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Recurrence-free and 5-year survival following robotic-assisted surgical staging for endometrial carcinoma

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HIGHLIGHTS

- 5-Year survival for endometrial carcinoma after robotic-assisted surgical staging
- Recurrence rates for endometrial carcinoma after robotic-assisted surgical staging

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ABSTRACT

Objective. The aim of this study is to report recurrence-free and overall survival for women with endometrial adenocarcinoma who were surgically staged using robotic-assisted laparoscopy.

Methods. A retrospective chart review was performed for all consecutive endometrial adenocarcinoma patients surgically staged with robotic-assisted laparoscopy at the University of North Carolina Hospital from 2005 to 2010. Demographic data, 5-year survival, and recurrence-free intervals were analyzed. Statistical analysis using Chi-square, *t*-test, and Kaplan–Meier curves were performed with SAS software. Study results were compared to endometrial cancer statistics from the Surveillance Epidemiology and End Results database from the National Cancer Institute.

Results. A total of 499 patients were identified and included in the study. Recurrence-free intervals after robotic-assisted surgical staging were 85.2% for stage IA, 80.2% for stage IB, 69.8% for stage II, and 69% for stage III. Projected 5-year survival was 88.7% for all patients included in the study. Nearly 82% of cases were endometrioid adenocarcinoma, with papillary serous, clear cell or mixed histology comprising 17.4% of cases. Median follow up time was 23 months, with a range of 0 to 80 months. Among stage IA, IB, II, and III patients, projected overall survival was 94.2%, 85.9%, 77.4%, and 68.6%, respectively.

Conclusions. The results from this study demonstrate that robotic-assisted surgical staging for endometrial cancer does not adversely affect rates of recurrence or survival. These findings provide further evidence that robotic-assisted laparoscopic surgical staging is not associated with inferior results when compared to laparotomy or traditional laparoscopy.

Introduction

Endometrial adenocarcinoma is the most common gynecologic malignancy in the United States. In 2011 over 46,000 cases were diagnosed, with approximately 8000 deaths [1]. The standard of care includes comprehensive surgical staging as recommended by the International Federation of Gynecology and Obstetrics [2,3]. Advances in minimally invasive techniques decrease patient morbidity, and laparoscopic techniques produce improved quality of life (QOL) compared to open techniques, but long-term survival and recurrence-free outcomes using robotic techniques remain unknown [4–6]. In this paper, we report projected long-term survival and recurrence outcomes after robotic-assisted surgical staging for patients with endometrial adenocarcinoma.

Methods

From May 2005 to January 2011, 521 patients who underwent robotic-assisted surgical staging for endometrial adenocarcinoma were included in the analysis. Patients with carcinosarcoma, uterine sarcoma, and other non-epithelial tumors of the uterus were excluded. Patients were excluded if laparotomy was performed as part of the surgical staging or if neoadjuvant treatment was administered. The surgical techniques utilized at our institution have been previously described in the literature [4]. With approval from the Institutional Review Board at the University of North Carolina, clinical patient

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data was abstracted from hospital records and national database registries. Recurrence was confirmed with tissue diagnosis or imaging techniques. Recurrence-free interval was defined as the time from surgical staging to first recurrence. Overall survival was defined from time of diagnosis to last contact. Patients were censored at point of last contact.

We compared demographics and medical characteristics of patients with and without endometrial cancer recurrence using Chi-square (discrete variables) or *t*-test analysis (continuous variables). Projected five-year disease-free survival and projected overall survival were calculated from Kaplan–Meier curves. The log-rank test was used to assess differences between strata for factors of stage, grade, histology, BMI, diabetic status, and age to determine factors associated with recurrence and overall survival. Analyses were performed using SAS v9.2 (Cary, NC, USA). We compared study results to endometrial cancer statistics from the Surveillance Epidemiology and End Results database from the American Cancer Society.

Results

Between May 2005 and January 2011, 499 patients underwent robotic-assisted hysterectomy for endometrial adenocarcinoma. Median age at time of surgery was 63 (range 28 to 91 years) (Table 1). Caucasian women accounted for 76.4% of patients while African American women made up 15.2% of the study population. Nearly 17% of patients were diabetic and 49.5% were hypertensive. Median BMI was 32 kg/m^2, ranging from 17 to 65 kg/m^2. Eighty-three percent of the study population was surgically stage IA or IB as defined by FIGO 2008 guidelines [7]. Grade 1 tumors accounted for 41.5% of cases, while grade 2 and grade 3 tumors accounted for 28.7 and 29.5% of cases, respectively. Nearly 82% of cases were endometrioid adenocarcinoma, with papillary serous or clear cell histology comprising 17.4% of cases. Pelvic lymphadenectomy was performed in 460 patients (92.2%), while paraaortic lymphadenectomy was performed in 348 patients (69.7%). Median follow up time was 23 months, with a range of 0 to 80 months.

Adjuvant therapy was administered to 162 patients (Table 1). Patients with high-intermediate, high-risk, or metastatic disease were eligible for adjuvant treatment. The Gynecologic Oncology Group's definition of high intermediate-risk disease based on age and the presence of pathologic factors (more than 50% myometrial invasion, grade 2 or 3 histology, or lymphovascular invasion) was utilized. Eighty-five patients received both chemotherapy and radiation therapy (52.5%). Radiation therapy alone was administered to 59 patients (36.4%), including 54 patients that received only vaginal brachytherapy, while 18 patients (11.1%) received chemotherapy alone.

Projected overall 5-year survival for this study cohort was 88.7% (Graph 1). Among stage IA, IB, II and III patients, projected overall survival was 94.2%, 85.9%, 77.4%, and 68.6%, respectively (Graph 2). Two of nine patients with stage IV disease were alive at the time of this study.

Tumors with grade 3 histology were more likely to recur compared with grade 1 and 2 tumors. Estimated 5-year survival was 76% for patients with grade 3 disease in contrast to 93% and 94.8% for grade 1 and 2 tumors, respectively ($p<0.0001$). Ninety percent of endometrioid adenocarcinoma patients were projected to be alive at five years compared with 80.7% of patients with non-endometrioid adenocarcinoma ($p=0.01$). Age greater than 70 years was associated with increased probabilities of recurrence and death. BMI greater than 30 kg/m^2 was associated with a significantly lower probability of recurrence compared to non-obese patients; however, no significant difference was detected in projected overall survival when stratified by BMI (Table 2). Diabetes was not significantly associated with recurrence or survival.

Recurrence was documented in 42 patients during the study period (Table 3). Isolated vaginal recurrence was diagnosed in 10 patients (23.8%). Intraabdominal and pelvic recurrences occurred in 20 patients (47.6%), while isolated pulmonary recurrence was diagnosed in 5 patients (11.9%). Combined intraabdominal and distant metastases were documented in 6 patients (14.3%). Port-site metastasis occurred in 5 patients; however, 4 of the 5 port-site metastases were concurrent with multiple pelvic and abdominal recurrence sites. One patient was diagnosed with an isolated port-site metastasis at the initial post-operative visit. Thirty-one percent of recurrences were grade 3 endometrioid lesions, while uterine serous and clear cell carcinomas accounted for 28.6% and 4.8%, respectively. Grade 1 and 2 tumors accounted for 16.7% and 19% of recurrences, respectively.

Table 1
Patient demographics.

	Patient population N = 499
Age in years (range)	63 (28–91)
Age categories	
<40	18 (3.9%)
40–54	97 (21.2%)
55–69	264 (52.9%)
>70	120 (24%)
Race	
Caucasian	381 (76.4%)
African American	76 (15.2%)
Hispanic	6 (1.4%)
Other	10 (2.3%)
BMI (kg/m^2)	32 (16–65)
BMI categories	
<18.5	3 (0.6%)
18.5–24.9	80 (16%)
25–29.9	111 (22.2%)
30–34.9	107 (21.4%)
35–39.9	79 (15.8%)
≥40	113 (22.6%)
Diabetic	
Yes	84 (16.8%)
No	415 (83.2%)
HTN	
Yes	247 (49.5%)
No	252 (50.5%)
Surgical stage	
IA	360 (72.1%)
IB	56 (11.2%)
II	16 (3.2%)
III	59 (11.8%)
IV	9 (1.8%)
Grade	
1	210 (42%)
2	144 (28.9%)
3	145 (29.1%)
Histology	
Endometrioid	412 (82.6%)
Non-endometrioid	87 (17.4%)
Lymphadenectomy	
Pelvic	460 (92.2%)
Paraaortic	348 (69.7%)
Adjuvant therapy	(n = 162, 32.5%)
Chemotherapy only	18 (11.1%)
Chemotherapy and radiation	85 (52.5%)
Radiation therapy only	59 (36.4%)
Vaginal brachytherapy only	54 (33.3%)

Discussion

The number of endometrial cancer cases in the United States has steadily increased for several years [8]. The introduction of minimally invasive surgery has changed the surgical approach to endometrial cancer staging. Early studies in laparoscopic surgical staging established its feasibility as an alternative to laparotomy with decreased blood loss and shorter recovery times [9]. Gil-Moreno et al. retrospectively evaluated laparoscopic surgical staging and reported decreased blood loss, length of hospital stay, and blood transfusion requirement associated with