

Original Article

Robotic-Assisted Gynecologic Surgery and Perioperative Morbidity in Elderly Women

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ABSTRACT **Study Objective:** To assess perioperative complications, conversions, and operative times in patients age ≥ 75 years undergoing robotic-assisted gynecologic surgery.

Design: Retrospective cohort study (Canadian Task Force classification II-2).

Setting: High-volume, 2-physician gynecologic oncology practice.

Patients: A total of 705 women who underwent any robot-assisted gynecologic procedure for benign ($n = 380$) or malignant ($n = 325$) conditions between July 2008 and May 2014. Fifty patients age ≥ 75 years (elderly group) were compared with 655 patients age < 75 years (younger group).

Interventions: Operative data were gathered prospectively for all robotic-assisted procedures. Demographic and perioperative outcomes were analyzed retrospectively for this study.

Measurements and Main Results: The mean age was 81.3 ± 4.2 years (range, 75.0–90.5 years) in the elderly group and 52.8 ± 11.5 years (range, 22.9–74.6 years) in the younger group. The elderly group had higher rates of surgery for malignancy (90.0% vs 43.2%; $p < .01$) and lymphadenectomy (44.0% vs 23.4%; $p < .01$), and was more likely to have cardiovascular disease (88.0% vs 37.6%; $p < .01$). There were no between-group differences in body mass index or history of chronic obstructive pulmonary disease, diabetes mellitus, or more than 1 previous abdominal surgical procedure. The elderly group was more likely to have a length of stay greater than postoperative day one (30.0% vs 14.8%; $p = .01$) and had a higher incidence of postoperative cardiac arrhythmia (8.0% vs 1.2%; $p < .01$). The elderly group also had a smaller median uterine size (83.0 ± 49.1 g vs 126.0 ± 189.5 g; $p < .01$), but total operative time, rate of conversion (6.0% vs 1.8%) and rate of blood transfusion (2.0% vs 1.5%) were not significantly different between the 2 groups. Rates of bowel and genitourinary injury were $< 1\%$ in both groups, and there was no between-group difference in postoperative infectious morbidity, vaginal cuff complications, or reoperation.

Conclusion: The perioperative complication rates of robotic-assisted surgery are comparable in elderly women and younger women, despite a longer hospital length of stay and greater likelihood of postoperative arrhythmia in elderly women. Journal of Minimally Invasive Gynecology (2016) 23, 949–953 © 2016 AAGL. All rights reserved.

Keywords: Elderly; Laparoscopy; Robotic surgery

The aging population in the United States has led to an increased need for surgical interventions in elderly individuals. Currently, 7% of the United States population is aged

≥ 75 years, and this proportion is expected to rise to 12% by the year 2025 [1]. There is general agreement that age is an independent risk factor for perioperative morbidity and mortality [2–8]. Turretine et al. [2] demonstrated that preexisting comorbidities increase approximately linearly to age 70, but perioperative mortality increases exponentially with each decade of life.

Despite these increased risks, however, the overall rate of mortality in gynecologic surgery in elderly women remains acceptably low [3], and thus surgery is a feasible option for this patient population [9–12]. Improved perioperative outcomes have been consistently demonstrated for a laparoscopic approach to gynecologic surgery compared with laparotomy for women of all ages and with all

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preexisting comorbidities [13–16]. More recently, robotic-assisted laparoscopy has been shown to have comparable outcomes to traditional laparoscopy in the surgical management of endometrial cancer [17,18].

Since the Food and Drug Administration granted approval for gynecologic procedures in 2005, the robotic platform has been increasingly used for gynecologic surgery, despite concerns about added costs and operative time [19–21]. There are little data on the safety of robotic surgery in elderly women, however. These data may be beneficial both for planning surgical procedures and for counseling patients on the risks and benefits of treatment options. The objective of the present study was to compare the overall safety of robotic-assisted gynecologic surgery in elderly women by examining operative statistics and perioperative complication rates in women age ≥ 75 compared with those age < 75 years.

Methods

Study Design and Population

Institutional Review Board approval was received to maintain a gynecologic robotic-assisted surgical database. Operative data from 723 consecutive robotic-assisted laparoscopic gynecologic surgery cases from a 2-physician gynecologic oncology practice in Seattle between July 2008 and May 2014 were obtained prospectively by a trained nurse circulator. Patients were evaluated preoperatively by a surgeon, and clinical data were obtained retrospectively by a systematic chart review. A gynecologic surgical fellow was involved in the majority of the surgical cases. Intraoperative data obtained included the procedure performed, total operative time (from incision to closure), time required to complete the hysterectomy portion of the procedure, specimen weight (in grams), pathological diagnosis, total estimated blood loss, and description of any intraoperative conversion to laparotomy or intraoperative injury. Medical records, including hospital charts, outpatient clinical notes,

and any available outside records were reviewed for pertinent data. Eighteen patients were excluded from the analysis because of missing data.

The patients were divided into 2 groups based on age at the time of surgical intervention: elderly group (age ≥ 75 years) and younger group (age < 75 years). Patient data were extracted, including age (in years), body mass index (BMI; calculated as weight in kilograms divided by height in meters squared), and medical or surgical comorbidities. The outcomes for the 2 groups were then compared with respect to length of stay (LOS), estimated blood loss, use of blood transfusion, operative time, and perioperative surgical complications.

Statistical Analysis

R version 3.0.2 (R Institute for Statistical Computing, Vienna Austria) was used for computation and analysis. The normality of data was determined using density plots for each of the continuous variables examined. The Student *t* test was used for continuous variables with a normal distribution (e.g., BMI), the Kruskal-Wallis test of medians was used for skewed distribution data (e.g., estimated blood loss and uterine weight), and Wald survival analysis was used for time variables. Fisher's exact test or the χ^2 test, as indicated, was used for analysis of categorical variables. Logistic regression analysis was performed to assess the impact of age and preoperative comorbidities on the likelihood of postoperative cardiac arrhythmia and prolonged LOS. For all tests, a *p* value of $< .05$ was considered to indicate significance.

Results

In this review, a total of 705 patients had available data for analysis, including 50 patients in the elderly group and 655 patients in the younger group. Patient demographic data and comorbid conditions are presented in Table 1. The mean patient age was 81.3 years in the elderly group and 52.8 years

Table 1

| Patient demographic data | | | |
|--|---------------------------|-----------------------------|---------|
| Variable | Elderly cohort (n = 50) | Young cohort (n = 655) | p value |
| Age, yr, mean \pm SD (range) | 81.3 \pm 4.15 (75–90) | 52.8 \pm 11.5 (22.9–74.8) | N/A |
| Body mass index, kg/m ² , mean \pm SD (range) | 30.9 \pm 6.19 (19.8–45) | 32.2 \pm 9.5 (15.4–63.9) | .16 |
| Comorbidities, n (%) | | | |
| Malignancy* | 45 (90) | 283 (43) | <.01 |
| Chronic obstructive pulmonary disease | 3 (6) | 10 (1.5) | .06 |
| Cardiovascular disease [†] | 44 (88) | 246 (38) | <.01 |
| Diabetes mellitus | 11 (22) | 81 (12) | .78 |
| >1 abdominal surgery | 7 (14) | 176 (27) | .06 |

N/A, not applicable.
 * Preoperative gynecologic malignancy diagnosis.
[†] CVD defined as hypertension, prior myocardial infarction, coronary artery disease or any preexisting arrhythmia.

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