Am J Clin Exp Obstet Gynecol 2016;3(2):40-45
www.ajceog.us /ISSN:2330-1899/AJCE0G0008485

Original Article

Demographic and outcome data of women undergoing bilateral sacrospinous ligament fixation

Lisa M Carbonell, Ilana B Addis, Kenneth D Hatch

Department of Obstetrics and Gynecology, University of Arizona College of Medicine, Tucson, AZ

Received March 26, 2015; Accepted May 30, 2015; Epub September 30, 2016; Published October 15, 2016

Abstract: Objective: To describe demographic, intraoperative, short-term (<3 months after surgery), and long-term (>3 months after surgery) outcome data in a large group of women undergoing bilateral sacrospinous ligament fixation (SSLF) for pelvic organ prolapse (POP). Methods: We conducted a retrospective chart review of 363 women with POP who were treated surgically with bilateral SSLF between 1994-2011. Demographic, intraoperative and short-term outcome data were abstracted. Long-term post-operative outcome data were obtained from phone interviews with participants. Comparative analyses were computed using χ^2 or Fishers exact tests. Results: Demographic data were similar among age groups. Mean length of hospital stay was 2.27 days. Younger patients had a shorter hospital stay. There were no differences in mean operative time, estimated blood loss, fever, transfusion, intraoperative complications, and discharge from the hospital with a catheter or development of urinary tract infection (UTI) between the various age groups. Patients who were discharged with a catheter were two times more likely to develop a UTI and patients who did develop a UTI were 3.1 times more likely to develop a fever. Women who did not have a TOT, TVH, and/or an anterior repair at time of surgery were less likely to be discharged home with a catheter. Short-term readmission risk was 3.5 times greater in women over 80 years of age. There were no differences in long-term recurrence of prolapse, incontinence, fistula formation or re-operation between the various age groups. There were no differences in short-term or long-term post-operative outcomes in patients who had graft placed at time of surgery. Conclusions: Bilateral SSLF is associated with few intraoperative and short-term post-operative complications. Most women undergoing bilateral SSLF are also undergoing simultaneous correction of other pelvic floor defects and these procedures put patients at higher risk for being discharged home with a catheter and increased their risk for UTI. Although the reported frequency of long-term recurrent prolapse and incontinence were higher than expected, these data are limited and therefore inconclusive. Bilateral SSLF is a safe surgical alternative in the treatment of POP in women younger than 80 years of age.

Keywords: Pelvic organ prolapse, sacrospinous ligament fixation, vaginal surgery

Introduction

Approximately 200,000 women undergo surgery for symptomatic pelvic organ prolapse (POP) annually in the United States [1]. The prevalence of POP approaches 40% and will continue to increase as the population ages [2, 3]. Among the many causes associated with symptomatic POP, hysterectomy is one with a significant morbidity. A case-control study of 160,000 women demonstrated that women who underwent hysterectomy were significantly more likely than age-matched controls to require subsequent pelvic floor repair [4]. POP, as a late complication of hysterectomy, has been found to have an incidence of 0.2-43% [5].

Definitive management of POP is surgical; either transvaginal, transabdominal, or laparoscopic. The main goals of surgery include relieving symptoms, restoring normal anatomy when possible, correcting co-existing urinary, coital and lower bowel dysfunction, avoiding the development of urinary, coital and lower bowel dysfunction, and obtaining a durable result [6]. Two of the most popular techniques used to treat vaginal vault prolapse are the abdominal or laparoscopic sacrocolpopexy with mesh interposition and the transvaginal sacrospinous ligament fixation (SSLF) [6]. Sacrocolpopexy remains the gold standard [7], but the transvaginal approach has gained popularity as it easily allows for simultaneous correction of other pelvic floor defects [8]. Additionally, trans-

Table 1. Baden-Walker System for the evaluation of pelvic organ prolapse on physical examination

Grade	Vaginal Apex, Anterior Vaginal Wall, Posterior Vaginal Wall
0	normal position
1	descent halfway to the hymen
2	descent to the hymen
3	descent halfway past the hymen
4	maximum possible descent

Table 2. Demographics of patient population

Age (years)	63.8 (12.3)	363
Height (in)	63.2 (2.9)	216
Weight (lb)	154.9 (30.3)	337
Gravidity	3.8 (2.1)	352
Vaginal Delivery	3.3 (1.8)	352
Tobacco use	21.9%	78
Former	11.8%	42
Current	10.1%	36
Previous Pelvic Surgery	70%	254
Previous Incontinence Procedure	38.8%	141

vaginal surgery has been found to have fewer complications, less blood loss, shorter duration of operation, less postoperative discomfort, a shorter hospital stay, and improved cost effectiveness when compared with abdominal surgery [9, 10].

SSLF can be performed in a unilateral or bilateral fashion. The Unilateral SSLF has been reported to be the preferred approach and there is outcome data for over a 1000 patients available in the literature [8, 11-16]. Bilateral SSLF outcome data are limited. In previous unpublished data, bilateral SSLF was found to be associated with few intraoperative and short-term postoperative complications and had good short-term anatomical outcomes. These results support bilateral SSLF as a safe surgical alternative in the treatment of POP in women under 80 years of age [17].

The purpose of this study is to describe demographic, intraoperative, short term (<3 months after surgery), and long term (>3 months after surgery) outcome data in a large group of women undergoing bilateral SSLF.

Materials and methods

Study patients were women who had undergone bilateral SSLF at the two hospitals of the University of Arizona Medical Center in Tucson between 1994-2011. The billing database at UAMC was used as the source for finding patients who had undergone bilateral SSLF. 363 patients were found who fit this criteria and a retrospective chart review was performed. The chart review of these patients included data collection of demographics, intra-operative outcomes, and short-term post-operative outcomes. All 363 participants were mailed a letter and card explaining the study and asking their permission to follow-up with them over the phone in order to collect the long-term post-operative outcome data. Study patients were instructed in the letter to mail back the card if they did not wish to be contacted or to indicate the best time to be called.

Demographics collected included age at time of surgery, weight at time of surgery, gravidity, parity, smoking status, history of prior pelvic surgery, history of prior incontinence procedures, and the pre-operative grade of pelvic organ prolapse (**Table 1**). Intra-operative outcomes included procedures performed in addition to bilateral sacrospinous ligament fixation, estimated blood loss, total operative time, occurrence of a gastrointestinal injury or urinary tract injury. Short-term post-operative outcomes included length of hospital stay, transfusion, febrile morbidity, discharge to home with a urinary catheter, post-operative day of passing their voiding trial, development of urinary tract infection (UTI), and readmission to the hospital. Long-term post-operative outcomes included recurrence of prolapse, incontinence, fistula formation, and re-operation. Short-term post-operative outcomes were outcomes that occurred with in the first 3 months following surgery. Long-term post-operative outcomes were outcomes that occurred after the first 3 months following surgery.

Descriptive statistics were calculated across the sample. Comparative analyses were performed using the χ^2 or Fishers exact test with significance at $p < .05$, all data was analyzed with IBM SPSS ® version 22 (IBM Corp: Armonk, NY).

Results

Between 1994 and 2011, 363 women underwent a bilateral SSLF. Demographic data for these women are presented in **Table 2**. Mean age at time of surgery was 63.8 (range 23-90

Table 3. Grade of prolapse prior to surgery

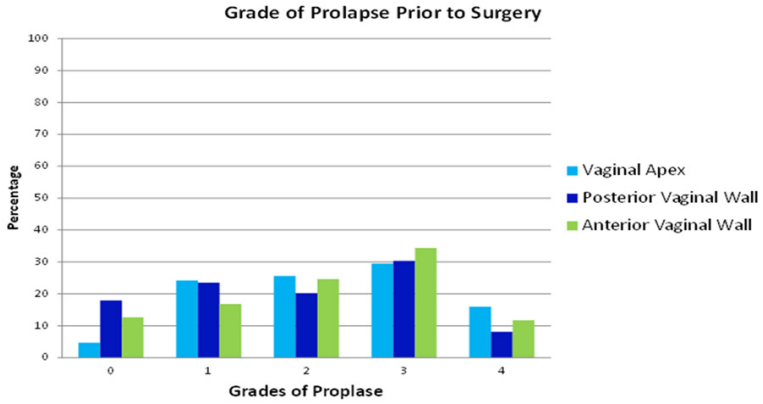
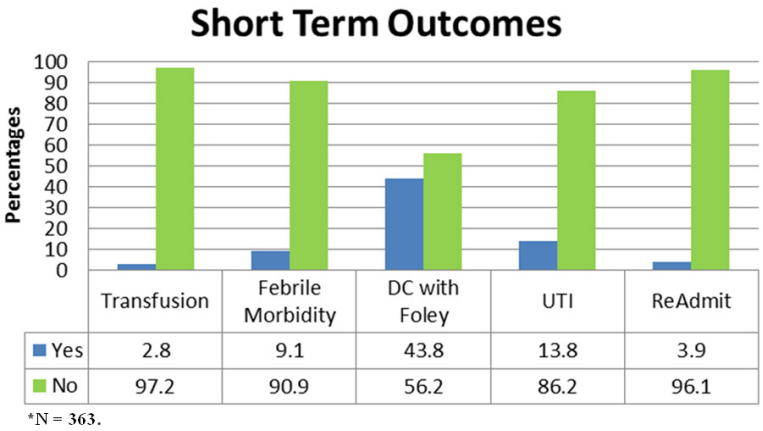


Table 4. Short-term outcomes of prolapse surgery



*N = 363.

Table 5. Possible risk factors associated with developing UTI

Intraoperative & Short-term Post-operative Outcomes	Developed UTI	Did Not Develop UTI	*P* value	Odds Ratio
DC with Foley Catheter n = 159	17.6%	82.4%	0.038	2.0
Graft Placed n = 92	10.9%	89.1%	0.381	≈1.0
GI Injury n = 1	0.0%	100%	1.000	≈1.0
GU Injury n = 2	0.0%	100%	1.000	≈1.0
Fever n = 33	30.3%	69.7%	0.008	3.1
Transfusion n = 10	10.0%	90.0%	1.000	≈1.0

years). The average weight was 154.9 pounds (± 30.3). Average gravidity was 3.8 and parity was 3.3. 21 percent were current or former tobacco smokers. 70 percent (n = 254) of women had undergone previous pelvic surgery and 38 percent (n = 141) had been treated with a previous incontinence or prolapse procedure, including use of a pessary. Preoperative grades of vaginal vault prolapse are presented in **Table 3**. The highest percentage of women had grade 3 prolapse of either the vaginal apex, posterior vaginal wall (rectocele), and/or anterior vaginal wall (cystocele).

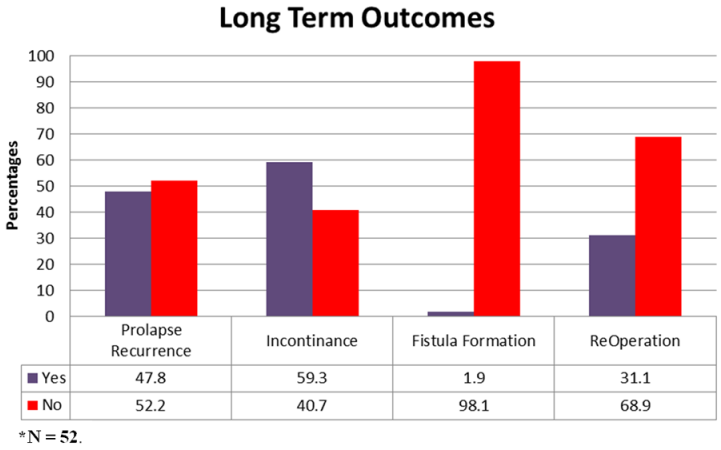
Intraoperative outcomes measured included estimated blood loss (EBL), total operative time, gastrointestinal (GI) injury and genitourinary (GU) injury. Average EBL was 214 milliliters (± 201). Mean operative time was 109 minutes (± 41). One rectal injury was noted intraoperatively. There were two GU injuries noted intraoperatively. At the time of surgery 25 percent of patients had a graft placed. Of these grafts 31 percent were synthetic and 69 percent were biologic. Grade of vaginal prolapse did not correlate with placement of graft at time of surgery. Most women undergoing bilateral SSLF also underwent simultaneous correction of other pelvic floor defects. The most frequent additional surgeries were anterior colporrhaphy (76%), vaginal hysterectomy (TVH) (17%), and transobturator tape (TOT) (17%). Additional simultaneous surgeries included posterior colporrhaphy, perineorrhapy, sphincteroplasty and other miscellaneous procedures.

Short-term postoperative outcomes are presented in **Table 4**. Mean length of hospital stay was 2.27 days. 34 percent of women passed their voiding trial on postoperative day (POD) 0-1, 63 percent by POD 4, and 91 percent by POD 10. 3 percent of women were transfused, 9 percent had febrile morbidity, 14 percent developed UTI, and 4 percent were readmitted to the hospital. 44 percent of women were discharged home with a catheter in place. Patients who were discharged with a catheter were 2 times more likely to develop UTI (p = .038) and patients who did develop a UTI were 3.1 times more likely to

Table 6. Short-term postoperative outcomes by age groups

Age Groups (years)	LOS			Fever	Transfusion	DC with Foley Catheter	UTI	Re-admission
	1 Day	2 Days	3+ Days					
23-60	27.4%	54.8%	17.7%	9.7%	3.0%	38.8%	19.4%	3.0%
n = 134	P < .05	P > .05	P < .05	P > .05	P > .05	P > .05	P > .05	P > .05
61-70	19.1%	47.3%	33.6%	8.9%	3.6%	44.6%	9.8%	4.5%
n = 112	P > .05	P > .05	P > .05	P > .05	P > .05	P > .05	P > .05	P > .05
71-79	14.1%	56.4%	29.5%	4.9%	1.2%	45.1%	9.8%	3.7%
n = 82	P > .05	P > .05	P > .05	P > .05	P > .05	P > .05	P > .05	P > .05
80+	5.9%	55.9%	38.2%	17.6%	2.9%	58.8%	14.7%	11.8%
n = 34	P > .05	P > .05	P > .05	P > .05	P > .05	P > .05	P > .05	P < .05

Table 7. Long-term outcomes of prolapse surgery



develop a fever (p = .008) (**Table 5**). Women who did not have a TOT, TVH and/or anterior colporrhaphy at time of surgery were significantly (p < .001) less likely to be discharged home with a catheter. The younger group of patients (age 23-60) had a significantly shorter length of hospital stay (p < 0.05). The risk of readmission was significantly higher (3.5 times greater) in women 80 years of age or older (p < 0.05; **Table 6**). In this age group there were 4 readmissions, 1 was for pyelonephritis and 3 were for recurrent prolapse requiring re-operation. There were no significant differences in fever, transfusion, discharge with a catheter or development of UTI between the various age groups. Placement of graft did not increase risk for discharge with a catheter or for developing UTI.

Of the 363 participants, 52 had long-term post-operative data successfully collected via chart review and/or contact over the phone. 311 participants declined follow-up interview or had an incorrect phone number listed. Nine of the initial participants are now deceased and long-term outcome data were not collected. Long-term post-operative outcomes are presented in **Table 7**. 47 percent of women reported prolapse recurrence, 59 percent reported incontinence, 1.9 percent reported fistula formation and 31 percent reported re-operation. There were no significant differences in long-term post-operative outcomes between the various age groups or between those who received graft and those who didn't receive a graft.

Discussion

Vaginal vault prolapse is often a consequence of prior hysterectomy. Other causes are inborn or age dependent insufficiency of soft tissue, damage to the pelvic floor during and after childbirth and obesity and other conditions that increase intraabdominal pressure [18-20]. The aim of the SSLF procedure is to support the vagina in the anatomically correct posterior position. The transvaginal route is preferred because it allows for simultaneous correction of other pelvic floor defects. Traditionally, SSLF procedures have been performed unilaterally [8, 15, 21]. The bilateral SSLF may be a better operation as it may increase the area of scar formation thereby providing improved support [21]. In addition to this potentially improved healing, the bilateral SSLF provides dual points of support and symmetrically restores the vaginal axis [21, 22]. Outcome data on the bilateral SSLF are limited in comparison to the multitude of data available on the unilateral SSLF, which is widely performed. Jones et al. compared

bilateral and unilateral SSLF in a retrospective cohort study and found no difference in intraoperative complication rates or short term cure rates [23]. Our data indicate that intraoperative and immediate postoperative complication rates of bilateral SSLF are similar to those of the unilateral procedure as reported in published outcome data from unilateral SSLF procedures [8, 14].

While abdominal sacrocolpopexy remains the gold standard for treatment of pelvic prolapse, the vaginal approach has been advocated for the medically complicated patient or the elderly patient [6]. Nieminen el al. recommended the SSLF as a good surgical alternative for prolapse repair in women over 80 years of age [24]. Our study, however, was consistent with a previous study done at our institution [17] showing a significant risk of readmission in women 80 years of age or older. There are limited outcome data in women 80 years of age or older treated with abdominal sacrocolpopexy. One study by Richter et al. found that older women undergoing abdominal sacrocolpopexy tended to have longer hospital stays, more comorbidities and more severe POP prior to procedure [25]. We can therefore make no conclusions about which operation should be preferred in this age group. It is clear that while there is less intraoperative morbidity and decreased length of hospital stay with the vaginal approach, surgery should still be approached cautiously and operative candidates chosen carefully.

Another interesting finding in our study was a urinary retention rate of 43.8 percent at the time of discharge. Most women undergoing bilateral SSLF are also undergoing simultaneous correction of other pelvic floor defects. Given the large number of concurrent anterior colporrhaphies (76%), TVHs (40%) and TOTs (17%) along with the short length of hospital stays we can conclude that procedures that include surgery along the anterior vaginal wall put patients at higher risk for being discharged home with a catheter which in turn increases their risk for UTI. Better triage of the appropriate patient for voiding trial may reduce rate of recatheterization and in turn may decrease the incidence of UTI's postoperatively. Unfortunately we did not collect data regarding whether the patients who were discharged home with a catheter were also prescribed prophylactic antibiotics. Although the use of systemic antibiotic drug therapy to reduce risk for developing UTI is controversial, prophylactic antibiotics may be appropriate in those who require relatively short-term catheterization and are at high risk for complications from UTI [26]. Given the significant relationship between urinary retention and developing UTI in our patient population, it would be reasonable to recommend prescribing prophylactic antibiotics to patients who are discharged home with a catheter in place.

In prior studies, Long-term prolapse recurrence rates for abdominal sacrocolpopexy have been reported at 1.9-16 percent [6, 27]. while recurrence rates following SSLF (combining both bilateral and unilateral fixations) have been reported to range from 4-33 percent [6, 28, 29]. In our study, patient-reported long-term post-operative outcomes including prolapse recurrence (47.8%), incontinence (59.3%), and re-operation (31.1%) were higher than expected. However, our long-term post-operative data collection was limited by the small number of participants (52) and by reporter bias and therefore inconclusive. Of note there were no significant differences in long-term post-operative outcomes between the various age groups. Cure rates are hard to define secondary to a lack of standardization regarding the definition of recurrence [27]. A better way to study long-term post-operative outcomes would be through a prospective cohort study where grade of prolapse recurrence can be clinically assessed, type of incontinence defined, fistula formation clinically differentiated between recto-vaginal and vesico-vaginal and the reason for re-operation clinically identified.

Our study findings indicate that bilateral SSLF is associated with few intraoperative and short-term post-operative complications. It can thus be concluded that bilateral SSLF is a safe surgical alternative in the treatment of POP in women younger than 80 years of age.

Disclosure of conflict of interest

None.

Address correspondence to: Dr. Ilana B Addis, Department of Obstetrics and Gynecology, University of Arizona College of Medicine, 1501 N. Campbell Ave, PO Box 245078, Tucson, AZ 85724-5078. Tel:

520-626-6591; Fax: 520-626-2514; E-mail: iaddis@obgyn.arizona.edu

References

[1] Boyles SH, Weber AM, Meyn L. Procedures for pelvic organ prolapse in the United States, 1979-1977. Am J Obstet Gynecol 2003; 188: 108-15.

[2] Hendrix SL, Clark A, Nygaard I, Aragaki A, Barnabei V, McTiernan A. Pelvic organ prolapse in the Women's Health Initiative: gravity and gravidity. Am J Obstet Gynecol 2002; 186: 1160-6.

[3] Luber KM, Boero S, Choe JY. The demographics of pelvic floor disorders: current observations and future projections. Am J Obstet Gynecol 2001; 184: 1496-501.

[4] Altman D, Falconer C, Cnattingius S, Granath F. Pelvic organ prolapse surgery following hysterectomy on benign indications. Am J Obstet Gynecol 2008; 198: 572, e1.

[5] Cruikshank SH. Sacrospinous fixation: should this be performed at the time of vaginal hysterectomy? Am J Obste Gynecol 1991; 164: 1072.

[6] Cary MP, Dwyer PL. Genital prolapse: vaginal versus abdominal route of repair. Curr Opin Obstet Gynecol 2001; 13: 499-505.

[7] MacLennan AH, Taylor AW, Wilson DH, Wilson D. the prevalence of pelvic floor disorders and their relationship to gender, age, parity and mode of delivery. BJOG 2000; 107: 1460-1470.

[8] Silva-Filho, Agnaldo L, Triginelli SA, et al. Sacrospinous fixation for treatment of vault prolapse and at the time of vaginal hysterectomy for marked uterovaginal prolapse. Journal of Pelvic Medicine and Surgery 2004; 10: 213-218.

[9] Sze EH, Karram MM. Transvaginal repair of vault prolapse: a review. Obstet Gynecol 1997; 89: 466-475.

[10] Maher CF, Qatawneh AM, Dwyer PL, Carey MP, Cornish A, Schluter PJ. Abdominal sacral colpopexy for vaginal vault prolapse: A prospective randomized study. Am J Obstet Gynecol 2004; 190: 20-26.

[11] Morley GW, DeLancey JOL. Sacrospinous ligament fixation for eversion of the vagina. Am J Obstet Gynecol 1988; 158: 872-81.

[12] Hardimen PJ, Drutz HP. Sacrospinous vault suspension and abdominal colposacropexy: success rates and complications. Am J Obstet Gynecol 1996; 175: 612.

[13] Richter K, Albrich W. Long-term results following fixation of the vaginal on the sacrospinous ligament by the vaginal route. Am J Obstet Gynecol 1981; 141: 811.

[14] Lantzsch T, Goepel C, Wolters M, Koelbl H, Methfessel HD. Sacrospinous ligament fixation for vagina vault prolapse. Arch Gynecol Obstet 2001; 265: 21-25.

[15] Cruikshank SH, Muniz M. Outcomes study: A comparison of cure rates in 695 patients undergoing sacrospinous ligament fixation alone and with other site specific procedures – A 16 year study. Am J Obstet Gynecol 2003; 188: 1509-1515.

[16] Guner H, Noyan V, Tiras MB. Transvaginal sacrospinous colpopexy for marked uterovaginal and vault prolapse. Int J Gynecol Obstet 2001; 74: 165-170.

[17] Dufault A, Addis I, Hatch KD. Demographic and short term outcome data of women undergoing bilateral sacropinous ligament fixation.

[18] Nichols DH. Enterocele and massive eversion of the vagina. In: Thompson JD, Rock JA (eds) TeLind's operative gynecology. Philadelphia: Lippincott. 1992.

[19] Nichols DH. Massive eversion of the vagina. Technique of transvaginal sacrospinous fixation. In: Nicholson DH, editor. Gynecologic and obstetric surgery. St Luis: Mosby. 1993.

[20] Symmonds RE, Pratt JH. Vaginal prolapse following hysterectomy. Am J Obstet Gynecol 1960; 79: 899-909.

[21] Cespesdes RD. Anterior approach bilateral sacrospoinous ligament fixation for vaginal vault prolapse. Urology 2000; 56: 70-75.

[22] Pohl JF, Fratterelli JL. Bilateral transvagional sacrospinous colpopexy: preliminary experience. Am J Obstet Gynecol 1997; 177: 1356-61; discussion 1361-2.

[23] Jones CM, Hatch KD, Harrigill K. Unilateral and bilateral sacrospinous ligament fixation for pelvic prolapse. J Pelvic Surg 2001; 7: 27-33.

[24] Nieminen K, Heinonen PK. Sacrospinous ligament fixation for massive genital prolapse in women aged over 80 years. BJOG 2001; 108: 817-821.

[25] Richter HE, Goode PS, Kenton K, Brown MB, Burgio KL, Kreder K, Moalli P, Wright EJ, Weber AM; Pelvic Floor Disorders Network. The effect of age on short-term outcomes after abdominal surgery for pelvic organ prolapse. J Am Geriatr Soc 2007; 55: 857-863.

[26] Saint S, Lipsky BA. Preventing catheter-related bacteruria should we? Can we? How? Arch Intern Med 1999; 159: 800-808.

[27] Beer M, Kuhn A. Surgical techiniques for vault prolapse: a review of the literature. Ero J Obstet Gynecol 2005; 119: 144-155.

[28] Clark AL, Gregory T, Smith VJ, Edwards R. Epidemiologyical evaluation of reoperation for surgically treated pelvic organ prolapse and urinary incontinence. Am J Obstet Gynecol 2003; 189: 1261-1267.

[29] Bruno D, Haab F. What's new in prolapse surgery? Curr Opin Urol 2003; 13: 315-323.