Vaginal Apex Resection: A Treatment Option for Vaginal Apex Pain

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OBJECTIVE: Vaginal apex pain is a subset of chronic pelvic pain commonly treated with surgical excision of the vaginal apex. Our objective was to estimate long-term postoperative pain levels, recovery time, and return to sexual function in women who have undergone vaginal apex repair for chronic vaginal apex pain.

METHODS: Since 1995, 45 women have undergone vaginal apex repair at our institution. All were asked to complete a questionnaire describing pain levels, sexual function, daily activities, ability to work, and medical therapy before and after surgical repair of the vaginal apex. Demographic background, previous medical history, and surgical history were abstracted from the medical records. Fisher exact and Wilcoxon rank sum tests were used to determine associations among baseline characteristics and various outcomes. McNemar χ^2 testing was use to compare before and after pain levels.

RESULTS: Twenty-seven women constituted the study sample and were available for evaluation before and after vaginal apex repair. Sixty-seven percent of respondents experienced resolution of pelvic pain after vaginal apex repair for a median of 20 months. The number of women experiencing pain with daily activities decreased from 92% before vaginal apex repair to 41% after vaginal apex repair, and 30% reported sexual activity without dyspareunia after vaginal apex repair ($P = .004$). Sixty-one percent of women returned to work after vaginal apex repair. Most patients required continued medical therapy after vaginal apex repair.

CONCLUSION: Vaginal apex repair improves general levels of pelvic pain in some patients diagnosed with vaginal apex pain. Pain relief after vaginal apex repair is temporary, and women are likely to need continued medical therapy. (Obstet Gynecol 2004;104:1340–6. © 2004 by The American College of Obstetricians and Gynecologists.)

LEVEL OF EVIDENCE II-2

Chronic pelvic pain affects an estimated 15% of reproductive-age women, constitutes 10% of all outpatient gynecology visits, and is listed as the preoperative indication for 10% of the 590,000 hysterectomies performed annually in the United States. Health care costs related to chronic pelvic pain, including physician consultations, mental health visits, and out-of-pocket patient expenses, are estimated at more than $2.8 billion per year.[1–3]

Within the spectrum of chronic pelvic pain is vaginal apex pain, which most commonly presents as dyspareunia and impaired sexual function. Dyspareunia originating at the vaginal apex is a well-described condition that has long been suspected as a possible complication of hysterectomy.[4] The Maryland Women's Study, a prospective survey of surgical outcomes in more than 1,200 women undergoing hysterectomy, reported that 2.3% of the women studied, who were pain free before the procedure, developed dyspareunia after hysterectomy.[5] It is unclear what percentage of women develop pain at the vaginal cuff after surgery, but if we extrapolate from these data, then as many as 15,000 women annually may be at risk for developing posthysterectomy dyspareunia.

The pathophysiology of vaginal cuff pain is not well understood. The neuronal wind-up theory proposes that surgical wounding leads to tissue and peripheral nerve injury.[6] Prolonged changes in the neural circuitry can develop in patients due to unknown factors that lead to altered signal processing at the level of the spinal cord (ie, neuronal wind-up), resulting in lowered pain thresholds termed visceral hyperalgesia.

Treatment options for vaginal apex pain are limited. Recent reports indicate that in patients with persistent posthysterectomy dyspareunia and whose pain is localized to the vaginal apex, excision of the painful tissue may be the treatment of choice.[4,7,8] Follow-up information on patients undergoing vaginal apex resection is described in one case study of 9 patients published by Sharp et al in 2000.[7] This case study reports improvement in dyspareunia and coital frequency, but many other surgical outcomes, such as improvement in daily activities, were not evaluated. If we speculate that vaginal apex pain results from surgical wounding, it is not clear

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why surgical resection would be the treatment of choice, and a closer look at surgical outcomes is warranted.

The primary aim of our study was to evaluate the long-term effects of vaginal apex repair on levels of pelvic pain, dyspareunia, daily activity, need for medical therapy, and patient satisfaction. We also examined the association between duration of pain after hysterectomy and resolution of pain after vaginal apex repair.

MATERIALS AND METHODS

The original study cohort included 45 women who underwent vaginal apex resection in the Division of Advanced Laparoscopy and Gynecologic Surgery at the University of North Carolina Women's Hospital between 1995 and 2002. After this study was approved by our Institutional Review Board, each potential study candidate was contacted by telephone or mail and asked if she would consent to participate in the study. All women included in the study were previously diagnosed with posthysterectomy vaginal apex pain, using the cotton-tipped applicator technique and underwent vaginal apex repair by laparoscopy or laparotomy as previously described.[4] For this procedure, the patient was placed in lithotomy position while awake, and the vaginal apex was carefully examined using a speculum and a cotton-tipped applicator. The painful areas and the angles of the vaginal apex were marked with a surgical marker to ensure full resection of the vaginal apex. A 2- or 3-cm diameter smooth-tipped vaginal stent was then placed in the vagina to stretch the vaginal apex and allow easier visualization of the apical area from the intra-abdominal view. Any intestinal adhesions to the vaginal cuff were removed, and precise identification of the bladder was performed by filling the bladder through a Foley catheter. The peritoneum overlying the bladder was then incised and dissected so as to displace the bladder inferiorly and separate it from the vaginal apex. The vaginal apex was then identified and excised with electrocautery scissors (ensuring that the marked apices and painful areas were removed) and the remaining edges were sutured to close the cuff, thus forming a new vaginal apex.

Patients were excluded if contact information was not available, if they refused to participate in the study, or if their complete medical record was not available for review. If they did not consent, respond within the allotted time period, or respond after being contacted 3 times, the women were considered lost to follow-up. After consenting, the participants were asked to complete a questionnaire regarding pain levels, sexual function, daily activities, ability to work, and medical therapy before and after surgical repair of the vaginal apex.

To evaluate vaginal apex pain levels, we asked the women, "Before (or after) your surgery, would you describe your pelvic or vaginal pain as none, mild, moderate, severe, or very severe?" The response options from which they could select were adapted from a previously validated 5-point verbal analogue pain scale.[9] A similar format was used for evaluating dyspareunia intensity. Participants were categorized as "improved" at follow-up if levels of pain decreased from "severe" or "very severe" to "mild" or "no pain." Otherwise they were classified as worsened if they worsened by more than one category, or not improved if they improved by only one category. Questions about daily activities, ability to work, medical therapy, and patient satisfaction varied. For example, to assess continuation of medical therapy, we asked women, "After your surgery, did you have to keep taking pain medications for continued pelvic or vaginal pain?"

Information regarding demographic background, previous medical history, and surgical history was abstracted from the medical record for each woman enrolled in the study and entered into an Excel (Microsoft Corporation, Redmond, WA) database. Variables included were race, household income, educational level, marital status, hysterectomy information (type, indication, additional surgeries performed concomitantly, complications), medical history (presence of pain syndromes, psychiatric diagnoses, social factors), height, weight, chief complaint (location of pain, duration of pain, nature of pain, impairment of sexual activity), type of therapies already attempted, and additional surgeries since her hysterectomy but before the vaginal apex repair. Surgical variables related to the vaginal apex procedure were resected pathology, concomitant surgeries, and complications.

Data analysis was performed using STATA 7.0 Statistical Software (Stata Corporation, College Station, TX). Univariate analysis was used to determine frequencies, means, medians, ranges, missing data, and outliers. All continuous variable distributions were tested for normality using the Shapiro-Wilk statistic. Continuous variables with skewed distribution were summarized using medians and ranges and categorical data were described using frequencies. Bivariate analysis was performed to determine associations between participant characteristics and outcome variables. The Wilcoxon rank sum test was used for nonnormal continuous variables and Fisher exact test for dichotomous variables with expected low cell frequencies. McNemar χ^2 tests were used to assess significance of before and after vaginal apex repair comparisons in levels of pelvic pain and dyspareunia.

Table 1. Patient Demographics, Pain Duration, and Hysterectomy Characteristics

	All N = 42	Respondents n = 27 (64)	Nonrespondents n = 15 (36)	P*
Age (y)	38 (26–59)	40 (29–59)	34 (26–59)	.014
Race				.596
White	37 (88)	24 (65)	13 (35)	
Black	5 (12)	3 (60)	2 (40)	
Marital status				.669
Married	34 (81)	21 (62)	13 (38)	
Divorced or separated	7 (17)	5 (71)	2 (29)	
Missing	1 (2)	1 (2)	0	
Education (y)				
< 12	2 (5)	2 (7)		
12–16	20 (47)	20 (74)	. . .	
> 16	5 (12)	5 (19)		
Missing	15 (36)	0		
Income				
< 20,000	4 (10)	4 (15)		
20,000–50,000	6 (14)	6 (22)	. . .	
> 50,000	15 (36)	15 (55)		
Missing	17 (40)	2 (7)		
Duration of pain before VAR (mo)	37 (4–180)	48 (6–180)	27 (4–146)	.057
Duration of time from VAR to follow-up interview (mo)	38 (5–94)	38 (5–94)	. . .	
Indications for hysterectomy				
Chronic pelvic pain	15 (36)	11 (41)	4 (27)	.285
Endometriosis	21 (50)	12 (44)	9 (60)	
Other (eg, fibroids, AUB)	6 (14)	4 (15)	2 (13)	
Route of hysterectomy				.384
Abdominal	31 (74)	19 (70)	12 (80)	
Vaginal or LAVH	11 (26)	8 (30)	3 (20)	
Oophorectomy with hysterectomy				.285
Unilateral or none	26 (62)	16 (59)	10 (67)	
Bilateral	15 (36)	11 (41)	4 (27)	
Missing	1 (2)	0	1 (6)	
Complications at hysterectomy				.693
No	36 (86)	23 (85)	13 (87)	
Yes	6 (14)	4 (15)	2 (13)	
Types				
Cuff cellulitis	1	0	1	
Wound infection	1	1	0	
Vaginal cuff bleeding	2	0	2	
Missing	2	0	2	

VAR, vaginal apex repair; AUB, abnormal uterine bleeding; LAVH, laparoscopically assisted vaginal hysterectomy.

Values are median (range) for age, duration of pain prior to VAR and duration of time from VAR to follow-up interview, or number (percentage).

* *P* values represent comparisons between respondents and nonrespondents. The Fisher exact test was used for categorical variables, and the Wilcoxon rank sum test was used for continuous variables. Missing data from nonrespondents indicated by ellipsis (. . .).

RESULTS

Between April 1995 and March 2002, we performed 45 vaginal apex resections. Forty-four women were contacted by telephone or mail (1 patient was deceased). Two women refused to participate, thus 42 charts were available for review. Background information was collected for all 42 participants, but 15 (35.7%) women did not return their questionnaires and were considered lost to follow-up. Demographic characteristics, route of hysterectomy, hysterectomy indication, complications at hysterectomy, concomitant oophorectomy, history of repeat surgery posthysterectomy but before vaginal apex repair, mean duration of pain, and mean interval between vaginal apex repair and follow-up are shown in Table 1.

Thirty-two (76%; 95% confidence interval [CI] 61–88%) women had other surgeries, and 40 (95%; 95% CI 84–99%) had additional medical management after their hysterectomy and before vaginal apex repair. The most common interim procedure was oophorectomy or ovarian remnant removal that was performed in 20 (48%; 95% CI 32–64%) women followed by lysis of adhesions

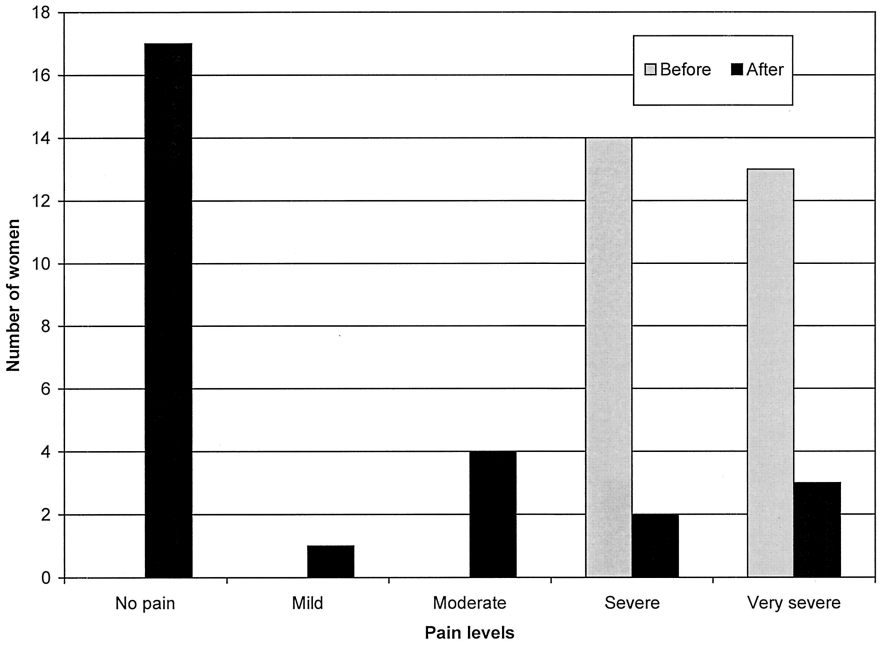

Fig. 1. Comparison of pelvic or vaginal pain levels before and after vaginal apex repair. Participants were matched based on before and after levels, and changes were assessed using the McNemar χ^2 test ($P < .001$).
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performed in 18 (43%; 95% CI 28–59%) women. Six participants had had prior vaginal apex repairs, and 4 women had prior removal of vaginal apex cysts or neuromas.

Pain syndromes were present in all (93%; 95% CI 81–99%) but 3 participants. These included diagnoses of migraines (6), irritable bowel syndrome (9), chronic pelvic pain (36), vaginal trigger point (5), interstitial cystitis (2), pelvic floor muscle spasm (3), back pain (5), and vulvodynia (1). Eighteen of the 42 (43%; 95% CI 28–59%) patients had clinically diagnosed psychiatric illnesses such as depression (14), anxiety (5), or sexual and physical abuse (9).

The major complaints on presentation to the clinic were left-sided or right-sided pelvic pain (38), dyspareunia (28), vaginal pain (8), and vaginal burning (1). All 42 women described their pain as "severe" or "very severe" before vaginal apex repair. On initial evaluation, 8 (19%; 95% CI 9–34%) participants rated their dyspareunia as severe enough that they could not participate in sexual intercourse at all.

The pathology in the resected vaginal apex tissue was diagnosed as fibrotic tissue in 16 specimens, tissue with inflammatory changes in 11, normal mucosa in 10 patients, endometriosis in 1, and neuroma in 1. Twenty-nine (69%; 95% CI 53–82%) patients had other procedures performed at the time of their vaginal apex resection; 16 of these additional procedures were lysis of adhesions. Three patients had postsurgical complications during their vaginal apex resection: 1 cuff cellulitis, 1 urinary tract infection and 1 urinary retention.

Data from 27 respondents concerning changes in pelvic pain levels before and after vaginal apex resection are in Figure 1. All women reported "severe" or "very severe" pelvic or vaginal pain before the vaginal apex repair. After the surgical repair, 22 (82%; 95%CI 62–94%) of women reported significantly decreased levels of pelvic pain. Eighteen women (67%; 95% CI 46–84%) reported resolution of pain for a median 20 months (range 3–81), but only 7 (26%; 95% CI 11–46%) women remained completely pain free at the end of the follow-up period.

Respondents and nonrespondents were similar with respect to race, marital status, type of hysterectomy, other procedures performed with hysterectomy, presence of other pain syndromes, psychiatric history, prior surgeries, and previous use of other medical therapies. However, respondents were older and had longer pain duration before vaginal apex repair than nonrespondents (Table 1).

Of 18 women (67%; 95% CI 46–84%) who were unable to do any work or chores before vaginal apex repair due to pelvic pain, 11 (61%; 95% CI 36–83%) were able to return to work after vaginal apex repair. Twenty-five (93%; 95% CI 76–99%) women had pain with daily activities before vaginal apex repair. Afterward, 11 (41%; 95% CI 22–61%) women were completely pain-free during daily activities, 9 (33%; 95% CI 17–54%) had pain only sometimes but were able to perform daily activities, and 6 (22%; 95% CI 9–42%) remained completely inactive due to continued pain. We noted that women with a previous history of other pain

Table 2. Changes in Sexual and Physical Activity and Overall Satisfaction With Vaginal Apex Repair Among Respondents

Question	Before VAR		After VAR		*P*
	N = 27	% (95% CI)	N = 27	% (95% CI)	
Were you sexually active?					.003
No–abstained by choice, not sexually active	2	7 (1–24)	1	4 (0.1–19)	
No–because of pain	6	22 (8–42)	3	11 (2–29)	
Yes–but only sometimes because of pain	16	59 (39–78)	12	44 (25–65)	
Yes–all the time despite pain	3	11 (2–29)	1	4 (0.1–19)	
Yes–because you had no pain	0		10	37 (19–58)	
Did you have difficulty with daily activities (around the house chores, exercising, and work)?					.002
No	2	7 (1–24)	11	41 (22–61)	
Yes–sometimes	14	52 (31–71)	9	33 (17–54)	
Yes–all the time and enough that you couldn't work	5	19 (6–38)	1	4 (0.1–19)	
Yes–all the time and enough that you couldn't work or do chores around the house	6	22 (9–42)	5	19 (6–38)	
Can't remember	0	0	1	4 (0.1–19)	
Overall, since your surgery would you say your pain has					
Improved after surgery			19	70 (50–86)	NA
Stayed the same since surgery		NA	5	19 (6–38)	
Worsened since surgery			3	11 (2–29)	
Overall, since your surgery would you say that your sexual activity has					
Improved since the surgery		NA	15	56 (35–75)	
Stayed the same since the surgery			7	26 (11–46)	
Worsened since surgery			0	0	
Not sexually active after the surgery, by choice			2	7 (1–24)	
Not sexually active after the surgery because of pain			3	11 (2–29)	
Overall, do you feel it was worth it to undergo the vaginal apex revision surgery?					
Yes		NA	21	78 (58–91)	
No			2	7 (1–24)	
Not sure			4	15 (4–34)	

VAR, vaginal apex repair; CI, confidence interval for corresponding proportion; NA, not applicable.

syndromes were less likely to experience an improvement in activities of daily living (odds ratio 0.35; 95% CI 0.04–30), however, our small sample size is reflected in the imprecise point estimate.

All women reported dyspareunia before the vaginal apex repair. After the procedure, 8 (30%; 95% CI 14–50%) women reported being able to have sex without any pain. Patterns in sexual activity, dyspareunia, and intensity of dyspareunia before and after vaginal apex repair are shown in Table 2 and Figure 2, respectively.

Continued medical therapy was still required after vaginal apex repair in the majority of patients. Twenty-one women (78%; 95% CI 58–91%) returned to the doctor for continued pelvic or vaginal pain despite also reporting improvement in pain. Fourteen (78%; 95% CI 52–94%) of the 18 whose pain resolved, reported taking pain medications for continued pelvic or vaginal pain, 9 of the 27 respondents (33%; 95% CI 17–54%) reported having another surgery after the vaginal apex repair for continued pelvic or vaginal pain. Yet, overall patient satisfaction with the procedure was high (Table 2).

DISCUSSION

Our analysis shows that 67% of our study population experienced resolution of pelvic pain after vaginal apex resection for a median of 20 months. Of the 18 women who experienced resolution of pelvic pain, only 7 (26%) were still pain-free at the time of follow-up. Pain with daily activities, dyspareunia, and sexual activity improved to a lesser extent. The number of women experiencing pain with activities of daily living decreased from 92% before vaginal apex repair to 41% after vaginal apex repair, and although dyspareunia was present in all women before vaginal apex repair, 30% of women reported sexual activity without any dyspareunia after

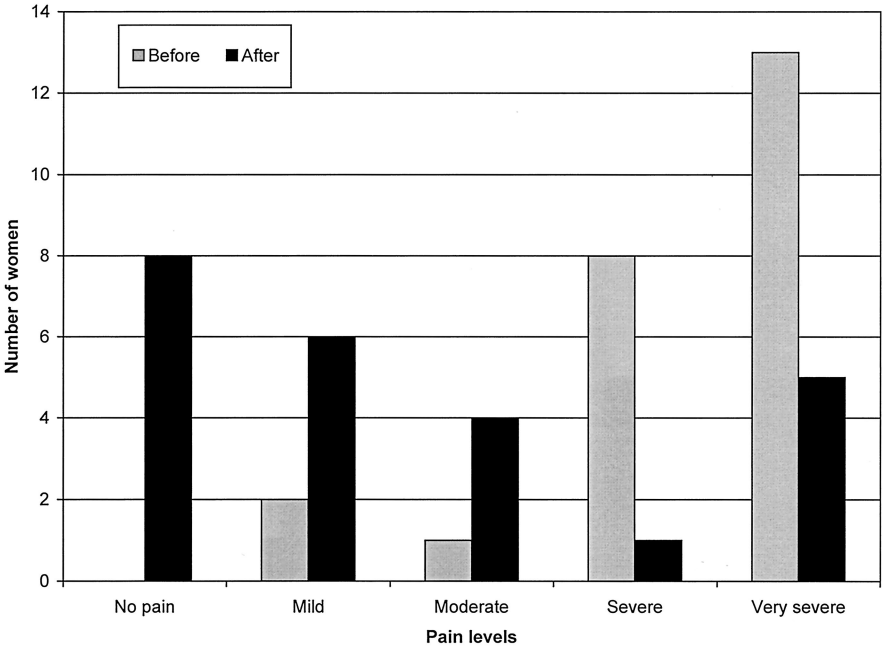

Fig. 2. Comparison of pain levels associated with dyspareunia before and after vaginal apex repair. Participants were matched based on before and after levels, and changes were assessed using the McNemar χ^2 test ($P = .003$).
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vaginal apex repair. Vaginal apex resection was successful at enabling women to return to work: 61% of women who had stopped work due to pelvic pain were able to return to work after vaginal apex repair. Independent of improvement in other areas, the majority of patients required continued medical therapy after vaginal apex excision. Patient satisfaction was high with the procedure; 78% of patients felt the surgery was "worth it." Only 3 patients reported worsening pain after vaginal apex repair.

Sharp and colleagues[7] published the first small study suggesting that vaginal apex repair may be effective in decreasing dyspareunia and increasing sexual activity. They reported that vaginal apex repair was essentially curative in 8 of 9 patients (88.8%) with persistent post-hysterectomy vaginal apex pain at a mean 36.4 ± 3.7 months after vaginal apex repair. Unfortunately, they did not discuss any other surgical outcomes such as general pelvic pain, pain with daily activities, return to work, continued medical therapy, and patient satisfaction.

In contrast to Sharp's case study, we found that 67% of patients have resolution of pain for approximately 20 months; however, at the end of the follow-up period only 26% of our patients were pain free, showing that for the majority of women in our study, complete resolution of pain was temporary. Nevertheless, it did result in marked improvement of pelvic pain, dyspareunia, and daily activity for the majority of participants. Furthermore, we noted that in addition to psychiatric history, the presence of other pain syndromes might also negatively affect the improvement of pain after vaginal apex repair.

Our findings are limited by the lack of a control group consisting of a concurrent group of women undergoing alternate treatments for vaginal apex pain. Our data were also limited by a small sample size, loss of 15 patients to follow-up, and its retrospective nature. Thus, making a conclusive statement about the true effectiveness of this procedure is beyond the scope of this small descriptive study. Despite this, we boast several advantages. The study implemented a well-designed questionnaire with validated pain scales.[9] It also included important additional outcomes not previously examined when evaluating the effectiveness of vaginal apex repair, such as the procedure's effect on daily activities, return to work, the continuation of medical therapies, patient satisfaction with the surgery, and the duration of pain before vaginal apex repair and pain relief after vaginal apex repair.

On the basis of our findings, we suggest advising women that vaginal apex repair is more successful at improving general chronic pelvic or vaginal pain than it is at improving sexual activity or daily activity levels. This implies that sexual activity is a complex process and improvement in sexual activity does not strictly correlate with decreases in levels of pain. Patients may be informed that pain relief can be temporary and that they will likely need continued medical therapy, because the mean pain-free duration after vaginal apex repair for women who experienced resolution of pain is just over one and one half years. Our cohort's lack of a control group must be clearly emphasized. Chronic

pain syndromes often temporarily respond to treatment interventions,[10,11] certainly our data suggests that this may also be the case in women experiencing chronic vaginal apex pain. It is also important to note that previous studies have clearly demonstrated that in cases of chronic pelvic pain (eg, due to endometriosis), surgical treatment may have a short-term placebo effect.[10] For example, in the case of chronic pelvic pain due to endometriosis, as many as 48% of women treated with "sham" surgery, reported improvement in pain levels up to 3 months after surgery.[10]

In light of limited literature and outcomes data, additional prospective controlled investigations should be undertaken on the effectiveness of vaginal apex repair. Several questions remain unanswered. If vaginal apex pain is truly a consequence of hysterectomy and results from surgical insult, then can the surgical technique for hysterectomy be altered to prevent the development of this type of pain in certain patients? One might speculate that a supracervical hysterectomy (where the vaginal apex is left intact) may be more appropriate in women undergoing hysterectomy, especially in those who have a history of chronic pelvic pain or other pain syndromes. Should we also pay special attention to the reapproximation of the cuff edges during surgery (ie, ensuring that the edges are everted and evenly sutured to prevent abnormal scarring or fluid collections at the vaginal cuff)? Lastly, it still remains to be determined whether posthysterectomy vaginal apex pain should be placed in the context of neuropathic pain arising from inflammatory and repair mechanisms of neural tissues in response to surgical tissue injury. The chronicity, hyperalgesia and allodynia clinically described in patients with vaginal apex pain certainly suggest neuropathic dysfunction. If this is the case, the therapeutic challenge is to devise a postsurgical regimen that prevents the development or return of vaginal apex pain. New research will be needed to determine whether first-line therapies approved for neuropathic pain (tricyclic antidepressants, 5% lidocaine, gabapentin, or opioid analgesics)[12] should be used to improve the therapeutic value of vaginal apex repair.

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