

# Laparoscopic Sacrocolpopexy or Sacrohysteropexy with or Without Burch Colposuspension: The Results of 36 Patients in Our Clinic

İlknur İNEGÖL GÜMÜŞ<sup>1</sup>, Önder SÜRGİT<sup>2</sup>, Nilüfer AKGÜN<sup>1</sup>, İkbâl KAYGUSUZ<sup>1</sup>, Deniz HIZLI<sup>1</sup>

Ankara, Turkey

## ABSTRACT

**OBJECTIVE:** Our aim was to investigate the results and the effectivity of laparoscopic sacrocolpopexy or sacrohysteropexy with or without Burch colposuspension in pelvic organ prolapse with or without urinary incontinence patients in our clinic.

**MATERIAL AND METHOD:** From January 2011 to January 2015 we performed laparoscopic sacrocolpopexy or sacrohysteropexy with or without Burch colposuspension for pelvic organ prolapse in 36 selected patients. Demographic and clinical data, intraoperative findings and postoperative course were recorded. POP-Q examination was used for pelvic prolapsed patients. Burch colposuspension was added to patients if they had stress urinary incontinence proven with physical examination and urodynamic tests. Twenty two patients underwent laparoscopic sacrocolpopexy or sacrohysteropexy and 14 patients underwent laparoscopic sacrocolpopexy or sacrohysteropexy with Burch colposuspension.

**RESULTS:** Laparoscopic sacrocolpopexy without Burch colposuspension (Group 1) (n=22) group's mean operation time and the mean blood loss were 51.1±11.8 minutes (range: 40-85 min.) and 39.3±13.9 cc (range: 30-70 cc) respectively. Laparoscopic sacrocolpopexy with Burch colposuspension (Group 2) (n=14) group's mean operation time and the mean blood loss were 88.5±13.5 minutes (range: 85-100 min.) and 65.0±11.0 (range: 60-80 cc) respectively (for mean operation time p=<0.001, for mean blood loss p=<0.001). Nine of the patients had operations with uterus preservation. All patients were discharged the following day. In Group 2 two patients developed denovo detrusor instability and improved with the administration of oxybutynin. In group 1 postoperatively, 8 patients developed denovo urinary incontinence. In the treatment of this condition we have added two patients Burch colposuspension operations, 6 patients underwent transobturator tape TOT. Two patients did not want to have reoperations, they received medical treatment.

**CONCLUSION:** Laparoscopic sacrohysteropexy or sacrocolpopexy with Burch colposuspension offer minimally invasive approaches and excellent definitive treatment option for patients with pelvic organ prolapse and urinary incontinence with long-term success rates ranging from 93-99%. In our study, our data shows that laparoscopic approaches for treatment of pelvic organ prolapse and urinary incontinence effective in hysterectomized or non-hysterectomized patients. Long-term prospective studies may provide additional useful data for these procedures.

**Keywords:** Pelvic organ prolapse, Laparoscopic sacrocolpopexy or sacrohysteropexy, Burch colposuspension, Urinary incontinence

Gynecol Obstet Reprod Med 2015;21:144-149

## Introduction

Sacrocolpopexy is suggested the gold standard for pelvic organ prolapse repair, in this procedure the vagina is suspended from the sacral promontory.<sup>1</sup> There is growing interest

in the use of laparoscopic procedures to correct pelvic organ prolapse (POP). In multiple prospective and retrospective case series, laparoscopic sacrocolpopexy demonstrates good success rates with a mean objective success rate of 90.5% (range 60-100%) and a mean reoperation rate of 5.9%.<sup>2,3</sup>

After sacrocolpopexy, de novo bowel, urinary and sexual dysfunctions are described.<sup>4,5</sup> These dysfunctions could be caused by injury of the autonomic nerves of the presacral space which supply the pelvic organ or prolapse bring obstruction may prevent urinary incontinence when the obstruction secondary to prolapse is resolved by sacrocolpopexy postoperative stress incontinence may occur. SUI also represents a risk after sacrocolpopexy.<sup>6</sup> Until recently, Burch colposuspension was deliberated the “gold standard” for treating SUI.<sup>7</sup> In recent years, Burch colposuspension combined with abdominal sacro-

<sup>1</sup> Turgut Özal University Medical School Department of Obstetrics and Gynecology, Ankara

<sup>2</sup> Turgut Özal University Medical School Department of General Surgery, Ankara

Address of Correspondence: Nilüfer Akgün  
Turgut Özal University Medical School,  
Department of Obstetrics and  
Gynecology, Ankara, Türkiye  
niluferakgun80@hotmail.com

Submitted for Publication: 30. 04. 2015

Accepted for Publication: 12. 10. 2015

colpopexy (ASC) was proposed as the standard.<sup>3,5</sup> However, this method's subjective cure rate decreases with time, and it is often associated with lower urinary tract symptoms.<sup>8</sup>

The aim of this study was to compare the effects of prophylactic burch colposuspension by laparoscopic sacrocolpopexy and sacrohysteropexy for correction of uterine and vault prolapse.

## Material and Method

From January 2011 to January 2015 we performed laparoscopic sacrocolpopexy or sacrohysteropexy with or without Burch colposuspension for pelvic organ prolapse in 36 selected patients. Demographic and clinical data, intraoperative findings and postoperative course were recorded.

A detailed medical history was obtained from all patients and a complete physical examination was performed. A interview information patient characteristics (age, weight, height, body mass index (BMI), calculated as weight in kilograms divided by the square of height in meters), parity, history of previous laparotomy or laparoscopic procedures, prior pelvic reconstructive surgery or hysterectomy operative data (operative time, procedures performed in addition to TLH, intraoperative blood loss estimated via the amount of fluid in the fluid extraction device), intraoperative and postoperative complications, difference between preoperative and postoperative hemoglobin levels, and length of hospital stay.

The preoperative evaluation of all patients included a complete history with urogynecologic examination, cotton tipped swap test (Q-tip test) for assessment of bladder neck excursion, urinalysis, urine culture, and multichannel urodynamic study. Pelvic organ prolapse was assessed using the POP-Q system.<sup>9</sup> All operations were performed by the same surgeon. Informed consent was obtained from all patients before the procedure.

### Operative techniques

All operations were performed with the patient under general anesthesia in a head-down lithotomy position. For sacrocolpopexy, the bladder was retracted away from the vagina and the vesicovaginal space was dissected. The fine dissection required here was performed with a 5-mm Ligasure energy system (Covidien). A piece of polypropylene mesh (ProLite, Atrium, Hudson, NH, USA) was cut to an appropriate size and shape. This was then placed in the vesicovaginal space and was fixed to the anterior vaginal fascia and cervix with 2/0 polyfilament sutures knotted extracorporeally (Figure 1). The sacral promontory was then exposed via a longitudinal incision in the peritoneum. The free end of the mesh was pulled toward the sacral promontory and the effect of this maneuver on the cystocele was inspected externally. To avoid placing excess tension on the mesh and attached tissues, the mesh was pulled toward the promontory just enough to provide correction of the cystocele. The mesh was then fixed to the first

sacral vertebra with a 5-mm endoscopic tackler (ProTack, Covidien, Mansfield, MA, USA) (Figure 2), and the excess mesh was trimmed away.

In laparoscopic sacrohysteropexy two windows were opened in the bilateral parametrium. Short arms of polypropylene T-shaped mesh was sutured posterior to anterior with surrounding the cervix. The sacral promontory was then exposed. The free ends of the mesh were pulled toward the sacral promontory. The mesh was fixed to the promontory with endoscopic tackler. And final, peritonealization was performed.

In patients for whom Burch colposuspension was indicated, this procedure was performed through the same ports that had been used for sacrocolpopexy or sacrohysteropexy. The bladder dome was filled with 200 mL of saline. The preperitoneal space was dissected from the anterior abdominal wall until Cooper's ligaments were visible. The retropubic space was exposed with sharp dissection and careful bipolar cautery of the small vessels staying close to the back of the pubic bone. Beginning laterally the bladder was dissected to identify the paravaginal fascia. Two strips of polypropylene surgical mesh shaped 3x2 cm were prepared and inserted consecutively (Figure 3). Each strip was placed just over the assistant's finger in the vagina and fixed using a special device tackler while the paravaginal fascia was held (Figure 4). This 5 mm endoscopic device contains 20 titanium helical tacks (Origin Med Systems, Menlo Park, CA, USA). The tackler was fired three times against the assistant's finger to ensure accurate placement of three titanium tacks embedded in the fascia (Figure 5). The same procedure was repeated on the other side. The mesh strip was then stretched to the ipsilateral Cooper's ligament and fixed securely by firing at least three titanium tacks again while the paravaginal fascia was held by the assistant's finger (Figure 6). The intraabdominal pressure was then lowered to 8 mmHg and the preperitoneal area was reperitonized with the tackler. The Foley catheter was removed after 8 h.

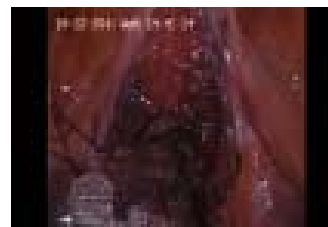


Figure 1: Mesh fixed to the anterior vaginal fascia



Figure 2: Fixation meshes with tacks



Figure 3: Mesh placement to paravaginal position



Figure 4: Strip was fixed using a special device tackler



Figure 5: The tackler was fired three titanium tacks embedded in the fascia

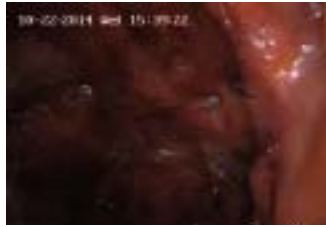


Figure 6: The mesh strip was stretched to the ipsilateral Cooper's ligament

### Statistical Analysis

Continuous variables were first inspected for normality of statistical distribution graphically and by Shapiro-Wilk test. Data are presented as mean  $\pm$  standard deviation (SD). For descriptive statistics, numbers and percentages were used for categorical variables. Baseline characteristics and outcome measures of the two groups were analyzed with Student's t-test for continuous data and chi-square test for the comparison of categorical variable. P values  $\leq 0.05$  were considered statistically significant. Statistical analysis was performed with SPSS version 17.0 software (SPSS Inc., Chicago, IL).

### Results

Patient characteristics and perioperative data are summarized in Tables 1-3. Only laparoscopic sacrocolpopexy (LSC) applied group (Group 1) was 23 patient, the mean age was  $53.9 \pm 10.5$  years (range: 35-66 years). The mean body mass index was  $24.4 \pm 1.9$  kg/m<sup>2</sup> (range: 22-28 kg/m<sup>2</sup>). The gravida  $3.0 \pm 0.9$  (range 2-5) and the parity  $2.5 \pm 0.7$  (range 1-4). The mean operation time and the mean blood loss were  $51.1 \pm 11.8$  minutes (range: 40-85 minutes) and  $39.3 \pm 13.9$  cc (range: 30-70 cc) respectively. 14 patient was occur LSC with Burch colposuspension applied group (Group 2), the mean age was

$63.6 \pm 8.8$  years (range: 53-75 years). The mean body mass index was  $25.5 \pm 1.3$  kg/m<sup>2</sup> (range: 23-27 kg/m<sup>2</sup>). The gravida  $3.6 \pm 1.15$  (range :2-6) and the parity  $3.2 \pm 0.9$  (range 2-4). 14 patient was occur LSC with Burch colposuspension applied group (Group 2), the mean age was  $63.6 \pm 8.8$  years (range: 53-75 years). In Group 2 two patient developed denovo detrusor instability and improved with the administration of oxybutynin and bladder retraining. Only LSC applied group postoperatively, eight patients developed denovo stress incontinans. In the treatment of this condition we have added two patients Burch operation, six patients underwent TOT. 2 patients did not want reoperated they received medical treatment. Our recommendation is not added routinely incontinence surgery procedure after the LSC. The patients should be informed on postoperative develop incontinence, in case of necessity. Since the operation is not costeffective, additional risks arised from operation are inappropriate. Sacrocolpopexy has a beneficial role in reducing irritative and obstructive urinary symptoms after surgery, regardless of concomitant Burch.<sup>10</sup> This finding suggests that prolapse repair itself has a beneficial effect on certain urinary symptoms.<sup>10</sup>

### Discussion

Laparoscopic sacrocolpopexy (LSC) minimizes bowel manipulation, decreases in blood loss, leading to less postoperative pain, duration of catheterisation and quicker postoperative recovery time. However, learning curve associated with the laparoscopic approach have increased operative times and limited its widespread use among surgeons.<sup>1</sup> Most complications following sacrocolpopexy can intraoperative injury to pelvic organs may occur during the trocar placement, suture placement and tissue dissection. Besides infections, thrombotic events, mesh erosion, bleeding and urinary tract complications to accompany this.<sup>13</sup> 11 patient series encompassing 1221 patients with the LSC treatment mean operative time

Table 1: Characteristics of patients and parameters related to surgery

Parameters	Group 1 Laparoscopic sacrocolpopexy or sacrocolpopexy (n=22)	Group 1 Range (min-max)	Group 2 Laparoscopic sacrohysteropexy or sacrohysteropexy + Burch (n=14)	Group 2 Range (min-max)	P
Age	$53.9 \pm 10.5$	35-66	$63.6 \pm 8.8$	53-75	<b>0.006</b>
Gravida	$3.0 \pm 0.9$	2-5	$3.6 \pm 1.15$	2-6	0.100
Parity	$2.5 \pm 0.7$	1-4	$3.2 \pm 0.9$	2-4	<b>0.030</b>
Mean BMI	$24.4 \pm 1.9$	22-28	$25.5 \pm 1.3$	23-27	<b>0.050</b>
Mean Blood Loss (mL)	$39.3 \pm 13.9$	30-70	$65.0 \pm 11.0$	60-80	<b>&lt;0.001</b>
Mean Operation Time (min)	$51.1 \pm 11.8$	40-85	$88.5 \pm 13.5$	85-100	<b>&lt;0.001</b>
Postoperative complications	None		None		
Denovo urinary incontinence	8 (%30.4)		0		<b>&lt;0.001</b>
Denovo detrusor instability			2		

Table 2: Characteristics of patients in laparoscopic sacrocolpopexy or sacrohysteropexy without burch colposuspension group (n=22)

Parameters	Hysterectomized women (n=16)	Range (min-max)	Nonhysterectomized women (n=6)	Range (min-max)	P
Age	57±3.23	52-60	52±13.3	36-66	0.210
Gravida	2.5±0.5	2-3	3.5±0.9	2-5	<b>0.010</b>
Parite	1.9±0.7	1-3	2.9±0.5	2-4	<b>0.001</b>
Mean BMI	23.7±1.8	22-26	25.1±1.9	22-28	0.08
Mean Blood Loss (mL)	33±2.6	30-35	43.9±16.9	30-70	<b>0.040</b>
Mean Operation Time (min)	44±2.1	40-45	56.2±13.3	45-85	<b>0.010</b>
Postoperative complications	None		None		
Denovo urinary incontinence	6		2		

Table 3: Characteristics of patients in laparoscopic sacrocolpopexy and Burch group (n=14)

Parameters	Hysterectomized women (n=11)	Range (min-max)	Nonhysterectomized women (n=3)	Range (min-max)	P
Age	64.6±11	53-75	62.5±2.9	60-65	00.600
Gravida	3.9±1.3	2-6	3.5±0.6	3-4	0.500
Parite	3.4±0.9	2-4	3.5±0.6	3-4	0.700
Mean BMI	26.2±0.8	25-27	24±1.16	23-25	<b>0.002</b>
Mean Blood Loss (mL)	69.4±7.7	60-80	62.5±2.9	60-65	0.100
Mean Operation Time (min)	93.9±4.9	85-100	87.5±2.9	85-90	<b>0.040</b>
Postoperative complications -	None		None		
Denovo detrusor instability	2		0		

was 124 min (range:55-185) with a 3% (range: 0-11%) conversion rate.<sup>6</sup> The largest series of LSC patients with 363 women undergoing LSC from 1996 to 2002 with a<sup>14</sup> mean operative time was 97 min. Overall, 96% of patients were satisfied with the results of their operation. The largest prospective series of LSC patients was<sup>15</sup> on a group of 132 consecutive patients mean operative time was 180.5 min. De novo SUI was identified in 7.4% of patients postoperatively. No perioperative complications were noted, although three patients (2.7%) experienced mesh-related pain.<sup>16</sup> Blood loss due to surgery is estimated blood loss with LSC appears to range from 22 to 255 mL.<sup>6,15,16</sup> However, the addition of a concomitant hysterectomy or incontinence surgery, such as placement of a pubovaginal sling, can increase blood loss. In our study only applied LSC group also the mean operation time was 51.1±11.8 min, the blood loss 39.3±13.9 (range 30-50 mL) whilst in LSC added Burch the mean operation time was 88.5±13.5min and the blood loss in the operation 65.0±11.0 (range 60-80 mL). We have no complications after the surgery.

The rates of de novo stress urinary incontinence after LSC vary widely and range from 0% to 55%.<sup>17</sup> Stress urinary incontinence (SUI), often occurs as a result of vaginal support defects and frequently accompany with pelvic organ prolapse.<sup>18</sup> SUI also represents a risk after sacrocolpopexy. Where as some women with prolapse have concomitant stress incontinence in part because of the obstructive effect of the prolapsed pelvic organs, creating urethral kinking. When prolapse

is treated with the use of a LSC, stress incontinence may develop. Anterior vaginal tensioning engaged to reduce bladder prolapse during SCP, it can result in flattening of the urethrovesical angle and entail to denova SUI<sup>19</sup> To prevent De novo SUI, preoperative urinary stress testing with prolapse diminished is used to patients who may benefit from incontinence surgery at the time of LSC. But, SUI occurs after POP surgery even with negative preoperative testing. One option for patients who require surgery to correct prolapse but who do not have symptoms of SUI is to perform a prophylactic continence operation at the time of prolapse repair. To the treatment some studies burch colposuspension at the time of sacrocolpopexy for prolapse significantly reduced the risk of postoperative symptoms of stress incontinence<sup>20,21</sup> and it avoids the potential complications of mesh.<sup>22</sup> Kummeling et al.<sup>23</sup> high incidences of postoperative stress incontinence were found in previously asymptomatic women, both in the Burch group (23.8%) and in the control group (44.1%). Besides Brubaker L et al.<sup>24</sup> fused the advantages of concomitant prophylactic Burch colposuspension endured at two years and did not affect the anatomic success rate of sacrocolpopexy. But, until now, no consensus has been reached yet about an anti-incontinence procedure should be carried out at the same time with POP repair, independently of the presence or absence of urinary incontinence.

In our present study our own experience is to compare LSC againts to LSC with Burch colposuspension group,



Burch applied group while blood loss and operation time is increased, but urinary incontinence not observed. Further studies are required to better understand the clinical performance of LSC and Burch colposuspension.

## Laparoskopik Sakrokolpopeksi veya Sakrohisteropeksinin Burch Kolposüspanسیون Operasyonu ile Birlikteliği: Kliniğimizdeki 36 Hastanın Sonuçları

**AMAÇ:** Pelvik organ prolapsusu ve üriner inkontinans tedavisinde laparoskopik sakrokolpopeksi veya sakrohisteropeksi operasyonunun Burch kolposüspanسیون ile birlikteliğinin sonuç ve etkinliğini araştırmaktır.

**GEREÇ VE YÖNTEM:** Ocak 2011 - Ocak 2015 tarihleri arasında pelvik organ prolapsusu tedavisi için 36 hastaya laparoskopik sakrokolpopeksi /sakrohisteropeksi Burch kolposüspanسیون operasyonu ile birlikte veya beraber olmadan yapıldı. Hastaların demografik verileri ve klinik özellikleri, intraoperatif ve postoperatif bulgular kaydedildi. Pelvik organ prolapsusunu değerlendirmek için POP-Q muayenesi kullanıldı. Muayene sırasında ve ürodinamik testlerde stres üriner inkontinans saptanan hastalara Burch kolposüspanسیون operasyonu eklenildi. 22 hastaya sadece laparoskopik sakrokolpopeksi veya sakrohisteropeksi işlemi uygulanırken 14 hastaya sadece laparoskopik sakrokolpopeksi veya sakrohisteropeksi operasyonuna Burch kolposüspanسیونu eklenildi.

**SONUÇ:** Burch kolposüspanسیونu olmadan laparoskopik sakrokolpopeksi uygulanan hastalarda (Grup 1) (n=22) sırasıyla grubun ortalama ameliyat süresi 51,1±11,8 dakika (40-85 dakika) ve ortalama kan kaybı 39,3 ± 13,9 cc (30-70 cc) vardı. Burch kolposüspanسیونu ile laparoskopik sakrokolpopeksi birlikte uygulanan hastaların (Grup 2) (n=14) sırasıyla ortalama ameliyat süresi 88,5±13,5 dakika (85-100 dk) ve ortalama kan kaybı 65,0±11,0 (60-80 cc) vardı. Gruplar arasında ortalama operasyon süresi (p=<0,001) ve ortalama kan kaybı (p=<0,001) açısından farklılık vardı. 9 hastanın uterusu korunmuştu. Bütün hastalar operasyon sonrası ertesi günde taburcu edildi. Grup 2'de iki hastada Denovo detrusor instabilitesi gelişti ve oksibutininin tedavisi uygulandı. Grup 1'de ise 8 hastada denova üriner inkontinans gelişti. Bu hastaların tedavisinde 2 hastaya Burch kolposüspanسیون operasyonu 6 hastaya transobturator bant (TOT) uygulandı. 2 hasta ise tekrar operasyonu kabul etmediği için medikal tedavi uygulandı.

**TARTIŞMA:** Laparoskopik sakrohisteropeksi veya sakrokolpopeksi ile Burch kolposüspanسیون operasyonun pelvik organ sarkması ve idrar kaçırma hastaları için uzun vadede %93-99 arasında değişen başarı oranları ile kesin tedavi seçeneğidir. Bizim çalışmamızda histerektomize veya non- histerektomize hastalarda pelvik organ prolapsusu ve idrar kaçırma tedavisinde laparoskopik yaklaşımlar etkilidir. Uzun süreli prospektif çalışmalar, bu işlemler için ek yararlı bilgiler sağlayabilir.

**Anahtar Kelimeler:** Pelvik organ prolapsusu, Laparoskopik sakrokolpopeksi veya sakrohisteropeksi, Burch kolposüspanسیون, Üriner inkontinans

## References

1. Mustafa S, Amit A, Filmar S, et al. Implementation of laparoscopic sacrocolpopexy: establishment of a learning curve and short-term outcomes. Arch Gynecol Obstet 2012;286:983-8.
2. Higgs PJ, Goh J, Krause H, et al. Abdominal sacral colpopexy: an independent prospective long-term follow-up study. Aust N Z J Obstet Gynaecol 2005;45:430-4
3. Shiozawa T, Huebner M, Hirt B. Nerve-preserving sacrocolpopexy: anatomical study and surgical approach. Eur J Obstet Gynecol Reprod Biol 2010;152(1):103-7
4. North CE, Ali-Ross NS, Smith AR, Reid FM. A prospective study of laparoscopic sacrocolpopexy for the management of pelvic organ prolapse. BJOG 2009;116:1251-7.
5. Price N1, Jackson SR, Advances in laparoscopic techniques in pelvic reconstructive surgery for prolapse and incontinence. Maturitas 2009;20;62(3):276-80.
6. Lee RK, Motttrie A A review of the current status of laparoscopic and robot-assisted sacrocolpopexy for pelvic organ prolapse. Eur Urol 2014;65(6):1128-37.
7. Moon YJ1, Jeon MJ Comparison of Burch colposuspension and transobturator tape when combined with abdominal sacrocolpopexy. Int J Gynaecol Obstet 2011;112(2): 122-5
8. Kjlhede P. Long-term efficacy of Burch colposuspension: a 14-year follow-up study. Acta Obstet Gynecol Scand 2005;84(8):767-72.
9. Persu C, Chapple CR, Cauni V, Gutue S, Geavlete P, Pelvic Organ Prolapse Quantification System (POP-Q) - a new era in pelvic prolapse staging, See comment in PubMed Commons below. J Med Life 2011;4(1):75-81.
10. Brubaker L, Nygaard I, Richter HE, et al. Two-year outcomes after sacrocolpopexy with and without burch to prevent stress urinary incontinence. Obstet Gynecol 2008;112(1):49-55
11. Romslo I, Mjlnerd OK, Molne K, Eik-Nes SH, Hagen B, Eriksen BC. Long-term effectiveness of the Burch colposuspension in female urinary stress incontinence. Acta Obstet Gynecol Scand 1990;69(1):45-50.
12. Cosson M, Boukerrou M, Narducci F, Occelli B, Querleu D, Crepin G. Long-term results of the Burch procedure combined with abdominal sacrocolpopexy for treatment of vault prolapse. Int Urogynecol J Pelvic Floor Dysfunct 2003;14(2):104-7.
13. Rosati M, Bramante S, Conti F. A review on the role of laparoscopic sacrocervicopexy. Curr Opin Obstet Gynecol 2014;26(4):281-9.
14. Rozet F, Mandron E, Arroyo C, et al. Laparoscopic sacral colpopexy approach for genito-urinary prolapse: experience with 363 cases. Eur Urol 2005;47:230-6.
15. Claerhout F, De Ridder D, Roovers JP, et al. Medium-term

- anatomic and functional results of laparoscopic sacrocolpopexy beyond the learning curve. *Eur Urol* 2009;55:1459-68.
16. North CE, Ali-Ross NS, Smith AR, Reid FM. A prospective study of laparoscopic sacrocolpopexy for the management of pelvic organ prolapse. *BJOG* 2009;116:1251-7.
  17. Leruth J, Fillet M, Waltregny D. Incidence and risk factors of postoperative stress urinary incontinence following laparoscopic sacrocolpopexy in patients with negative preoperative prolapse reduction stress testing. *Int Urogynecol J* 2013;24:485-91.
  18. Abrams P, Andersson KE, Birder L et al. Fourth International Consultation on Incontinence Recommendations of the International Scientific Committee: evaluation and treatment of urinary incontinence, pelvic organ prolapse, and fecal incontinence. *Neurourol Urodyn* 2010;29(1):213-40.
  19. Nygaard IE, McCreery R, Brubaker L, et al. Abdominal sacrocolpopexy: a comprehensive review. *Obstet Gynecol* 2004;104(4):805-23.
  20. Bemelmans BL. Abdominal sacrocolpopexy with Burch colposuspension to reduce urinary stress incontinence. *Eur Urol* 2006;50(2):381.
  21. Steers W. Abdominal sacrocolpopexy with Burch colposuspension to reduce urinary stress incontinence. *Eur Urol* 2007;51(2): 565-6.
  22. Jenkins TR1, Liu CY. Laparoscopic Burch colposuspension. *Curr Opin Obstet Gynecol* 2007;19(4):314-8.
  23. Kummeling MT, Rietbergen JB, Withagen MI, Mannaerts GH, van der Weiden RM. Sequential urodynamic assessment before and after laparoscopic sacrocolpopexy. *Acta Obstet Gynecol Scand* 2013;92(2):172-7.
  24. Brubaker L, Nygaard I, Richter HE, Visco A, Weber AM, Cundiff GW, et al. for the Pelvic Floor Disorders Network. Two-year outcomes after sacrocolpopexy with and without Burch to prevent stress urinary incontinence. *Obstet Gynecol* 2008;112:49-55.