Surgical manual of the Korean Gynecologic Oncology Group: ovarian, tubal, and peritoneal cancers

Seob Jeon,1 Sung Jong Lee,2 Myong Cheol Lim,3 Taejong Song,4 Jaeman Bae,5 Kidong Kim,6 Jung-Yun Lee,7 Sang Wun Kim,7 Suk-Joon Chang,8 Jong-Min Lee9

1Department of Obstetrics and Gynecology, Soonchunhyang University Cheonan Hospital, Soonchunhyang University College of Medicine, Cheonan, Korea
2Department of Obstetrics and Gynecology, St. Vincent’s Hospital, College of Medicine, The Catholic University of Korea, Suwon, Korea
3Center for Uterine Cancer and Gynecologic Cancer Branch, Research Institute and Hospital, National Cancer Center, Goyang, Korea
4Department of Obstetrics and Gynecology, Kangbuk Samsung Hospital, Sungkyunkwan University School of Medicine, Seoul, Korea
5Division of Gynecologic Oncology, Department of Obstetrics and Gynecology, Hanyang University College of Medicine, Seoul, Korea
6Department of Obstetrics and Gynecology, Seoul National University Bundang Hospital, Seoul National University College of Medicine, Seongnam, Korea
7Women’s Cancer Center, Yonsei Cancer Center, Department of Obstetrics and Gynecology, Severance Hospital, Yonsei University College of Medicine, Seoul, Korea
8Gynecologic Cancer Center, Department of Obstetrics and Gynecology, Ajou University School of Medicine, Suwon, Korea
9Department of Obstetrics and Gynecology, Kyung Hee University Hospital at Gangdong, Kyung Hee University School of Medicine, Seoul, Korea

ABSTRACT

The Surgery Treatment Modality Committee of the Korean Gynecologic Oncology Group has determined to develop a surgical manual to facilitate clinical trials and to improve communication between investigators by standardizing and precisely describing operating procedures. The literature on anatomic terminology, identification of surgical components, and surgical techniques were reviewed and discussed in depth to develop a surgical manual for gynecologic oncology. The surgical procedures provided here represent the minimum requirements for participating in a clinical trial. These procedures should be described in the operation record form, and the pathologic findings obtained from the procedures should be recorded in the pathologic report form. Here, we describe surgical procedure for ovarian, fallopian tubal, and peritoneal cancers.

Keywords: Manuals as Topic; Gynecologic Surgical Procedures; Ovarian Neoplasms

INTRODUCTION

This surgical manual is for all cases of suspicious ovarian, tubal, and peritoneal cancers. It is organized into five sections including surgical procedures in ovarian, tubal, and peritoneal cancers, perioperative preparation, operation record form (ORF), pathologic report form (PRF), and tumor burden index (TBI).
We emphasize that surgical procedures in this manual represent the minimum requirements for clinical trials. This manual is the first version and will be updated to accommodate various clinical trials.

**SURGICAL PROCEDURES IN OVARIAN, TUBAL, AND PERITONEAL CANCERS**

In cases of suspected early stage diseases, the primary objective of surgical staging of ovarian, tubal, and peritoneal cancers is to establish adjuvant treatment strategies and in cases of suspected advanced stage diseases, optimal debulking surgery of ovarian, tubal, and peritoneal cancers should be achieved with acceptable morbidity.

1. **Contents of surgical procedure**

   Midline vertical abdominal incision from the pubic symphysis to the xiphoid process is recommended for adequate exposure and evaluation of the whole abdomen. Minimally invasive surgical techniques (laparoscopy or robotic surgery) may be performed to accomplish surgical staging for selected patients based on preoperative imaging, such as computed tomography (CT), magnetic resonance imaging, or positron emission tomography/CT [1-7].

   Prior to systemic exploration, free peritoneal fluid should be aspirated for cytology. Washing cytology with at least 20 to 50 mL of saline should be obtained in case of no free fluid in abdominal cavity. Patients with stage III or IV disease do not require cytologic assessment [1,6,8].

   A systematic exploration is recommended to check the tumor involvement in the pelvic and abdominal organs, and peritoneal surface; clockwise or counterclockwise examination is usually performed from the cecum cephalad along the right paracolic gutter. The followings are investigated sequentially: ascending colon, liver, right diaphragm, stomach, lesser sac, porta hepatitis, transverse colon, left diaphragm, spleen, distal pancreas, descending colon, left paracolic gutter, rectosigmoid colon, uterus, ovary, and bladder [1,6].

   Biopsy should be performed at any suspicious site with tumor involvement if the suspected disease affects the surgical staging or adjuvant treatment. Multiple intraperitoneal biopsies from the cul-de-sac, vesical peritoneum, both pelvic sidewalls, and both paracolic gutters should be conducted in case of no evidence of disease [1,6].

   Ovarian tumor should be removed intact, and frozen biopsy is strongly recommended during operation, if possible. Hysterectomy with bilateral salpingo-oophorectomy is recommended. Tumors throughout the abdomen should be removed as much as possible. Omentectomy should be fulfilled during surgical staging [9].

   All visible and palpable tumor volume should be minimized as much as possible with debulking operations, such as visceral and parietal peritonectomy: peritoneal stripping, diaphragmatic resection, cholecystectomy, hepatic resection, splenectomy, distal pancreatectomy, appendectomy, bowel resection, urinary tract resection, partial cystectomy, and lymph node dissection [7,10-15].

   Retroperitoneal inspection should be carried out to check for metastasis to pelvic and para-aortic lymph nodes. Pelvic and para-aortic lymph node should be systematically
evaluated in case of stage I or II, and the extent of retroperitoneal lymph node dissection could be modified based on the degree of the intraperitoneal residual tumor and the status of the lymph node on the preoperative image (see the description of lymphadenectomy in ORF) [16-18]. Unilateral salpingo-oophorectomy with preservation of the uterus may be considered to preserve fertility for selected patients [19,20].

Before the neoadjuvant chemotherapy (NAC), the methods for pathologic diagnosis of ovarian, tubal, and peritoneal cancers are recommended as follows: laparoscopic biopsy, image-guided gun biopsy or aspiration, or cell block from the aspiration of ascites. In case of interval debulking surgery, the traced lesion after NAC should be evaluated carefully and its management should be recorded clearly [21,22].

Medical record of surgery is recommended to describe the extent of initial tumors before surgery at pelvis, mid-abdomen, or upper abdomen. Demonstration of the status of residual tumors after surgery, complete or incomplete, is recommended to identify the size and number of remaining lesions. Photograph or video recording is one of the methods used to describe the preoperative and postoperative tumor, and surgical procedures. We provide schematic overview of this surgical manual (Table 1).

| Table 1. Schematic overview of surgical procedure in ovarian, tubal, and peritoneal cancers |
| Recommendation for surgical technique in ovarian, tubal, and peritoneal cancer |
| Preparation |
| Preoperative intravenous antibiotics injection with adequate bowel preparation is recommended |
| Assessment |
| • A midline vertical incision is recommended. Minimally invasive techniques (laparoscopy, robotic) may be performed for selected patients |
| • Systematic exploration for tumor involvement on the pelvic and abdominal organs, and peritoneum |
| • Aspiration of peritoneal fluid or washing cytology in case of no free peritoneal fluid (pelvis, paracolic gutters and infradiaphragmatic area) |
| • Inspection and palpation of all peritoneal surfaces including diaphragms, serosa, and mesentery of the entire gastrointestinal tract |
| • Random biopsies in the absence of any suspicious area |
| • Intraoperative frozen biopsy (recommended) |
| Surgery |
| • Bilateral salpingo-oophorectomy, but unilateral salpingo-oophorectomy may be considered in case of preserving fertility |
| • Hysterectomy |
| • Omentectomy |
| • Pelvic and para-aortic lymph node dissection |
| The following procedures can be considered for the optimal cytoreduction |
| • Bowel resection |
| • Stripping and/or resection of the diaphragm or other peritoneal surfaces |
| • Splenectomy |
| • Appendectomy |
| • Partial cystectomy, uretero-neoureterostomy, or ureteroneocystotomy |
| • Partial hepatectomy |
| • Partial gastrectomy |
| • Cholecystectomy |
| • Distal pancreatectomy |
| • Suprarenal, porta hepatitis, cardiophrenic, internal mammary, axillary, or supraclavicular lymph node dissection |

*All visible and palpable tumor should be tried to be resected by experienced gynecologic oncologists or multidisciplinary surgical team if surgical procedure is feasible with acceptable morbidity |

Special circumstances |
| • Before the neoadjuvant chemotherapy (NAC), the method for microscopic diagnosis of ovarian, tubal, and peritoneal cancer is suggested as follows: laparoscopic biopsy, image-guided gun biopsy or aspiration, and cell block from the aspiration of ascites |
| • In case of interval debulking surgery, the traced lesion after NAC is suggested to be explored surgically |
PERIOPERATIVE PREPARATION

We provide perioperative preparation that includes antibiotic prophylaxis, prevention of thromboembolic disease, and patient’s position.

1. Antibiotic prophylaxis
The use of prophylactic antibiotics before surgery is suggested for the prevention of postoperative gynecological infections. Antibiotics are recommended to be given immediately before skin incision. Antibiotic regimen can be selected according to the types of surgery or surgeon’s preference. Additional use of prophylactic antibiotics is recommended to maintain effective levels of intravascular antibiotics in certain clinical situations, like massive bleeding or prolonged operative time [23,24].

2. Prevention of thromboembolic disease
Prophylaxis with anti-coagulants can be selectively suggested to cancer patients with high risk of deep-vein thrombosis and thromboembolic disease (Table 2) [25-29].

3. Patient position
If concomitant bowel resection is expected during operation, lithotomy position is recommended for patients who undergo laparotomy, and gel pads can be used for prevention of pressure sores [12].

OPERATION RECORD FORM

In the debulking surgery for the advanced stage disease, multidisciplinary surgical teams including gynecologic oncologic surgeons, colorectal surgeons, hepatobiliary surgeons, and even thoracic surgeons usually perform a lot of surgical procedures to minimize residual lesion and these surgical procedures should be described systematically and properly in the operation record. ORF for ovarian tubal and peritoneal cancers has been established on the basis of the Synoptic Operative Template for Ovarian Cancer of National Cancer Center of Korea. Standardized ORF may encourage to record all required information and surgical procedures and can save time. In the clinical trial setting, by looking at ORF, investigators can identify all procedures. ORF includes the following information (Fig. 1, Supplementary Fig. 1).

TUMOR BURDEN INDEX

To estimate perioperative tumor burden, Korean Gynecologic Oncology Group (KGOG) developed TBI by modifying the peritoneal carcinomatosis index of Korean National Cancer Center. The peritoneal cavity is divided into nine well defined regions (Fig. 2, Supplementary Fig. 2). Investigators should describe pre- and post-operative largest tumor diameter, operative finding, operation name in each region, and the largest residual tumor at the end of the operation.

Table 2. The methods for the prevention of thromboembolic events [25-29]

<table>
<thead>
<tr>
<th>Class</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pharmacologic</td>
<td>Unfractionated heparin, low-molecular weight heparin, fondaparinux, warfarin, dextran</td>
</tr>
<tr>
<td>Mechanical</td>
<td>External pneumatic compression, elastic stocking</td>
</tr>
<tr>
<td>Behavioral</td>
<td>Short preoperative hospitalization, early postoperative mobilization, feet elevation above heart level</td>
</tr>
</tbody>
</table>
Fig. 1. Operation record form for ovarian, tubal, and peritoneal cancers. CA-125, cancer antigen 125; CA-19-9, cancer antigen 19-9; CEA, carcinoembryonic antigen; FFP, fresh frozen plasma; FIGO, International Federation of Gynecology and Obstetrics; HE-4, human epididymis protein 4; KGOG, Korean Gynecologic Oncology Group; LN, lymph node; LNS, lymph node sampling; LLQ, left lower quadrant; Lt, left; LUQ, left upper quadrant; PR conc, platelet concentration; p-RBC, packed red blood cells; RLQ, right lower quadrant; Rt, right; RUQ, right upper quadrant; WB, whole blood.

Fig. 2. Korean Gynecologic Oncology Group tumor burden index (TBI) for ovarian, tubal, and peritoneal cancers. IMA, inferior mesenteric artery; LN, lymph node; LUQ, left upper quadrant; PALN, paraaortic lymph node; RUQ, right upper quadrant.
PATHOLOGIC REPORT FORM

Surgery Treatment Modality Committee of KGOG collected and analyzed several ovarian cancer PRFs from committee members’ hospitals and decided that PRF should be made with Gynecologic Pathology Study Group. There were in-depth discussions with the Gynecologic Pathology Study Group about how to develop the PRF for ovarian, tubal and peritoneal cancer. PRF includes the following information (Fig. 3, Supplementary Fig. 3).

SUPPLEMENTARY MATERIALS

Supplementary Fig. 1
Operation record form for ovarian, tubal, and peritoneal cancers
Click here to view

Supplementary Fig. 2
Tumor burden index (TBI) for ovarian, tubal, and peritoneal cancers
Click here to view

Supplementary Fig. 3
Pathologic report form for ovarian, tubal, and peritoneal cancers
Click here to view

Fig. 3. Pathologic report form for ovarian, tubal, and peritoneal cancers. pTNM, pathological tumor node metastasis.
REFERENCES


