



Original Article

Laparoendoscopic Single-site Compared With Conventional Laparoscopic Ovarian Cystectomy for Ovarian Endometrioma

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ABSTRACT **Study Objective:** To estimate the efficacy of laparoendoscopic single-site (LESS) ovarian cystectomy in ovarian endometrioma.

Design: Retrospective study. Canadian Task Force Classification II-2.

Setting: University hospital.

Patients: Three hundred forty-three premenopausal women with previously untreated ovarian endometrioma.

Intervention: The surgical and follow-up outcomes were compared between LESS (n = 154) and conventional laparoscopic ovarian cystectomy (n = 189).

Measurements and Main Results: Four patients (2.6%) in the LESS group but no patients in conventional group required additional ports (p = .040). No patient in either group required conversion to laparotomy. Operating times, estimated blood loss, perioperative hemoglobin level changes, and transfusions did not differ between groups. However, the length of postoperative hospital stay was significantly shorter in the LESS group (2 ± .4 days vs 2.3 ± .8 days, p = .001) and significantly more patients in this group were discharged within 2 days of surgery (93.5% vs 79.4%, p < .001). Perioperative complications occurred in 1 patient (0.6%) in the LESS group and in 2 patients (1.1%) in the conventional group (p > .999). The LESS group showed significantly lower pain scores at 16 (3.2 vs 3.6, p < .001), 24 (2.8 vs 3, p = .004), and 30 hours (2.7 vs 3, p = .040) after surgery. The requirement for additional analgesics was significantly lower in the LESS group (27.9% vs 45%, p = .001). After a median follow-up time of 48 months, 11 patients (7.1%) in the LESS group and 21 patients (11.1%) in the conventional group showed recurrent endometrioma (p = .209).

Conclusion: LESS ovarian cystectomy has similar feasibility and efficacy with conventional laparoscopic surgery in the management of endometrioma. However, LESS is associated with less postoperative pain, lower analgesic requirement, and earlier discharge. *Journal of Minimally Invasive Gynecology* (2015) ■, ■-■ © 2015 AAGL. All rights reserved.

Keywords: Laparoscope; Single port; Laparoendoscopic single-site surgery; Ovarian cystectomy; Endometrioma

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Endometriosis is characterized by the presence of endometrial-like glands and stroma outside the uterus [1]. It affects about 6% to 10% of reproductive aged women,

The authors declare no conflicts of interest.

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about 50% to 60% of women suffering from pelvic pain, and about 50% of infertile women [2–4]. It is an important health problem for women because of its contribution to pelvic pain and subfertility [1,4,5]. Ovarian endometrioma is 1 of the main manifestations of endometriosis, which is found in 51% of cases [6]. The mainstay for the treatment of endometrioma is surgical management [1,4,5]. Excisional surgery of ovarian endometrioma has more favorable outcomes than ablative surgery with regard to the recurrence of endometrioma, pregnancy rate, and the rate of further surgery [7]. Laparoscopic management of

endometrioma is favored over the laparotomy approach because it has several advantages: a shorter hospital stay, faster recovery, decreased hospital costs, and decreased adhesion formation [8–11]. Therefore, laparoscopic ovarian cystectomy is the preferred standard surgical management for women with ovarian endometrioma.

Recently, laparoendoscopic single-site surgery (LESS) has been adopted in the surgical management of gynecologic disease to enhance the advantage of conventional laparoscopic surgery and cosmetic outcomes [12]. Several studies suggested the feasibility of LESS in the surgical management of adnexal tumors [13–24]. However, the role of LESS is not well known in the ovarian cystectomy for women with ovarian endometrioma. The aim of this study was to estimate the role of LESS ovarian cystectomy compared with conventional laparoscopic ovarian cystectomy in women with ovarian endometrioma.

Methods

We searched patients who underwent laparoscopic surgery due to ovarian endometrioma at Asan Medical Center (Seoul, Korea) between 2009 and 2011 after obtaining the approval of the Institutional Review Board. Only premenopausal women with previously untreated ovarian endometrioma who underwent laparoscopic ovarian cystectomy were eligible for this study. Patients who underwent additional procedures with ovarian cystectomy were excluded. Demographic data, including age, body weight, height, body mass index, parity, history of previous abdominal surgery, comorbid medical disease, and American Society of Anesthesiologist physical status; clinicopathologic data, including preoperative CA-125 level, size of endometrioma, operating time, estimated blood loss, preoperative and postoperative hemoglobin level, perioperative hemoglobin level change, transfusion, postoperative hospital stay, postoperative pain score, analgesics requirement, perioperative complications, and postoperative use of gonadotropin-releasing hormone agonist; and follow-up data, including recurrence, the date of recurrence, and the date of last follow-up, were obtained from patients' medical records. Surgical outcomes and follow-up results were compared between LESS versus conventional laparoscopic ovarian cystectomy. Preoperative hemoglobin level was checked within 4 weeks before surgery, and postoperative hemoglobin level was checked at postoperative day 1. Perioperative complication was defined as any complication documented during surgery and within 30 days after surgery.

Surgical Procedures

LESS ovarian cystectomy was performed using a commercially available, 4-channel, single-port system (Fig. 1A). After making a 15-mm skin incision in the umbilicus, the single-port system was inserted. A rigid, 5-mm laparoscope was handled by a first assistant (a senior training resident), and the surgeon used rigid laparoscopic instru-

ments (forceps, dissectors, scissors, spoon forceps, monopolar or bipolar bovie, or suction/irrigators) with both hands. For conventional laparoscopic ovarian cystectomy, a 10-mm, 12-mm, and 5-mm trocar was inserted in umbilicus, left lower quadrant of abdomen, and suprapubic area, respectively (Fig. 1B). A first assistant held a rigid 10-mm laparoscope. A Cohen cannula was used for uterine manipulation and handled by a second assistant (a junior training resident) for both surgical approaches.

Excluding the placement of laparoscopic ports, surgical procedures for ovarian cystectomy were the same between the 2 surgical approaches. Patients were positioned at dorsal lithotomy, 15-degree Trendelenburg position under general anesthesia. Pneumoperitoneum was made using CO₂ gas at 8 to 12 mm Hg. After incising the surface of ovarian endometrioma, the cyst contents were suctioned, and the remaining cyst wall was stripped completely without removing the normal-appearing ovarian tissues. The stripped ovarian cyst was removed using an Endobag. Bleeding from the remaining ovary was controlled using monopolar or bipolar electrocauterization. The abdominal wall was closed by a layer-by-layer method, and skin adhesive was used for the closure of the skin. A Foley catheter and a closed drain system were not used routinely.

All surgeons in our center performed both LESS and conventional laparoscopic ovarian cystectomy and used the same surgical techniques. There was no change in the surgical procedures during the study period. The selection between LESS and conventional laparoscopic ovarian cystectomy was done according to patient and surgeon preference. There was no specific indication or contraindication for LESS ovarian cystectomy.

Postoperative Management and Follow-up

Patients were allowed sips of water at postoperative day 0, and a regular diet was served at postoperative day 1. Postoperative pain was controlled by administering parenteral nonopioid analgesics (ketorolac, 30 mg) at postoperative days 0 and 1 and enteral nonopioid analgesics (ketorolac, 10 mg) from postoperative day 2 every 8 hours. Whenever patients request additional analgesics, parenteral analgesics were given. Patient-controlled anesthesia was not used. Pain score was measured using the visual analogue pain scale (0 = no pain, 10 = agonizing pain) every 8 hours after surgery. Patients were discharged from postoperative day if they ate well, voided well, had normal activity, were tolerated to pain, and had no symptoms or signs of postoperative complications requiring treatment or admission.

If patients wanted to become pregnant after surgery, they did not receive medical treatment, and they tried pregnancy 2 to 3 months after surgery. If patients wanted to delay pregnancy, we recommended gonadotropin-releasing hormone agonist or the oral pill.

Patients were followed every 6 months after surgery with physical examination and transvaginal ultrasonography. An

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