



The safety of same-day discharge after laparoscopic hysterectomy for endometrial cancer



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HIGHLIGHTS

- Few patients undergo same-day discharge after laparoscopic hysterectomy for endometrial cancer in the United States.
- Same day discharge patients are younger, and have fewer medical comorbidities than patients admitted to the hospital.
- There was no difference in postoperative complications between same-day discharge patients and admitted patients.

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ABSTRACT

Objective. To determine factors influencing discharge patterns after laparoscopic hysterectomy for endometrial cancer and to evaluate the safety of same-day discharge during the 30-day postoperative period.

Methods. Using the American College of Surgeons' National Surgical Quality Improvement Project's database, patients who underwent hysterectomy for endometrial cancer from 2010 to 2014 were identified and categorized by their hospital length of stay. Statistical analyses were performed to assess the relationship between hospital stay and demographics, medical comorbidities, intraoperative surgical factors and postoperative outcomes.

Results. A total of 9020 patients had laparoscopic hysterectomies for endometrial cancer and of these, 729 patients (8.1%) were successfully discharged on the day of surgery. These patients were younger and had lower body mass indexes and fewer medical comorbidities than patients who were admitted after their procedure. The same-day discharge group underwent surgical procedures of less complexity than the hospital admission group based on shorter operative times and fewer relative value units (RVUs). There was a lower rate of surgical site infections in the same-day discharge group, and no difference in rates of other postoperative complications including hospital readmissions and reoperations.

Conclusions. Rates of laparoscopic hysterectomy for endometrial cancer are gradually increasing but the rates of same-day discharge have increased at a much slower rate. Same-day discharge has been successful despite differences in preoperative demographics, medical comorbidities and intraoperative surgical complexity. Overall postoperative complication rates were equivalent despite length of hospital stay, demonstrating the safety and feasibility of same-day discharge after laparoscopic hysterectomy for endometrial cancer.

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Introduction

Endometrial cancer is the most common gynecologic cancer in the United States with an estimated 60,050 new cases and 10,470 deaths in 2016 [1]. Standard first-line treatment for endometrial cancer is primary surgical management with total hysterectomy, bilateral salpingo-oophorectomy and at times, lymphadenectomy [2]. The procedure was traditionally performed by laparotomy, but multiple studies

have demonstrated the feasibility of a minimally invasive approach [3–6]. The Gynecologic Oncology Group – LAP2 trial comparing laparoscopy to laparotomy for the treatment of early stage endometrial cancer, demonstrated equivalent survival outcomes with fewer complications and shorter hospital stays [7–8]. This trial established laparoscopy as the preferred surgical technique for the upfront surgical management for endometrial cancer. Similar findings were noted in multiple randomized prospective trials in Europe and Asia studying laparoscopy versus laparotomy in endometrial cancer [9–11].

Same-day discharge is typical after laparoscopic oophorectomies or ovarian cystectomies, but patients are often admitted overnight after laparoscopic hysterectomies for observation to detect potential

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perioperative complications such as bleeding or inadvertent injury to other structures. However, studies on laparoscopic hysterectomies for benign indications have shown same-day discharge to be feasible and safe without an increase in reoperations or hospital readmissions [12–15]. Additional benefits include high rates of patient satisfaction [16–17] and decreased healthcare costs [13]. Currently, studies on laparoscopic hysterectomies for endometrial cancer looking at same-day discharge have been limited to retrospective single- or dual-institution reports [18–22]. It is also unclear if same-day discharge after laparoscopic hysterectomies for endometrial cancer is being implemented at a national level.

The aim of this study is to evaluate the preoperative and intraoperative factors associated with successful same-day discharge, and the 30-day postoperative complications after laparoscopic hysterectomies for endometrial cancer using a national database.

Materials and methods

Data acquisition

The American College of Surgeons (ACS) compiles the National Surgery Quality Improvement Program (NSQIP) database, which provides patient-level, aggregate surgical outcomes data from over 500 participating hospitals throughout the United States. The NSQIP database comprises prospectively collected data from a sample of randomly assigned patients who are followed for 30 days after their surgical procedure.

All patients with endometrial cancer who had undergone hysterectomies were identified from the NSQIP participant use data files for the years 2007 to 2014 by the appropriate International Classification of Disease, Ninth Revision (ICD-9) diagnostic codes and Current Procedural Terminology (CPT) codes. Differentiation between conventional laparoscopy and robotic assisted laparoscopy was not possible due to the limitations of the database. Variables of interest included patient demographics, medical comorbidities, operative procedures, relative value units (RVUs), operative and anesthesia times, and postoperative complications.

Same-day discharge was defined as discharge home on the same calendar day as the date of surgery. Admission status after hysterectomy was determined by the total length of hospital stay as coded by the NSQIP database. Subjects with a total length of stay of 0 were categorized as same-day discharge and those with a total length of stay of 1 or more were identified as hospital admissions.

All data was received from the ACS without identifiable information and was deemed exempt by the New York University School of Medicine's Institutional Review Board (IRB), in accordance with institutional standards.

Statistical analysis

Mean values and standard deviations were used to describe continuous data, and categorical variables were displayed as totals and frequencies. Categorical covariates were compared using the chi-square analyses, and continuous covariates were compared using 2-tailed independent samples *t* tests, Mann-Whitney tests, and Kruskal-Wallis tests. Multivariate logistic regression analyses were performed to evaluate the association between patient demographics and admission status. These were reported as odds ratios (ORs) with 95% confidence intervals (CI). All statistical analyses were performed using R Studio version 0.99.442. The two-sided significance level was set at $p < 0.05$.

Results

The NSQIP database included 14,757 patients who underwent hysterectomies for endometrial cancer from 2007 to 2014. Of this cohort, 5178 patients (35.1%) had abdominal hysterectomies, 9272 (62.8%) had laparoscopic hysterectomies, and 287 (1.9%) had vaginal

hysterectomies. There was a gradual increase in laparoscopic hysterectomy as well as a concurrent decrease in abdominal hysterectomy from 2007 to 2014. The rates of vaginal hysterectomy remained consistent over the study period (Fig. 1).

From 2007 to 2009, fewer than 250 laparoscopic hysterectomy cases were captured in the NSQIP database due to a small number of participating hospitals. As a result, the remainder of the analysis was performed from 2010 to 2014, during which a total of 9020 patients underwent laparoscopic hysterectomies for endometrial cancer. Of these, 729 patients (8.1%) were successfully discharged home the same-day whereas 8291 (91.9%) were admitted after their procedure. There was an increase in same-day discharges over the 5-year period: 3.8% patients in 2010 were discharged on the day of surgery compared to 9.8% in 2014 ($p = 0.008$) (Fig. 2A). When the total length of hospital stay was stratified by 0, 1, or 2 or more hospital days, the proportion of patients who were discharged home on hospital day 0 and on hospital day 1 increased while the proportion of patients who were discharged from the hospital on hospital day 2 or more decreased (Fig. 2B). In 2010, 3.2% of patients were discharged home the day of surgery and 67.4% were discharged after one day, compared to 2014 when 9.8% were discharged on the same-day and 74.0% were discharged one day after surgery ($p = 0.002$).

A comparison of patient characteristics is summarized in Table 1. Risk factors for admission after laparoscopic hysterectomy were age ($p < 0.0001$), BMI ($p < 0.0001$), white or black race ($p < 0.0001$), partially or totally dependent functional status ($p = 0.03$), and an American Society of Anesthesiologists (ASA) score > 1 ($p < 0.0001$) on univariate analysis. A multivariate logistic regression was performed, and these risk factors remained significant for hospital admission with the exception of functional status.

Table 2 lists patients' preoperative medical comorbidities. Admission after laparoscopic hysterectomy was associated with a history of diabetes (27.0% vs 16.3%, $p = 0.005$), chronic obstructive pulmonary disease (2.3% vs 0.5%, $p = 0.002$), and hypertension requiring medication (55.8% vs 45.1%, $p < 0.0001$). The other captured comorbidities were rare in the admitted group and not found in the same-day discharge group.

Operative and anesthesia times, the total number of RVUs, the inclusion of lymph node dissection, and the performance of radical versus simple hysterectomy were evaluated to determine the differences in the complexity of surgery (Table 3). Patients who were admitted had longer median operative times (164 min vs 131 min, $p < 0.0001$) as well as longer median anesthesia times (254 min vs 235 min, $p = 0.01$). The median total number of RVUs was higher in the admitted group (31.6 vs 27.0, $p < 0.0001$). Fewer patients who were discharged home on the day of surgery had lymph node dissections (50.5% vs 59.8%, $p < 0.0001$) or radical hysterectomies (7.4% vs 18.9%, $p < 0.0001$).

The rates of complications within the 30-day postoperative period were compared between the two groups including hospital readmission, surgical site infection, wound dehiscence, venous thromboembolism, urinary tract infection, myocardial infarction, and the development of renal failure. There were no significant differences seen between the two groups in any of these complications with the exception of surgical site infection. There was a decreased rate of surgical site infection in the same-day discharge group compared to the admitted group (0.1% vs 1.0%, $p = 0.03$). The rates of complications were further compared between patients who were discharged home the same-day and patients who were admitted for one hospital day (Table 4), and again, no significant differences were found. There was no difference in surgical site infection rate when comparing the cohorts who were discharged same-day and admitted for 1 hospital day.

Readmission rates were further analyzed for 2011–2014. There was no readmission information available for 2010 in the NSQIP database. There was a slow decrease in readmission rates for all laparoscopic hysterectomies for endometrial cancer (Supplemental Fig. 1). In 2011 the readmission rate was 4.7%, while in 2014 the rate decreased to 3.5%.

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