

ONCOLOGY

Staging laparoscopy for the management of early-stage ovarian cancer: a metaanalysis

Hyun Jong Park, MD; Dong Wook Kim, PhD; Ga Won Yim, MD; Eun Ji Nam, MD, PhD; Sunghoon Kim, MD, PhD; Young Tae Kim, MD, PhD

OBJECTIVE: We sought to perform a quantitative analysis on operative outcomes of laparoscopic staging surgery in patients with presumed early-stage ovarian cancer using a metaanalysis.

STUDY DESIGN: Electronic searches for studies of laparoscopic staging surgery in patients with ovarian cancer were performed within 3 electronic databases (Medline, Embase, and the Cochrane Library) using the key words "ovarian cancer," "early stage," "laparoscopy," "staging surgery," "staging laparoscopy," and "recurrence." Two authors independently screened articles, and those meeting the defined inclusion/exclusion criteria were included in the metaanalysis.

RESULTS: We identified 11 observational studies. The combined results of 3 retrospective studies showed that the estimated blood loss in laparoscopy was significantly lower than that for laparotomy

($P < .001$). The overall upstaging rate after laparoscopic surgery was 22.6% (95% confidence interval [CI], 18.1–27.9%) without significant heterogeneity among all study results. The overall incidence of conversion from laparoscopy to laparotomy was 3.7% (95% CI, 2.0–6.9%). The overall rate of recurrence in studies with a median follow-up period of ≥ 19 months was 9.9% (95% CI, 6.7–14.4%).

CONCLUSION: Through our quantitative analysis, we concluded that the operative outcomes of a laparoscopic approach in patients with early-stage ovarian cancer could be compatible with those of laparotomy. In the future, further randomized controlled trials may be needed.

Key words: early-stage ovarian cancer, laparoscopy, laparotomy, operative outcomes, recurrence, staging surgery

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The laparoscopic approach is currently applied to complicated surgeries in the field of gynecologic cancer

From the Division of Gynecologic Oncology, Department of Obstetrics and Gynecology, Institute of Women's Life Medical Science (Drs Park, Yim, Nam, S. Kim, and Y. T. Kim), and the Biostatistics Collaboration Unit (Dr D. W. Kim), Yonsei University College of Medicine, Seoul, Republic of Korea.

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Reprints: Young Tae Kim, MD, PhD, Division of Gynecologic Oncology, Department of Obstetrics and Gynecology, Yonsei University College of Medicine, 250 Seongsanno, 134 Shinchon-dong, Seodaemun-gu, 120-752 Seoul, Republic of Korea. ytkchoi@yuhs.ac.

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and has been associated with quick recovery times, lower morbidity, and shorter hospital stays compared with laparotomy.¹⁻⁴ However, in ovarian cancer, the resection area is broader than in other gynecologic cancers, so dissemination occurring from exfoliation of tumor cells and a larger risk of intraoperative tumor rupture remain limitations of laparoscopic staging surgery.⁵

The traditional approach for staging of clinical early-stage ovarian cancer (EOC) is through laparotomy with an extended midline incision that exposes the whole peritoneal cavity.⁶ However, due to recent advances in laparoscopic techniques and instruments, it is possible to perform the standard staging procedure for ovarian cancer laparoscopically.

In a Cochrane systematic review of studies that compared the operative outcomes of laparoscopy and laparotomy carried out in patients with EOC through November 2007, a quantitative metaanalysis was impossible, and only a qualitative review could be conducted due to the low quantity of studies in the literature.⁷ Since then, many studies have

applied laparoscopic staging surgery in patients with EOC. The purpose of our study was to perform a quantitative metaanalysis on operative outcomes of laparoscopic staging surgery in patients with presumed EOC using a metaanalysis of single-armed studies and the laparoscopic arms of comparative studies.

MATERIALS AND METHODS

Literature search

A literature search was performed using the key words, "ovarian cancer," "early stage," "laparoscopy," "staging surgery," "staging laparoscopy," and "recurrence" in Medline (from December 1969), Embase (from September 1974), and the Cochrane Library (from February 1990) for articles published through Aug. 24, 2012.

Participants included in this metaanalysis are as follows. Among cases with presumed EOC (International Federation of Gynecology and Obstetrics stage I-II) prior to surgery based on a baseline study, patients who either received laparoscopic staging surgery or who were

referred to the department of gynecologic oncology for laparoscopic staging surgery after pathologic diagnosis of cancer following surgery for a benign-looking ovarian mass at an outside hospital were selected as participants.

Study selection

Inclusion/exclusion criteria of studies subject to our metaanalysis were as follows: (1) among manuscripts for which the original full text was found, only those specifically providing useful operative outcomes were included; (2) studies written in languages other than English were excluded; (3) abstracts, comments, reviews, and editorials were excluded; (4) case reports and case series with a sample size of ≤ 10 were excluded; (5) as for laparoscopic, full-staging procedures, studies that did not clearly mention the performance of lymphadenectomy or where < 10 cases

of lymphadenectomy were carried out were excluded; (6) studies that did not include invasive epithelial-origin carcinoma in patients were excluded; (7) studies in which laparoscopic surgery was performed for the purpose of diagnostic biopsy instead of radical treatment were excluded; and (8) the publication year, authors, study centers, and study periods were investigated, and overlapping articles were excluded. In cases of overlapping study populations, only the larger study was included in our analysis.

Data extraction

After analyzing each study, variables showing operative outcomes ("A" variables) and those with unique demographic characteristics of each study ("B" variables) were examined.

"A" variables are as follows: (1) operation time (mean \pm SD, min); (2)

estimated blood loss (EBL) (mean \pm SD, mL); (3) perioperative complications (including intraoperative and postoperative complications associated with surgery) during the postoperative and follow-up periods; (4) upstaging rate after staging surgery; (5) rate of conversion to laparotomy; (6) rate of intraoperative tumor rupture; and (7) recurrence rate during the follow-up period after laparoscopic staging surgery. In the examination of "A" variables, data presented as a median value and a range were converted to a mean value and SD using the formula proposed by Hozo et al.⁸ The recurrence rate was investigated only in studies with follow-up periods of ≥ 19 months. This time length was chosen because a sufficient observation period must be required to evaluate recurrence. The median recurrence-free interval should be regarded as ≤ 19 months when referring to the literature on ovarian cancer.^{9,10}

"B" variables were as follows: (1) age (mean \pm SD); (2) proportion of incomplete staging procedures at the initial surgery (the proportion of patients referred to the department of gynecologic oncology for laparoscopic staging surgery due to incomplete staging at the initial surgery); (3) proportion of patients with invasive epithelial-origin carcinoma; (4) conducting rate of adjuvant chemotherapy after staging surgery; (5) total harvested number of lymph nodes (which was classed as a "B" variable because lymphadenectomy can be performed in a number of different ways according to each surgeon's individual protocol); and (6) proportion of fertility-sparing surgeries.

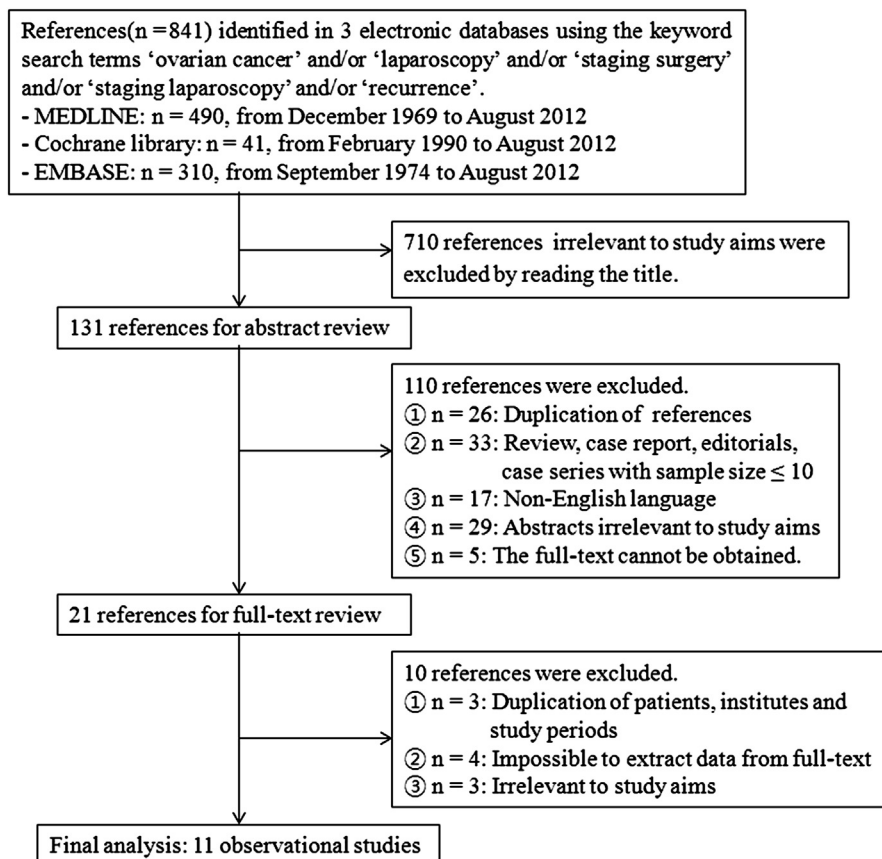
Studies were selected and data were extracted by 2 reviewers (H.J.P. and Y.T.K.), and any discrepancy between reviewers was resolved through discussion.

Data analysis

Data were analyzed using software (Comprehensive Meta-Analysis, version 2.0; Biostat, Englewood, NJ). To control for differences in study designs among studies, data provided by each study were divided into retrospective and prospective categories according to the method of data collection and then

FIGURE 1

Flow chart of study selection



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