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Case Report

# *In vitro* fertilization complicated by rupture of tubo-ovarian abscess during pregnancy

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ABSTRACT

*Objective:* Pelvic abscess during pregnancy is an uncommon complication, but can lead to adverse perinatal outcomes during pregnancy.
*Case report:* We present a patient who developed rupture of a tubo-ovarian abscess during pregnancy following *in vitro* fertilization and embryo transfer. Thirty-eight reported cases are reviewed, and transvaginal oocyte retrieval, genital tract infections, endometrioma, and previous pelvic surgery are considered as risk factors for pelvic abscess during pregnancy.
*Conclusion:* Prolonging gestational duration when an infection situation is allowed is the principle of treatment.


## Introduction

The development of a pelvic abscess during pregnancy is rare and often missed during clinical practice. It can lead to adverse pregnancy outcomes, such as spontaneous pregnancy loss, preterm birth, premature rupture of membranes, chorioamnionitis, perinatal infection, and even fetal and maternal death [1]. It is important for clinicians to know the risk factors, characteristics, and treatment for pelvic abscess during pregnancy [2].

## Case Report

The patient was a 33-year-old woman, gravid 2, para 0, who presented to the emergency room at a gestation of 31 weeks and 2 days with lower abdominal pain for 8 hours. In August 2013, she received ultrasound-guided transvaginal oocyte retrieval (TVOR) and embryo transfer for bilateral tubal obstruction. She received no prophylactic antibiotics after *in vitro* fertilization therapy. Thirty days after the embryo transfer, an ultrasound examination confirmed a twin pregnancy that was appropriate for the gestational age. At 31 weeks and 2 days gestation, the patient presented to our emergency room with sudden onset of severe left lower quadrant abdominal pain, nausea, and vomiting. On admission, she had a temperature of 37.4°C. An abdominal examination revealed marked generalized tenderness, rebound tenderness, guarding and palpable uterine contractions, which lasted 20–25 seconds and occurred at a frequency of one in 15 minutes. A pelvic ultrasound (Figure 1) revealed a 6.7 cm × 5.6 cm × 5.1 cm diameter solid and cystic mass with an irregular contour in the left adnexal region and two intrauterine fetuses. There was a moderate amount of free fluid in the cul-de-sac. At this point, a diagnosis of threatened premature labor and torsion and rupture of the left adnexal mass was suspected. Magnesium sulfate treatment was started for threatened preterm labor, and dexamethasone was administered to enhance fetal lung maturity.

Her condition aggravated after admission. After 8 hours of admission, the patient began to fidget and her abdominal pain increased in severity. Her blood pressure dropped to 85/40 mmHg, pulse rate accelerated to 140–150/min, and her temperature was 39.8°C. The fetal heart rates were 176 beats/min and 182 beats/min. Uterine contractions that lasted 20–25 seconds and occurred at a frequency of 5–7 minutes were recorded. A routine blood test showed that the white blood cell count was 18.54 × $10^9$/L, with 86.3% granulocytes. The presumptive diagnosis of fetal distress, acute peritonitis, and septic shock was made. The patient underwent an emergent exploratory laparotomy and cesarean section to terminate gestation. Soon after the abdominal cavity was reached, ~1000 mL of yellow, odorless pus in the abdominal space was observed. The uterus was hyperemic and covered with purulent

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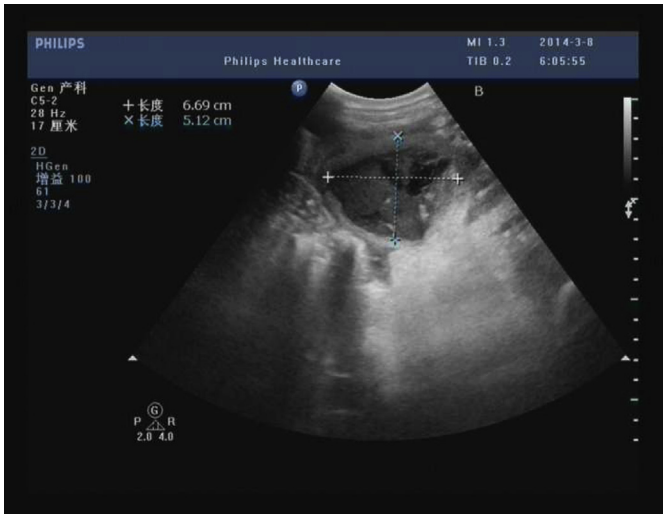


**Figure 1.** A 6.7 cm × 5.6 cm × 5.1 cm diameter solid and cystic mass with an irregular contour was revealed in the left adnexal region.

exudate. A cesarean section was performed, and healthy male twins were delivered. The color and clearness of the amniotic fluid was normal. The right fallopian tube was hyperemic and edematous, and the fimbria was open. The right ovary was hyperemic and 4 cm × 4 cm × 3 cm in diameter. A left adnexal mass, which was approximately 12 cm × 10 cm × 10 cm in diameter, was hyperemic and covered with pus. The mass arose from the left ovary, and normal ovarian tissue was missing. There was a rupture site in the mass, the length of which was 8 mm. Pus could be easily extruded from the mass. The left fallopian tube was intumescent, hyperemic, and edematous. The appendix was normal. Left-sided salpingo-oophorectomy was performed. Pelvic drains were left *in situ*. A culture of vaginal secretions on admission grew *Escherichia coli* and *Streptococcus fecalis*. *Streptococcus fecalis* grew in the culture obtained from the peritoneal fluid. Histopathological examination showed chronic purulent inflammation, pyosalpinx, and perisalpingitis in the left tube. Chronic purulent inflammation was observed in the left ovary.

Intravenous antibiotics were administered for 14 days postoperatively according to the drug sensitivity test and all drains were removed on postoperative Day 10. The mother was discharged 2 weeks after delivery in a stable condition. Both premature infants were healthy and discharged 4 weeks after delivery.

## Discussion

The incidence of pelvic abscess during pregnancy is rare. A systematic search was performed in the PubMed database from 1954 to July 2014. The following search term was applied to all published English articles: "(pelvic abscess OR tubo-ovarian abscess OR ovarian abscess) AND (gestation OR gestational OR pregnant OR pregnancy)". The bibliographies of relevant articles were also hand-searched to identify further potentially eligible studies. A total of 38 cases of pelvic abscess during pregnancy were revealed in our literature review (Table 1) [1–36]. To provide a reference for clinical practice, we reviewed the etiology, clinical characteristics, and treatment of pelvic abscess during pregnancy.

### *Etiology and risk factors*

During pregnancy, the immune status of pregnant women alters, which is necessary to allow mothers to tolerate genetically different fetal tissues [30]. However, when pregnant women with a suppressed immune system have risk factors during pregnancy, infection is more likely to recur or disseminate, and symptoms are hard to notice. Risk factors associated with the development of pelvic abscesses during pregnancy are summarized as follows (Table 1). (1) TVOR is considered a risk factor for the formation of a pelvic abscess during pregnancy. During TVOR, vaginal microorganisms may inoculate into the impaired ovary, or bacteria from a preexisting pelvic infection may be reactivated and disseminate into the impaired ovary [36,37]; (2) reactivation of chronic pelvic inflammatory disease or appendicitis during pregnancy is another risk factor for abscess formation [28]; (3) the bloody content of the endometrioma may serve as a culture medium for bacteria and facilitate the spread of infection [38]. The pseudocapsule of the endometriomata may prevent antibiotics from overcoming bacteria [28]. In addition, endometriosis may increase the risk of abscess formation, because locally impaired immunity in the pelvic cavity makes the patient vulnerable to infection [39]; (4) women with previous pelvic surgery are more likely to develop a pelvic abscess during pregnancy; and (5) lower genital tract infections may ascend and result in a pelvic abscess.

### *Symptoms and diagnosis*

According to the 38 reviewed cases of pelvic abscess during pregnancy, the time of symptom onset is highly variable, ranging from 5 days to 287 days of gestation (mean, 116.5 days; standard deviation, 73.2 days). The symptoms of pelvic abscess during pregnancy are variable, mainly including abdominal pain, fever, peritoneal irritation, vomiting, nausea, and abnormal vaginal discharge. An ultrasound usually reveals a cystic mass, or solid and cystic mass in the adnexal region. Free fluid may be observed by ultrasound as well. A computerized tomography scan and magnetic resonance imaging can be performed if necessary [23]. The pathogens of pelvic abscess during pregnancy are variable (Table 1). *Escherichia coli* (9/38, 23.7%) and *Peptostreptococcus* species (9/38, 23.7%) were the most commonly found microorganisms in pelvic abscesses.

In the present case, a culture of her vaginal secretion grew *Streptococcus fecalis*, which was the same as the culture of peritoneal fluid. We assumed that microorganisms of the vagina may inoculate into the impaired ovary when TVOR was performed and lead to the formation of a pelvic abscess. Furthermore, the suppressed immune system during pregnancy may have resulted in the reactivation of previous pelvic inflammation and increased the susceptibility to a subsequent pelvic abscess.

### *Treatment*

The treatment of pelvic abscesses during pregnancy is difficult. Prolonging gestational duration when an infection situation is allowed is the principle of treatment. Surgical interventions and antibiotic therapy are all choices for treatment. In 36 surgical cases, ultrasound-guided drainage was performed in five cases, with recurrence in two cases. Laparotomy with resection of the abscess occurred in 23 cases with recurrence in one case. Laparotomy/laparoscopy with aspiration or abscess drainage was performed in eight cases with recurrence in three cases. In our literature review, pregnancy loss occurred in 14 cases, 13 of which underwent surgical interventions. In one case, rupture of the left pyosalpinx occurred and acute peritonitis was treated with expectant management. The patient died of sepsis at 25 weeks' gestation.

Gjelland et al [40] reported that ultrasound-guided transperitoneal or transvaginal drainage of abscess allows antibiotics to control the infection more effectively. The reported incidence of a residual abscess requiring further surgery despite repeated