

## Research

### Vaginal Cuff Dehiscence after Robot-Assisted Gynecologic Surgery

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## Abstract

### Objective

To estimate the incidence of vaginal cuff dehiscence (VCD) after robot-assisted gynecologic surgery (RAGS).

### Methods:

A prospective cohort data analysis of a consecutive series of patients undergoing RAGS in a single institution was conducted. Data on BMI (expressed as kg/m<sup>2</sup>), estimated blood loss (EBL), hemoglobin (Hb) drop, procedure time, length of hospital stay, uterine weight, pain medication use, smoking, prior radiation, chronic steroid use and complications were extracted from the medical record of all patients undergoing RAGS. The type of suture material used for vaginal cuff closure was also noted. Vaginal cuff closure was performed with one of two delayed absorbable suture materials: 2-0 PDS or 0-V-Loc. Care was exercised by the primary surgeon to avoid extensive use of electrocautery at the vaginal cuff. Patient follow up data was available for up to 6 months postoperatively. The  $\chi^2$  test and Kaplan-Meier method were used for statistical analysis. Statistical significance was determined by the log-rank test.

### Results

A total of 521 patients underwent RAGS. Types of procedures were hysterectomy with or without adnexal excision, and hysterectomies with lymphadenectomies. Patients were further subdivided in to groups with/without adjuvant radiation therapy of our cohort, 414/521 patients underwent robot assisted hysterectomy with or without adnexal excision and 107/521 patients underwent comprehensive staging procedure for gynecologic malignancies (hysterectomy, adnexal resection, bilateral pelvic and para-aortic lymphadenectomy) of the 107 patients who underwent

hysterectomy for the indication of gynecologic malignancy, 35 received adjuvant radiation therapy (external beam and/or vaginal brachytherapy). The suture material used for vaginal cuff closure was either 2-0 PDS (87/521) versus 0 V-lock (434/521). When comparing benign versus oncologic RAGS, mean console time was 110 and 168 mins (P=0.056), mean estimated blood loss was 71 and 65 ml (P=0.74), Hb drop 1.4 and 1.2 g/dL (P=0.45), uterine weight was 212 and 95 gms (P=0.98), and length of hospital stay was 1.4 and 1.6 days (P=0.33), respectively. Among entire RAGS cohort, only one patient was identified with VCD after hysterectomy for benign indication. (Incidence: 0.19%, confidence interval 95% -0.18-0.57). There was no difference in VCD after RAGS for malignancy with or without adjuvant radiation treatment. No statistically significant difference was noted between the benign versus oncologic RAGS when compared to pain medication use, BMI, smoking or chronic steroid use.

### Conclusion

RAGS do not appear to increase the rate of vaginal cuff dehiscence

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even with the presence of adjuvant radiation in our series. In our study, we found the incidence of VCD associated with RAGS to be much lower than previous studies have demonstrated, with an incidence of 0.19%. Based on our findings, we recommend using delayed absorbable sutures, either 2-0 PDS or V-Loc suture, for closure of the vaginal cuff. We also recommend judicious use of thermal energy on the vaginal cuff to minimize tissue damage. Together these interventions may minimize the risk of VCD during RAGS.

## Introduction

Vaginal cuff dehiscence is an uncommon, but potentially serious, complication of total hysterectomy. During total hysterectomy, after removal of the uterus, the vaginal incision and peritoneal defect are closed. Vaginal cuff dehiscence (VCD) refers to separation or disruption of this vaginal incision. With dehiscence of the cuff, abdominal contents are at risk of prolapsed through the vaginal opening, which can lead to serious sequelae including bowel injury, necrosis and sepsis. The overall incidence of VCD is low, but varies widely based on the route of hysterectomy. Abdominal and vaginal hysterectomies are associated with the lowest rate of VCD, 0.12 - 0.38% and 0.08 - 0.29% respectively [1-3]. Laparoscopic hysterectomy is associated with the highest rate of VCD, specifically robotic assisted laparoscopic hysterectomy [2-4]. The incidents of VCD with robotic assisted route is reported to be as high as 4.93% [2,5]. Various method of cuff closure and suture material have been studied to decrease the rate of VCD associated with traditional laparoscopic and robotic assisted hysterectomy. The results of these studies are conflicting, and do not demonstrate one method to be superior to another in prevention of VCD [6,7]. Certain patient specific risk factors may also increase the risk for VCD, in general conditions leading to impaired wound healing, including infection, immunosuppressant, diabetes, cigarette smoking and pelvic radiation therapy [8,9]. Our goal was to estimate the incidence of vaginal cuff dehiscence after robot-assisted gynecologic surgery (RAGS).

## Methods

A prospective cohort data analysis of a consecutive series of patients undergoing RAGS in a single institution was conducted. Data on BMI (expressed as kg/m<sup>2</sup>), estimated blood loss (EBL), hemoglobin (Hb) drop, procedure time, length of hospital stay, uterine weight, pain medication use, smoking, prior radiation, chronic steroid use and complications were extracted from the medical record of all patients undergoing RAGS. The type of suture material used for vaginal cuff closure was also noted. Vaginal cuff closure was performed with one of two delayed absorbable suture materials: 2-0 PDS or 0-V-Loc. Care was exercised by the primary surgeon to avoid extensive use of electrocautery at the vaginal cuff. Patient

follow up data was available for up to 6 months postoperatively. The  $\chi^2$  test and Kaplan-Meier method were used for statistical analysis. Statistical significance was determined by the log-rank test.

## Results

A total of 521 patients underwent RAGS. Types of procedures were hysterectomy with or without adnexal excision, and hysterectomy with lymphadenectomies. Patients were further subdivided in to groups with/without adjuvant radiation therapy. Of our cohort, 414/521 patients underwent robot assisted hysterectomy with or without adnexal excision and 107/521 patients underwent comprehensive staging procedure for gynecologic malignancies (hysterectomy, adnexal resection, bilateral pelvic and para-aortic lymphadenectomy). Of the 107 patients who underwent hysterectomy for the indication of gynecologic malignancy, 35 received adjuvant radiation therapy (external beam and/or vaginal brachytherapy). The suture material used for vaginal cuff closure was either 2-0 PDS (87/521) versus 0 V-Loc (434/521). When comparing benign versus oncologic RAGS, oncologic cases were associated with longer operative times, mean console time 110 and 168 mins ( $P=0.056$ ), and greater length of stay, length of hospital stay was 1.4 and 1.6 days ( $P=0.33$ ), respectively. Cases performed for oncologic reasons were also associated with lower mean estimated blood loss compared to those performed for benign indications, 65 vs 71 ml ( $P=0.74$ ), and a lower drop in Hb post-operatively 1.2 vs 1.4 ( $P=0.45$ ), respectively. A greater mean uterine weight was observed in cases performed for benign indications, compared to oncologic cases, 212 vs. 95 grams ( $P=0.98$ ).

Among the entire RAGS cohort, only one patient was identified with VCD (Incidence: 0.19%, confidence interval 95% -0.18-0.57). This case occurred in a hysterectomy performed for benign indication. There were no VCD in the cohort of patients who underwent RAGS for oncologic indications and there was no difference in the incidents of VCD after RAGS for malignancy with or without adjuvant radiation treatment. No statistically significant difference was noted between the benign versus oncologic RAGS when compared to pain medication use, BMI, smoking or chronic steroid use.

## Conclusion

In our series, RAGS does not appear to increase the rate of vaginal cuff dehiscence even in the presence of adjuvant radiation. We found the incidence of VCD associated with RAGS to be much lower than previous studies have demonstrated, with an incidence of 0.19%. Based on our findings, we recommend using delayed absorbable sutures, either 2-0 PDS or V-Loc suture, for closure of the vaginal cuff. We also recommend judicious use of thermal energy on the vaginal cuff to minimize tissue damage. Together these interventions may minimize the risk of VCD during RAGS.

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