Available online at www.sciencedirect.com
ScienceDirect
Gynecologic Oncology 105 (2007) 409–413
Gynecologic Oncology
www.elsevier.com/locate/ygyno

Laparoscopy versus laparotomy for the surgical management of apparent early stage ovarian cancer

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Received 22 October 2006
Available online 31 January 2007

Abstract

Objective. To compare the results of laparoscopic staging of apparent early ovarian cancer (EOC) with those obtained with comprehensive surgical staging via laparotomy.

Methods. Consecutive patients undergoing comprehensive laparoscopic staging for presumed EOC (LPS group; $N=15$) were compared with historical controls selected from consecutive women who have had conventional staging with open surgery (LPT group; $N=19$).

Results. No difference was found in demographics and preoperative variables between the two groups. There were no significant differences between the two groups with regard to median number of lymph nodes and likelihood of identifying metastatic disease. No conversion to laparotomy and no intraoperative complication occurred in the LPS group. Operative time was significantly longer in the LPS group when compared with the LPT group (377±47 vs. 272±81 min, $P=0.002$). One patient in the LPS group had a retroperitoneal haematoma recognized in the postoperative period, and this required laparotomy and ligature of the hypogastric arteries to achieve haemostasis. Minor postoperative complications occurred in 1 (6.7%) patient in the LPS group and in 8 (42.1%) patients in the LPT group ($P=0.047$). Hospital stay was significantly shorter in the LPS group [3 (2–12) vs. 7 (4–14) days, $P=0.001$]. Median (range) follow-up time was 16 (4–33) and 60 (32–108) months in the LPS and LPT group, respectively. Eleven (73.3%) patients in the LPS group and 13 (68.4%) in the LPT group received adjuvant treatment. There were no recurrences in the LPS group whereas 4 (7.1%) recurrences occurred in the LPT group. Overall survival was 100% in both groups.

Conclusion. Our results suggest that laparoscopic comprehensive surgical staging of EOC is as safe and adequate as the standard surgical staging performed via laparotomy.

Keywords: Early ovarian cancer; Laparoscopy; Laparotomy; Surgical staging

Introduction

Ovarian cancer accounts for approximately a quarter of all genital tract malignancies but is responsible for half the deaths from gynecological cancer, primarily due to its late presentation. Only 19% of the patients are diagnosed with stage I disease [1] and early diagnosis is frequently incidental during procedure for supposed benign adnexal masses. When the disease is limited to the ovaries, 5-year survival rates are excellent approaching 90%, but it has been demonstrated that nearly 30% of patients with an apparent early ovarian cancer (EOC) actually harbour microscopic metastatic disease [2,3]. Disease upstaging has not only implications in providing the most accurate prognostic information, but it affects indications for adjuvant therapy and may ultimately result in an improved disease-free and overall survival [4,5]. Therefore, an optimal surgical staging of women without gross evidence of extra-ovarian disease is of utmost importance, particularly when considering only clinical observation without adjuvant treatment for patients with stage I ovarian cancer.

Traditional approach to ovarian cancer is surgical comprehensive staging including peritoneal washing, total abdominal hysterectomy, bilateral salpingo-oophorectomy, multiple random

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0090-8258/$ - see front matter © 2006 Elsevier Inc. All rights reserved.
doi:10.1016/j.ygyno.2006.12.025

biopsies of the peritoneal surface, omentectomy, and pelvic and paraaortic lymphadenectomy, performed through a generous longitudinal midline laparotomy. Laparoscopic approach for the surgical staging or restaging of EOC was first reported in the mid 1990s [6]. However, since stage I ovarian cancer is a rare condition, only limited case series addressing the technical feasibility and safety of laparoscopic staging of presumed EOC have been published so far [7–14]. In the absence of large-scale randomized controlled trials to validate the benefits of laparoscopy over open surgery for the management of EOC, we must rely only on a small non-randomized case-control study [15] and a retrospective multicenter comparative survey [16] in the recent literature.

This study was designed to compare the results of laparoscopic staging of apparent EOC with those obtained with comprehensive surgical staging via laparotomy in terms of feasibility, adequacy and mid-term outcome.

Materials and methods

Laparoscopic approach for the management of early stage ovarian cancer was introduced at the Department of Obstetric and Gynecology of University of Insubria in January 2003. Consecutive women diagnosed with an apparent stage I ovarian cancer on frozen-section analysis at the time of primary surgery at our institution as well as patients who had previous adnexal surgery elsewhere and referred to our Oncologic Unit for restaging, underwent comprehensive surgical staging by laparoscopy (LPS group). Early ovarian cancer (EOC) was defined as an ovarian tumor grossly limited to one or both ovaries with no evidence of intraperitoneal disease (stage I according to the FIGO classification). All histologic types of adnexal cancers, including stromal and germ cell tumors were included. Gross evidence of spread of the disease beyond the ovaries was regarded as exclusion criterion. Written informed consent was obtained from the patients after a thorough counseling detailing therapeutic options, risks of the procedure, possibility of conversion to laparotomy and bowel resection. Laparoscopic staging protocol fulfilled oncological standards and adhered to FIGO recommendations. The study was approved by the Institutional Review Board.

Controls were selected from consecutive women having had surgical staging via laparotomy for apparent EOC in our department before that time period (between 1997 and 2003), and who met the same criteria for eligibility as the cases (LPT group). Our hospital serve a stable population and the patients were operated in al cases by the same two surgeons (F.G., M.F.), with extensive training and experience in gynecologic oncology and in advanced laparoscopic procedures. Preoperative work-up, operative technique, other aspects of patient management unrelated to surgical approach and criteria for outcome evaluation remained consistent over time. Data concerning the surgical procedures, intra- and postoperative details as well as follow-up evaluations of both study groups were recorded prospectively in our computerized oncological database, a research-quality database maintained by the Oncologic Unit and up-dated on a regular basis.

All patients received a single dose of prophylactic antibiotic 1 h prior to the intervention (ampicillin/sulbactam 1.5 g intravenously) and anti-thrombotic prophylaxis with low-molecular-weight heparin (nadroparin 2850 IU subcutaneous daily) was given for 3 weeks beginning from the day before surgery.

Intraoperative mass rupture was defined as any rupture, intentional or unintentional, that resulted in spill of cyst contents into the peritoneal cavity. If a mass was drained intentionally within a collection bag to facilitate removal without a resulting peritoneal spill, the mass was not considered ruptured. An active bleeding with symptomatic anemia and hemoglobin less than 8 g/dL were considered criteria for blood transfusion. Postoperative complications were defined as adverse events occurring within 30 days of surgery as a result of the procedure. Febrile morbidity was defined as two temperatures >38 °C, 6 h apart, within 48 h of surgery and requiring antibiotic therapy. Hospital stay was counted from the first postoperative day.

Adjuvant chemotherapy with a combination of carboplatin and paclitaxel was administered to patients with epithelial ovarian cancer FIGO stage IAG3, IBG3, IC, and greater than I.

Follow-up evaluations were scheduled monthly for the first 3 months, then every 3 months for the first 2 years, and every 6 months thereafter.

Laparoscopic technique

Patients were placed in lithotomic position. After pneumoperitoneum was created, a 10-mm 0° operative laparoscope was introduced at the umbilical site. Under direct vision three ancillary trocars were inserted, one 10-mm suprapubically and two 5-mm laterally to the epigastric arteries, in the left and right lower abdominal quadrants, respectively. First, sterile saline solution was instilled for peritoneal washing and the liquid aspirated was sent for cytologic examination. Parietal and visceral peritoneal surfaces were carefully inspected, including diaphragm, liver, gallbladder, small bowel and mesentery, recto-sigmoid colon, pouch of Douglas, paracolic gutters and abdominal wall. Subsequently, in those women not referred for restaging, the ovary with the suspicious mass was removed and retrieved via an endobag to avoid contact with the port sites and it was submitted for frozen section assessment. The surgical specimens were removed in all cases through the umbilicus, as previously described [17]. Briefly, a retrieval bag supplied with a 40-cm long thread was rolled, grasped with a grasping forceps and introduced through the umbilical trocar with the free end of the thread held outside the abdomen. The operative laparoscope was then introduced, the surgical specimen was inserted in the retrieval bag, the thread was pulled, and the edges of the bag were grasped through the umbilical incision. Even in the presence of large adnexal masses, gentle traction on the bag during the process allows serial exteriorization of the bag, keeping the cyst components at the incision. In case of large cystic tumors puncture of the mass and aspiration were performed within the retrieval bag. When solid components were encountered, they were removed by morcellization (while in the bag) using Kocher clamps or curved Mayo clamps. Once the mass was removed in its entirety along with the bag, endobag integrity was verified, surgeons' gloves were changed and secondary drapes about the umbilical incision were removed.

After the diagnosis of malignancy, multiple random peritoneal biopsies were performed. Bilateral pelvic lymphadenectomy was performed as previously described [18] and in all patients, external iliac, internal iliac and obturator lymph nodes were removed. Common iliac and paraaortic lymphadenectomy were performed placing the laparoscope in the suprapubic trocar and moving the monitor cephalad. The peritoneum was opened over the common iliac arteries and the incision was extended cephalad over the underlying inferior vena cava and abdominal aorta, exposing the ureters, gonadal vessels and inferior mesenteric artery. Under direct vision of the above mentioned structures, common iliac, precaval and paraaortic nodal dissection were performed. In some cases an additional 3-mm ancillary trocar was placed in the left hypochondrium in order to introduce a grasper to retract the visceral peritoneum allowing an easier access to the retroperitoneal space. The upper limit of the nodal harvest was the insertion of the right ovarian vein in the vena cava on the right side and the left renal vein on the left side. In order to prevent the contamination of the abdominal wall with malignant cells, a specimen bag was used to retrieve the lymph nodes, separately from each sidewall. Total infracolic omentectomy was than performed using scissors and bipolar coagulation. Appendectomy was performed by coagulation of the mesoappendix, ligature of the appendix by endo-loops and resection. The surgical specimens were extracted from the abdomen by individual endobags. Salpingo-oophorectomy and total laparoscopic hysterectomy were than performed if not accomplished in a previous procedure. In case of unilateral tumor, fertility-sparing surgery was offered to young patients who desired preservation of reproduction potential, after a biopsy of the contralateral ovary ruled-out the presence of malignant cells. In all cases the peritoneal cavity was reinspected laparoscopically after closing the vaginal cuff to ensure adequate haemostasis and abundant washing of the peritoneal cavity was then performed.

Laparotomic technique

Laparotomy was performed in all cases via a midline longitudinal incision. The surgical staging included in all cases peritoneal washing, peritoneal biopsies, paraaortic and bilateral pelvic lymphadenectomy, total infracolic omentectomy, appendectomy and bilateral resection of the infundibulo-pelvic