

Laparoscopic Ventral Mesh Fixation in Patients with Pelvic Organ Prolapse

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Abstract

Pelvic organ prolapse (POP) is a condition with a high incidence rate and often creates difficulties in surgical coloproctology and gynecology. The aim of this study was to evaluate the effectiveness of laparoscopic ventral reticular sacrocolporectopexy and sacrorectopexi in women and men with POP, respectively. This study was conducted at the Educational-Surgical Clinic of Azerbaijan Medical University and Department of Surgery of the Faculty of Medicine of Ankara University (2016–2019) on 21 patients with POP (15 women and 6 men). Results of diagnostics and surgical treatment of POP were studied with preferences towards endoscopic, radiation, and functional methods. The surgical methods used in these patients included laparoscopic fixation methods (sacrocolpexy, sacrocolporectopexy) of protruding organs (uterus, vaginal vault/vaginal cuff, rectum) and simultaneous vaginal (colporrhaphy, colpolevatoroplasty, vaginal plastic surgery) and proctological surgeries (circulatory resection, hemorrhoidectomy, sphincteroplasty). The findings demonstrated that the most progressive POP mostly occurred in women of premenopausal age and during menopause. Based on the results of the long-term evaluation of the surgical treatment (6–12 months), the rates of recurrence of prolapse and complications were low (up to 4.8% and 9.5%, respectively) with favorable long-term functional results, such as a decrease in the degree of fecal incontinence and constipation, observed in the evaluation. Due to the concomitant weakness of the ligamentous apparatus of the pelvic floor in these patients, there is the need for intra-abdominal apical support of organs. In conclusion, that laparoscopic sacrocolpexy in women and sacrorectopexy in men are reliable surgical method to treat POP. However, specific skills need to be acquired by both gynecologist and coloproctologist to be able to do these laparoscopic surgery techniques.

Keywords: Laparoscopic sacrocolpexy, laparoscopic sacrocolporectopexy, pelvic organ, prolapse, vaginal plastic surgery

Introduction

Isolated and combined pelvic organ prolapse (POP) is a difficult problem in surgical coloproctology and gynecology, both in terms of diagnosis and the choice of the most optimal tactics, method, and scope of surgical treatment.^{1,2} POP is found in persons of older age groups of both sexes, especially in women in a ratio of 6.7:1.³ Among all inpatient gynecological patients, the share of POP patients is 28–40%.^{4,5} The prolapse of the vaginal vault (vaginal cuff) after hysterectomy is observed in 8–12% of patients.⁶ The factors for the development of POP include, first of all, natural childbirth and birth trauma, obstetricians' aggression (in 1.7–40% of cases), previous hysterectomy. In all other cases (also in men), these factors include

older age, obesity, weakness of the muscular-ligamentous apparatus of the pelvic floor, a sedentary lifestyle, etc.⁷ The high prevalence of this pathology in women of all ages, especially in women who have previously given birth, and the unsatisfactory results of surgical treatment are increasing its relevance.⁷⁻⁹ The frequency of surgical interventions for pelvic organ ptosis varies greatly and, according to different authors, ranges from 6 to 18% among patients with pelvic organ ptosis and 1.5–1.8% among the general population of women.¹⁰

The problem of POP is now documented and also accepted as a multidisciplinary one¹¹; therefore, surgeons in a related field have formed new sections of practical surgery, namely urogynecology and urocoloproctology.¹¹ Many patients seek surgical help already in the late 3–4 stages according to the Pelvic Organ Prolapse Quantification (POPQ) classification. At the same time, older patients usually have severe concomitant diseases (diabetes mellitus, chronic ischemic heart disease (CIHD) with

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arterial hypertension, venous thromboses, and thrombophlebitis, etc.), which complicate the choice of the method of anesthesia and surgery. The most radical surgery method is considered to be vaginal hysterectomy (VHE), after which it becomes necessary to fix the vaginal cuff to the promontorium. In addition, in surgical practice, ventrofixation of the uterus to the anterior abdominal wall, as well as ventral suspension of the uterus in various modifications, are widespread.⁸ Most researchers prefer the restoration of the pelvic floor by strengthening the supporting muscular-ligamentous apparatus during any intervention in the pelvis minor, thereby preventing the POP.^{12,13} In recent decades, according to some authors, abdominal sacrocolporectomy (SCP) and sacrorectomy, performed with open and laparoscopic (robotic) approaches, which significantly reduce the incidence of postoperative complications compared to VHE, have become a reliable method.¹³

One of the most common manifestations of POP is rectocele. Rectocele is often combined with apical prolapse of the rectum, prolapse of the perineum, and this pathology is not eliminated by traditional correction, such as posterior colporrhaphy.¹⁴ This requires performing intra-abdominal sacrocolporectomy, which is one of the most adequate surgeries to support the pelvic organs during their ptosis and is widely used in coloproctology and gynecology.¹⁵ However, when more than one organ demonstrates ptosis, i.e. in case of simultaneous ptosis of the rectum and the uterus (uterine stump after its extirpation) or the vagina, as well as in cases when sacrocolpo-(uterine, stump)rectomy is ineffective, the results of treatment are unfavorable and more complex pathogenetically justified surgical techniques are required.

This study aimed to investigate the effectiveness of laparoscopic ventral mesh sacrocolporectomy and sacrorectomy (men), in the case of pelvic organ prolapse.

Methods

In the Educational-Surgical Clinic of Azerbaijan Medical (AZMED) University and at the Department of Surgery of the Faculty of Medicine of Ankara University (2016–2019) for the period of 2014–2020 surgical treatment of POP, including the rectum and the uterus, was carried out in 112 patients of both sexes with perineal and abdominal approaches. Ethical

regulation of present study was registered Clinic of Azerbaijan Medical (AZMED) University, and a separate permit was obtained from each patient and approved by the ethics committee of the respective hospital. Abdominal surgery was performed in 46 patients, among the latter 21 patients (15 women) underwent laparoscopic ventral mesh sacrocolporectomy (LVMSR) and sacrorectomy (LVSR) in men (6). The average age of the latter group was 49.0 ± 2.3 (from 31 to 65). All women were divided into 3 groups by age: the reproductive period group aged from 31 to 45, the premenopausal group aged from 46 to 55, and the postmenopausal group aged over 56.

Before the surgery, 3, 6, and 12 months after the surgery all patients underwent a comprehensive clinical, laboratory, and instrumental examination from the assessment of complaints and taking anamnesis before the proctological and gynecological examinations. Studies aimed at determining the severity and severity of prolapse according to the POP-Q system included examination, digital transvaginal and transrectal examinations, endoscopic (anoscopy, rectoscopy, colonoscopy, vaginoscopy, hysteroscopy), radiation (ultrasound of the pelvic organs, X-ray defecography, computer tomography (CT) and/or magnetic resonance imaging (MRI) of the pelvic floor) and functional (contact sphincterometry, anal manometry) methods. Diagnostics of the weakness of the ligamentous apparatus of the uterus and rectum were carried out using MRI and X-ray defecography. In this case, in the sagittal projection, the level of the utero-cervical zone at rest and its mobility during straining concerning the pubococcygeal line were determined, as well as indicators of the anorectal angle during and after defecation during X-ray defecography. The results were considered good when reaching stages 0 and I, which were noted in all patients after surgery. Degree II of prolapse according to the POP-Q system was found in 6 patients, degree III in 13 patients, and IV in 2 patients.

Postoperatively and after 3 and 6 months, the results of the surgery were clinically evaluated, according to the indications of visual instrumental methods. Present study also performed a comparative study of the physical parameters of the obturator of the rectum, the degree of incontinence and constipation according to the Wexner scale,¹⁶ early and late complications, and recurrences.

The exclusion criterion was the symptoms of urodynamic disorders in both women and men who underwent surgery performed by a team

Table 1 Demographic and Anthropological Data, Pre-, and Postoperative Indicators

Parameters	Abs.	p
Sex	15 f/6	
Average age	49.0±2.3 (31–65)	
Body mass index (BMI)	28.9±1.3 kg/cm ² (22.5–37.8) In men, 27.1±1.8 kg/cm ² , (19.5–32.3)	
Number of childbirths	2.4±0.7	
Menopause	12/3	p<0.05
Previously undergone surgeries for POP, including rectum prolapse	4	
Status on the ASA scale		
ASA I	4	
ASA II	11	
ASA III	5	
ASA IV	1	
Preoperative mean values on the Wexner incontinence scale	14.1 (10–20)	p<0.05
Preoperative mean values on the Wexner constipation scale	18.9 (14–26)	p<0.05
Concomitant pathologies:		
CIHD, with and without arterial hypertension	11	
Diabetes mellitus	6	
Chronic obstructive pulmonary disease (COPD)	15	
Chronic venous insufficiency	11	
Chronic liver disease	6	
Intraoperative complications		
Bleeding	1	p<0.05
Damage to a neighboring organ	1	p<0.05
Average intraoperative blood loss (mL)	94.6±4.9 (61–174)	p<0.01
Average laparoscopic surgery time (min)	125.6±6.2 (85–172)	p<0.01
The average amount of intraoperative blood loss (mL)	85.0±3.7 (50–155)	p<0.01
Postoperative mean values on the Wexner incontinence scale	6.1 (3–8)	p<0.05
Postoperative mean values on the Wexner constipation scale	6.5 (4–18)	p<0.05
Postoperative complications		
Early complications:	-	
Insufficient sutures	2	p<0.05
Suppuration of the wound	2	p<0.05
Late complications:		
Postoperative ventral hernia	1	p<0.05
Recurrence	2	p<0.05
The average number of hospital days	5.1±0.7 (2–8)	p<0.05

including urologists.

The obtained (digital) results were processed using the SPSS statistical software, version 16.0. Quantitative indicators were calculated using the Wilcoxon (Mann-Whitney) nonparametric formula (W criteria) and Student's t-test. The degree of incontinence and constipation was assessed according to the Wexner point scales,¹⁶ and the degree of prolapse (ptosis) of the organ was evaluated according to the POP-Q system.¹⁴

Results

The examination of patients revealed prolapse of the anterior and posterior walls of the vagina without urodynamic disorders in 6 of 21 patients, prolapse of the posterior wall with partial and full-thickness prolapse of the rectum with incontinence in 4 of 21 patients, with constipation in 2 of 21 patients. Ptosis of the cervix/vaginal vault with full-thickness ptosis of the rectum was found in 2 of 21 patients, and partial thickness ptosis was found in 1 of 21 patient. Anterior rectocele was found in 4 patients, posterior in 1 patient, anterior and posterior in 5 patients. During laparoscopic surgery, uterine fibroadenoma was considered an indication for the extirpation of the uterus in 6 pre-and postmenopausal patients, and in 1 patient who had previously given birth, the indication for this surgery was dyshormonal persistent bleeding that did not respond to conservative treatment. In 3 women, extirpation

(2) and supravaginal amputation of the uterus had previously been performed.

LVMSR was performed in all 15 patients. The BMI was 28.9±1.3 kg/cm², from 22.5 to 37.8 kg/cm². LVSR was performed in 6 male patients. The BMI was 27.1±1.8 kg/cm², from 19.5 to 32.3 kg/cm² (Table 1).

When fixing prolapsed organs, strips of the synthetic mesh such as Galmesh, Lintex, Eslan, UltraPro, etc. was used with dimensions of 20x300 mm. The anterior wall of the rectum and the posterior wall of the uterus (vaginal vault/vaginal cuff) were mobilized up to the anal sphincter muscles. The distal part of the strip was placed between the posterior wall of the vagina and the anterior wall of the rectum above the anal sphincter and the second team of surgeons performed a colpolevatoroplasty from the perineum side after excision and isolation of vaginal mucosa, with rectocele of degree II-III in 4 patients and colpolevatororrhaphy with U-shaped continuous sutures encircling the muscle layers of both organs (vicril 3/0) under the control of the index finger of the right hand inserted into the anal canal in 7 patients without rectocele. Then, the laparoscopic team stitched the proximal part of the mesh strip without tension to the promontorium, thereby ensuring reliable fixation of both organs (vagino- and rectopexy). The second team also performed anterior colporrhaphy (4), vaginal plastic surgery (2), Longo circular resection of rectum mucosa (5), sphincteroplasty (3), and hemorrhoidectomy (3) according to the indications.

In general, recurrent uterine prolapse (1) and vaginal prolapse (1) occurred in postmenopausal women. Those patients underwent, respectively, VHE and extirpation of the cervical stump with sacrovaginopexy and colpolevatoroplasty with good long-term results. No recurrences were observed after LVSR (Table 2).

When analyzing the data obtained, it can be noted that recurrences after laparoscopic surgeries are practically not encountered in those cases, then the indications for surgery are determined jointly by experienced coloproctologists and gynecologists and performed by highly qualified surgeons. And in case of recurrences, preference should be given to perineal and vaginal surgeries under spinal and epidural anesthesia, which is safer, especially for patients with complicated concomitant diseases. The restoration of the anatomy and physiology of the entire pelvic floor complex (the ligamentous apparatus, the pelvic floor muscles, and the closing apparatus of the rectum) is the

Table 2 Result of Surgical Interventions

Surgeries	Abs,
LVMSR	15 (2 recurrences)
LVSR	6
Colpolevatoroplasty	4
Posterior colpolevatororrhaphy	7
Anterior colpolevatororrhaphy	4
Vaginal plastic surgery	2
Circular resection of rectum mucosa	5
Sphincteroplasty	3
Hemorrhoidectomy	3
VHE	1
Extirpation of the cervical stump	1

main advantage of surgical tactics and a reliable way to improve the patients' quality of life.

Discussion

Over the past decades, a large number of scientific and practical studies have appeared on the methods of POP surgical treatment and their results⁹⁻¹¹. Most often, POP is manifested by a disorder of defecation, and often urination. Until recently, there were no uniform tactics for the treatment of this pathology, especially in cases where there is ptosis (prolapse) of more than one organ.^{10,11} In such cases, the classical methods of their correction are ineffective, often accompanied by recurrence. Good anatomical and functional results were shown by the use of mesh prostheses in those patients for more reliable apical support of the pelvic organs, which prevents the recurrence of prolapse. Some authors note that in more than 60–70% of patients who need apical support, it is not carried out. Due to this, about 17% of patients experience a recurrence. Like many surgeons, we prefer intraabdominal sacrocolporectopexy, in this case, laparoscopic sacrocolporectopexy (sacrorectopexy in men) with the use of a synthetic prosthesis¹⁶. However, with a pronounced concomitant rectocele, it is impossible to solve this problem only with sacrocolporectopexy.¹⁷ Therefore, in such cases, abdominal surgery was supplemented with a single-stage posterior, sometimes anterior colporrhaphy, and in case of a significant defect in the anterior wall of the rectum with colpovevatoroplasty. In addition, the III-IV degree of anal insufficiency was an absolute indication for simultaneous sphincteroplasty¹⁸.

Currently, there are no surgical methods that exclude repeated surgical interventions, recurrences, and complications. Due to the concomitant weakness of the ligamentous apparatus of the pelvic floor (rectum, uterus, stump of the uterus) in almost all patients, the need for intraabdominal provision of their apical support is of great importance.

In conclusion, present experience has shown that laparoscopic sacrocolporectopexy (sacrorectopexy in men) is a reliable method of surgical treatment of POP. However, it requires the acquisition of certain skills both in gynecology and coloproctology, and in laparoscopic surgery. With complete pelvic prolapse in elderly patients, it is possible to simultaneously perform fixation of the uterus or vaginal cuff and rectum by laparoscopic access, followed by levatoroplasty

or colpoperineorrhaphy. Evaluation of the long-term results of surgical treatment for 6-12 months did not reveal a high frequency of relapses of prolapse or complications. Also, this option of surgical intervention requires a lot of experience from surgeons and gynecologists, can be used in patients with concomitant somatic pathology.

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