

Correction of the Residual Prolapse in the Posterior Pelvic Floor Compartment after Abdominal Sacrocolporectopexy using Posterior Colporrhaphy and Anterior Levatoroplasty

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ABSTRACT

The aim of the study was to improve the results of anterior sacrocolporectopexy, performed for surgical treatment of pelvic posterior compartment prolapse for elimination of its residual manifestations.

Material and Methods: The study group consisted of 18 patients who underwent anterior abdominal sacrocolporectopexy using a synthetic graft due to vaginal apical prolapse and upper rectocele. In the postoperative period, they continued to have complaints about obstructive defecation. When examining these patients in the supine position with digital examination of the rectum in the middle part of the rectovaginal septum a residual rectocele was diagnosed, this was confirmed by x-ray during defecography. Ultrasound showed too proximal location of the graft, namely in the area of the upper third of the rectovaginal septum. At the same time, according to MRI data, the apical prolapse was corrected. These patients were performed additional rectovaginal septum correction with vaginal access using posterior colporrhaphy and anterior levatoroplasty within 2.9 ± 0.5 years. The treatment results were evaluated 12 months after the operation according to clinical data, defecography, ultrasound, MRI, anorectal functional tests on the Polygraf ID apparatus, quality of life assessment.

Results: 12 months after repeated surgical treatment, all patients noted a decrease in symptoms of obstructive defecation, which was confirmed by the results of defecography. So the size of the rectocele decreased from 4.2 ± 0.7 cm to 1.8 ± 0.4 cm (P = 0.003); barium evacuation rate increased from 3.6 ± 0.4 g / s to 5.5 ± 0.5 g / s (P = 0.005); and the percentage remaining after evacuation of barium suspension decreased from 31.2 ± 4.8% to 18.5 ± 4.2% (P = 0.055). Anorectal manometry showed a decrease in the sensitivity threshold from 31.2 ± 3.4 ml to 20.8 ± 3.9 ml (P = 0.053); the volume causing the urge to defecate from 84.2 ± 5.6 ml to 74.5 ± 4.2 ml (P = 0.175); the amplitude of the recto-anal inhibitory reflex with 46.6 ± 5.3 mm Hg up to 34.1 ± 4.9 mm Hg (P = 0.093) and its duration from 27.2 ± 4.5 s to 16.7 ± 2.6 s (P = 0.052). The results of the balloon ejection test also improved, which was positive only in 5 (27.7%) patients before the second operation, after it in all 18 patients.

Conclusions: Thus, as a result of repeated surgery, posterior colporrhaphy and anterior levatoroplasty, in order to eliminate the middle and low rectocele formed after abdominal sacrocolporectopexy due to excessively high graft fixation in the rectovaginal septum, all the anatomical and physiological parameters characterizing the functions of the posterior pelvic floor were normalized. So, posterior colporrhaphy and anterior levatoroplasty are adequate and sufficient for the correction of inadequately performed primary surgical procedure in the amount of abdominal sacrocolporectopexy.

Keywords: repeated pelvic prolapse, re-surgery, sacrocolporectopexy, posterior colporrhaphy, MRI, defecography, anorectal manometry

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INTRODUCTION

Pelvic organ prolapse is a common pathology in women of all ages. Analysis of literature data shows that the prevalence of this pathology increases with age and among women 50-60 years of age, its frequency is 48%, among women 50-60 years of age it is 50-68%, among women over 60 years of age it is 50-68% (1,2,3). The main method of treating pelvic organ prolapse is surgery. However, in 30% of patients, its results are unsatisfactory for various reasons. It may be a relapse of the disease, or the development of another type of prolapse. Their pathogenesis is not precisely determined. This can be obesity, genetic predisposition to pelvic floor weakness, chronic obstructive pulmonary disease, diabetes, errors in performing primary surgical treatment (2,4). Of these patients, 18%-25% undergo repeated operations, and

this percentage increases with every next surgery (3, 5). Despite the high frequency of relapses and prolapse de novo, there is little work on the results of repeated surgery for prolapse.

The aim of the study was to improve the results of anterior sacrocolporectopexy, performed for surgical treatment of pelvic posterior compartment prolapse for elimination of its residual manifestations.

MATERIAL AND METHODS

The study group consisted of 18 patients who, due to vaginal apical prolapse and upper rectocele in 2013 - 2017 abdominal sacrocolporectopexy according to D'Hoore was performed using a synthetic graft (6). In the postoperative period, patients in this group continued to need strong,

long-term straining during defecation, the need for manual assistance with defecation, a feeling of incomplete emptying of the rectum during defecation, in connection with which they needed further medical assistance. There were similar complaints before the initial operation. The follow-up dates were 2.9 ± 0.5 years. The patients who made up the study group had the following demographic characteristics: all were Caucasian, the average age was 63.5 ± 4.5 years, the body mass index was 30.5 ± 2.7 kg / m², the number of births was 2.4 ± 0.6 , all 18 patients were in menopause, none of them took hormone replacement drugs, 4 patients smoked (22.2%). Concomitant pathology was present in 14 (77.7%) patients: in 7 (38.8%) patients - chronic obstructive pulmonary disease; 12 (66.6%) - coronary heart disease; 4 (22.2%) have diabetes mellitus; 6 (33.3%) patients had a comorbid pathology. Concomitant diseases were in the stage of compensation and did not pose an increased risk for primary and further surgical treatment. When examining these patients in the supine position with digital examination of the rectum in the middle part of the rectovaginal septum, a residual rectocele was diagnosed, which was confirmed by x-ray during defecography. Ultrasound diagnosed atrophy of the muscles levatorsani from one or both sides, and the lower grafted edge was in the region of the upper third of the vagina. MRI revealed no other pathology from the pelvic organs and pelvic floor. Patients in this group were performed a second operation: posterior colporrhaphia and anterior levatoroplasty. The treatment results were evaluated 12 months after the operation according to clinical data, defecography, ultrasound, MRI, anorectal functional tests on the Polygraf ID apparatus, quality of life assessment. The Cleveland Clinic constipation scoring system was used to assess the last one (7). Statistical analysis of the results obtained during the study was carried out on a personal computer using the Biostatistica program. The distribution of attributes of the studied values was designated as "mean value \pm standard deviation" ($M \pm m$), where n is the sample size, i.e. group size. Multiple comparison of the average values before and after the repeated operation was performed using a one-factor variance analysis using the Newman-Kales criterion. The differences were considered significant at $P < 0.05$.

RESULTS AND DISCUSSION

12 months after repeated surgery, all patients noted a decrease in the severity of obstructive defecation. Subjective sensations of patients were confirmed by objective research results. A digital examination of the rectum did not reveal rectocele in any patient. During rectoscopy with straining using A. Parks method, mucosal prolapse into the lumen of the apparatus was not observed. Using ultrasound, similar data were obtained. The graft, according to ultrasound, was in the same position as after the initial operation, its lower edge was located on the border of the upper and middle third of the vagina. The thickness of the rectovaginal septum in the lower third was 0.6 cm due to levatoroplasty. There were no ultrasonic data for the development of a compensatory posterior rectocele. Defecography showed an improvement in the anatomical and functional results in patients after repeated surgery.

The size of the rectocele decreased from 4.2 ± 0.7 cm to 1.5 ± 0.4 cm ($P = 0.003$). The other parameters after the initial operation were close to normal, and after the second operation they remained practically unchanged. So, the level of location of the perineum relative to the pubococcygeal line was -3.2 ± 0.4 cm before the repeated operation at rest, -2.8 ± 0.7 cm after the repeated operation ($P = 0.623$). When straining, these indicators corresponded to -5.6 ± 0.5 cm before the second operation and -4.5 ± 0.6 cm 12 months after it ($P = 0.168$). Similar results were obtained when measuring the posterior anorectal angle. At rest, before the second operation, the anorectal angle was $97.2^\circ \pm 2.6^\circ$. After repeated surgery, it corresponded to $91.2^\circ \pm 2.9^\circ$ ($P = 0.133$). When straining, the anorectal angle before the second operation corresponded to $139.1^\circ \pm 4.2^\circ$, after it - $134.6^\circ \pm 3.9^\circ$ ($P = 0.438$). Before the second operation, all patients had a violation of the evacuation of barium from the rectum during the bowel movement; the barium evacuation rate was 3.6 ± 0.4 g / s. 12 months after repeated surgical treatment, this indicator improved to 5.5 ± 0.5 g / s ($P = 0.005$). Before repeated surgery, the percentage remaining in the rectum after defecation of barium suspension exceeded normal values, amounting to $31.2\% \pm 4.8\%$. After repeated surgery, the percentage of barium suspension remaining after emptying, practically corresponded to the norm, amounting to $18.5\% \pm 4.2\%$ ($P = 0.055$). These defecography indicators characterizing the anatomical relationships and functions of the pelvic floor and rectum are presented in table 1.

Table 1: Defecography parameters before correction of the rectocele and 12 months after it in patients with repeated prolapse after sacrocolporectomy

Main estimated parameters (mm) (n=25)	Healthy volunteer	Before re-operation	After re-operation	p-value
Rectocele size(cm)	≤ 1	4.2 ± 0.7	1.8 ± 0.4	0.003
The level of the anorectal zone relative to pubococcygeal line				
At rest	-2.9 ± 0.9	-3.2 ± 0.4	-2.8 ± 0.7	0.623
At straining	-5.6 ± 1.0	-5.6 ± 0.5	-4.5 ± 0.6	0.168
Posterior anorectal angle				
At rest	$92^\circ \pm 1.5^\circ$	$97.2^\circ \pm 2.6^\circ$	$91.2^\circ \pm 2.9^\circ$	0.133
At straining	$137^\circ \pm 1.5$	$139.1^\circ \pm 4.2^\circ$	$134.6^\circ \pm 3.9^\circ$	0.438
Barium evacuation rate (g / s)	5.6 ± 0.9	3.6 ± 0.4	5.5 ± 0.5	0.001
Barium remaining after evacuation (%)	16.5 ± 5.3	31.2 ± 4.8	18.5 ± 4.2	0.055

According to MRI, before and after surgical treatment, the location of the uterocervical zone did not change and amounted to 28.6 ± 3.5 mm above the pubococcygeal line at rest. When straining, its displacement did not exceed 11 mm, which corresponds to the norm.

Anorectal manometry showed an improvement of rectal function in all patients after repeated surgery. Before repeated surgery, the sensitivity threshold in patients of the

study group was 31.2 ± 3.4 ml. 12 months after surgery, it significantly decreased to 20.8 ± 3.9 ml ($P = 0.053$). The volume causing the urge to defecate before surgery also exceeded the normal values of this parameter, amounting to 84.2 ± 5.6 ml. An improvement in this indicator after repeated surgical treatment to 74.5 ± 4.2 ml ($P = 0.175$) was noted. Studies have also shown a decrease in the amplitude of the rectoanal inhibitory reflex (RAIR) from 46.6 ± 5.3 mm Hg up to 34.1 ± 4.9 mmHg ($P = 0.093$) and its duration from 27.2 ± 4.5 s to 16.7 ± 2.6 s ($P = 0.052$) (table 2).

Table 2: Results of anorectal manometry before and after rectocele correction in patients previously undergoing abdominal sacrocolporectomy

Main estimated parameters (n=50)	Healthy volunteer	Before re-operation	After re-operation	p-value
The threshold of first sensation (ml)	18.7±5.1	31.2±3.4	20.8±3.9	0,053
The threshold of maximum tolerable distention (ml)	72.3±3.1	84.2±5.6	74.5±4.2	0.175
RAIR amplitude (mmHg)	32.8±2.6	46.6±5.3	34.1±4.9	0.093
RAIR duration (sec)	15.1±1.9	27.2±4.5	16.7±2.6	0.055

The balloon ejection test results also confirmed an improvement in the evacuation function of the rectum. Before the second operation, only 5 (27.7%) of 18 patients showed the ability to push a 50 ml balloon out of the rectum within 1 minute. 12 months after surgery, all patients performed this test without difficulty. Patients of this group did not show complaints of incontinence of intestinal contents. When conducting anorectal manometry prior to rectocele correction, a slight decrease in pressure in the area of the internal anal sphincter to 55.9 ± 3.2 mmHg was noted and in the area of the external anal sphincter up to 44.6 ± 4.1 mm Hg, compared with these indicators in healthy volunteers: 59.8 ± 6.2 mm Hg and 48.8 ± 3.2 mm Hg, respectively. After rectocele correction, the pressure indices in the area of internal and external anal sphincters approached normal numbers up to 58.3 ± 4.9 mm Hg and 47.1 ± 3.3 mmHg. Also, a slight increase in the maximum pressure in the anal canal was noted with voluntary contraction of the muscles of the pelvic floor from 138.3 ± 8.5 mm Hg up to 159.1 ± 9.8 mm Hg ($P = 0.119$), which we associate with the absence of excessive straining during bowel movements and the restoration of the innervations of the pelvic floor after re-surgery. The latent period of the pudendal nerve also decreased from 2.53 ± 0.6 ms to 2.22 ± 0.4 ms. And although the differences between these values were unreliable, their approximation to normal values was noted.

As a result, all patients noted a significant improvement in the quality of life in the long term after repeated surgery, which was explained by the normalization of defecation. Before the reoperation, the average number of points when filling the Cleveland scale of constipation was 21.2 ± 2.4 ; 12 months after the reoperation, the average number of points corresponded to 12.7 ± 3.5 ($P = 0.054$).

CONCLUSIONS

Thus, as a result of repeated surgery, posterior colporrhaphia and anterior levatoroplasty, in order to eliminate the middle and low rectocele formed after abdominal sacrocolporectomy due to excessively high graft fixation in the rectovaginal septum, all the anatomical and physiological parameters characterizing the functions of the posterior pelvic floor were normalized. So, posterior colporrhaphy and anterior levatoroplasty are adequate and sufficient for the correction of inadequately performed primary surgical procedure in the amount of abdominal sacrocolporectomy.

DISCUSSION

The problem of pelvic prolapse in women is relevant due to the high frequency of this pathology, reaching 50% in women older than 50 years (8). On average, 20% of this category of patients undergoes surgical treatment (9, 10, 11). According to the literature, 18% -25% of patients due to unsatisfactory treatment results, which are manifested by a relapse of the disease or the development of another type of prolapse, repeat operations are performed (12, 13). Predisposing factors are an increase in age, a decrease in estrogen, increased body weight, hard physical labor, concomitant pathology, such as chronic obstructive pulmonary disease, accompanied by frequent prolonged coughing. All of these factors lead to increased abdominal pressure. A constant increase in intra-abdominal pressure weakens the pelvic floor and related supporting structures (11, 14, 15, 16). Inadequate primary surgery may also be a risk factor for re-prolapse and re-surgery (17, 18).

The following standardized terminology is proposed by the International Urogynecological Association (IUGA) / International Continence Society (ICS). Operations for pelvic prolapse should be divided into primary and repeated, performed on the same compartment of the pelvis and on the other compartment of the pelvic floor that has arisen de novo, as well as on operations for complications associated with the primary surgical intervention (19). The use of a mesh graft in only one segment of the pelvis is associated with a higher frequency of de novo prolapse in other departments compared to traditional using the patient's own tissues (20).

In our opinion, this was the reason for the unsatisfactory results of prolapse correction in the study group of patients. During primary sacrocolporectomy, apical prolapse was eliminated in these patients and there was no relapse in this zone at the time of repeated treatment, the graft was correctly located in the region of the upper third of the rectovaginal septum, which was confirmed by ultrasound data. MRI also showed that after sacrocolporectomy, the utero -cervical zone was located normally and its

displacement during straining also did not exceed the parameters of healthy women. This indicates the reliability of sacrocolporectomy using a synthetic graft. However, these patients continued to be disturbed by obstructive defecation, the cause of which was the newly developed rectocele in the middle third of the rectovaginal septum, although many authors believe that correction of apical prolapse is sufficient for complete correction of prolapse in the area of the posterior pelvic compartment (21, 22). We agree with those authors who, in the case of dissection of the rectovaginal septum, only proximal to the middle third of the vagina for some reason, recommend simultaneously adding abdominal sacrocolporectomy with posterior colporrhaphia to avoid repeated surgical intervention (23). If this was not done simultaneously, in the long-term postoperative period, posterior colporrhaphia and anterior levatoroplasty significantly improve the treatment results that we have presented.

Perineal techniques may include sphincteroplasty for incontinence, anterior and posterior levatoroplasty for the perineum descendance. We find the transvaginal approach more suitable for patients with isolated rectocele without significant prolapse of the rectal mucosa (24). If necessary, it can be combined with other methods, such as stapler transanal rectal resection (STARR), posterior levatoroplasty (25, 26). The posterior colporrhaphia, which was used by us as a second operation, is widely used for rectocele correction. It can be supplemented by anterior levatoroplasty and carried out from the perineal and vaginal access (27). One of the most extensive series of observations on posterior colporrhaphia, including 231 patients, was published by M.A. Kahn et al. back in 1997 (28). When studying long-term results after 3.5–4 years, the authors noted good anatomical results of rectocele correction and a decrease in the manifestations of obstructive defecation. Over the past 10 years, small mesh grafts have been used to further strengthen tissue in the area of defects in rectovaginal fascia. The mesh can be stacked under or above the fascial defect. The advantage of the method is to optimize the surgical result without reducing the capacity of the vagina and impaired sexual function. It also helps to reduce the frequency of unsatisfactory treatment results, the cause of which is a pronounced weakness of the connective tissue or the detection of not all fascial defects. Although, there is no convincing evidence of the advantages of this method over posterior colporrhaphia (29). We consider it unnecessary to implant the mesh with perineal access during repeated intervention, as recommended by some researchers (30). Our study showed that in some patients, after abdominal sacrocolporectomy performed for apical prolapse of the posterior vaginal wall and upper rectocele with a high transplant location in the rectovaginal septum, secondary middle rectocele may occur. Repeated surgery, posterior colporrhaphia and anterior levatoroplasty, relieves patients of this pathology and leads to a normalization of the defecation, which is confirmed by defecography and anorectal manometry.

CONFLICT OF INTEREST

None

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