



Herniation formation in women undergoing robotically assisted laparoscopy or laparotomy for endometrial cancer[☆]



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HIGHLIGHTS

- Fascial herniation in women undergoing surgery for endometrial cancer is not uncommon
- Fascial herniation occurs less often with robotic surgery compared with laparotomy
- Trocar site herniation can take many months to manifest; surgery revision rates are low

ARTICLE INFO

Article history:

Received 16 November 2015

Received in revised form 6 January 2016

Accepted 7 January 2016

Available online 8 January 2016

Keywords:

Robotic surgery

Gynecologic surgery

Laparotomy

Trocar site herniation

Ventral herniation

Endometrial cancer

ABSTRACT

Objective. To compare the incidence of trocar site hernia in women who underwent robotically assisted laparoscopic surgery (RBT) for endometrial cancer staging with the incidence of ventral hernia formation in patients who underwent laparotomy (LAP) for the same indication. To analyze risk factors for hernia formation in women undergoing RBT for endometrial cancer.

Methods. We retrospectively identified all patients who underwent surgical staging for endometrial cancer via RBT or LAP from 2009–2012. Clinicopathologic data were analyzed. Appropriate statistical tests were used.

Results. 738 patients were staged via RBT (n = 567) or LAP (n = 171). Overall median age was 61 years (RBT range, 33–90; LAP range, 28–86; p = 0.4). Median BMI was 29.5 kg/m² (range, 17.9–66) and 30.3 kg/m² (range, 16.8–67.2), respectively (p = 1.0). Eleven (1.9%) of 567 patients in the RBT cohort developed a trocar site hernia compared with 11 (6.4%) of 171 LAP patients who developed a ventral hernia (p = 0.002). Median time to diagnosis was 18 months (range, 3–49) and 17 months (range, 7–30), respectively (p = 0.7). Of the 11 RBT patients who developed a trocar site hernia, 10 (91%) were midline defects and 1 (9%) was a lateral defect of a prior inferior epigastric port site. No hernias required emergent operative intervention. Four (0.7%) of 567 RBT patients compared with 2 (1.2%) of 171 LAP patients required surgical hernia repair (p = 0.4).

Conclusions. Trocar site herniation after RBT staging for endometrial cancer is uncommon and less likely to occur than ventral hernia formation with LAP staging. Furthermore, surgical revision rates are low.

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1. Introduction

Endometrial cancer is the most common gynecologic malignancy in the United States, with more than 52,000 new cases diagnosed in 2015 [1]. Surgical staging for endometrial carcinoma, including hysterectomy, bilateral salpingo-oophorectomy and lymphadenectomy, remains the standard of care for both treatment and prognosis [2]. Traditionally, surgical staging was performed via laparotomy. Results of the Gynecologic

Oncology Group (GOG) LAP2 study, however, demonstrated the benefits of minimally invasive surgery for staging of endometrial cancer [3]. Specifically, a laparoscopic approach was associated with fewer postoperative complications and a shorter length of hospital stay. Since then, the use of laparoscopy has further increased, as gynecologic oncologists have incorporated the use of robotic surgical platforms to facilitate laparoscopy. In a 2015 survey of Society of Gynecologic Oncology (SGO) members, 97% of respondents reported using the robotic platform, and greater than 90% stated that robotic-assisted laparoscopic surgery was appropriate for use in the staging of endometrial cancer [4].

With the rapid growth of robotically assisted laparoscopic surgery over this past decade, there has been an increase in the literature focusing on operative outcomes and comparisons to traditional laparotomy [3,5–12]. The incidence of trocar site hernias, although uncommon,

[☆] Financial support: Supported in part by the MSK Cancer Center Support Grant P30 CA008748.

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has been shown to be a potential postoperative complication for patients who undergo robotic surgery [13,14]. In sharp contrast, the reported incidence of ventral hernia formation in patients who underwent laparotomy for gynecologic malignancies ranges from 8.8% to 16.9% [15,16].

Given the growing use of the robotic platform for surgical staging of endometrial cancer, our study sought to determine the incidence of trocar site hernias in this patient population. Our secondary objective was to evaluate all cases and identify potential prognostic factors for the development of trocar site hernias. Finally, we sought to compare the rate of hernia formation among patients who underwent robotically assisted laparoscopic surgery to the rate of ventral hernia formation among those who underwent laparotomy for endometrial cancer staging during the same time period.

2. Methods

After Institutional Review Board approval, we retrospectively identified all patients who underwent surgical staging for endometrial cancer at Memorial Sloan Kettering Cancer Center from January 2009 through December 2012, to allow for at least 2 full years of potential follow-up for capturing any cases of trocar site herniation that may have occurred during that time. Surgical staging included total hysterectomy, removal of adnexa, and lymph node evaluation via standard lymphadenectomy or sentinel lymph node mapping and biopsy. The surgical approach was categorized as laparotomy or robotically assisted laparoscopic surgery depending on the type of surgical approach by which the case was completed. Data collection involved review of all operative notes, inpatient progress notes, and postoperative follow-up visits.

Demographic data collected for each patient included assessments of age, body mass index (BMI), and documented past medical history of hypertension, diabetes mellitus, and history of smoking within the 30 days prior to surgery. Confirmation of trocar site hernias within the robotic group was obtained through documentation of observed herniation on physical exam and/or radiographic evidence of bowel herniation on imaging with computed tomography scans or magnetic resonance imaging. Patients with noted trocar site hernias were evaluated for location and classified as either having midline or lateral defects. Notation of trocar type and performance of fascial closure was noted. Incidence of surgical repair post-diagnosis and indication as emergent or non-emergent was documented. For all laparotomy cases, confirmation of ventral herniation was established through documentation on physical exam, and instance of post-diagnostic operative repair was noted.

For all patients undergoing robotically assisted procedures, perioperative details, including time spent operating on the robotic console (between docking and undocking) and estimated blood loss (EBL), were noted. All attending physicians of record were fellowship-trained gynecologic oncologists. Routine setup for robotic surgery required the use of 5 ports: a 12-mm Hasson camera trocar placed either in the umbilical or supraumbilical region, two 8-mm robotic trocars in the bilateral lower quadrants, an 8-mm robotic trocar inferior to the right subcostal margin, and a 10/12-mm assistant trocar inferior to the left subcostal margin. General institutional practice includes primary fascial closure of all 12-mm midline camera ports.

Association statistical tests between the two groups and other demographic and clinical factors were performed through the Mann-Whitney U or Kruskal-Wallis test for continuous variables and the Chi Square or Fisher Exact test for categorical variables, as appropriate. All statistical analyses were performed on IBM SPSS Statistics ver. 22.0 (IBM SPSS Statistics for Windows 2013, Armonk, NY).

3. Results

Seven hundred thirty-eight patients with endometrial cancer who had undergone staging via a robotically assisted laparoscopic approach

or via laparotomy were identified. This included 567 patients (77%) who underwent robotic surgery and 171 (23%) who underwent laparotomy. Demographic characteristics of each cohort are listed in Table 1. Median age in both cohorts was 61 (robotic range, 33–90; laparotomy range, 28–86; $p = 0.4$). Median BMI was 29.5 kg/m² (range, 17.9–66 kg/m²) and 30.3 kg/m² (range, 16.8–67.2 kg/m²), respectively ($p = 1.0$). No significant differences were noted in incidence of hypertension, diabetes mellitus, or smoking history between patient groups (Table 1).

With a median follow-up of 27 months (range, 0.3–77 months) for the entire cohort, trocar site hernias were noted in 11 robotic patients (1.9%) and ventral hernias were noted in 11 laparotomy patients (6.4%) ($p = 0.002$; Table 2). The median time to diagnosis was 18 months (range, 3–49 months) and 17 months (range, 7–30 months), respectively ($p = 0.7$).

Within the robotic cohort, the median age was 66 years (range, 58–80 years) in the patients who developed a hernia compared with 61 years (range, 33–90 years) in those who did not ($p = 0.1$; Table 3). The median BMI was 38.8 kg/m² (range, 23.9–55.2 kg/m²) for herniated cases and 29.5 kg/m² (range, 17.9–66 kg/m²) for non-herniated cases ($p = 0.05$). Again, no significant differences were noted in incidence of hypertension, diabetes mellitus, or smoking history between the hernia and non-hernia cohorts (Table 3). Panniculectomy was performed in 14 (8%) of 171 patients undergoing concurrent laparotomy; none of these cases were associated with subsequent formation of a ventral hernia. When investigating perioperative features between patients with and without herniation in the robotic cohort, median EBL was 100 mL (range, 50–250 mL) in the hernia cohort and 50 mL (range, 5–1200 mL) in the non-hernia cohort ($p = 0.1$). Median time spent at the console was 105 min (range, 78–163) for the herniated cases and 134 min (range, 38–367 min) for the non-herniated cases ($p = 0.2$).

Of the 11 robotic patients who developed a trocar site hernia, 10 (91%) were classified as midline defects and 1 (9%) as a lateral defect of a prior inferior epigastric port site (Fig. 1). The 10 midline defects consisted of four umbilical camera port sites and six supraumbilical camera port sites. The median time to diagnosis was 18.5 months for the umbilical hernias, 7 months for the supraumbilical hernias, and 8 months for the lateral defect. There were no instances of trocar herniation requiring emergent intervention in any of the groups. All midline camera ports had primary fascial closure using a synthetic absorbable suture. The 8-mm lateral port site had not undergone fascial closure. Four (0.7%) of 567 patients from the robotic cohort ultimately underwent surgical repair of a trocar site hernia after diagnosis. In comparison, 2 (1.2%) of 171 patients in the laparotomy group required surgical repair for a ventral hernia ($p = 0.4$). All cases of robotic trocar site hernia repair were of an elective nature and performed laparoscopically by a hernia specialist at our institution.

4. Discussion

In the current analysis, the incidence of trocar site hernia development following robotically assisted laparoscopy was significantly

Table 1
Patient demographics.

Patient characteristic	RBT (n = 567)	LAP (n = 171)	p value
Age, years			0.412
Median	61	61	
Range	33–90	28–86	
BMI, kg/m ²			0.981
Median	29.5	30	
Range	17.9–66	16.8–67.2	
Comorbidity			
Hypertension	252 (44%)	81 (47%)	0.501
Diabetes mellitus	70 (12%)	20 (12%)	0.820
Smoker within 30 days	30 (5%)	11 (6%)	0.568

RBT = robotically assisted laparoscopic surgery, LAP = laparotomy, BMI = body mass index.

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