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Original Article

Comparison of the laparoscopic versus conventional open method for surgical staging of endometrial carcinoma

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ABSTRACT

Objective: Although laparoscopic surgery is widely utilized in the treatment of endometrial cancer, its efficacy in staging the cancer is not well established. The aim of this study was to compare staging endometrial cancer with laparoscopic and conventional open methods.

Materials and Methods: From January 2002 to June 2012, 151 patients (70 treated by laparoscopy and 81 by laparotomy) diagnosed with endometrial cancer were enrolled. This was a retrospective cohort review of endometrial cancer surgically staged using laparoscopy or laparotomy in the Department of Obstetrics and Gynecology, National Taiwan University Hospital, Taipei, Taiwan.

Results: The two groups did not significantly differ in patient age, body mass index, previous obstetrical history, or amount of previous abdominal surgery. No differences between the surgical cohorts were observed in relation to cancer status, including stage, grade, myometrial invasion, lymphovascular space invasion, lymph node involvement, and recurrence rate. The laparoscopic approach had less intraoperative blood loss, longer operative time, lower uterine weight, number of removed lymph nodes, and shorter hospital stay.

Conclusion: Our preliminary results showed that the laparoscopic method for staging endometrial cancer was technically feasible and efficient.

Introduction

Endometrial cancer (EC) is the most common female genital malignancy in developed countries, accounting for 4% of cancers in female patients. EC occurs most commonly in women with a mean age > 50 years. The standard treatment of EC is surgery according to the staging system of the International Federation of Obstetrics and Gynecology (FIGO). The traditional procedures of staging surgery include cytology of peritoneal washings, total abdominal hysterectomy, and bilateral salpingo-oophorectomy. Staging surgery may also include pelvic and/or para-aortic lymphadenectomy. The benefit of pelvic and para-aortic lymphadenectomy is not well established in low-risk EC; this includes those with myometrial invasion that does not extend past half of the depth of the myometrium, Grade 1–2 endometrioid adenocarcinoma, and no lymphovascular space invasion (LVSI) [1–3].

The role of laparoscopy in surgical staging has become increasingly important in recent decades. Numerous studies have shown significantly less morbidity, shorter hospitalization, less pain, and quicker recovery with laparoscopic staging [4–10]. However, the therapeutic value of laparoscopy has not been confirmed until now. Many previous studies may have been ineffective in evaluating the efficacy of laparoscopic staging as they had a wide range of conversion to laparotomy at 0–36.4% [11–20].

The aim of this retrospective study was to compare the safety, morbidity, and EC recurrence rate between surgical staging with laparoscopy and laparotomy.

Materials and methods

We retrospectively reviewed the data recorded for all patients with EC treated by laparoscopic or open surgery between June 2002 and April 2012 in the National Taiwan University Hospital, Taipei, Taiwan.

Inclusion criteria were as follows: (1) tissue-proven endometrial carcinoma; (2) tumor mass ≤ 2 cm without regional or distal lymph

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node enlargement on magnetic resonance imaging evaluation; (3) standard surgical staging was performed, consisting of total hysterectomy, bilateral salpingo-oophorectomy, pelvic lymphadenectomy and/or para-aortic lymphadenectomy; and (4) preoperative evaluation showed the tumor to be clinically confined to the uterine corpus, which defines clinical Stage 1. No patient received radical hysterectomy although some patients were confirmed Stage 2 or higher by postoperative pathological reports.

Pelvic lymphadenectomy consisted of removing the lymphatic tissue from over the external iliac artery and vein, and from the obturator fossa, above the obturator nerve. Para-aortic lymphadenectomy consisted of removing the lymphatic tissue from the area over the abdominal aorta and inferior vena cava, below the level of the inferior mesenteric artery.

Controls were selected from consecutive cases who had undergone surgical staging of EC through laparotomy since 2002 and met the above inclusion criteria. Patient characteristics included age, body mass index (BMI), parity, virginity status, and history of previous abdominal surgery. Oncological data included cancer grade, surgical stage (as defined by FIGO, 2009), depth of myometrial invasion, LVSI, and recurrence rate.

Statistical analysis

SPSS for Windows version 17.0 (SPSS Inc., Chicago, IL, USA) was used for statistical analysis. Descriptive statistics were presented as means ± standard deviations or percentages. Means were compared by Student t test, and proportions were compared by χ^2 or Fisher's exact tests, as appropriate. All calculated p values were two-tailed, and $p < 0.05$ was considered statistically significant.

Results

Between January 2002 and June 2012, 151 women underwent staging surgery for EC (81 by laparotomy and 70 by laparoscopy). In the laparoscopy group, all the operations were performed laparoscopically; none of the cases were converted to laparotomy. These cases were compared with a historical cohort of 81 patients with EC who had undergone surgical staging through laparotomy during the same time period. Pelvic lymphadenectomy was performed in all patients in both the laparoscopic and laparotomic groups. Para-aortic lymphadenectomy was performed in two patients (2.8%) in the laparoscopic group and in 11 patients (13.6%) who underwent laparotomy.

Characteristics of the two study groups are summarized in Table 1. There was no significant difference between the two groups with regards to age, obstetric history, BMI, percentage of previous abdominal surgery, histological grade of EC, or EC stage. There was no significant difference in the percentages of previous abdominal surgery between the two groups (27.1% in the laparoscopic group and 25.9% in the laparotomic group, $p = 0.974$). The percentages of previous laparotomy, such as cesarean section, appendectomy, adnexal surgery, and myomectomy, between the two groups did not show a significant difference (23% in the laparoscopic group and 20% in those who had staging by laparotomy, $p = 0.717$). However, no patient had previously undergone more than three laparotomies. Table 2 shows the intraoperative parameters of the two groups. Although laparoscopic approach had a significantly longer operative time than laparotomy (159 minutes vs. 140 minutes, $p = 0.003$), it had less intraoperative blood loss (78 mL vs. 248 mL, $p < 0.001$). Three patients in the laparotomic group had excessive blood loss > 500 mL and required blood transfusion. None of the patients in the laparoscopic group required blood transfusion. Additional findings included a significantly smaller uterine weight (187 g vs. 288 g, $p = 0.003$) and fewer lymph nodes resected (15 vs. 20, $p = 0.002$) with the laparoscopic approach as opposed to laparotomy. Those who underwent laparoscopy had a shorter average hospital stay when compared to those who underwent laparotomy (5 days vs. 10 days, $p = 0.012$). There was no significant difference in complication rate between the laparoscopic and laparotomic groups (11.4% vs. 18.5%, $p = 0.089$). No vascular complications or bowel injuries were noted during the laparoscopic staging surgeries. Two cases of intraoperative bladder injury were reported, and cystorrhaphy was performed successfully by laparoscopic approach. However, the rate of lymphocyst infection was significantly lower in the laparoscopic group (1.4% vs. 12.3% in the open group, $p < 0.001$).

Table 3 shows the oncological results of the two surgical methods. In both groups, most patients had Stage 1 and Grade 1 EC with invasion into less than half of the myometrium. Two patients (2.9%) in the laparoscopic group and six (7.4%) in the open group were upstaged to Stage 3 due to pelvic lymph node metastases. Although significantly more patients in the open group underwent para-aortic lymphadenectomy (8.6% vs. 1.4% of the laparoscopic group, $p < 0.001$), there was no significant difference of EC recurrence rate between the two groups (2.9% in the laparoscopy group vs. 2.5% in the laparotomy group, $p = 0.882$). Approximately one-quarter of the patients in each group received postoperative adjuvant therapy (27.1% vs. 29.6%, $p = 0.578$). Two patients in the laparoscopic group had confirmed recurrence, both with metastases to the lung, at 6 months and 12 months postoperatively. One patient expired from sepsis 16 months after laparoscopic staging surgery. Comparatively, of those who underwent laparotomy, four patients had recurrence at 3 months to 6 years after primary treatment. The recurrent focus was located over the vagina, lung, chest wall, neck, or abdominal lymph nodes. Two patients in the laparotomic group expired at 1.6 years and 2 years after primary treatment. The recurrent rate and overall survival between both groups did not differ significantly.

Furthermore, we analyzed the oncological outcomes of the subgroup of FIGO Stage 2 and Stage 3 (Table 4). There were four and 14 patients in the laparoscopic and laparotomic groups, respectively. It still showed no significant difference in recurrent rate and overall survival between the groups.

Table 1
Patient characteristics by surgical approach.

	Staging by laparoscopy ($n = 70$)	Staging by laparotomy ($n = 81$)	p
Patient age (y)	55.3 (29–80)	53.4 (28–75)	0.248
Gestation	2.65 (0–8)	2.94 (0–8)	0.147
Parity	2.09 (0–7)	2.14 (0–5)	0.147
Body mass index (kg/m^2)	25.0 (16–38)	25.4 (13–44)	0.354
Virgins	5 (7.1)	6 (7.4)	0.965
Previous abdominal surgery	19 (27.1)	21 (25.9)	0.974

Data are presented as n (%) or mean (range).

Discussion

This retrospective, single-institutional study demonstrates that the laparoscopic management of EC with lymphadenectomy is a feasible, effective, and safe method. There is no need for conversion to laparotomy with proper patient selection criteria. The application of laparoscopy in EC staging is gaining more importance, and some studies have shown that laparoscopy has been performed more than laparotomy in gynecological oncology services [21]. The trend of this change is based on the advantages of laparoscopy, including lower costs to the hospital, shorter hospital stays, and