Laparoscopic hysterectomy in the treatment of endometrial cancer: NCI experience

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Abstract  Background: The standard treatment for women with endometrial cancer is total abdominal hysterectomy and pelvic lymphadenectomy for surgical staging. Total laparoscopic radical hysterectomy (TLH) is an alternative approach providing surgical and patient related advantages to laparoscopy.

Methods: Twenty female patients with early stage endometrial cancer were operated upon by TLH and pelvic lymphadenectomy, aiming to assess the safety and efficacy of TLH.

Results: The mean operative time was 296.8 min conversion to laparotomy was done in one patient due to bleeding from the uterine vessels. The mean blood loss was 517.5 cc. The uterus was removed transvaginally in 18 patients (90%) and via a small Pfannenstiel incision in two patients (10%). The mean number of pelvic lymph nodes retrieval was 21.2. Postoperative bleeding occurred in one patient (5%) which necessitated exploration. One patient (5%) suffered a pulmonary embolism. Four patients (20%) developed pyrexia, and one patient (5%) suffered from a chest infection. One patient (5%) had wound infection. The mean hospital stay was 4.5 days (range 3–10).

Conclusion: TLH with pelvic lymphadenectomy is a safe and effective approach in the treatment of early endometrial carcinoma.

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Introduction

The standard treatment for women with endometrial cancer is total abdominal hysterectomy (TAH) and pelvic lymphadenectomy for surgical staging. Lymphadenectomy involving the para-aortic lymph glands is usually performed in women with poorly differentiated tumors (GIII), invasion of the myometrium more than 50%, nonendometrioid carcinomas, or marked involvement of the pelvic lymph glands [1].
Traditionally the uterus had been removed by an abdominal or vaginal route. Vaginal hysterectomy is often an alternative to the abdominal approach in obese and poor surgical-risk patients; however, it lacks exploration of the intraperitoneal cavity, which offers greater difficulty for oophorectomy with inability to sample lymph nodes. The optimum approach to hysterectomy would retain the advantages of the abdominal route, which include clear visualization and ease of manipulation of the adnexal structures, and to combine these features with the principal advantage of vaginal hysterectomy, namely avoidance of a large abdominal incision, so reducing the surgical trauma and wound morbidity [2].

Total laparoscopic radical hysterectomy (TLH) was first described in 1990 by Canis and colleagues [3]. There are many surgical and patient-related advantages to laparoscopy [4]. Controversy remains with respect to its safety and efficacy, so the feasibility of the technique must be demonstrated and the morbidity and mortality rates that are associated with it must not be prohibitively high. Also, the short-term results and the long-term survival should be comparable to that of the accepted standard therapy [4].

Patients and methods

Patient selection

Twenty female patients with early stage endometrial cancer were operated upon by TLH and pelvic lymphadenectomy. The criteria for selection were determined as follows: estimated uterine upper margin was not beyond the midpoint between the umbilicus and the symphysis pubis, no preexisting cardiopulmonary dysfunction or poor control of systemic diseases, bimanual pelvic examination confirmed good mobility of an enlarged uterus, fractional curettage revealed no tumor extension in the endocervical canal, preoperative metastatic work up revealed no extra-uterine disease either regional or systemic, all tumors were GI–II endometrial carcinomas, while patients with GI III were excluded from this study because of high risk of para-aortic lymph node metastasis.

Surgical procedure

The patient was put under general anesthesia with endotracheal intubation and with naso-gastric tube suction to minimize bowel distension. The patient was positioned in a modified lithotomy position with the hips flexed 30°. Patients lied with legs open and slightly bent, with the buttocks protruding over the edge of the table. The patients' arms were tucked at her sides. And a Foley urinary catheter was placed. And when using a uterine manipulator, it was also placed.

The patient was placed in the Trendelenburg position, and then pneumoperitoneum was achieved through a Veress needle. Then four ports were introduced (10 or 12 mm) one at the umbilical incision, two 10–12 mm ports 4 cm medial and slightly above the level of the anterior superior iliac spines, and a 5 mm one midway between the umbilicus and the symphysis pubis) (Fig. 1). Blood vessels including the ovarian vessels and the uterine artery could be controlled by laparoscopic coagulating shears (LCS) or using metal clips and scissors which could be safer.

After bowel manipulation out of the pelvis, the round ligament was transected, and then the peritoneum over the psoas muscle was cut lateral to the infundibulopelvic ligament, which was retracted medially to permit identification of the iliac vessels and the ureter. The course of each pelvic ureter had to be visualized through the medial leaf of the broad ligament. With medial traction on the utero-ovarian ligament or ovary, the peritoneal incision was extended lateral to the ovarian vessels above the level of the pelvic brim to expose the area for lymphadenectomy. Then the infundibulopelvic ligament was transected, care had to be taken to ensure that the ureter was secure. Pelvic lymphadenectomy could have been performed first, or it could have been postponed after the hysterectomy and then performed bilaterally.

The anterior leaf of the broad ligament and anterior peritoneal reflection of the uterus were opened. The bladder was reflected anteriorly with atraumatic forceps introduced through the suprapubic sheath, and the bladder was dissected from the cervix. The uterus was elevated and directed posteriorly, and the index finger of the assistant surgeon was introduced through the anterior vaginal fornix and was moved from side to side and up and down until it became obvious that the bladder had been completely dissected from the cervix.

Attention and care was then directed to controlling the uterine artery lateral to the cervix (Fig. 2). Care had to be taken not to injure the ureter at this point. Ligation of the uterine artery and vein at their origin was preferred. The cardinal ligaments were controlled transvaginally under laparoscopic guidance, and the anterior and posterior vaginal fornices were opened transvaginally and were connected on both sides, and the index finger of the surgeon hooked the cardinal ligaments which were secured by clamps and transfixed by ligatures close to the cervix.

The whole specimen was removed through the vagina. In cases where the uterus was large, it was delivered through a small Pfannenstiel incision. The vaginal cuff was then closed using Vicyl sutures. Then the peritoneal cavity was insufflated again and the laparoscope was re-inserted to check for hemostasis before closure.

Lymphadenectomy was done using a combination of blunt and sharp dissection. The limits of lymphadenectomy were;
laterally to the circumflex iliac vein, posteriorly to the internal iliac vessels, the cephalad margin was the common iliac artery, and caudally to include the obturator group. The lymphadenectomy specimens were removed by an endo-bag. Laparoscopic exit was done after lavaging the operative field and leaving a suction drain in the pelvis (Fig. 3).

Results

This study included 20 female patients with early stage endometrial cancer. The mean age was 58.5 years (range 48–68). Their mean body weight was 90.4 kg (range 55–180). The mean operative time was 296.8 min (range 230–360). Three patients (15%) had intra-operative bleeding; two of them had bleeding from the obturator vessels during pelvic lymphadenectomy which was controlled laparoscopically by suction, gauze compression and cautery, the third patient had bleeding from branches of the uterine artery, which necessitated conversion to laparotomy. The mean blood loss was 517.5 cc (range 300–1000). The uterus was removed trans-vaginally in 18 patients (90%), and via a small Pfannenstiel incision (due to a large uterus size) in two patients (10%). The mean number of pelvic lymph nodes removed was 21.2 (range 9–39). Pelvic lymphadenectomy was omitted in two patients (10%) to decrease the operative time in these obese old-aged patients. There was no injury to the urinary tract or the bowel during the procedure (Table 1).

Postoperative bleeding (which necessitated blood transfusion) occurred in one patient (5%). The patient was explored by a laparotomy, and bleeding from the uterine artery pedicle was controlled. One patient (5%) suffered from a pulmonary embolism on the 4th postoperative day, and it was treated by low molecular weight heparin.

Four patients (20%) developed pyrexia post-operatively. One patient (5%) had wound infection. There was no mortality during this study. The mean hospital stay was 4.5 days (range 3–10).

Histopathological examination revealed; endometrial carcinoma GI in seven patients (35%), GI–II in two patients (10%), GII in six patients (30%), adeno-squamous carcinoma in one patient (5%), papillary serous carcinoma GII in one patient (5%), endometrioid adenocarcinoma GI in two patients (10%) and mixed mullerian carcino-sarcoma in one patient (5%). The mean number of pelvic lymph nodes removed was 21.2 LN (range 9–39). Table 2 summarizes the histopathological results.

Discussion

This study assessed the laparoscopic techniques for the treatment of endometrial cancer in terms of safety and efficacy. The short term results related to efficacy were the number of lymph glands resected, the duration of surgery, the length of hospital stay, and the need to resort to laparotomy. While those related to safety included the amount of blood loss during surgery and the postoperative complications.

In our study the mean operative time was 296.8 min (range 230–360). Frigerio et al. reviewed 110 patients with early endometrial carcinoma, 55 patients underwent TAH and 55 patients underwent TLH. The reported mean operative time was 175 min (range 70–360) in the TAH group, and a mean
of 220 min (range 80–375) in the TLH group [6]. While Zullo (2005) reported a mean operative time of 135.3 min in the TAH group and a mean of 196.7 min in the TLH group [7]. This is a variable issue because it is much related to the experience of the surgeon and the learning curve. This applies also to the assistants, including the nurses and technical support; a well trained team approach to TLH makes the procedure quicker and safer.

In our study the mean blood loss was 517.5 cc (range 300–1000). Results of many studies showed decreased blood loss in the laparoscopic group of patients compared to the open abdominal group. This is also related to the learning curve so it decreases with more experience. In 2005, Tozzi and colleagues reported a mean blood loss of 586 cc in the TAH group and 241 cc in the TLH group [5]. Zullo had a mean blood loss of 282.5 cc in the TAH group and 173.9 cc in TLH group.

In this study the mean number of removed lymph nodes was 21.2 nodes. Frigerio et al. [6] had removed 17 nodes in the TAH group and 18.5 nodes in the TLH group. Zullo [7] had a mean of 10.7 nodes in the TAH group and 11.5 nodes in the TLH group. Their results showed that the laparoscopic technique was effective as the open approach in lymph node harvest.

The number of complications in larger case series of laparoscopically-assisted radical hysterectomy and lymphadenectomy was reported by Köhler et al. in 2004 [8]. The rate of major complications varied between 2.9% and 8.7%; the conversion rate was 1.4–7.5%. Vascular complications tended to be more common during laparoscopic surgery. Generally, the intraoperative vascular injuries were related mainly to the lymphadenectomy that occurred in the series. With increased laparoscopic experience, bleeding normally can be controlled by various laparoscopic methods including stitches, clips, and electrocautery devices, thus avoiding conversion to open surgery. In particular, cases of hemodynamic instability or brisk bleeding that cannot be controlled laparoscopically should be converted to an open procedure which was the case in one of our patients (5%).

Urologic structures are at risk of injury at the time of the laparoscopic radical hysterectomy and pelvic lymphadenectomy procedure. Xu et al. (2007) reported a reduction in such complications with the use of a new method in which the bladder is filled with saline to enable identification of the bladder and vaginal wall. In addition, visualization of the ureter course throughout the procedure decreases the risk of its injury [9]. No one of the patients in our study had injury to the urological tract during surgery.

Postoperative complications in our study were chest infection in one patient (5%), wound infection in one patient (5%), pulmonary embolism in one patient (5%). Four patients (20%) suffered from fever in the postoperative period. One patient (5%) had an attack of bleeding postoperatively and was explored to control it. Blood transfusion was needed in this patient. In the study done by Frigerio et al. [6] six patients (10.9%) in the TLH group had complications; two patients had pelvic abscess, two patients had fever postoperatively, one patient had urinary tract infection and one patient had asymptomatic lymphocele. While the TAH group in their study showed postoperative complications in 16 patients (29.9%) in the form of wound infection, small fascial disruptions, ileus, myocardial infarction, urinary tract infection and asymptomatic lymphocele.

In our study the mean hospital stay was 4.5 days. Frigerio et al. [6] had a mean hospital stay of 8.5 days in the TAH and a mean of 4 days in the TLH group [6]. Zullo et al. (2005) had a mean of 8.2 days in the TAH group and a mean of 4.1 days in the TLH group [7]. These results showed the reduced hospital stay in the laparoscopic group compared to the open approach; this decreased the cost of the inpatient and the nursing care and was an indicator of rapid recovery. According to Tozzi et al. the time for recovery of intestinal function in the TLH group was 2 versus 2.3 days in the TAH group, and the time elapsed before the patient could undertake his normal activity was significantly shorter after laparoscopic surgery (28.2 days) versus 47.8 days after open surgery [5].

Conclusion

TLH with pelvic lymphadenectomy is an applicable approach in the treatment of early endometrial carcinoma. It provides the safety and efficacy as TAH, together with advantages of laparoscopic surgery; being a less invasive approach with better postoperative recovery and less postoperative complications. And its efficacy is related to the experience of the surgeon and the learning curve.

References