Vaginal Cuff Dehiscence: Risk Factors and Associated Morbidities
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ABSTRACT
Background and Objectives: To evaluate whether the route and surgical technique by which hysterectomy is performed influence the incidence of vaginal cuff dehiscence.

Methods: We performed a retrospective analysis of total hysterectomy cases performed at Brigham and Woman’s Hospital or Faulkner Hospital during 2009 through 2011.

Results: During the study period, 2382 total hysterectomies were performed; 23 of these (0.96%) were diagnosed with cuff dehiscence, and 4 women had recurrent dehiscence. Both laparoscopic (odds ratio, 23.4; P = .007) and robotic (odds ratio, 73; P = .0006) hysterectomies were associated with increased odds of cuff dehiscence in a multivariate regression analysis. The type of energy used during colpotomy, mode of closure (hand sewn, laparoscopic suturing, or suturing assisted by a device), and suture material did not differ significantly between groups; however, continuous suturing of the cuff was a protective factor (odds ratio, 0.24; P = .03). Women with dehiscence had more extensive procedures, as well as an increased incidence of additional major postoperative complications (17.4% vs 3%, P = .004).

Conclusion: The rate of cuff dehiscence in our cohort correlates with the current literature. This study suggests that the risk of dehiscence is influenced mainly by the scope and complexity of the surgical procedure. It seems that different colpotomy techniques do not influence the rate of cuff dehiscence; however, continuous suturing of the cuff may be superior to interrupted suturing.

Key Words: Total hysterectomy, Vaginal cuff dehiscence, Laparoscopy, Robotic surgery.

INTRODUCTION
Vaginal cuff dehiscence is an uncommon but potentially morbid complication after hysterectomy. It is defined as separation of a vaginal cuff that was previously closed. After dehiscence, there is a direct connection between the peritoneal cavity and the vagina; abdominal or pelvic contents may be expelled through the vagina, causing a wide range of signs and symptoms from minimal vaginal discharge to profuse bleeding and gastrointestinal evisceration. The incidence of this condition as reported in the literature is 0% to 7% and appears to be higher after laparoscopic and robotic approaches compared with vaginal and abdominal approaches.1–5 Uccella et al1 previously reported the incidence to be 0.13% when the procedure is performed by the vaginal approach, 0.2% when performed abdominally, and 0.64% when performed by the laparoscopic approach. Risk factors are ill-defined5 and include factors that influence wound healing, as well as mechanical factors such as early resumption of sexual activity, trauma, and increased intra-abdominal pressure.5–9

Limited data exist about the effect of different approaches to colpotomy creation, suture materials,2 or suturing techniques10,11 on the risk of vaginal cuff separation.12 Furthermore, the available retrospective reports often lack clear descriptions of the technique of colpotomy used, especially in abdominal and vaginal hysterectomies.3 In a literature review by Uccella et al,12 the pooled incidence of vaginal dehiscence was lower for transvaginal cuff closure (0.18%) than for both laparoscopic and robotic closure (0.64% and 1.64%, respectively). Proposed factors unique to minimally invasive procedures that could play a role in this observed difference are a magnified view that could induce the surgeon to include an insufficient amount of tissue in closure and insufficient tension maintained on the suture by traditional laparoscopic or robotic instruments rather than by the surgeon’s hands.12

The aim of this study is to assess whether various sources of energy, suture materials, and surgical techniques applied during hysterectomy via different routes influence the incidence of vaginal cuff dehiscence.
METHODS

Institutional review board approval was obtained. We identified all women who underwent total hysterectomy at Brigham and Woman’s Hospital or Faulkner Hospital during 2009 through 2011 through the Partners Research Patient Data Registry. The charts of all of the identified women were reviewed. Exclusion criteria were subtotal hysterectomies, cesarean hysterectomies, and pelvic enterotomies.

Data extracted included demographic characteristics (age, race, gravity, and parity), comorbidities (smoking, diabetes, chronic steroid use or use of immunosuppressants, malignancy, connective tissue disease, vascular disease, and surgical history), indication for hysterectomy (oncologic vs non-oncologic), mode of hysterectomy, subtype of hysterectomy (simple vs radical or with extensive gastrointestinal involvement), intraoperative characteristics (mode of colpotomy and of closure, type of suture used, whether additional electrosurgical energy was used to achieve hemostasis, estimated blood loss, major intraoperative complications, and length of stay), and both major postoperative complications (requiring observation as inpatients, with or without additional treatment) and minor postoperative complications (treated on an outpatient basis, including bleeding complications, infections, organ injuries, venous thromboembolism, and cardiovascular complications). In all cases of laparoscopic hysterectomy, as well as robotic-assisted laparoscopic hysterectomy, the cuff was closed by the laparoscopic approach. Laparoscopic-assisted vaginal hysterectomies were included in the vaginal cohort. Vaginal cuff dehiscence was defined as an opening of a previously closed vaginal cuff including an opening in the peritoneum. The diagnosis was established either during routine follow-up or on examination after complaints of vaginal bleeding, discharge, or pain. In cases of vaginal cuff dehiscence, the inciting event, time to presentation, and type of treatment were recorded. Treatment of dehiscence was performed according to the surgeon’s preference by the vaginal or laparoscopic route. In the case of devitalized tissue at the margins, the tissue edges were freshened. Furthermore, all cases of vaginal cuff dehiscence were examined during an in-depth chart review in an effort to identify characteristics that may have been associated with the dehiscence.

Data were summarized by use of descriptive statistics. Continuous variables were grouped into clinically meaningful categories, and the proportions of all variables in cases and controls were compared by Fisher exact tests. Logistic regression was used to adjust associations for potential confounders, and missing value indicators were used to ensure that subjects were not excluded from multivariate models.

Given the small size of the case group, attention was given to building a parsimonious model that would still adjust for potential confounders. We began the multivariate analysis by adjusting all surgical variables by 3 baseline characteristics: age, body mass index, and comorbidities. None appeared to be important confounders, so we built our multivariate model adjusting only for age. We collapsed subcategories for 2 variables to minimize the number of indicators in the model and to avoid categories without any cases: laparoscopic suturing was collapsed into 1 category (both intracorporeal and extracorporeal), and type of suture was collapsed into 2 categories (braided vs barbed). A bipolar energy source for colpotomy was used for only 1% of the total sample (28 controls and 0 cases). Because this category could not be meaningfully collapsed with the other colpotomy types, these 28 patients were excluded from the model. Intraoperative complications did not affect the results of the model once postoperative complications were included, so they were left out of the multivariate analysis. Finally, a post hoc power analysis was performed and is presented in the “Results” section.

RESULTS

During the 3-year study period, 2382 total hysterectomies were performed; 23 (0.96%) were associated with cuff dehiscence. Thirty-five percent were performed abdominally, 13% were performed vaginally, 44% were performed laparoscopically, and 8% were performed robotically. There were 4 cases of recurrent dehiscence. The baseline characteristics of dehiscence cases and controls are presented in Table 1. Women with dehiscence did not differ from the general cohort in terms of indications for surgery, comorbidities, or surgical history.

Table 2 presents a univariate analysis comparing operative characteristics and outcomes between cases with and without associated dehiscence. Both laparoscopic and robotic-assisted laparoscopic hysterectomies were more common in the dehiscence group. There were more major postoperative complications among women with dehiscence. Women with dehiscence did not differ from the general cohort in terms of surgical technique.

The multivariate regression analysis is presented in Table 3. This analysis found that women who had vaginal cuff dehiscence were younger than those who did not have...
|                         | No Dehiscence (n = 2359) | Dehiscence (n = 23) | Fisher Exact Test (P Value) |
|-------------------------|-------------------------|---------------------|-----------------------------|
| **Age**                 |                         |                     |                             |
| <50 y                   | 842 (35.7%)             | 15 (65.2%)          | .007                        |
| ≥50 y                   | 1517 (64.3%)            | 8 (34.8%)           |                             |
| **Race**                |                         |                     |                             |
| White                   | 1739 (81.3%)            | 16 (80.0%)          | .74                         |
| Black                   | 189 (8.8%)              | 3 (15.0%)           |                             |
| Asian                   | 66 (3.1%)               | 0 (0%)              |                             |
| Hispanic                | 123 (5.8%)              | 1 (5.0%)            |                             |
| Other                   | 16 (0.7%)               | 0 (0%)              |                             |
| American Indian         | 5 (0.2%)                | 0 (0%)              |                             |
| Missing                 | 221                     | 3                   |                             |
| **BMI**                 |                         |                     |                             |
| <20                     | 95 (4.7%)               | 3 (15.0%)           | .19                         |
| 20–24.9                 | 544 (26.8%)             | 7 (35.0%)           |                             |
| 25–29.9                 | 584 (28.8%)             | 5 (25.0%)           |                             |
| ≥30                     | 806 (39.7%)             | 5 (25.0%)           |                             |
| Missing                 | 330                     | 3                   |                             |
| **Gravidity**           |                         |                     |                             |
| 0                       | 388 (18.7%)             | 6 (28.6%)           | .20                         |
| 1                       | 231 (11.1%)             | 4 (19.0%)           |                             |
| 2                       | 538 (25.9%)             | 2 (9.5%)            |                             |
| 3                       | 382 (18.4%)             | 5 (23.8%)           |                             |
| >3                      | 539 (25.9%)             | 4 (19.0%)           |                             |
| Missing                 | 281                     | 2                   |                             |
| **Any comorbidity**     |                         |                     |                             |
| No                      | 1111 (48.9%)            | 14 (63.6%)          | .20                         |
| Yes                     | 1159 (51.1%)            | 8 (36.4%)           |                             |
| Missing                 | 89                      | 1                   |                             |
| **Prior laparoscopy**   |                         |                     |                             |
| No                      | 1642 (72.0%)            | 18 (85.7%)          | .22                         |
| Yes                     | 639 (28.0%)             | 3 (14.3%)           |                             |
| Missing                 | 78                      | 2                   |                             |
| **Prior laparotomy**    |                         |                     |                             |
| No                      | 1441 (63.1%)            | 11 (52.4%)          | .37                         |
| Yes                     | 842 (36.9%)             | 10 (47.6%)          |                             |
| Missing                 | 76                      | 2                   |                             |
| **Oncologic indication for surgery** |                    |                     |                             |
| No                      | 1495 (63.4%)            | 16 (69.6%)          | .67                         |
| Yes                     | 864 (36.6%)             | 7 (30.4%)           |                             |

*BMI = body mass index.*
Table 2.
Perioperative Characteristics of Total Hysterectomy Population, With and Without Dehiscence

|                              | No Dehiscence (n = 2359) | Dehiscence (n = 23) | Fisher Exact Test (P Value) |
|------------------------------|--------------------------|---------------------|----------------------------|
| Hysterectomy type            |                          |                     |                            |
| Abdominal                    | 832 (35.3%)              | 5 (21.7%)           | .02                        |
| Vaginal                      | 309 (13.1%)              | 1 (4.3%)            |                            |
| Laparoscopic                 | 1034 (43.8%)             | 11 (47.8%)          |                            |
| Robotic                      | 184 (7.8%)               | 6 (26.1%)           |                            |
| Subtype                      |                          |                     |                            |
| Total                        | 2183 (92.5%)             | 19 (82.6%)          | .09                        |
| Radical/GI* or other major organ involvement | 176 (7.5%)             | 4 (17.4%)           |                            |
| Conversion to abdominal      |                          |                     |                            |
| No                           | 2296 (97.3%)             | 22 (95.7%)          | .47                        |
| Yes                          | 63 (2.7%)                | 1 (4.3%)            |                            |
| Colpotomy                    |                          |                     |                            |
| Cold                         | 1006 (44.5%)             | 7 (31.8%)           | .56                        |
| Advanced bipolar device      | 28 (1.2%)                | 0 (0%)              |                            |
| Monopolar                    | 859 (38.0%)              | 11 (50.0%)          |                            |
| Harmonic scalpel**           | 367 (16.2%)              | 4 (18.2%)           |                            |
| Missing                      | 99                       | 1                   |                            |
| Mode of closure              |                          |                     |                            |
| Hand sewn                    | 1192 (50.7%)             | 8 (34.8%)           | .29                        |
| Laparoscopic suturing with intracorporeal knotting | 777 (33.0%)             | 10 (43.5%)          |                            |
| Laparoscopic suturing with extracorporeal knotting | 1 (0.0%)                | 0 (0%)              |                            |
| Suturing assisted by device  | 382 (16.2%)              | 5 (21.7%)           |                            |
| Missing                      | 7                        | 0                   |                            |
| Closure type                 |                          |                     |                            |
| Interrupted                  | 891 (38.1%)              | 10 (43.5%)          | .67                        |
| Continuous                   | 1445 (61.9%)             | 13 (56.5%)          |                            |
| Missing                      | 25                       | 0                   |                            |
| Suture type                  |                          |                     |                            |
| Multifilament absorbable     | 1807 (78.3%)             | 16 (72.7%)          | .58                        |
| Monofilament absorbable      | 30 (1.3%)                | 0 (0%)              |                            |
| Barbed                       | 471 (20.4%)              | 6 (27.3%)           |                            |
| Other (permanent suture)     | 1 (0.0%)                 | 0 (0%)              |                            |
| Missing                      | 50                       | 1                   |                            |
| EBL*                         |                          |                     |                            |
| ≤300 mL                      | 1923 (84.0%)             | 21 (91.3%)          | .56                        |
| >300 mL                      | 365 (16.0%)              | 2 (8.7%)            |                            |
| Missing                      | 71                       | 0                   |                            |

Table 2 continued on next page.
dehiscence. The odds ratios for dehiscence after laparoscopic and robotic hysterectomies were 23.4 (P = .007) and 73 (P = .0006), respectively. Continuous closure of the cuff was found to be protective (odds ratio, 0.24; P = .03). Finally, major postoperative complications multiplied the odds for dehiscence by a factor of 10 (P = .0002).

There was a tendency toward more complicated procedures (radical hysterectomy or major organ involvement) among the women with dehiscence. Energy use during colpotomy, mode of closure (hand sewn, laparoscopic suturing, or suturing with an assisting device), and suture material did not differ significantly between groups.

The dehiscence cases are further described in detail in Table 4, including descriptions of recurrences where applicable. Five cases of dehiscence were treated conservatively; the rest required surgical intervention.

With an α of .05 and power of 80% and with the exposure prevalences we observed and the number of controls we have in this study, to be able to detect the odds ratios we observed for colpotomy, mode of closure, and suture type, we would need approximately 300 cases, 155 cases, and 345 cases, respectively.

**DISCUSSION**

The rate of cuff dehiscence in our study population, 0.96%, is compatible with the literature.4,5,10 Both laparoscopic and, in particular, robotic-assisted laparoscopic hysterectomies were associated with higher odds of dehiscence. These findings correlate with the available literature1,12,13 and may reflect the accumulation of more experience with laparoscopic hysterectomy than with robotic-assisted hysterectomy at our institution. As previously reported, an improvement in the experience of surgeons can help in reducing the incidence of cuff separation.1,4,12

We found that women with dehiscence were younger than the general cohort. All other baseline characteristics were similar between groups, including the indication for hysterectomy. The latter is in contrast to a previous study

| Table 2. (continued) |
|----------------------|
| Perioperative Characteristics of Total Hysterectomy Population, With and Without Dehiscence |
| No Dehiscence (n = 2359) | Dehiscence (n = 23) | Fisher Exact Test (P Value) |
| Any major intraoperative complication |
| No | 2262 (95.9%) | 21 (91.3%) | .25 |
| Yes | 97 (4.1%) | 2 (8.7%) |
| Length of stay |
| 1 d | 52 (2.3%) | 2 (9.1%) | .09 |
| >1 d | 2203 (97.7%) | 20 (90.9%) |
| Missing | 104 | 1 |
| Major postoperative complication |
| None | 2043 (97.0%) | 19 (82.6%) | .004 |
| Hematoma/hemoperitoneum | 22 (1.0%) | 2 (8.7%) |
| Wound infection | 16 (0.8%) | 1 (4.3%) |
| Ureteral/bladder injury | 8 (0.4%) | 1 (4.3%) |
| Other | 18 (0.9%) | 0 (0%) |
| Missing | 252 | 0 |
| Any minor postoperative complication |
| No | 1742 (82.2%) | 17 (73.9%) | .28 |
| Yes | 378 (17.8%) | 6 (26.1%) |
| Missing | 239 | 0 |

*aEBL = estimated blood loss; GI = gastrointestinal. 
bEthicon Endo-surgery, Cincinnati, Ohio.
that found that when the indication was a malignancy, the risk of dehiscence increased 3-fold. There is inconsistency in the literature regarding baseline characteristics associated with cuff dehiscence; some studies showed younger age to be a risk factor, some cited older age as a risk factor, and some did not find any significant association between age and dehiscence. Other baseline characteristics have been sporadically studied. Hur et al found a lower body mass index among women with dehiscence. Nick et al reported no difference in tobacco use or diabetes between women with cuff dehiscence and those without cuff dehiscence, whereas Ramirez and Klemer found that comorbidities associated with poor wound healing increased the risk of cuff dehiscence.

Surgical factors did not influence the risk of cuff dehiscence in this cohort. The surgical factors that were reviewed were type of energy used for colpotomy, mode of suture, type of suture, and suturing technique, reflecting a more comprehensive analysis of surgical factors than previous studies. Even though laparoscopic and robotic-assisted laparoscopic procedures were associated with a higher risk of dehiscence, the method of closure was not; this may be attributed to the fact that the procedures performed by a minimally invasive approach incorporate several differences from the vaginal or abdominal approaches in addition to the mode of closure (i.e., energy used for colpotomy and suture types). Because of the delayed presentation of cuff dehiscence after minimally invasive techniques, it was previously suggested that

Table 3.
Logistic Regression Analysis of Factors Associated With Dehiscence

|                            | Crude OR (95% CI) | P Value | Multivariate Model OR (95% CI) | P Value |
|-----------------------------|-------------------|---------|--------------------------------|---------|
| Age ≥50 y                   | 0.30 (0.12–0.70)  | .006    | 0.28 (0.11–0.70)               | .007    |
| Hysterectomy type           |                   |         |                                |         |
| Abdominal                   | 1.00 (reference)  |         | 1.00 (reference)               |         |
| Vaginal                     | 0.54 (0.06–4.65)  | .58     | 1.21 (0.13–11.4)               | .87     |
| Laparoscopic                | 1.78 (0.62–5.15)  | .29     | 23.4 (2.39–229)                | .007    |
| Robotic                     | 5.84 (1.76–19.3)  | .004    | 73.0 (6.24–854)                | .0006   |
| Subtype                     |                   |         |                                |         |
| Total                       | 1.00 (reference)  | .08     | 3.58 (0.96–13.3)               | .06     |
| Radical/GI or other major organ involvement | 2.62 (0.88–7.78) | .08 | 3.58 (0.96–13.3) | .06 |
| Colpotomy                   |                   |         |                                |         |
| Cold                        | 1.00 (reference)  |         | 1.00 (reference)               |         |
| Monopolar                   | 1.84 (0.71–4.77)  | .21     | 0.23 (0.02–3.54)               | .29     |
| Harmonic scalpel            | 1.56 (0.46–5.37)  | .48     | 0.18 (0.01–3.91)               | .27     |
| Mode of closure             |                   |         |                                |         |
| Hand sewn                   | 1.00 (reference)  |         | 1.00 (reference)               |         |
| Laparoscopic suturing       | 1.95 (0.77–4.97)  | .16     | 0.82 (0.07–9.29)               | .87     |
| Suturing assisted by device | 1.95 (0.64–6.01)  | .24     | 1.88 (0.18–19.4)               | .6      |
| Suture type                 |                   |         |                                |         |
| Braided monofilament or multifilament | 1.00 (reference) |         | 1.00 (reference) |         |
| Barbed                      | 1.46 (0.57–3.75)  | .43     | 1.73 (0.38–7.84)               | .48     |
| Continuous closure          | 0.81 (0.35–1.85)  | .61     | 0.24 (0.07–0.86)               | .03     |
| Any postoperative complication | 7.55 (2.50–22.8) | .0003 | 10.0 (2.97–33.9) | .0002 |

*All variables in the table were included in the multivariate model.

*CI = confidence interval; GI = gastrointestinal; OR = odds ratio.

*C. Ethicon Endo-surgery, Cincinnati, Ohio.
Table 4. Detailed Data for Cases of Dehiscence

| Patient | Age (y) | Oncologic Indication | Route of Hysterectomy | Radical Hysterectomy | Time to Event (d) | Symptoms | Precipitating Event | Surgical Repair Performed | Comments |
|---------|---------|----------------------|-----------------------|----------------------|-------------------|----------|---------------------|---------------------------|----------|
| 1       | 61      | Yes                  | LAVH                  | Yes                  | 30                | Bleeding | Coitus              | Yes                       | Receiving chemotherapy  |
| 2       | 46      | Yes                  | TAH                   | Yes                  | 62                | Acute pain, prolapse of small bowel | Coitus | Yes | Receiving bevacizumab maintenance |
| 3       | 56      | Yes                  | TLH                   | Yes                  | 22                | Bleeding | Valsalva            | Yes                       | |
| 4       | 57      | TAH                  | TLH                   | Yes                  | 52                | Vaginal drainage and pain | Coitus | Yes | |
| 5       | 44      | Yes                  | TLH                   | Yes                  | 17                | Bleeding | Coitus              | Yes                       | |
| 6       | 47      | Yes                  | TLH                   | Yes                  | 25                | Bleeding and discharge | Coitus | Yes | |
| 7       | 40      | Yes                  | TLH                   | Yes                  | 240               | Vaginal pain and mass | Valsalva | Yes | |
| 8       | 48      | Yes                  | TLH                   | Yes                  | 38                | Abdominal pain | Coitus | Yes | Revision of vaginal cuff scar due to dyspareunia between cases of dehiscence |
| 9       | 36      | Yes                  | RaLH                  | Yes                  | 17                | Vaginal drainage | Coitus | Yes | |
| 10      | 52      | Yes                  | Robotic assisted      | Yes                  | 16                | Vaginal drainage | Coitus | Yes | |
| 11      | 47      | Yes                  | RaLH                  | Yes                  | 45                | Abdominal pain | Coitus | Yes | |
| 12      | 42      | Yes                  | RaLH                  | Yes                  | 31                | Vaginal drainage | Coitus | Yes | |
| 13      | 37      | Yes                  | TAH                   | Yes                  | 99                | Abdominal pain | Coitus | Yes | |
| 14      | 41      | Yes                  | TAH                   | Yes                  | 70                | Abdominal pain | Coitus | Yes | |
| 15      | 30      | Yes                  | TAH                   | Yes                  | 87                | Abdominal pain and vaginal drainage | Coitus | Yes | |
| 16      | 61      | Yes                  | TLH                   | Yes                  | 30                | Vaginal leakage | Coitus | Yes | |
| 17      | 49      | Yes                  | TLH                   | Yes                  | 75                | Bleeding | Coitus | Yes | |
| 18      | 53      | Yes                  | TLH                   | Yes                  | 105               | Pressure | Coitus | Yes | |
| 19      | 30      | Yes                  | RaLH                  | Yes                  | 27                | Vaginal leakage | Valsalva | Yes | |

Table 4 continued on next page.
the use of electrocoagulation on the vaginal cuff may play a
significant role in impaired healing.8 Uccella et al1 suggested
that the role of monopolar energy is minimal in the patho-
genesis of cuff dehiscence. Other authors concluded that the
application of excessive bipolar electrosurgery (40 W and
4 seconds) tends to weaken suture material.15 Previous
studies have not compared the use of ultrasonic energy as a
means of colpotomy with other more commonly used tech-
niques. In this study we had the advantage of including a
wide variety of colpotomy methods. Nevertheless, neither
different energy sources nor the use of additional energy to
achieve hemostasis influenced the risk of dehiscence in our
findings. However, given the small sample size of vaginal
cuff dehiscence patients, the lack of significance could be a
type II error.

According to several previous small cohorts, the use of
bidirectional barbed suture seems promising as means to
reduce the risk of dehiscence.5,11 Hur et al4 previously
speculated that switching from cuff closure with Polysorb
suture (Covidien, Dublin, Ireland) to delayed absorbable
monofilament suture may have resulted in a decreased
incidence of cuff dehiscence. Other authors suggested
that using a 2-layer closure may help reduce the risk even
further. In our study, continuous suturing of the cuff was
associated with a decreased risk of cuff dehiscence; how-
ever, neither type of suture nor mode of suture affected
the risk of cuff dehiscence.

Although women with dehiscence did not differ from the
general cohort in terms of indications for surgery (i.e.,
occlusive vs non-oncologic indications), there was an
increased incidence of major complications. The finding may be attributed to an increased preoperative
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wound healing and increased intraperitoneal pressure.
which all cases occurred after robotic procedures. In their review, Kho et al. encountered 3 patients with recurrent dehiscence, which comprised 14% of those who underwent surgical repair for dehiscence. They concluded that the risk of recurrence stems from insufficient mobilization and trimming of the edges during dehiscence repair. In our series, 2 cases of recurrence occurred after abdominal hysterectomy, 1 case followed traditional laparoscopy, and the fourth case occurred after robotic surgery. Hysterectomy was performed because of malignancies in 2 women and because of fibroids in 2 women. The time to recurrent dehiscence ranged between 26 and 390 days. It is difficult to draw significant conclusions regarding recurrent cuff dehiscence because of the rarity of this complication. However, it is prudent to keep in mind that this can occur even after a significant lag time and to monitor and educate patients accordingly.

The main strength of this study is that all women in this cohort received treatment at the same institution over a limited period, as well as during recent years, which serves as a good indicator of relevant surgical proficiencies incorporating current technology. We have also attempted to include in our analysis a comprehensive list of patient and surgical factors that may affect the risk of dehiscence. This cohort suffers the limitations of a retrospective analysis. Furthermore, the possibility of a type II error in our study is a real consideration given the relative rarity of vaginal cuff dehiscence. As stated in the “Results” section, to achieve statistical significance in the difference among different modes of colpotomy, modes of closure, and suture types, our case cohort would have to be 10 times larger.

**CONCLUSION**

Our data confirm the previously suggested increased risk of cuff dehiscence after laparoscopic and robotic hysterectomies compared with alternate approaches. Furthermore, we found that dehiscence appears to be predominantly mediated by the scope of the initial surgery and is frequently accompanied by other major postoperative complications, specifically hemoperitoneum. Continuous suturing of the cuff may be superior to interrupted suturing. Finally, our experience shows that dehiscence may recur and should be monitored accordingly.

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