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Original Article

Laparoscopy vs Robotics in Surgical Management of Endometrial Cancer: Comparison of Intraoperative and Postoperative Complications

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ABSTRACT **Study Objective:** To compare the rates of intraoperative and postoperative complications of robotic surgery and laparoscopy in the surgical treatment of endometrial cancer.

Design: Unicentric retrospective study (Canadian Task Force classification II-2).

Setting: Tertiary teaching hospital.

Patients: The study was performed from January 2002 to December 2011 and included patients with endometrial cancer who underwent laparoscopic or robotically assisted laparoscopic surgical treatment. Data collected included preoperative data, tumor characteristics, intraoperative data (route of surgery, surgical procedures, and complications), and postoperative data (early and late complications according to the Clavien-Dindo classification, and length of hospital stay). Morbidity was compared between the 2 groups.

Measurements and Main Results: The study included 146 patients, of whom 106 underwent laparoscopy and 40 underwent robotically assisted surgery. The 2 groups were comparable in terms of demographic and preoperative data. Intraoperative complications occurred in 9.4% of patients who underwent laparoscopy and in none who underwent robotically assisted surgery ($p = .06$). There was no difference between the 2 groups in terms of postoperative events.

Conclusion: Robotically assisted surgery is not associated with a significant difference in intraoperative and postoperative complications, even when there were no intraoperative complications of robotically assisted surgery. Journal of Minimally Invasive Gynecology (2014) 21, 120–125 © 2014 AAGL. All rights reserved.

Keywords: Complications; Endometrial cancer; Laparoscopy; Outcomes; Robotics; Surgery

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Endometrial carcinoma is the most common genital tract malignancy in western countries [1–3]. Over the past decade and a half, gynecologic oncologists have increasingly adopted minimally invasive approaches for treatment of endometrial cancer, including laparoscopically assisted vaginal hysterectomy and pelvic and/or para-aortic lymphadenectomy. From May 1996 to September 2005, a large randomized trial comparing laparoscopy with laparotomy for surgical staging of endometrial cancer (Gynecologic Oncology Group Trial LAP2) showed no difference in oncologic outcomes with the laparoscopic approach, promoting further refinement of minimally invasive techniques for cancer surgery [4]. The reported benefits of a laparoscopic approach were lower blood loss and transfusion rates, shorter hospital stay, faster postoperative recovery [5–21], and superior short-term quality of life [12,13]. However, the learning curve for laparoscopy is long and difficult, due to surgeon experience, training, and limitations of laparoscopy

The authors declare no conflicts of interest.

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(counterintuitive motion, non-wristed instrumentation, and heavy reliance on skilled surgical assistance), and contributes to limitation of uniform adoption of laparoscopy.

The introduction of robotically assisted laparoscopic surgery, approved by the US Food and Drug Administration in 2005 for use in gynecologic surgery, offered a new approach, with 3-dimensional imaging, wristlike instrument rotation, tremor ablation, and motion scaling, and seems to overcome many of the difficulties associated with conventional laparoscopy.

The objective of the present study was to compare intraoperative complication rates and perioperative morbidity between 2 cohorts of patients, one that underwent robotically assisted surgery and the other that underwent traditional laparoscopy at the same institution.

Material and Methods

We performed a retrospective review of patients who received surgical treatment of endometrial cancer from January 2002 to December 2011 at the Gynaecologic and Breast Surgery Department at "Hôpital Européen Georges-Pompidou." This work was part of a currently ongoing process of continual evaluation of professional practices.

Patients

The study population was divided into 2 groups, a laparoscopy group and a robotically assisted laparoscopy group. All patients with endometrial cancer who had undergone an initial surgical curative treatment were included in the study, regardless of the type of disease (histologic type, grade, and stage) and the surgical procedure that was scheduled or performed (total hysterectomy with or without pelvic and/or para-aortic lymphadenectomy). Patients who received neoadjuvant medical treatment were excluded.

Surgical Approach

At our institution, the robotic approach was begun to be used in 2008. The same gynecologic oncologic team, consisting of senior experienced surgeons, performed all procedures. The first version of the da Vinci Surgical System (Intuitive Surgical, Inc., Sunnyvale, CA) was used for robotic surgical procedures, and traditional laparoscopic instruments for laparoscopic surgery. The choice of surgical technique to be performed was made after considering the degree of emergency and access to the robotic system. Two factors limited our robotic surgery activity. First, the robot is used by several surgical specialties, which for several years limited us to only 1 intervention per week and then to 2 interventions per week since 2012. Second, the robot is alternatively used for various indications including surgery of the cervical canal (extended colpohysterectomy, pelvic lymphadenectomy, and para-aortic lymphadenectomy staging), surgery to treat ovarian cancer, and surgery to treat benign conditions. Moreover, all endometrial cancer cases eligible for laparoscopic surgery are logically eligible for robotic surgery, yet the surgical approach was determined only according to availability of the robot and the degree of urgency. Thus, when the robot is not available, laparoscopy is performed.

All laparoscopic or robotically assisted procedures were performed with the patient in the low dorsolithotomy position. Uterine manipulators were used for laparoscopic procedures but not for robotically assisted procedures. All patients underwent hysterectomy, bilateral salpingo-oophorectomy, and pelvic washings. Pelvic and para-aortic lymph node dissections were performed according to evolution of the recommendations [22].

Data were extracted from the hospital medical database. For each patient, we recorded demographic characteristics (age, weight, height, body mass index, and parity), medical history (surgical history, personal and family history of cancer, use of hormone replacement therapy, hypertension, and diabetes), and symptoms that led to the diagnosis of endometrial cancer. We noted the results of preoperative biopsy and the results of imaging (ultrasound and pelvic magnetic resonance imaging). We also recorded for each intervention the surgical approach chosen, the type of surgery performed, operative time (defined as from incision to closing), time in the operating room (defined as from entry to exit), duration of hospital stay (defined as day of surgery to day of discharge), need for transfusion, and occurrence of intraoperative and postoperative complications according to time of onset (early, $\leq$30 days; or late, $>$30 days) and the Clavien-Dindo classification, which stratifies complications into 5 grades according to their therapeutic and clinical effects. This classification has been proved, is widely recognized [23], and enables clear differentiation of postoperative complications, therapeutic failures, and sequelae. All final histologic results were recorded using the FIGO classification [24].

Statistical Analysis

The laparoscopy and robotically assisted laparoscopy groups were compared. The χ^2 test or Fisher exact test was used for qualitative variables, and the Student *t* test or nonparametric Mann-Whitney test for quantitative variables. A threshold of $p < .05$ was considered statistically significant. All analyses were performed using commercially available software (STATA version 11.0; Stata Corp., College Station, TX).

Results

The study included 146 patients: 106 who underwent traditional laparoscopy and 40 who underwent robotically assisted laparoscopy. Patients who initially received neoadjuvant medical treatment were excluded. Both groups were similar in terms of demographic data and medical history