

Original Article

Mini-Laparotomy Versus Laparoscopy for Gynecologic Conditions

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ABSTRACT **Study Objective:** To compare conversion rates, operative time, and estimated blood loss in patients undergoing mini-laparotomy (<4 cm vertical or transverse abdominal incision) versus laparoscopy for treatment of benign gynecologic conditions.

Design: Retrospective study (Canadian Task Force classification II-2).

Setting: Academic medical center.

Patients: Women who underwent laparoscopy or mini-laparotomy for treatment of gynecologic conditions from January 2002 to March 2011. Patients who underwent hysterectomy as part of the surgery, cancer staging procedure, pregnancy-related procedure, or diagnostic surgery alone were excluded.

Interventions: Mini-laparotomy or laparoscopy.

Measurement and Main Results: Primary outcomes were operative time and estimated blood loss. Secondary outcomes were hospital readmission, repeat operation, overnight hospital admission, emergency room visits because of surgery-related signs or symptoms, and wound complications. Of 950 medical records examined, 493 patients (52%) met the inclusion criteria, of which 141 (29%) underwent mini-laparotomy and 352 (71%) underwent laparoscopy. The groups had similar indications for surgery and level of surgical assistant. Patients who underwent mini-laparotomy were older than those who underwent laparoscopy. In patients who underwent mini-laparotomy, mean operative time was significantly shorter (49.3 versus 91.5 minutes; $p = .003$), and estimated blood loss was less (20 versus 32 mL; $p = .001$). The cumulative secondary outcome rate was not statistically different between the 2 groups (15% versus 16%). When each secondary outcome (conversion, repeat operation, overnight hospital admission, readmission to the hospitalization, emergency department visit, and wound complication) was examined independently, only the wound complication rate was significantly higher in the mini-laparotomy group compared with the laparoscopy group (5 of 141 patients versus 1 of 352 patients; $p = .008$).

Conclusions: Mini-laparotomy is a safe alternative to traditional minimally invasive approaches in gynecology and offers the additional benefits of shorter intraoperative time and less blood loss; however, it is associated with a significantly higher rate of major wound complications. Mini-laparotomy is an important surgical approach and should be included in gynecologic surgical training. Journal of Minimally Invasive Gynecology (2014) 21, 109–114 © 2014 AAGL. All rights reserved.

Keywords: Laparoscopy; Mini-laparotomy; Minimally invasive surgery

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Every year, many women undergo intra-abdominal gynecologic surgery to treat adnexal pathologic conditions including masses and cysts and for cancer prophylaxis.

The authors report no conflicts of interest.

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Other indications for gynecologic surgery include malignancy, ectopic pregnancy, leiomyomas, abnormal uterine bleeding, infertility, and endometriosis. Approaches to gynecologic surgery include the vaginal route, laparotomy, laparoscopy, and robot-assisted laparoscopy.

Laparotomy is the traditional approach to intra-abdominal gynecologic surgery and can be performed to treat all intra-abdominal benign and malignant gynecologic diseases. Laparotomy provides the advantage of rapid, easy access in a wide range of procedures, but is associated with longer recovery time and hospital stay. The gynecologist has the

unique ability to approach surgery vaginally, which is both minimally invasive and inexpensive [1,2]. The vaginal approach to pelvic disease is the original minimally invasive surgery, and patients are spared abdominal incision, have quicker return to function, and experience less postoperative pain [1–4]. The vaginal approach to gynecologic surgery is still an important minimally invasive option and must be stressed in resident surgical education.

Contemporary minimally invasive approaches, laparoscopy and robot-assisted laparoscopy, have become popular and have become the standard of care at most institutions [2,3]. Compared with open abdominal surgery, laparoscopy and robot-assisted laparoscopy offer many advantages to the gynecologic patient including less overall cost, less postoperative pain, and shorter length of stay [1–3,5,6]. Laparoscopy, including robot-assisted laparoscopy, has specific disadvantages including the need for specialized training and instruments, pain from insufflation, potential for trocar-associated injury, and the need for morcellation [2,7,8].

Mini-laparotomy, with an abdominal incision <4 cm, is another surgical approach. Mini-laparotomy offers many of the advantages of minimally invasive surgery including shorter length of stay and quick return to function, but without the additional costs and complications of laparoscopy [9,10]. Mini-laparotomy is described in the gynecologic literature in the management of sterilization [11], myomectomy, benign adnexal disease [12], benign hysterectomy [13], and early endometrial [14] and cervical cancer.

The objective of the present study was to compare operative time, estimated blood loss, feasibility, and safety of laparoscopy versus mini-laparotomy.

Material and Methods

This retrospective cohort study was approved by our institutional review board. Operating room schedules from 2002 to 2011 were reviewed to identify patients who underwent laparoscopy or mini-laparotomy on the gynecology or gynecologic oncology services. Patient operative records were reviewed using the computerized clinical notes system. Patients were excluded if the surgery was pregnancy-related (e.g., ectopic pregnancy), the surgery was diagnostic only, or the intended procedure also included hysterectomy. Primary outcomes were operative time (from start of incision to closure) and estimated blood loss. Other data collected included repeat operation and readmission rates, wound complications, emergency room visits, and conversion rates.

After eligible patients were identified, hospital medical records were examined for additional data. Data for indication for surgery, size and number of incisions, conversion of the procedure, and estimated blood loss were obtained from the attending surgeon's operative notes. If no specific trocar size was reported in the operative note, it was assumed that the trocar was 5 mm because that is the most commonly used trocar size. Mini-laparotomy skin incision length was

obtained from the operative notes. Surgeon information and operative time were collected from the records of the circulating nurse.

Data on secondary outcomes were collected from the operative notes, discharge summaries, and emergency room notes available on the computerized medical record within 30 days after surgery. An emergency room visit was included in analysis only if the reason for the visit was related to the recent surgery. Repeat operations and readmissions were included only if they were related to complications from the surgery. Additional surgery indicated by the pathology report from the first surgery was not included as a repeat operation.

Statistical Analysis

All data were collected in Excel 2010 and analyzed using SPSS version 18.0 (SPSS, Inc., Chicago, IL). Numerical data were analyzed using the Mann-Whitney *U* test. Nominal data were compared using a χ^2 test or the Fisher exact test when appropriate. A *p* value of $\leq .05$ was considered statistically significant. A posteriori power analysis was performed with G*power. The study had 87% power to detect a difference in estimated blood loss (*d* = 0.28) and 99% power to detect a difference in operating time (*d* = 1.00).

Results

A total of 493 patients were identified who met inclusion criteria: 141 patients (29%) underwent mini-laparotomy and 352 patients (71%) underwent laparoscopy. Patient demographic characteristics are given in Table 1. Patients undergoing mini-laparotomy and laparoscopy had similar body mass index, surgical assistant level, and preoperative hematocrit concentration. There was a statistically significant difference in patient age between the mini-laparotomy and laparoscopy groups (48.6 years versus 40.9 years; *p* = <.000).

Indications for surgery are given in Table 2, and were similar in both groups. Overall, in the mini-laparotomy group, 137 of 141 patients (97%) underwent adnexal surgery to treat an adnexal cyst or mass, or prophylactic bilateral salpingo-oophorectomy in patients with the *BRCA* gene

Table 1

Demographic characteristics

Variable	Mini-laparotomy (n = 141)	Laparoscopy (n = 352)	p value
Age, yr	48.6 (12–88)	40.9 (12–88)	<.000
Body mass index	25.7 (13.3–51.6)	26.8 (26.0–49.9)	.50
Assistant level, PGY	4 (1–5) ^a	4 (1–5) ^a	.33
Preoperative hematocrit concentration	38.4 (20.9–46.6)	38.5 (25.4–46.4)	.32

PGY = postgraduate year.

^a PGY5 indicates assistant who had graduated from residency at time of surgery.

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