate. It is, however, often difficult to ascertain whether the rectocele is responsible for symptoms or whether there might be another cause. Physiologic evaluation of patients with rectocele has therefore been suggested [12, 21, 22], before considering surgical repair.

We have previously reported [23] that paradoxical sphincter reaction (PSR) is frequently found in patients with rectocele. The present study demonstrates an association between rectocele and PSR and this association may indicate that PSR is a causative factor in the formation of the rectocele. Straining and emptying efforts against a contracted pelvic floor may facilitate development of rectocele. This association might also be one of the reasons for suboptimal results of surgical repair.

Different approaches to the treatment of PSR have been proposed [24–27]. The best results are reported using EMG feedback [28–30], aiming to teach patients to relax the pelvic floor muscles during straining. The present study indicates that some patients with rectocele might benefit from biofeedback.

The present study does not support an association between rectocele and pathologic reduced colon transit although this was abnormal in a high frequency of the patients. It may nevertheless be useful to include colonic transit studies in the preoperative assessment since these pa-

tients might have a less favorable outcome after rectocele repair [22].

Defecography is necessary in the evaluation of patients to confirm the clinical diagnosis and visualize concurrent abnormalities.

Surprisingly rectocele was negatively associated with enterocele in the present study. Nichols [31] reported rectocele and enterocele often to be found together on gynecologic examination, but this could not be verified in the present study. This might be explained by the reported difficulty of distinguishing enterocele from rectocele on gynecologic examination [32, 33] or that rectocele and enterocele both being due to weakness of the rectovaginal septum may compete for the same anatomic space.

Surgical repair of rectocele is not always satisfactory. Surgical technique is important [22] and preoperative and radiologic assessment will help to exclude patients whose constipation is due to reasons other than rectocele.

## Conclusions

The present study supports an association between rectocele and paradoxical anal sphincter reaction. Constipated patients with rectocele should be investigated thoroughly before surgical repair is considered. Defecography will confirm the clinical diagnosis and might show concurrent abnormalities. Electrophysiologic assessment might demonstrate PSR and transit studies will help to identity patients with a less favorable outcome after surgical repair.

Further prospective studies on the effect of biofeedback in patients with rectocele and PSR are indicated.

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