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Original Article

Single-port compared with conventional laparoscopic cystectomy for ovarian dermoid cysts



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ABSTRACT

Objective: We compared the immediate surgical outcomes of single-port laparoscopic cystectomy (SLC) and conventional laparoscopic cystectomy (CLC) for managing ovarian dermoid cysts.

Materials and methods: A retrospective case-control study was conducted to enroll 71 patients with dermoid cysts, including 34 patients in the SLC group and 37 patients in the CLC group. The outcome measures included operative time, blood loss, postoperative pain, analgesic use, and serum levels of hormones, including estrogen (E2), follicle-stimulating hormone, luteinizing hormone, and anti-Mullerian hormone.

Results: SLC was associated with less time required for specimen retrieval (1.3 ± 0.8 vs. 12.0 ± 3.4 minutes, $p < 0.001$), fewer ruptured bags (0% vs. 10.8%, $p = 0.049$), and less need of additional wound elongation (0% vs. 27.0%, $p = 0.001$) when respectively compared with CLC. Additionally, patients who underwent SLC reported lower postoperative lower abdominal pain and less accumulated postoperative analgesics when respectively compared with patients who underwent CLC. There was no significant difference of hormones between two groups.

Conclusion: Our study demonstrated the feasibility of using the single-port method in place of CLC in the management of ovarian dermoid without increased difficulty of techniques or risk of ovarian damage.

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Introduction

The advantages of laparoscopy include less intraoperative blood loss, a reduced need for postoperative analgesic, shorter hospital stays, and better cosmetic results compared with laparotomic surgery [1–3]. A recent advancement in the field of minimally invasive gynecology is transumbilical single-port laparoscopy (SPL) or transvaginal natural orifice transluminal endoscopic surgery, which is an attempt to enhance the cosmetic benefits and minimize the morbidity associated with abdominal incisions [4–6]. Although

gynecologic surgeons pioneered pelvic laparoscopy to conduct tubal ligation through a single umbilical incision in the 1970s [7], more advanced procedures were reported years later, with the first single-port hysterectomy reported by Pelosi and Pelosi [8] in 1991 and the first single-port ovarian cystectomy reported by Kosumi et al in 2001 [4].

Through technological innovations, single-port adnexal surgeries have increasingly been conducted with comparable results to conventional multiple-port laparoscopy [9–27]. However, ovarian reservation is still a challenge and requires the preservation of as much normal tissue as possible during single-port laparoscopic cystectomy (SLC) [28,29]. Through a single subumbilical single-port incision, the limited range of instrument motion makes enucleation and suturing difficult and increases the operation time [21,30]. Although several studies on SPL have addressed how to

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manage adnexal lesions, including patients with dermoid cysts, specimen retrieval and spillage of cyst content have not been elucidated [15,21,22,24,30].

Laparoscopic cystectomy for managing ovarian dermoid cysts has been well documented and has several advantages, such as less intraoperative blood loss, less postoperative pain, less postoperative analgesic requirement, shorter hospital stay, and better cosmetic results [1–3]. However, there are still some problems during conventional laparoscopic cystectomy (CLC) for ovarian dermoid cyst. The fascia must be torn and stretched when retrieving a dermoid cyst through one 10-mm or less trocar incision during CLC, and spillage sometimes occurs [31–34]. Although the malignancy rate of ovarian dermoid cysts is low, the cancer cells can still spread [35]. Therefore, the wound must be elongated to avoid spillage during retrieval of dense specimens or specimens with calcified contents [33,36].

Although the aforementioned studies reveal that SPL can provide results that are comparable to conventional laparoscopy, SLC and CLC have not been directly compared for managing ovarian dermoid cysts. In this article, we describe single-port compared with conventional multiport laparoscopic cystectomy for the management of ovarian dermoid cysts.

Materials and methods

Study population

This study was designed as a retrospective case-control study, and port placement was one of the differences in operative procedures between the two groups. Patients who opted for the use of the Alexis small wound retractor (Applied Medical, Rancho Santa Margarita, CA, USA) at their own expense were enrolled in the SLC group, and those who did not were enrolled in the CLC group. Patients with ovarian dermoid cysts were evaluated at Taipei Veterans General Hospital from June 13, 2011 through June 12, 2013. Approval for the study was obtained from the hospital's ethics committee, and informed consent was obtained from all patients (VGHIRB 2011-06-004IA; NCT02009228). Inclusion criteria were as follows: the patient received cystectomy for ovarian dermoid cysts (even while pregnant), an American Society of Anesthesiologists physical status classification of I or II, and the patient provided signed informed consent.

Patients who received an oophorectomy for dermoid cyst or had a dermoid ovarian cyst with malignant potential and concomitant surgeries for uterine lesion, pelvic organ prolapse, or urodynamic urinary incontinence were excluded (Fig. 1).

Surgical technique

The following procedures were followed to establish the three-channel single port: a 1.5-cm horizontal intraumbilical skin incision, a 1.5–2-cm rectus fasciotomy to open the peritoneal cavity, and the insertion of an Alexis small wound retractor (Applied Medical). The wrist portion of a size 6.5 surgical glove was fixed to the outer ring of the wound retractor [37]. A 12-mm trocar was inserted through a small hole made in one of the fingertips of the glove and advanced into the abdominal cavity. Two additional holes for the accessory channels were made in another fingertip of the glove, and two conventional 5-mm trocars were inserted through the holes (Fig. 2).

Laparoscopic enucleation was performed after placing the ovary in a LiNA Easy Bag (Endobag) (125 × 200 mm for a 10-mm trocar; LiNA Medical, Glostrup, Denmark) to prevent intraperitoneal spillage. After enucleation of the ovarian dermoid cysts, the ovarian cortical strips were closed with 2–0 V-Loc sutures (Covidien,

Mansfield, MA, USA) in all patients. Electric cauterization for hemostasis was not used during enucleation and closure of ovary. The specimen was thoroughly removed through the Endobag.

After hemostasis, the single-port was removed, and the umbilical fascia and subcutaneous tissue were closed with size 2–0 Polysorb sutures. After the procedure was completed, Dermabond skin adhesive (Ethicon, Raleigh, NC, USA) was used to close the skin. Patients were discharged when they were fully ambulatory and apyrexial.

All procedures were performed by a single surgeon (Y.J.C.), assisted by another two surgeons (B.S.H. or H.W.T.), at a single institute (Taipei Veterans General Hospital) during the study period.

Outcome measurements

Patient data including demographic information, final pathology, operative time, blood loss, low abdominal pain, shoulder tip pain, postoperative hospital stay, serum levels of estrogen (E2), follicle-stimulating hormone (FSH), luteinizing hormone (LH), and anti-Mullerian hormone (AMH) were collected. A visual analog pain scale (VAS) applicable to the patients was used to evaluate postoperative pain at 12, 24, and 48 hours after the surgery. The VAS consisted of a nongraduated 10-cm line ranging from “no pain” to “pain as bad as it could be”. In addition, the postoperative use of analgesics (meperidine prescribed as a 50-mg intramuscular injection every 4 hours and tenoxicam prescribed as a 20-mg intramuscular injection every 24 hours) was administered when requested by the patient, which was recorded. The accumulated dose was calculated as the summation of all used meperidine or tenoxicam per patient during the postoperative 48 hours.

Serum E2, FSH, LH, and AMH levels were assessed before the operation and 4 weeks after operation. Serum AMH concentrations were assayed using the ACTIVE MIS/AMH ELISA kit (reference DSL-10-14400; Diagnostic Systems Laboratories, Inc., Webster, TX, USA) according to the manufacturer's instructions.

Statistical analysis

Statistical analysis was performed using SPSS 18.0.0 software (SPSS, Chicago, IL, USA). Descriptive statistics are presented as the means and standard deviation or percentages. Discrete variables were analyzed by the Chi-square or Fisher exact test; continuous variables were analyzed with the Student *t* test. A two-tailed $p < 0.05$ was considered significant.

Results

A total of 90 patients scheduled for laparoscopic cystectomy were screened in this study; 19 patients were excluded for various reasons including oophorectomy for dermoid cyst ($n = 6$), additional gynecologic surgery ($n = 8$), and declining to participate ($n = 5$) (Fig. 1). Overall, 34 patients in the SLC group and 37 patients in the CLC group were included for analysis, including two pregnant patients who received SLC during the second trimester without an additional accessory port (Table 1).

Demographic parameters, including age, parity, body mass index, location of ovarian dermoid cysts, history of abdominal surgery, adhesion, and size of ovarian dermoid cysts, were comparable between the two groups (Table 2).

The surgical outcomes of the two groups are shown in Table 2. There were no significant differences for the total operative time (92.35 ± 17.13 minutes for the SLC group compared with 83.38 ± 20.70 minutes for the CLC group, $p = 0.052$), the time required to set the port (7.56 ± 1.88 minutes for the SLC group

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