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Impact of robotics on the outcome of elderly patients with endometrial cancer

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HIGHLIGHTS

- Robotic surgery in elderly patients with endometrial cancer decreases complication rates, blood transfusions, and hospital stay.
- No difference in 2-year disease-free survival was observed in elderly patients with endometrial cancer between open and robotic surgeries.

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ABSTRACT

Objective. To evaluate the impact of introducing a robotics program on clinical outcome of elderly patients with endometrial cancer.

Methods. Evaluation and comparison of peri-operative morbidity and disease-free interval in 163 consecutive elderly patients (≥70 years) with endometrial cancer undergoing staging procedure with traditional open surgery compared to robotic surgery.

Results. All consecutive patients ≥70 years of age with endometrial cancer who underwent robotic surgery ($n = 113$) were compared with all consecutive patients ≥70 years of age ($n = 50$) before the introduction of a robotic program in December 2007. Baseline patient characteristics were similar in both eras. Patients undergoing robotic surgery had longer mean operating times (244 compared with 217 minutes, $p = 0.009$) but fewer minor adverse events (17% compared with 60%, $p < 0.001$). The robotics cohort had less estimated mean blood loss (75 *vs* 334 mL, $p < 0.0001$) and shorter mean hospital stay (3 *vs* 6 days, $p < 0.0001$). There was no difference in disease-free survival ($p = 0.61$) during the mean follow-up time of 2 years.

Conclusion. Transitioning from open surgery to a robotics program for the treatment of endometrial cancer in the elderly has significant benefits, including lower minor complication rate, less operative blood loss and shorter hospitalization without compromising 2-year disease-free survival.

Introduction

As life expectancy continues to rise, an increasing proportion of patients requiring treatment for malignancy are elderly, which has created new challenges for oncologists [1]. The cohort of people over the age of sixty-five accounts for almost two-thirds of new cancer cases and three-fourths of cancer related deaths [2,3]. Despite this trend, elderly patients have historically been under-represented in clinical trials [4]. This lack of participation has hampered the development of standardized treatment guidelines for the elderly based on best available evidence [5–7].

Endometrial cancer is the most common gynecologic malignancy in the western world, and parallel to the aging demographics, the incidence of endometrial cancer is increasing [8–10]. Surgical management of endometrial cancer traditionally includes comprehensive surgical staging, especially for high-risk histologies [11]. Elderly women often present with more advanced disease and higher-risk histology, and applying these complex procedures to elderly patients can be particularly challenging because these women have more medical comorbidities, and a greater potential for post-operative complications [12,13].

Although the application of minimally invasive surgical techniques has rapidly evolved, especially computer-assisted surgery using robotics, there is limited data regarding its value in the elderly population [14–16]. Since the 2005 approval of the da Vinci Surgical System for gynecologic procedures, reports comparing robotics to laparotomy have demonstrated reduced operative blood loss, lower incidence of

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postoperative complications, and faster recovery resulting in shorter hospital stay [17–24], with comparable recurrence rates and survival [19,25]. Nevertheless, technical considerations are voiced when using robotics in the elderly. Once the patient is docked to the robot, the Trendelenburg position cannot be reversed without undocking, and the respiratory and cardiovascular systems might be adversely affected by the Trendelenburg position and compromise the potential advantages of robotic surgery in the elderly.

Our study aims to evaluate how the use of robotics to complement laparoscopy is equivalent or better than the use of laparotomy for the treatment of endometrial cancer in elderly patients (≥70 years). We compared the peri-operative morbidity and outcomes following staging procedures performed via traditional open surgery or robotic surgery.

Materials and methods

Patients

The institutional review board approved the study protocol and informed consent was obtained from all patients.

We included all consecutive women aged 70 years and over who underwent surgical staging for endometrial cancer since the initiation of the division of gynecologic oncology in March 2003 (Fig. 1) at a tertiary care center that serves as a teaching site for Obstetrics and Gynecology residents and Gynecologic Oncology fellows. The patients were divided into two cohorts: (1) women ≥70 years old who underwent staging procedure via laparotomy (from March 2003 to December 2007) and (2) women ≥70 years old who underwent staging procedure via robotic surgery (January 2008 to January 2013). Of note, with the initiation of the robotic program, all women found suitable to undergo surgery for the treatment of their endometrial cancer were offered robotic surgery regardless of body habitus, previous medical/surgical history, uterus size, or parity.

The primary end points were peri-operative outcomes, including complications and the length of stay. The secondary end point was disease-free survival.

Data collection

All study variables and their categories were defined at the initiation of the robotic program, prior to any data collection. Since the introduction of robotics in December 2007, information was collected prospectively, and a database was created for the purpose of documenting and evaluating the experience with this new minimally invasive technique. Data collection for the laparotomy era was based on data retrieval using patients' electronic medical records. The clinical research staff was extensively trained to ensure that data collection was performed systematically and uniformly, regardless of study era. Demographic and clinical data collected included age, body mass index (BMI), comorbidities, American Society of Anesthesiologists (ASA) score, and previous abdominal or pelvic surgeries. Operative data included type of procedure, conversion to open surgery, and any intraoperative complications. Operating time was recorded as total operating time defined as skin incision to skin closure. Estimated blood loss (EBL) was calculated by the difference in the total amount of suctioned fluids and irrigation fluids. Uterus size and weight were collected. For the classification of surgical complications, we used the modified Clavien-Dindo system [26]. The lengths of hospital stay and readmissions were documented. Tumor histological subtype, grade, and International Federation of Gynecology and Obstetrics (FIGO) stages (2008 classification [27]) were retrieved from the final pathological reports. Recurrence was confirmed with tissue diagnosis or imaging techniques. Recurrence-free interval was defined as the time from surgical staging to first recurrence. Patients were censored at point of last contact.

Surgical technique

Open surgery procedures and robotic surgical procedures were performed and supervised by 3 primary surgeons (S.L., J.P., and W.H.G) as previously described [25]. All patients received prophylactic antibiotics and thromboprophylaxis using subcutaneous heparin 5000 units and full-length lower extremities pneumatic compression stockings. Until July 2012, all patients underwent a total hysterectomy, bilateral salpingo-oophorectomy, and complete bilateral pelvic lymphadenectomy (iliac and obturator). Patients with poorly differentiated cancers, clear cell cancers, and papillary serous cancer on the preoperative endometrial biopsy also underwent a para-aortic lymphadenectomy up to the level of the gonadal vessels on the right and inferior mesenteric artery on the left and an infracolic omentectomy. Since December 2010, patients also underwent a sentinel node dissection prior to lymphadenectomy, as previously described [28].

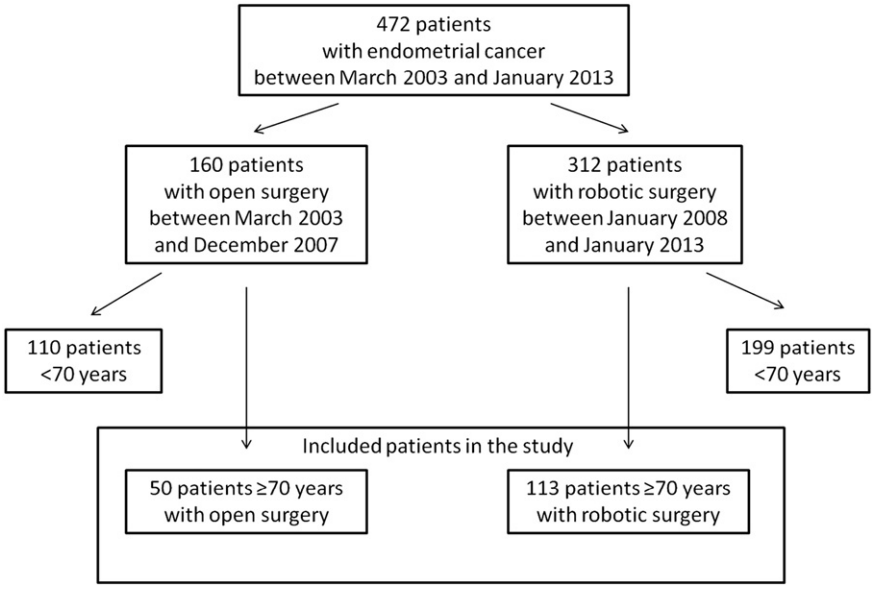

Fig. 1. Flow chart inclusion of the study.