

Measuring the space between vagina and rectum as it relates to rectocele

Jin Liu, Li-Dong Zhai, Yun-Sheng Li, Wan-Xiang Liu, Rui-Hua Wang

Jin Liu, Li-Dong Zhai, Yun-Sheng Li, Wan-Xiang Liu, Department of Anatomy and Neurobiology, Tianjian Medical University, Tianjin 300070, China

Rui-Hua Wang, Radiology Division, Tianjin Hongqiao Hospital, Tianjin 300131, China

Author contributions: Li YS designed the study; Liu J, Zhai LD performed the research, analyzed the data and wrote the paper; Wang RH, Liu WX participated in the study.

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Correspondence to: Yun-Sheng Li, Professor, Department of Anatomy and Neurobiology, Tianjian Medical University, Qixiangtai Road 22, Heping District, Tianjin 300070, China. liujin@tjmu.edu.cn

Telephone: +86-22-23542535

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functional outcomes of rectocele repair.

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Abstract

AIM: To measure the normal space between the posterior wall of the vagina and the anterior wall of the rectum using computed tomography (CT) and reveal its relationship to rectocele.

METHODS: A total of twenty female volunteers without rectocele were examined by CT scan. We performed a middle level continuous horizontal pelvic scan from the upper part to the lower part and collected the measurement data to analyze the results using *t*-test.

RESULTS: Twenty volunteers were enrolled in the study. The space between the posterior wall of the vagina and the anterior wall of the rectum was measured at three levels (upper 1/3, middle, lower 1/3 level of vagina). The results showed that the space from the posterior wall of the vagina to the anterior wall of the rectum at the upper 1/3 level and the middle level was 3.896 ± 0.3617 mm and 4.6575 ± 0.3052 mm, respectively. When the two groups of data were compared, we found the space at the upper 1/3 level was shorter than at the middle level ($P < 0.01$). Moreover, at the lower 1/3 level the space measured was 10.058 ± 0.4534 mm. The results revealed that the space at the lower 1/3 level was longer than that at the middle level ($P < 0.01$).

CONCLUSION: These measurement data may be helpful in assessing rectocele clinical diagnosis and

INTRODUCTION

Rectocele (herniation of the anterior rectal wall into the posterior wall of vagina) is a common problem in women. Nichols and Genadry^[1] and Pucciani^[2] divided rectocele into those with chronic evacuation difficulty and normal genital position (type 1, distension rectocele) and those associated with genital organ prolapse (type 2, displacement rectocele). It has been suggested that these two types have different anatomical, clinical, and therapeutic methods. In the past few decades, several techniques have been proposed for treating rectocele. In some mild cases, conservative management succeeded. If conservative management failed to relieve symptoms, surgical treatment was advocated. Endorectal rectocele repair has been performed by colorectal surgeons^[3-5]. However, after endorectal repair difficult evacuation has been reported^[6,7]. Transvaginal rectocele repair has been performed mainly by gynecologists using posterior colporrhaphy^[8,9]. These methods included plication of the levator muscles, strengthening of the rectovaginal septum and closure of the specific defect of the rectovaginal fascia. Transvaginal repair has been criticized because of sexual discomfort. The aim of the present study was to measure the normal spaces between rectum and vagina using computed tomography (CT). To our knowledge, data on the normal space between rectum and vagina was lacking. This information should prove beneficial not only to rectocele repair but also to the correction of genital organ prolapse.

MATERIALS AND METHODS

Twenty female volunteers without rectocele were examined by CT (SIEMENS SOMATOM spirit, JAPAN) scan in Tianjin HongQiao hospital. Their mean age were 42.5 years (range 32-48 years). They were placed in the supine position, and received continuously horizontal pelvic scan from the upper part of the vagina to its lower part. This scanning was performed with a slice thickness of 8.0 mm and collimation of 4.0 mm. We used CT to reconstruct the images on three planes (upper, middle, lower level of the vagina) and measured the vertical space from the posterior wall of the vagina to the anterior wall of the rectum. We collected the measurement data and used *t*-test to analyze the results.

RESULTS

We measured the space between the posterior wall of the vagina and the anterior wall of the rectum of the volunteers at three levels (upper 1/3, middle, lower 1/3 level of the vagina) and collected data. The data was divided into three groups. The first group was measured at the upper 1/3 level of the vagina (Figure 1A), the second group was acquired at the middle level of the vagina (Figure 1B) and the third group was measured at the lower 1/3 level of the vagina (Figure 1C). The two-samples mean *t*-test was used to study differences between groups. Table 1 showed the data describing the distance between the posterior wall of the vagina and the anterior wall of the rectum at three levels (upper 1/3, middle, lower 1/3 level of the vagina). Table 2 presented the comparison of space size between the upper 1/3 level of the vagina and the middle level of the vagina and the comparison of space size between the middle level of the vagina and the lower 1/3 level of the vagina. Data was expressed as mean \pm SD, and statistical significance was considered present when $P < 0.01$. In Table 2, the results showed the space from the posterior wall of the vagina to the anterior wall of the rectum was longer at the middle level of the vagina than at the upper 1/3 level of vagina ($P < 0.01$) and was shorter at the middle level of the vagina than at the lower 1/3 level of the vagina ($P < 0.01$).

DISCUSSION

Rectocele is defined as herniation of the anterior rectal wall into the posterior vaginal wall. Rectoceles may be classified according to their position (low, middle, high); size (small < 2 cm, medium 2-4 cm, large > 4 cm); degree (type 1, type 2). The classifications of position and size are pure an anatomical description. However, the degree type could lead surgeons to make different decisions for management, which were proposed by Nichols and Pochak^[1] and Pucciani^[2]. Although it was a well-known fact that rectocele results from the weakness of the rectovaginal septum, there was a long-standing debate about the rectovaginal septum because

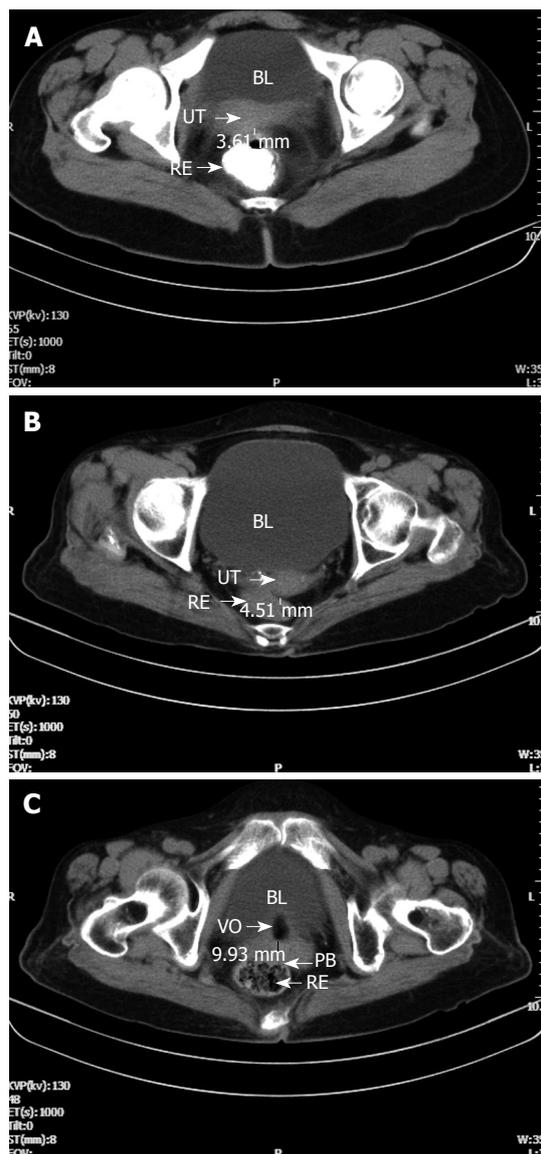


Figure 1 The space between the posterior wall of the vagina and the anterior wall of the rectum. A: Upper 1/3 level of the vagina; B: Middle level of the vagina; C: Lower 1/3 level of the vagina. BL: Bladder; UT: Uterus; RE: Rectum; VO: Vagina orifice; PB: Perineal body.

of several early anatomical studies unable to determine the presence of rectovaginal septum. In 1970, Nichols *et al*^[10] were able to identify a definitive anatomical and histological facial structure between the rectum and vagina in all dissections. Delancey^[11,12] confirmed the fibers of rectovaginal septum ran vertically and blended with the muscular wall of the vagina. He also demonstrated the presence of some other posterior vaginal wall supporting structures which include the endopelvic fascia, levator anti muscle and perineal membrane. In our study, we measured the distance between the posterior wall of the vagina and the anterior wall of the rectum (Tables 1 and 2). The results showed the distance becomes wider leading from top to bottom (Figure 1). The data also revealed that the rectovaginal septum becomes gradually thicker leading from top to bottom because the septum is the main portion between the gap from vagina to rectum. Based on these

Table 1 Data on the space between the vagina and the rectum at three levels (mm)

<i>n</i>	Group 1 (upper 1/3 level)	Group 2 (middle level)	Group 3 (lower 1/3 level)
n1	3.61	4.51	9.93
n2	4.02	4.87	10.14
n3	3.34	4.92	10.26
n4	4.31	4.38	10.38
n5	3.29	4.65	9.87
n6	4.04	4.73	9.66
n7	3.83	4.89	9.54
n8	3.91	4.99	10.23
n9	3.96	5.08	9.66
n10	4.26	4.16	9.78
n11	3.73	4.26	9.88
n12	4.26	4.34	9.46
n13	2.96	4.67	9.83
n14	4.15	4.54	10.23
n15	3.86	4.78	10.49
n16	4.11	4.96	10.57
n17	4.29	5.21	11.04
n18	4.16	4.17	10.87
n19	3.97	4.49	9.38
n20	3.86	4.55	9.96

Table 2 Comparison of the space difference at the upper 1/3 level of the vagina, the middle level of the vagina and the lower 1/3 level of the vagina

	Group 1 (<i>n</i> = 20)	Group 2 (<i>n</i> = 20)	Group 3 (<i>n</i> = 20)	<i>P</i> value
mean ± SD (mm)	3.896 ± 0.3617	4.6575 ± 0.3052	10.058 ± 0.4534	<i>P</i> < 0.01

measurement findings, it seemed that the higher position rectocele occurred more easily.

Although the true incidence of rectocele in the general population is uncertain, it has been found in 20%-80% of women referred to pelvic floor clinics^[13]. The difficulties in diagnosis are not only because early rectocele is asymptomatic, but also because the dominant symptoms of rectocele are complex. Shorvon and colleagues^[14] defined the rectocele depth exceeding 1 cm as pathological rectocele. At this stage, it is possible that patients have no sensation of difficulty in evacuation, constipation and so on. As a result, some early rectocele patients may be neglected. This study investigated the size of the normal space between the posterior wall of the vagina and the anterior wall of the rectum (Table 1). The study may be useful in the early diagnosis of rectocele by comparison of the patient's data with normal data.

The surgical indications for rectocele repair are controversial. Most surgeons advocated operative repair if the quality of life of the patient was affected, for instance they had a large symptomatic rectocele and failed to empty sufficiently. Surgery for rectocele repair included several different techniques using different approaches, ranging from the endorectal to the perineal or vaginal route^[15,16]. Endorectal rectocele repair was developed by Sullivan^[17]; its advantages included an ability to deal with coincident anorectal pathology (in particular hemorrhoids and anterior mucosal rectal prolapse), with a definitive

defect-specific septal repair and excision of the redundant rectal mucosa. The transperineal rectocele repair was described by Watson^[18]; this method has been used to restore the anatomical pelvic floor structures and repair the rectovaginal septum. The traditional transvaginal approach was developed further into posterior colpoperineorrhaphy by Helgar. This surgery technique was used for all forms of genital and related rectal prolapse. However, this procedure destroyed the perineal body and created a tight band inside the vaginal introitus. We also observed the perineal body at the lower 1/3 level of the vagina (Figure 1C), which joined together the distal part of transvaginal septum. It is obvious that the whole perineal body is an important pelvic floor supporting structure. However, all these surgery techniques have been reported to produce some postoperative symptoms. For example, the difficult evacuation has been reported with endorectal repair. Transvaginal repair and transperineal repair have also been criticized because of sexual discomfort. A combination of the three surgery techniques was popularized recently. This produced a strong rectovaginal septum to avoid rectocele and also eliminated postoperative symptoms. Furthermore, the anatomical restoration of normal space between the rectum and vagina is key to resolving complex postoperative symptoms, e.g. difficult evacuation, sexual discomfort and so on. There is limited measurement data available relating to the space between the rectum and the vagina, which can be helpful for surgeons in assessing clinical diagnosis and functional outcomes of different types of rectocele repair. The present study provides measurement data on the normal space between rectum and vagina which may be useful for assessing clinical diagnosis of rectocele and functional outcomes of rectocele repair.

COMMENTS

Background

Rectocele is a common problem in females. In the past few decades, several techniques have been proposed for treating rectocele. However, it is difficult to diagnose rectocele early because there is no data on the normal size of the space between the rectum and vagina. There are several different techniques available for repair of rectocele, but they are associated with some postoperative symptoms. This study may be helpful for surgeons in assessing clinical diagnosis and functional outcomes of different types of rectocele repair.

Research frontiers

Surgery for rectocele repairs includes several different techniques using different approaches, ranging from the endorectal to the perineal or vaginal route. Nowadays a combination of the three surgery techniques is popular, which not only produces a strong rectovaginal septum to avoid rectocele but also eliminates postoperative symptoms.

Innovations and breakthroughs

This study revealed that the rectovaginal septum becomes gradually thicker going from top to bottom. Furthermore, based on these measurement findings, surgeons could assess clinical diagnosis and functional outcomes of different types of rectocele repair.

Terminology

Rectocele can be defined as herniation of the anterior rectal wall into the posterior vaginal wall.

Peer review

The manuscript is simple, but important for colorectal surgeons, gynecologists and general surgeons who daily manage this disease.

REFERENCES

- 1 **Nichols DH**, Genadry RR. Pelvic relaxation of the posterior compartment. *Curr Opin Obstet Gynecol* 1993; **5**: 458-464
- 2 **Pucciani F**, Rottoli ML, Bologna A, Buri M, Cianchi F, Pagliai P, Cortesini C. Anterior rectocele and anorectal dysfunction. *Int J Colorectal Dis* 1996; **11**: 1-9
- 3 **D'Avolio M**, Ferrara A, Chimenti C. Transanal rectocele repair using EndoGIA: short-term results of a prospective study. *Tech Coloproctol* 2005; **9**: 108-114
- 4 **Ayabaca SM**, Zbar AP, Pescatori M. Anal continence after rectocele repair. *Dis Colon Rectum* 2002; **45**: 63-69
- 5 **Zbar AP**, Lienemann A, Fritsch H, Beer-Gabel M, Pescatori M. Rectocele: pathogenesis and surgical management. *Int J Colorectal Dis* 2003; **18**: 369-384
- 6 **Heriot AG**, Skull A, Kumar D. Functional and physiological outcome following transanal repair of rectocele. *Br J Surg* 2004; **91**: 1340-1344
- 7 **D'Hoore A**, Vanbeckevoort D, Penninckx F. Clinical, physiological and radiological assessment of rectovaginal septum reinforcement with mesh for complex rectocele. *Br J Surg* 2008; **95**: 1264-1272
- 8 **Reisnauer C**, Huebner M, Wallwiener D. The repair of rectovaginal fistulas using a bulbocavernosus muscle-fat flap. *Arch Gynecol Obstet* 2009; **279**: 919-922
- 9 **Tantanasis T**, Giannoulis C, Daniilidis A, Papathanasiou K, Loufopoulos A, Tzafettas J. Tension free vaginal tape underneath bladder base: does it prevent cystocele recurrence? *Hippokratia* 2008; **12**: 108-112
- 10 **Nichols DH**, Milley PS. Identification of pubourethral ligaments and their role in transvaginal surgical correction of stress incontinence. *Am J Obstet Gynecol* 1973; **115**: 123-128
- 11 **DeLancey JO**, Kane Low L, Miller JM, Patel DA, Tumbarello JA. Graphic integration of causal factors of pelvic floor disorders: an integrated life span model. *Am J Obstet Gynecol* 2008; **199**: 610.e1-610.e5
- 12 **DeLancey JO**. Structural anatomy of the posterior pelvic compartment as it relates to rectocele. *Am J Obstet Gynecol* 1999; **180**: 815-823
- 13 **Porter WE**, Steele A, Walsh P, Kohli N, Karram MM. The anatomic and functional outcomes of defect-specific rectocele repairs. *Am J Obstet Gynecol* 1999; **181**: 1353-1358; discussion 1358-1359
- 14 **Shorvon PJ**, McHugh S, Diamant NE, Somers S, Stevenson GW. Defecography in normal volunteers: results and implications. *Gut* 1989; **30**: 1737-1749
- 15 **Guarnieri A**, Cesaretti M, Tirone A, Vuolo G, Verre L, Savelli V, Piccolomini A, Di Cosmo L, Carli AF, Burrioni M, Pitzalis M. [Stapled transanal rectal resection (STARR) in the treatment of rectocele: personal experience] *Chir Ital* 2008; **60**: 243-248
- 16 **Yamana T**, Takahashi T, Iwaware J. Clinical and physiologic outcomes after transvaginal rectocele repair. *Dis Colon Rectum* 2006; **49**: 661-667
- 17 **Sullivan ES**, Leaverton GH, Hardwick CE. Transrectal perineal repair: an adjunct to improved function after anorectal surgery. *Dis Colon Rectum* 1968; **11**: 106-114
- 18 **Watson SJ**, Loder PB, Halligan S, Bartram CI, Kamm MA, Phillips RK. Transperineal repair of symptomatic rectocele with Marlex mesh: a clinical, physiological and radiologic assessment of treatment. *J Am Coll Surg* 1996; **183**: 257-261

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