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Risk of Mesh Erosion With Sacral Colpopexy and Concurrent Hysterectomy

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Abstract

OBJECTIVE—To examine short- and long-term mesh-related complications in women undergoing abdominal sacral colpopexy with concurrent hysterectomy, compared with women with a prior hysterectomy undergoing sacral colpopexy alone.

METHODS—Patient characteristics, hospital complications, postoperative clinical course, and long-term graft-related complications were reviewed for all women with genital prolapse who underwent abdominal sacral colpopexy between 1996 and 1998. Women with concurrent hysterectomy were compared with women with vaginal prolapse after a prior hysterectomy.

RESULTS—One hundred twenty-four patients, 60 with concurrent hysterectomy and 64 with prior hysterectomy, were observed postoperatively for a median of 35.5 (0–74) months. Demographics of the two groups were similar, with a mean age of 65.1 ± 9.4 years and a mean body mass index of 25.8 ± 4.2 kg/m². Eighty percent of colpopexies used prolene sythetic mesh and 20% allograft material. Initial operative and hospital complications were rare in both groups and included a blood transfusion of 2 U, a ureteral transection, a wound infection, heart block, and an arrhythmia. Delayed graft complications included one mesh erosion in a patient with a prior hysterectomy that was managed by office resection (0.8%).

CONCLUSION—Concurrent hysterectomy with abdominal sacral colpopexy has a low incidence of mesh complications and can be used as a first-line treatment for genital prolapse.

More than one in ten American women will undergo major surgery for symptomatic genital prolapse by age 79.¹ Genital prolapse can be surgically repaired; however, the failure rate is 4–33%,^{2–4} and 30% of surgeries for genital prolapse are done for recurrences.¹ Historically, initial surgical repair of genital prolapse has been vaginal hysterectomy with additional procedures to repair and suspend the vagina.^{5,6} A possibly more efficacious approach is the sacral colpopexy, which uses synthetic mesh to bridge and suspend the upper vagina to the anterior vertebral longitudinal ligament fronting the sacrum.^{4,7,8} This surgical approach has been used successfully in women with recurrent prolapse⁹ and could be considered as a primary surgical procedure if the complications are justifiably low. In the past, abdominal sacral colpopexy has been limited to patients with recurrent prolapse because of the complexity of the procedure and concerns for patient safety. Specific drawbacks of the procedure over the vaginal approach include an abdominal incision, dissection and placement of a synthetic mesh, mesh infection, and/or erosion or foreign body reaction. Though mesh-related complications usually occur in the first couple of years, they may be delayed and develop years after surgery.

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^{10,11} Some surgeons have suggested that the procedure should not be performed at the time of a hysterectomy to avoid potential bacterial contamination of the prosthetic material through the vaginal incision.⁶ Fedorkow and Kalbfleisch¹² did not show an increase in the febrile morbidity, duration of hospitalization, or use of transfusions in women who had an abdominal sacral colpopexy concurrent with hysterectomy relative to previously hysterectomized women undergoing sacral colpopexy alone. However, they did not report long-term clinical outcome. Our study examines short- and long-term mesh-related complications in women undergoing abdominal sacral colpopexy with concurrent hysterectomy and compares them with women with a prior hysterectomy who underwent sacral colpopexy alone.

MATERIALS AND METHODS

This is a retrospective-unmatched-case-control study of the second author's abdominal sacral colpopexy cases performed from January 1, 1996, through December 31, 1998. After obtaining institutional review board approval, hospital and clinical records were reviewed by the first author. All cases that included an abdominal sacral colpopexy procedure during the period were included if they had at least one postoperative evaluation in the clinic record. The patients were divided into two groups: women with concurrent hysterectomy and women who had genital prolapse and a prior hysterectomy. The charts were reviewed for the patient characteristics, preoperative evaluation, prolapse grading by the Baden and Walker method,¹³ hospital complications, mesh-related complications, erosion of the graft material through the cuff, infection, and recurrent prolapse. The date of the last gynecologic examination was used to determine the follow-up interval from the date of surgery.

The surgical procedure as described by Timmons⁷ was modified to include preoperative prophylactic antibiotics, two-layer closure of the cuff after hysterectomy, irrigation with a bacitracin-gentamycin solution, and vaginal suspension with a bridge of either prolene mesh or allograft fascia lata that had been soaked in the same antibiotic solution. The mesh or allograft was fashioned in two 4 × 16-cm strips to be used as prosthetic implants to suspend the vagina back towards the sacrum. After sharp dissection of the bladder off of the visceral surface of the vagina, each strip was attached with a Gortex (W.L. Gore & Associates, Flagstaff, AZ) suture to the proximal 4 cm of the vaginal apex. One strip was placed on the ventral surface and one on the dorsal surface using six sutures per strip of prosthesis material. The two prosthetic strips were placed parallel and in contact with each other, sutured along their sides. The strips, without additional attachment to the uterosacral ligaments, were then draped in the pelvic cul-de-sac over, in most cases, a Halban-type culdeplasty.¹⁴ They were then sutured with one to two gortex sutures to the exposed anterior sacral longitudinal ligament at S1-S2 without tension. Prolene mesh was extraperitonealized, but the allograft was not. Additional surgical repairs such as enterocele repair, retropubic urethropexy, paravaginal repair, and posterior repair were performed in many cases, and a cystoscopy with suprapubic catheter placement performed in most cases.

A power analysis based on the rate of mesh erosion was the primary outcome variable for this study. Visco et al¹⁵ reported that 3% of women undergoing abdominal sacral colpopexy with synthetic mesh for the treatment of genital prolapse experience mesh erosion and 20% of women undergoing abdominal sacral colpopexy combined with vaginally placed suture or mesh experience mesh erosion. Using these data, a confidence level of 95% ($\alpha = .05$), and a power of 80% ($\beta = .2$), 65 patients would be required in each group (Epi Info 6; Centers for Disease Control and Prevention, Atlanta, GA). Unfortunately, there is no consistent reporting in the literature of the risk of mesh erosion in abdominal sacral colpopexy with a concurrent hysterectomy. The power calculation may use optimistically different proportions but reflects the potential for vaginal contamination of the mesh. Continuous data were analyzed using a two-sample Student *t* test and included comparisons of age, parity, body mass index,

preoperative grade of prolapse, and mean follow-up time. Categorical data were analyzed with the χ^2 test and included ethnicity, smoking, chronic illness, and prosthesis type. Comparison of median follow-up time was done using a median test (SAS 8.2; SAS Institute Inc. Cary, NC). A *P* value of less than .05 was considered significant.

RESULTS

The hospital and clinical records were reviewed for 124 women meeting study criteria. Sixty patients with concurrent hysterectomy and 64 patients with prior hysterectomy were followed up postoperatively for a median of 35.5 months (0–74). The demographics of the two groups were similar, with a mean age of 65.1 ± 9.4 years and a mean body mass index of 25.8 ± 4.2 kg/m². The patient characteristics are listed in Table 1 and show that the two groups are comparable, with the exception of the group without concurrent hysterectomy. This group demonstrates preoperative grading of 0.2 grades less (*P* = .02), which is of questionable clinical significance. There was no difference in age, parity, ethnicity, mean body mass index, mean and median time of follow-up, smoking status, chronic illnesses, distribution of illness types, or type of prosthesis. Overall, 15% (19 of 124) had pulmonary illnesses, 11% (13 of 124) had diabetes mellitus, and 5% (six of 124) used corticosteroids on a regular basis. Additional surgical procedures performed at the time of sacral colpopexy are shown in Table 2. Surgical and hospital-related complications were rarely observed with abdominal sacral colpopexy, with or without concurrent hysterectomy. We were unable to identify risk factors for these complications (Table 3).

Long-term complications that were identified at clinic follow-up are shown in Table 4. In the sacral colpopexy with hysterectomy group one woman with an allograft had delayed vaginal healing that resolved over 3 months. In the group without hysterectomy and with prolene mesh there was one mesh erosion identified 3 years postoperatively that responded to office resection, a case of granulation tissue at the cuff discovered 3 months postoperatively that responded to office treatment with silver nitrate, and a gortex suture requiring trimming in the office on three occasions within the first postoperative year. Though we did not achieve statistical power, the proportion of cuff complications does not appear to differ between women undergoing sacral colpopexy with concurrent hysterectomy and women undergoing sacral colpopexy alone. The overall rate of mesh erosion was 0.8% (one of 124). Postoperative time to follow-up examination ranged from one visit before completion of a month to 5 years. Mean durations of follow-up were 36.1 ± 24.3 months with a median of 29.5 months (1–74) in the hysterectomy group and 26.7 ± 22 months with a median of 40 months (1–71) in the prior hysterectomy group.

As a matter of interest there were three of 124 (2.4%) recurrent vault prolapses and a total of 12 of 124 (9.7%) recurrences of grade 3 or greater and/or symptomatic genital prolapse. Asymptomatic first- or second-degree prolapse was not reported. Ten women with prior hysterectomy had recurrent prolapse, two developed vault prolapse, four underwent repeat rectocele operations, and four had recurrent third-degree prolapse but were observed. Four of the ten were allograft and six were prolene mesh recipients. Recurrent prolapse occurred in two cases with concurrent hysterectomy: one in the allograft group requiring a pessary and one with an asymptomatic third-degree rectocele in the prolene mesh group.

DISCUSSION

In an attempt to characterize the surgical failures of genital prolapse operations,¹ Olsen et al discovered 30% of the surgeries done for pelvic organ dysfunction were repeat surgeries. Marchionni et al³ discovered 1.8% (three of 308) of women developed prolapse 11 years after a hysterectomy for indications other than prolapse. They found an 11.6% incidence of vaginal

vault prolapse after hysterectomy for genital prolapse. Symmonds et al¹⁶ studied recurrent enterocele and vaginal vault prolapse. They found an overall failure of 11% in 197 women after what they termed a “standardized vaginal approach for surgical treatment” and postulated three mechanisms for failure. They noted that 39% failed in 0–2 years, 24% failed in 2–10 years, and 37% failed after 10 years, suggesting early failures related to inadequacy of the technique, midfailures to slow progression of a missed defect, and late failures to gradual failure of the supporting structures.

Although there are numerous techniques reported, correcting prolapse has historically included a vaginal hysterectomy combined with reattaching the vagina to existing uterosacral ligaments and performing an anterior and posterior colporrhaphy for a cystocele and rectocele.^{5,16,17} In 1957,⁵ McCall described a culdeplasty that obliterates and suspends the relaxed cul-de-sac of Douglas between the uterosacral ligaments with permanent suture. He observed 25 cases over 3 months to 3 years with no failures. Later, Given¹⁷ reported 48 cases over 2 months to 22 years with only two failures (4%).

In the 1980s a popular modification of the vaginal approach to suspend the vagina was the sacral spinous ligament suspension. Failure rates of five of 163 (3%) within 2 years were reported.¹⁸ Later, in 1995, Holley et al¹⁹ reported on 32 women with a median follow-up time of 3.5 years demonstrating 8% vault prolapse, 6% enterocele, 92% cystocele, and 17% rectocele recurrence.

As surgeons began reporting failures at other sites in the vagina after a sacral spinous ligament suspension surgery, Shull et al developed a modification of the McCall procedure that directly attached the uterosacral ligaments to the pubocervical and rectovaginal septa, with addition of other site-specific defect repairs. They described 302 women with at least one postoperative visit from 1994 to 1998 and had a 5% grade 2 or greater recurrent prolapse, mostly associated with the anterior vagina, and a 1% ureteral injury rate.²⁰ Others^{21,22} attempted the same surgery with failure rates of approximately 10% after 3 months to 3 years and a much higher ureteral injury rate of 2.4–11%.

Abdominal sacral colpopexy has been adopted to improve surgical success. Symmonds et al. stated in 1981¹⁶ that the procedure was useful only in the setting of a shortened, narrow, “much operated upon” vagina, reserving the conventional vaginal approaches for all other prolapses. The procedure can be more time consuming and technically difficult and may not be chosen as a first-line therapy unless there is a need to do a laparotomy.⁶ However, the procedure has been perfected over time by Timmons et al⁹ and has a success rate of 99% (161 of 163) for vaginal vault support (median follow-up time of 33 months, range 9 months–18 years).

It has been postulated that surgical failure occurs with inadequate correction of the ligamentous defects and neuropathy resulting from vaginal dissection.^{16,23} Welgoss et al²⁴ determined that the relative risk of suboptimal outcome with a surgically induced neuropathy was 1.82 (95% confidence interval [CI] 1.13, 2.93). Benson and McClellan reported that the odds of creating a pudental nerve neuropathy with vaginal surgery, versus abdominal surgery, were 5.78 (95% CI 1.6, 20).²⁵ With the potential for improved success and reduced pelvic neuropathy, Benson et al prospectively randomized 88 women to an abdominal sacral colpopexy or to a vaginal sacral spinous ligament suspension. They demonstrated a higher success with a lower reoperation rate (16% versus 33%) for the abdominal approach, with a mean follow-up of 2.5 years.⁴ This was confirmed by Sze et al⁸ in 101 women evaluated 2 years after surgery (19% versus 33%). Thus, improvement can be achieved with an abdominal sacral colpopexy, but additional surgical risks must be considered.

Complications of the sacral colpopexy may include increased operative time, mesh infection or erosion, and bleeding from the retroperitoneal space at the time of presacral dissection.

Foreign body reaction or mesh erosion through the vagina has been reported in 12 of 357 cases (3.4%) by Timmons et al²⁶ and up to 16% by Valaitis et al.²⁷ Visco et al¹⁵ reported on 155 women and found erosion rates of 3.2% with abdominal sacral colpopexy alone, 4.5% when combined with colopoperineopexy, and 20% with a combined abdominal and vaginal-perineal approach. Kohli et al¹⁰ reported a 12% mesh erosion and suture erosion rate with a mean time to erosion of 14 ± 8 months. In our study there were few surgical and mesh complications in the 124 women undergoing sacral colpopexy over the 5-year observation period. The overall mesh erosion rate was 0.8%. Our excellent results may be related to the manner in which the vaginal cuff is closed (in two layers), irrigation with an antibiotic solution, and careful handling of the tissues. The patient population may also be a factor in the successes and has been characterized as one having multiple ethnicities, a mean age of 65, a smoking rate of 5%, and a body mass index of 26%. Comparing other study populations with ours is inappropriate, as a more vulnerable population may reflect attributes of the population, not the procedure. We have made no attempt to describe our recurrent prolapse and failure rates other than in generalities because the postoperative grading of the prolapse was not consistently characterized, unless it was symptomatic or the prolapse was beyond the hymen. Though we did not achieve statistical power, we conclude from the 124 cases in this study that mesh complications are rare with abdominal sacral colpopexy in patients with concurrent hysterectomy and that sacral colpopexy can be used safely as a first-line treatment for genital prolapse.

References

1. Olsen AL, Smith VJ, Bergstrom JO, Colling JC, Clark AL. Epidemiology of surgically managed pelvic organ prolapse and urinary incontinence. *Obstet Gynecol* 1997;89:501–6. [PubMed: 9083302]
2. Virtanen HS, Makinen JI. Retrospective analysis of 711 patients operated on for pelvic relaxation in 1983–1989. *Int J Gynecol Obstet* 1993;42:109–15.
3. Marchionni M, Bracco GL, Checcucci V, Carabaneanu A, Coccia EM, Mecacci F, et al. True incidence of vaginal vault prolapse. Thirteen years of experience *J Reprod Med* 1999;44:679–84.
4. Benson JT, Lucente V, McClellan E. Vaginal versus abdominal reconstructive surgery for the treatment of pelvic support defects: A prospective randomized study with long-term outcome evaluation. *Am J Obstet Gynecol* 1996;175:1418–21. [PubMed: 8987919]
5. McCall ML. Posterior culdeplasty. Surgical correction of enterocele during vaginal hysterectomy; a preliminary report. *Obstet Gynecol* 1957;10:595–601. [PubMed: 13484166]
6. Imperato E, Aspesi G, Rovetta E, Presti M. Surgical management and prevention of vaginal vault prolapse. *Surg Gynecol Obstet* 1992;175:233–7. [PubMed: 1514157]
7. Timmons MC. Transabdominal sacral colpopexy. *Operative Tech Gynecol Surg* 1996;1:92–6.
8. Sze EH, Kohli N, Miklos JR, Roat T, Karram MM. A retrospective comparison of abdominal sacrocolposuspension versus sacrospinous fixation with transvaginal needle suspension for the management of vaginal vault prolapse and coexisting stress incontinence. *Int Urogynecol J Pelvic Floor Dysfunct* 1999;10:390–3. [PubMed: 10614976]
9. Timmons MC, Addison WA, Addison SB, Cavenar MG. Abdominal sacral colpopexy in 163 women with posthysterectomy vaginal vault prolapse and enterocele. Evolution of operative techniques *J Reprod Med* 1992;37:323–7.
10. Kohli N, Walsh PM, Roat TW, Karram MM. Mesh erosion after abdominal sacrocolpopexy. *Obstet Gynecol* 1998;92:999–1004. [PubMed: 9840566]
11. Weidner AC, Cundiff GW, Harris RL, Addison WA. Sacral osteomyelitis: An unusual complication of abdominal sacral colopexy. *Obstet Gynecol* 1997;90:689–91. [PubMed: 11770599]
12. Fedorkow DM, Kalbfleisch RE. Total abdominal hysterectomy at abdominal sacrovaginopexy: A comparative study. *Am J Obstet Gynecol* 1993;169:641–3. [PubMed: 8372874]
13. Baden WF, Walker TA, Lindsey JH. The vaginal profile. *Texas Med* 1968;64:56–8.
14. Wall LL, Norton PA, DeLancey JOL. *Practical urogynecology*. Baltimore: Williams & Wilkins, 1993:334.

15. Visco AG, Weidner AC, Barber MD, Myers ER, Cundiff GW, Bump RC, et al. Vaginal mesh erosion after abdominal sacral colpopexy. *Am J Obstet Gynecol* 2001;184:297–302. [PubMed: 11228477]
16. Symmonds RE, Williams TJ, Lee RA, Webb MJ. Posthysterectomy enterocele and vaginal vault prolapse. *Am J Obstet Gynecol* 1981;140:852–9. [PubMed: 7270596]
17. Given FT. Posterior culdeplasty: Revisited. *Am J Obstet Gynecol* 1985;153:135–9. [PubMed: 3898845]
18. Nichols DH. Sacrospinous fixation for massive eversion of the vagina. *Am J Obstet Gynecol* 1982;142:901–4. [PubMed: 7039324]
19. Holley RL, Varner RE, Gleason BP, Apffel LA, Scott S. Recurrent pelvic support defects after sacrospinous ligament fixation for vaginal vault prolapse. *J Am Coll Surg* 1995;180:444–8. [PubMed: 7719548]
20. Shull BL, Bachofen C, Coats KW, Kuehl TJ. A transvaginal approach to repair of apical and other associated sites of pelvic organ prolapse with uterosacral ligaments. *Am J Obstet Gynecol* 2000;183:1365–73. [PubMed: 11120498]
21. Karram M, Goldwasser S, Kleenam S, Steele A, Vassallo B, Walsh P. High uterosacral vaginal vault suspension with fascial reconstruction for vaginal repair of enterocele and vaginal vault prolapse. *Am J Obstet Gynecol* 2001;185:1339–42. [PubMed: 11744906]
22. Barber MD, Visco AG, Weidner AC, Amundsen CL, Bump RC. Bilateral uterosacral ligament vaginal vault suspension with site specific endopelvic fascia defect repair for treatment of pelvic organ prolapse. *Am J Obstet Gynecol* 2000;183:1402–10. [PubMed: 11120503]
23. Delancey JO. Anatomic aspects of vaginal eversion after hysterectomy. *Am J Obstet Gynecol* 1992;166:1717–24. [PubMed: 1615980]
24. Welgoss JA, Vogt VY, McClellan EJ, Benson JT. Relationship between surgically induced neuropathy and outcome of pelvic organ prolapse surgery. *Int Urogynecol J Pelvic Floor Dysfunct* 1999;10:11–4. [PubMed: 10207761]
25. Benson T, McClellan E. The effect of vaginal dissection on the pudendal nerve. *Obstet Gynecol* 1993;82:387–9. [PubMed: 8355938]
26. Timmons MC, Addison WA. Mesh erosion after abdominal sacral colpopexy. *J Pelvic Surg* 1997;3:75–80.
27. Valatis SR, Stanton SL. Sacrocolpopexy: A retrospective study of a clinician's experience. *Br J Obstet Gynaecol* 1994;101:518–22. [PubMed: 8018642]

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Table 1

Patient Characteristics

Variable	ASC with hysterectomy	ASC without hysterectomy	P
No. of subjects	60	64	
Age (y) [*]	63.4 ± 10.6	66.7 ± 7.8	.05
Parity [†]	2.9 ± 1.8	3.2 ± 1.5	.36
Ethnicity [‡]			.21
White	28 (46.7)	34 (52.3)	
Japanese	21 (35.0)	18 (27.7)	
Hawaiian	1 (1.7)	3 (4.6)	
Filipino	4 (6.7)	4 (6.2)	
Chinese	4 (6.7)	0 (0.0)	
Other	1 (1.7)	5 (7.7)	
Unknown	1 (1.7)	1 (1.5)	
BMI [*] (kg/m ²)	25.2 ± 4.1	26.3 ± 4.3	.18
Follow-up (mo)			
Mean [*]	36.1 ± 24.3	29.7 ± 37.0	.26
Median [‡]	29.5 (1–74)	40.0 (1–71)	.07
Pre-operative grade [*]	3.9 ± 0.4	3.6 ± 0.5	.02
Smoker [†]	3 (5.0)	3 (4.6)	.83
Chronic illness [†]	16 (26.7)	19 (29.2)	.84
Prosthesis type [†]			.86
Prolene	47 (78.3)	52 (81.2)	
Cadaver	13 (21.7)	12 (18.8)	

ASC = abdominal sacral colpopexy; BMI = body mass index.

* Mean ± standard deviation; two-sample *t* test.

[†] *n* (%); χ^2 test.

[‡] Median (range); median test.

Table 2**Additional Operative Procedures Performed**

Procedure	ASC with hysterectomy [n (%)]	ASC without hysterectomy [n (%)]
Burch urethropexy	48 (80.0)	43 (67.2)
Paravaginal repair	36 (60.0)	27 (42.2)
Halban enterocele repair	53 (88.3)	58 (90.6)
Posterior repair	56 (93.3)	50 (78.1)
Cystoscopy	57 (95.0)	52 (81.3)
Suprapubic catheter placement	57 (95.0)	55 (85.9)
Sling	1 (1.7)	0 (0.0)

ASC = abdominal sacral colpopexy.

Table 3**Hospital Complications**

ASC with hysterectomy (<i>n</i> = 60)	ASC without hysterectomy (<i>n</i> = 64)
Ureteral transection with stent placement Transfusion of 2 U of packed cells Wound infection given oral antibiotics	Heart block × 24 h Cardiac ischemia with arrhythmia

ASC = abdominal sacral colpopexy.

Table 4

Late Clinic Complications

ASC with hysterectomy (<i>n</i> = 60)	ASC without hysterectomy (<i>n</i> = 64)
Delayed vaginal healing × 3 mo (1) Allograft Small bowel obstruction, observed (1) Prolene Intestinal bleeding from NSAIDs (1) Prolene Incision hernia after 18 mo (1) Prolene Recurrent prolapse (2) Prolene (1) Allograft (1)	Mesh erosion and resection in the office Prolene (1) Cuff granulation, office treatment only Prolene (1) Gortex suture cut in office Incisional hernia Prolene (1) Abdominal hernia mesh infection Prolene (1) Small bowel obstruction (2) Prolene (1) Allograft (1) Suorapubic catheter cellulite Recurrent prolapse (10) Prolene (6) Allograft (4)

ASC = abdominal sacral colpopexy; NSAIDs = nonsteroidal antiinflammatory drugs.