Operative Laparoscopy in Pregnancy

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ABSTRACT

Objective: We compared the surgical outcomes of pregnant women undergoing laparotomy in the first 2 trimesters of pregnancy with those undergoing laparoscopy for the management of acute pelvic pain.

Methods: We performed a systematic retrospective chart review of patients whose discharge diagnosis included intrauterine pregnancy with exploratory laparotomy or laparoscopy from August 1, 1993 to October 31, 1999. The following factors were assessed: preoperative diagnosis, postoperative diagnosis, gestational age at the time of surgery, operative time, hospital stay, pathology, gestational age at delivery, complications, and outcome of the pregnancy in both groups.

Results: Sixteen pregnant patients underwent surgery during the study period. All but one had abdominopelvic pain, and all patients had an associated adnexal mass. The mean gestation age at the time of surgery was 15±6 weeks versus 13±4 weeks in the laparoscopic and laparotomy groups, respectively (P=NS). All patients undergoing laparoscopy remained in the hospital for one day compared with a mean of 4.4±1.1 days in the laparotomy group (P<0.0001). Pregnancy outcomes were similar and uniformly good.

Conclusion: Laparotomy can be avoided and pregnant patients managed safely by operative laparoscopy, with shorter hospital stays.

Key Words: Laparoscopy, Pregnancy, Laparotomy, Pain, Adnexal mass.

INTRODUCTION

The incidence of pelvic pain requiring surgery ranges from approximately 1:440 to 1:1300.1 The incidence of surgery during pregnancies is approximately 0.75%.2 One in 600 pregnancies are complicated by the presence of adnexal masses.3 One must consider operative intervention when the mass persists or the patient develops symptoms of acute pelvic pain. The majority of these cases are still approached via laparotomy due to a concern about injuring the pregnancy with laparoscopic trocar insertion or the high intraperitoneal pressures associated with pneumoperitoneum. Several studies have documented the safety of laparoscopic cholecystectomy during pregnancy.4-8 Conversely, 2 reports reveal that complications may occur while laparoscopy is being performed during pregnancy.6,9 A growing body of evidence indicates that laparoscopy for gynecologic indications can be performed safely during pregnancy.8,10-15 We compare the management of pregnant patients with symptomatic abdominal pain managed by performing laparoscopic surgery with those managed by laparotomy.

METHODS

We performed a retrospective chart review of all intrauterine pregnancies managed by laparotomy or laparoscopy between August 1, 1993 and October 31, 1998. The following factors were noted: patient age, gestational age, presenting symptoms, ultrasound findings, operative time, procedure performed, pathology results, gestational age at delivery, pregnancy outcome, hospital length of stay, and complications.

All patients undergoing laparoscopy were positioned in the dorsal supine position with anesthesia in control of a leftward tilt. Positional changes were modified with close communication with the anesthesia personnel. General endotracheal anesthesia was used in all patients. Sequential compression devices were placed below the knees. The individual placement of the laparoscope and operating trocars was modified depending on uterine size and gestational age. The trocar sizes were also modified according to gestational age. Our rule was to use the open technique for all initial trocar placements. If the uterus was 18 to 20 weeks gestational or greater, the ini-
tial trocar placement was above the umbilicus, using a 5-
mm trocar via the open technique. The remaining trocar
sites were placed under direct visualization varying from
5 mm to 12 mm on the affected side. Versa Step trocars
were used in some cases per surgeons’ discretion. In no
cases were more than 4 trocar sites used, including the
laparoscope. If the uterus was less than 18 weeks, the ini-
tial trocar placement was in the umbilicus, not subumbil-
ical. CO₂ pneumoperitoneum was obtained with open
placement of the laparoscopic trocar that ranged from a
10-mm to a 3-mm diagnostic laparoscope. In pregnancies
associated with a uterine size of 18 weeks or greater, the
initial trocar placement was above the navel, with the lat-
eral ports being placed under direct visualization.
Intraabdominal pressure was monitored in all patients,
and care was taken not to exceed 12 mm Hg pressure to
ensure adequate venous return and minimize pressure on
the inferior vena cava.₈,₁₃,₁₅,₁₆ Using multiple graspers and
manipulators, the abdominal contents were manipulated
based on the location, symptoms, and characteristics of
the pelvic pathology. Ovarian cystectomy, oophorecto-
my/salpingectomy, or lysis of adhesions was performed.
In all cases, uterine manipulation was kept to a minimum.
Copious irrigation was used. Postoperatively, the patients
were observed closely during labor and delivery for
increased uterine activity. We used indomethacin in a 1-
time dose of 50 mg per rectum at greater than 12 week’s
gestation. No further tocolysis was used. All patients
undergoing laparotomy were placed in the supine posi-
tion with a slight leftward tilt. General endotracheal anes-
thesia was used in all cases. The patients underwent mid-
line abdominal incisions in all cases with minimal manip-
ulation of the uterus. Preoperatively, the fetus was moni-
tored. Postoperatively, patients were observed closely
during labor and delivery for increased uterine activity
and fetal heart tones.

Discreet data were compared with the chi-square test,
with Fisher’s exact test used where appropriate. The
independent samples t test was used to analyze continu-
ous variables.

RESULTS

The perioperative characteristics of the study patients are
presented in Table 1. Pelvic/abdominal pain was present
in all but one patient (6 of 7 laparoscopically managed
patients and 9 of 9 patients undergoing laparotomy). All
patients had a preoperative finding of an adnexal mass.
The pathology noted at the time of surgery is presented
in Table 2. The pregnancy outcomes are noted in Table
3. One of 7 infants was delivered prematurely (34 weeks
vaginally) in the laparoscopically managed group com-
pared with 3 of 9 (31 weeks for breech, 33 weeks for
failed induction for chorioamnionitis, 35.57 weeks for
severe preeclampsia) managed by laparotomy. This dif-
ference was not statistically significant. All deliveries
were remote from the index operation except for the one
spontaneous abortion following a patient managed by
laparotomy. All infants born preterm did well. The blood
loss for the laparoscopies was noted to be minimal. The
blood loss for the laparotomies ranged from a low of 50
cc to a high of 300 cc, with the mean of 117±75 cc. The
mean operating time for the laparoscopies was 116.7
minutes, with a mean operating time for the laparotomies
of 88 minutes (not statistically significant).

DISCUSSION

Our study supports the previously observed safety and
effectiveness of operative laparoscopy during pregnancy.
Until recently, laparoscopy was considered contraindi-
cated in pregnancy. Our data show no increased mor-
Bidity associated with laparoscopy performed during
pregnancy. In a landmark survey by Reedy et al,⁹ 413
laparoscopic procedures performed during pregnancy
for general surgical and gynecological indications
appeared to have no higher fetal or maternal complica-
tions compared with those in a population undergoing
laparotomy, and none were associated with the laparo-
scopic procedure itself.¹⁰ Nongynecologic laparoscopic
procedures have been reported far more than gyneco-
logic procedures have, with cholecystectomy being the
most commonly reported. Reedy et al¹² compared
laparoscopy and laparotomy in pregnancy using the
Swedish Health Registry, comparing a number of param-
eters including birth weight, gestational length, growth
restriction, infant survival, and malformations, conclud-
ing that no differences existed in the parameters when
comparing laparoscopy and laparotomy. A fetal loss of
10% to 25% and a preterm delivery rate of approximate-
ly 20%¹²-¹⁴ have been reported, but these data are asso-
ciated with laparotomy.

Adherence to several technical aspects is important when
performing laparoscopy during pregnancy. Clearly, safe
laparoscopic access is paramount, and we feel that the
open (Hasson) technique is appropriate. Modification of
trocars should be individualized but must be anticipat-
ed once access is initially obtained to ensure an effective
procedure with minimal, if any, uterine manipulation; the location of these trocars in relation to the enlarged uterus is a key to success. Smaller trocars, diameters down to 2 mm, were used. In addition, 3-mm laparoscopes superior to the umbilicus were used in our study (on uteri that were at or above the umbilicus). Minimizing CO2 insufflation to maximize both cardiac output, maternal hepatic flow, and minimizing fetal acidosis is best accomplished by keeping intraperitoneal pressures ≤12 mm Hg. Communication with the anesthesiologist for patient’s O2 and CO2 status should be routine. To minimize risk of venous stasis, we used sequential compression devices below the knees and kept the patient out of the pure supine position with use of the operating room table. Foley catheters were routinely used after general anesthesia was obtained to decompress the bladder to prevent compromise of the operative field.13,15

### Table 1.
Patient Characteristics and Perioperative Variables

| Variable                        | Laparoscopy (n=7) | Laparotomy (n=9) | P    |
|---------------------------------|-------------------|------------------|------|
| Age (years)*                    | 27.1±3.7          | 22.9±5.3         | 0.478|
| Nulliparous                     | 1(14%)            | 5(56%)           | 0.145|
| Gestational age at surgery (weeks)* | 15±6             | 13±4             | 0.232|
| Operating time (minutes)*       | 116±34            | 89±35            | 0.809|
| Hospital stay (days)*           | 1.0±0.0           | 4.4±1.1          | <0.0001|

*Mean ± SD.

### Table 2.
Pathological Diagnoses

| Diagnosis                      | Laparoscopy (n=7) | Laparotomy (n=9) |
|--------------------------------|-------------------|------------------|
| Serous cystadenoma             | 2                 | 0                |
| Benign cystic teratoma         | 1                 | 3                |
| Simple ovarian cyst            | 2                 | 2                |
| Peritubular cyst               | 1                 | 0                |
| Luteoma                        | 0                 | 1                |
| Endometrioma                   | 0                 | 1                |
| Leiomyomata                    | 0                 | 2                |
| Adhesions                      | 1                 | 0                |

### Table 3.
Pregnancy Outcomes*

| Outcome                  | Laparoscopy (n=9) | Laparotomy (n = 9) |
|--------------------------|-------------------|-------------------|
| Spontaneous abortion     | 0                 | 1                 |
| Preterm delivery         | 1                 | 3                 |
| Term delivery            | 6                 | 5                 |

*Differences not statistically significant.
CONCLUSION

Laparoscopic surgery associated with pregnancy is feasible and carries a low morbidity. Although their operative times were longer, the pregnant women undergoing operative laparoscopy appear to have benefited from the minimally invasive procedures with brief hospital stays, rapid postoperative recoveries, and subsequent successful pregnancy outcomes.

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