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Role of pelvigraphy and colpocystodefecography in diagnosis of outlet obstructive constipation

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Abstract *Aims:* The aim was to research the changes in pelvic floor morphology and corresponding viscera in patients with outlet obstructive constipation (OOC). *Patients and methods:* Thirty-eight patients with OOC and 12 healthy volunteers were enrolled in this study. With simultaneous pelvigraphy and colpocystodefecography (PCCD), including pelvigraphy, vaginal opacification, voiding cystography and defecography, pelvic floor morphology was observed and the anorectal angle, the level of the perineum, peritoneum and bladder were measured. *Results:* Thirty-seven cases of internal rectal prolapse (IRP), 5 cases of rectocele (RC) and 5 cases of spastic pelvic floor syndrome SPFS were diagnosed by PCCD. 12 IRP, 4 RC and 1 SPFS were detected by common physical examination. All of these were confirmed by PCCD. Moreover, PCCD found 9 pelvic floor hernia

or peritoneoceles, 6 cystoceles, 3 descending perineum syndromes and 10 uterine prolapses. Compared with controls, OOC patients had a significantly large anorectal angle during defecation, abnormal descending of the perineum at rest and during defecation, and a deep pouch of Douglas during defecation. Some patients with urinary system symptoms may have had an abnormal descent of the bladder during rest and defecation. *Conclusion:* Simultaneous PCCD has a higher positive ratio than the common physical examination in diagnosing IRP and RC, and provides information for the diagnosis of pelvic floor hernia or peritoneocele, cystocele or uterine prolapse. PCCD is helpful in the selection of a proper surgical procedure.

Keywords Constipation ·
Gastrointestinal motility ·
Defecography

Introduction

Outlet obstructive constipation (OOC) is a defecation disorder that is due to functional abnormality of the anorectum. As a functional disease, OOC is a special syndrome resulting from pathophysiologic and anatomic changes in the peritoneum of the pelvic floor and pelvic organs. The most common clinical manifestations include difficult defecation

and some urinary or gynecological symptoms. The present study combined peritoneography, cystography, defecography, as well as vagina barium marker together (pelvigraphy and colpocystodefecography, PCCD) in order to explore the relation among the pelvic organs and pelvic floor morphology, and further improve diagnostic veracity and completeness.

Table 1 General patient information. *OOC* outlet obstructive constipation

Group	Patients	Gender		Age (years)		Duration	
		Male	Female	Average	Range	Average	Range
Control group	12	2	10	45.0	30–60		
OOC group	38	4	34	47.5	28–72	38	1–240

Patients and methods

Patients

The general information of patients in the control group and the OOC group is found in Table 1. The control group was composed of volunteers who had no disease related to the anorectum or difficult defecation. The OOC group consisted of 38 patients with difficult evacuation, anorectal bloating, incomplete defecation, and finger assistance defecation (Table 2). Among the OOC group, 13 patients showed frequent urination, urinary incontinence or dysuria (Table 3). Five cases showed symptoms related to gynecology, such as excess leucorrhea or yellow leucorrhea and pain during sexual activity, and 5 patients had a pelvic or abdominal operation history, such as hysterectomy, caesarean section or transabdominal rectopexy.

Techniques for examination

The apparatus for examination was an autoradiography system (VS-10 800 mA; DAOJING, Japan).

Table 2 Symptoms of the OOC group ($n=38$)

Symptoms	Case	Ratio (%)
Difficult evacuation	32	84.3
Anorectal bloating	31	81.6
Incomplete emptying	30	78.9
Taking laxatives	18	47.4
Finger assistance	3	7.9
Rectal bleeding	2	5.3

Each patient had more than one symptom

Table 3 Concomitant urinary symptoms of the OOC group ($n=13$)

Symptoms	Cases	Ratio (%)
Frequent urination	9	69.2
Urinary incontinence	11	84.6
Difficult urination	4	30.8

Each patient had more than one symptom

Method

Bowel preparation was unnecessary, but a scratch test with iodine had to be carried out before examination. With an empty bladder, patients lay down on their back. Under the surveillance of autoradiography, 20 ml of Omnipaque (300 mg/ml) was injected into the abdominal cavity. Contrast medium in the urinary bladder was Omnipaque (25%, 120 ml) infused through the ureter. The patient stood up, breathing deeply, to make the Omnipaque flow into the pouch of Douglas. Next, patients were seated on a wooden commode. A resting and a straining photo was taken to evaluate the configuration and descending degree of the peritoneum of the pelvic floor and bladder respectively. Then, patients lay down on their left side and 250–300 ml barium paste was infused into their rectum until they felt bloated. The anal canal and vagina was marked by barium paste. Finally, the patient was seated on the wooden commode once more, and a different phase of defecation was screened under a cineradiographic system.

Parameter measurement

The anorectal angle (ARA) was calculated by using the central longitudinal axis (the areas above and below the axis are equal) of the lower rectum. The median impression of the muscles symbolized the position of the perineum, the lowest point of the pouch of Douglas symbolized the position of the peritoneum of the pelvic floor, and the position of the bladder was represented by the lowest point of the cervix of the bladder. The parameters mentioned above were measured according to the low edge of ischial tuberosity. The distance between two points represented its position, which was positive if it was over the line, and negative if it was below the line. The variational degree of each parameter was obtained by subtracting the resting value from the straining value.

Statistical analysis

The data obtained were expressed as mean \pm SE for each group. Comparison between the different groups was performed using the Student's *t*-test with $p < 0.05$ considered an indicator of significance.

Results

Radiographic results

Among the 38 patients with OOC, all patients displayed abnormality of pelvic floor configuration except one. By using PCCD, 37 patients were diagnosed as having internal rectal prolapse (IRP), and 5 with rectocele (RC). Two cases of spastic pelvic floor syndrome (SPFS; paradoxical sphincter reaction) were also found. The clinical physical examination proposed a diagnosis of 12 IRP, 4 rectoceles and 1 SPFS, which were totally verified by PCCD. Moreover, 9 peritoneoceles, 6 cystic prolapses, 3 perineal descending syndromes, and 10 uterine prolapses were found by PCCD. In the control group, PCCD displayed 5 patients with IRP, and 1 of them had an accompanying rectocele, while others showed no abnormalities.

Results of measured parameters

There is no significant difference in ARA in the rest phase between the two groups ($p>0.05$). Compared with the controls, OOC patients had a significantly large anorectal angle during defecation, descent abnormality of the perineum at rest and during defecation, and a deep pouch of Douglas during defecation ($p<0.01$, Table 4). Some patients with urinary system symptoms may have had an abnormal descent of the bladder during rest and defecation ($p<0.01$, Table 4).

Discussion

The etiology of OOC has now become controversial. Previous studies usually focused on the anorectum rather

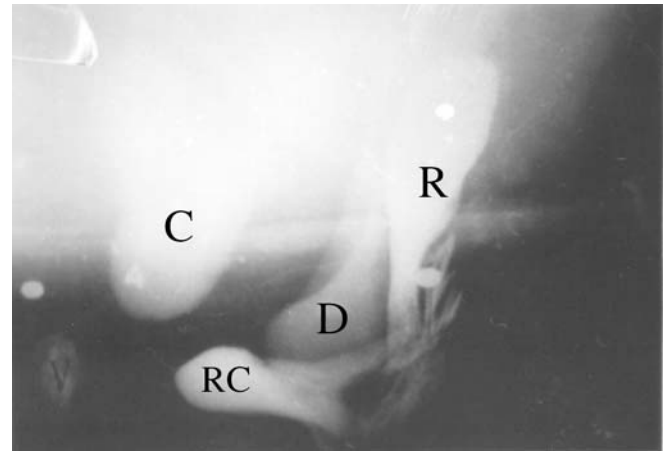


Fig. 1 Peritoneoceles press on the front of the rectal wall or the cervix of the rectocele. *C* cyst, *D* Douglas pouch, *R* rectum, *RC* rectocele

than bladder, uterus, vagina, and the peritoneum of the pelvic floor, so it is difficult to explain some of the urinary and uterine symptoms observed in clinical practice. Therefore, we designed PCCD to observe not only the anorectal alteration, but also the bladder, female reproductive organs, and the peritoneum of the pelvic floor.

This study indicates that OOC can result in a change in the position and configuration of the pelvic organs, which can exist uniquely or coexist with others. PCCD can display the relationship among the pelvic organs during defecation [1]. For example, a peritoneocele may press on the front of the rectal wall or the cervix of the rectocele (Fig. 1), a prolapsed bladder may press on the front of the vagina, and a tipped uterus may make the rectum press on the sacrum (Fig. 2). PCCD had a higher positive rate in the diagnosis of OOC, especially in the peritoneocele, bladder prolapse, and tipped uterus, while a clinical, common

Table 4 Results of defecography

	Resting phase	Straining phase
Anorectal angle		
Control group ($n=12$)	117.42±12.04	127.94±14.09*
OOC group ($n=38$)	121.53±12.29	138.64±10.68
Position of the perineum		
Control group ($n=12$)	1.55±1.28	-0.49±1.27
OOC group ($n=38$)	0.88±0.83*	-2.15±0.79**
Position of the peritoneum		
Control group ($n=12$)	5.96±1.24	4.68±1.13
OOC group ($n=38$)	5.84±2.90	2.54±2.25**
Position of the bladder		
Control group ($n=12$)	5.91±1.03	5.23±1.43
OOC group ($n=38$) ^a	4.73±1.51*	2.75±1.55**

* $p<0.05$; ** $p<0.01$ compared with the control group

^aHad urinary symptoms

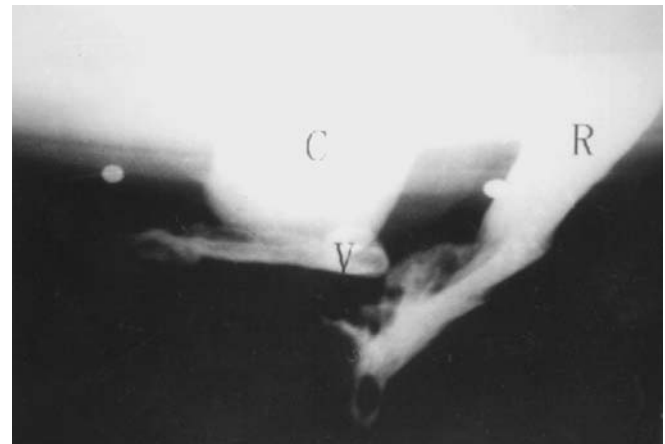


Fig. 2 Tipped uterus presses on the rectum. *C* cyst, *R* rectum, *V* vagina

physical examination was only able to diagnose 30–40% of rectal prolapses and rectoceles [2]. So we consider PCCD as an objective, effective and simple method, which, combining the dynamic and static phases, can be used to examine the alteration of the pelvic organs and peritoneum in patients with OOC [1, 3–5].

Of the 9 patients with peritoneocele diagnosed by PCCD, 3 patients underwent surgery. A deepened Douglas pouch was observed during the operation, indicating the existence of a peritoneocele, and the frontal wall of the rectum was pressed by a tipped uterus, which was observed in 2 female patients as well. We used a transabdominal rectopexy [6, 7],

and selected uterofixation in patients with a tipped uterus. As a result, symptoms related to difficult defecation were obviously alleviated postoperatively. Therefore, the precise preoperative diagnosis supplied by PCCD can help to select a rational treatment, to decide the necessity and type of operation, to give objective evidence for the corrective scope and degree of operation, and to avoid misoperation. However, to further elevate the success rate of treatment, a transabdominal operation should be considered for those patients who are likely to have an accompanying peritoneocele, cystic prolapse, and a tipped uterus, especially when non-operative methods have no effect.

References

1. Hock D, Lombard R, Jehaes C et al (1993) Colpocystodefecography. *Dis Colon Rectum* 36:1015–1021
2. Liberman H, Hughes CH, Dippolito A (2000) Evaluation and outcome of the Delorme procedure in the treatment of rectal obstruction. *Dis Colon Rectum* 43:188–192
3. Altringer WE, Saclarides TJ, Dominguez JM, Brubaker LT, Smith CS (1995) Four-contrast defecography: pelvic “flooroscopy”. *Dis Colon Rectum* 38:695–699
4. Bremner S, Mellgren A, Holmstrom B et al (1997) Peritoneocele: visualization with defecography and peritoneography performed simultaneously. *Radiology* 202:373–377
5. Agachan F, Pfeifer J, Wexner SD (1996) Defecography and proctography. Results of 744 patients. *Dis Colon Rectum* 39:899–905
6. Zhang SB, Zhang LY, Huang XK et al (1996) The relationship between constipation and prolapse of pelvic floor. *Chin J Surg* 34:770
7. Zhang SB, Zhang LY (1996) Morphological changes and the clinical significance of pelvic floor in patients with internal rectal prolapse. *Chin J Radiol* 3:253–256