

## First trimester of pregnancy laparoscopic procedures

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**Abstract.** Laparoscopic procedures are being performed during pregnancy with increasing frequency; however, few first-trimester operations have been published. Two first-trimester procedures are here reported, both performed with uneventful recoveries.

**Key words:** Laparoscopy — Pregnancy — Appendectomy — Cholecystectomy — Twins

First-trimester pregnancy laparoscopic procedures remain controversial due to the potential impact of carbon dioxide pneumoperitoneum on fetal organogenesis. Traditional first-trimester open procedures are, however, associated with a fetal loss of 1.1% with appendectomy [7] and 12% with cholecystectomy [3]. Initial first-trimester laparoscopic reports have been encouraging [2, 4, 5, 8]. The operations have been successfully accomplished without fetal loss and subsequent delivery of healthy normal infants. We would like to present two first-trimester cases, an appendectomy and cholecystectomy, the second involving a twin pregnancy.

### Case reports

#### Case report I

A 30-year-old woman (gravida 3, para 1, abortus 1) presented at 8 weeks of gestation with sudden acute right lower quadrant pain. Her medical history was pertinent for recurrent symptomatic Crohn's disease. Physical examination revealed a temperature of 99.0°F and significant localized abdominal pain. WBC was 4,600/mm<sup>3</sup>. Appendicitis was the primary preoperative diagnosis. Surgical options were discussed. These included either a standard open surgical approach with known organogenesis anesthetic risk and a 2% risk of fetal loss, or a laparoscopic approach which could

provide a more complete diagnostic evaluation, treatment, and quicker recovery, but with less known risk of organogenesis and fetal loss as a result of carbon dioxide pneumoperitoneum. Informed consent was obtained for laparoscopy. ASA class was 3E. Cefotetan was given as antibiotic prophylaxis. Sequential compression stockings were placed. Laparoscopy was initiated following general endotracheal anesthesia (GETA) using propofol, succinylcholine, fentanyl, mivacurium, and isoflurane. A Hassan port was placed with an open cutdown technique due to previous abdominal procedures. Pneumoperitoneum was maintained with carbon dioxide for an average intraabdominal pressure of 15 mmHg and an end-tidal carbon dioxide of 28–33 mmHg. O<sub>2</sub> saturation was 96–99%. Arterial gases were not obtained. Laparoscopy revealed a recent right ovarian cyst rupture. Active Crohn's disease was not noted. The appendix was removed via a suprapubic port placed under direct vision. It was normal on final pathology. The procedure lasted 1 h. Transvaginal ultrasound fetal evaluation performed preoperatively and 48 h postoperatively documented a continued viable intrauterine pregnancy. Droperidol, ketorolac, morphine, and acetaminophen were given in the initial postoperative period. The patient was transitioned to oral oxycodone and hydrocodone. The patient was discharged on the 1st postoperative day. She had an uneventful pregnancy and delivered at 37 weeks' gestation by elective cesarean section. The baby was healthy, weighing 7 lb 0 oz and having Apgar scores of 7 at 1 min and 9 at 5 min. Mother and child enjoy good health.

#### Case report II

A 31-year-old woman (gravida 6, para 3, abortus 2) was referred at 8.5 weeks' gestation with symptomatic cholelithiasis. This was causing nausea and weight loss, threatening her twin pregnancy. She was afebrile with only minimal right upper quadrant pain. Laboratory values were normal. Multiple gallstones were documented by ultrasound. Informed consent included discussion of open surgical technique, with known anesthetic risk and 10% risk of fetal loss, or a laparoscopic approach with benefits of a short procedure and quick recovery but with less known risk of effect of carbon dioxide pneumoperitoneum on organogenesis or fetal loss. ASA class was 3, cefotetan was administered, and pneumatic stockings were placed preoperatively. GETA was initiated using fentanyl, thiopental, atracurium and isoflurane. Laparoscopic cholecystectomy was performed using a Veress needle to create a pneumoperitoneum (average insufflation—12 mmHg, O<sub>2</sub> saturation 96–99%; average endtidal CO<sub>2</sub>—30 mmHg). Arterial gases were not obtained. A cholangiogram was not performed as the biliary anatomy was straightforward; the procedure took 0.5 h. Postoperative medications were droperidol, demerol, and hydrocodone. Preoperative and 48-h postoperative transvaginal ultrasound fetal evaluation was unremarkable. The patient was discharged on the 2nd postoperative day; her appetite improved and she gained 30 lb over the next 23 weeks. An emergency cesarean section was performed at 31 weeks' gestation for a bleeding placenta previa. Twin "A" was born weighing 3 lb 15 oz and had Apgar scores of 7 at 1 min and 8 at 5 min. He required ventilator support

for 1 week following delivery. Twin "B," weighing 4 lb 0 oz, had Apgar scores of 7 at 1 min and 8 at 5 min and needed continuous positive airway pressure after birth. All are now well.

## Discussion

Pregnancy is no longer considered an absolute contraindication to laparoscopic procedures. Laparoscopy is now being used cautiously for nonobstetrical emergent and urgent indications despite potential adverse complications. Although most frequently performed in the second trimester, first-trimester-pregnancy operations have been reported. First-trimester gynecologic procedures have included treatment of adnexal torsion [5], and treatment of an ectopic pregnancy complicating a concomitant intrauterine one (B. Albrecht, personal communication). Laparoscopy was also used to diagnose appendicitis in first-trimester patients [8]. Open appendectomies were then successfully performed. A first-trimester laparoscopic appendectomy is now being described. Three cases of first-trimester laparoscopic cholecystectomies have been published, including one successfully treating acute cholecystitis [2, 4, 6]. Increased fetal loss has been reported following nonobstetric second- and third-trimester laparoscopic procedures [1]. Abnormal fetal organogenesis has not been observed.

Most surgeons employed a Veress needle for first-trimester insufflation. Intraoperative fetal monitoring was not performed during the first trimester, although transvaginal ultrasound fetal heart monitoring could be used after approximately 8 weeks' gestation. End-tidal carbon dioxide measurements were used to monitor maternal, and thereby indirectly fetal, carbon dioxide levels during each procedure. More precise arterial gas monitoring was not utilized.

The abnormal fetal heart rhythms and excessive maternal end-tidal carbon dioxide levels which would mandate laparoscopic procedure termination have yet to be determined.

During the first trimester of pregnancy laparoscopic procedures may have undetermined complications; however, most initial case reports reveal safe outcome. Long-term safety needs to be established. Further study should include both experimental animal models to better understand the fetal physiologic effects of laparoscopy and formation of a laparoscopy-in-pregnancy registry.

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