



Case Report

Acute abdomen in early pregnancy due to ovarian torsion following successful *in vitro* fertilization treatment

Hsing-Chun Tsai^a, Tian-Ni Kuo^a, Ming-Ting Chung^a, Mike Y.S. Lin^a, Chieh-Yi Kang^a, Yung-Chieh Tsai^{a, b, c, *}

^a Center for Reproductive Medicine, Department of Obstetrics and Gynecology, Chi-Mei Medical Center, Tainan, Taiwan

^b Department of Sports Management, Chia Nan University of Pharmacy and Science, Tainan, Taiwan

^c Department of Medicine, College of Medicine, Taipei Medical University, Taipei, Taiwan

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ABSTRACT

Objective: Ovarian torsion is an acute abdomen requiring prompt intervention. Ovarian torsion seldom occurs during pregnancy. However, with *in vitro* fertilization (IVF) treatments, ovarian hyperstimulation may increase the size of the ovaries and result in the occurrence of adnexal torsion. Here, we report two cases of ovarian torsion after IVF and discuss the optimal management of this emergency medical condition.

Case Report: The first case was a 23-year-old woman who received IVF–embryo transfer due to tubal factor infertility. Sudden-onset, lower abdominal pain developed at the 6th week of pregnancy. Conservative treatment with antibiotics was the initial approach, but a right oophorectomy had to be performed due to right ovarian torsion with hemorrhagic and gangrenous changes. The second case was a 38-year-old woman diagnosed with bilateral ovarian torsion at 8 weeks' gestation due to the sudden onset of low abdominal pain. Laparoscopy was arranged immediately after the diagnosis was confirmed. The left ovary was successfully preserved due to prompt intervention. Both pregnancies continued without problems after surgery.

Conclusion: Ovarian hyperstimulation during IVF–embryo transfer treatment is a risk factor for developing adnexal torsion. Early diagnosis and prompt surgical intervention is the only way to protect the ovary and preserve the pregnancy. Laparoscopic surgery in early pregnancy causes no harm to the fetus and should be encouraged once the diagnosis is confirmed. Delaying surgery may induce serious infection and jeopardize the lives of both the fetus and mother.

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Introduction

Ovarian torsion comprises ~2.7% of surgical emergencies in women, and 80% of these instances occur during reproductive age [1]. Ovarian torsion is rare during gestation, developing in only one in 5000 pregnancies. Most ovarian torsion in pregnancy occurs in the first trimester or in the puerperium [2,3]. Since early diagnosis and intervention lead to a better outcome for the mother and fetus, ovarian torsion should be suspected for all acute abdominal pain during pregnancy.

Infertility is a common problem in women of reproductive age. When natural conception has been unsuccessful, artificial insemination by husband (AIH) and *in vitro* fertilization with embryo transfer (IVF-ET) are usually performed. Today, controlled ovarian hyperstimulation has become a standard protocol for AIH and IVF-ET. Although superovulation can increase the chance of pregnancy by increasing the number of oocytes, it also raises the possibility of developing ovarian hyperstimulation syndrome (OHSS) and, thereafter, adnexal torsion [4–6]. Once pregnant, the persistent secretion of human chorionic gonadotropin from the placenta may further stimulate the ovaries and increase the risk of ovarian torsion. Here, we report our experience managing ovarian torsion in early pregnancy after IVF treatment.

* Corresponding author. Center for Reproductive Medicine, Chi Mei Medical Center, 901 Chung Hwa Road, Yung-Kang City, Tainan 71010, Taiwan.

E-mail address: yung0613@ms2.hinet.net (Y.-C. Tsai).

Case Reports

Case 1

A 23-year-old woman, gravida 1, para 0, pregnant in the 6th week of gestation after IVF-ET treatment, was admitted to our hospital due to acute lower abdominal pain. The ovulation stimulation was the standard long protocol as described in previous reports [7]. A total of nine oocytes were harvested and three embryos were transferred into the uterine cavity on the 3rd day after the oocyte retrieval. She received progesterone (Utrogestan) 600 mg/d as luteal support and cabergoline (Dostinex) 0.5 mg/d to prevent ovarian hyperstimulation. She returned to our clinic 1 week after ET due to abdominal fullness and distension. Transvaginal sonography at the 6th week of gestation showed enlarged bilateral ovaries with mild ascites, and three intrauterine sacs all with fetal cardiac activity.

However, she presented to our emergency room with sudden-onset, lower abdominal pain at the 6th week of gestation. Her physical examination revealed lower abdominal tenderness with muscle guarding and rebounding, especially at the right lower quadrant of the abdomen. Pelvic examination revealed right adnexal tenderness with a palpable mass and no motion tenderness. She had no nausea or vomiting. Transvaginal ultrasound showed bilateral enlarged ovaries (left: 5 cm × 4 cm × 4 cm; right: 10 cm × 7 cm × 6 cm), with the right ovary located superior to the uterus. Cardiac activity was noted in all three intrauterine fetuses, and there was scanty fluid accumulated in the cul-de-sac. Laboratory data showed mild leukocytosis (white blood cell count: 12,400/ μ L) and mild C-reactive protein elevation (5.9 mg/L). Mild ovarian hyperstimulation with right ovarian torsion was suspected after evaluation. Conservative treatment with analgesics was given initially, but without improvement 4 hours later. Explorative laparoscopy was then performed and revealed an enlarged right ovary, 10 cm × 5 cm in diameter, with torsion for two rounds over the pedicle. A right oophorectomy was done due to the hemorrhagic and gangrenous changes (Figure 1). The postoperative course was uneventful and the patient was discharged on Postoperative Day 1. The final pathological report confirmed a necrotic right ovary. She received progesterone 8% gel until the end of the first trimester and had transabdominal fetal reduction at the 11th week of gestation due to the triplet pregnancy. The pregnancy continued uneventfully.

Case 2

A 38-year-old woman, gravida 3, para 2, had IVF-ET treatment for unexplained factor infertility. Ovulation stimulation was the standard long protocol. A total of six oocytes were picked up and three embryos were transferred into the uterine cavity on the 3rd day. She received progesterone (Utrogestan) 600 mg/d as luteal support. Ultrasound at the 6th week of gestation revealed one intrauterine sac with a viable embryo.

She presented to our emergency room with sudden-onset, right lower abdominal pain at the 8th week of gestation. Her physical examination revealed right lower abdominal tenderness with muscle guarding and rebounding. Transvaginal ultrasound showed bilateral enlarged ovaries (left: 7.3 cm × 5.5 cm, right: 8 cm × 7.7 cm) with scanty ascites. Fetal cardiac activity was present and the crown-rump length was 14 mm. Laboratory data showed leukocytosis (white blood cell count: 15,400/ μ L) and elevated C-reactive protein (9.8 mg/L). Right ovarian torsion was suspected and the patient improved after antibiotics and analgesics treatment. However, 2 days later, the laboratory data still showed leukocytosis (white blood cell count: 15,500/ μ L) and elevated C-

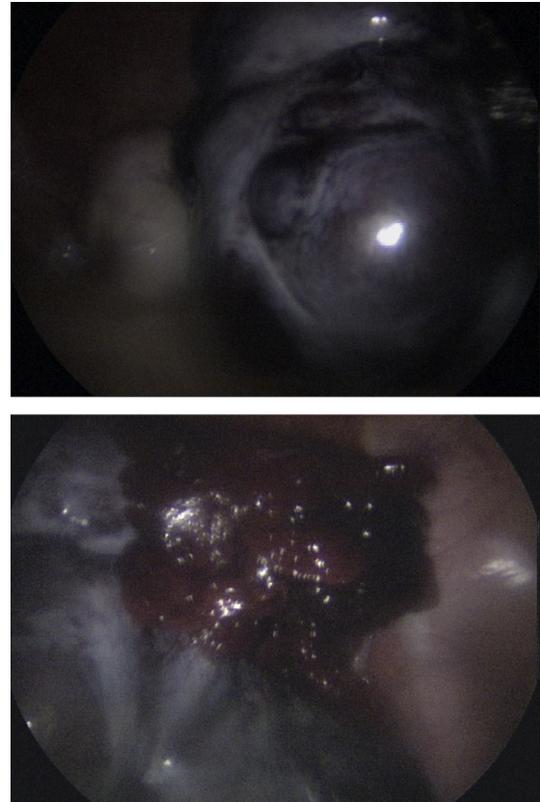


Figure 1. Right ovary is enlarged with torsion at the pedicle for two rounds. Laparoscopic right oophorectomy is ultimately performed due to hemorrhagic and gangrenous changes.

reactive protein of 91.1 mg/L. Laparoscopic surgery was performed due to deterioration of the clinical condition. During the operation, the right ovary, measuring 8 cm × 8 cm in diameter, was seen to be twisted for two rounds with hemorrhagic and gangrenous changes, so right salpingo-oophorectomy was performed. The left ovary was also twisted but without ischemic change, so unwinding of the left adnexa was done (Figure 2). The postoperative course was uneventful, and the patient was discharged on Postoperative Day 1. The pregnancy continued without a problem.

Discussion

Ovarian torsion during pregnancy is a rare but serious condition. Delayed treatment may produce fatal consequences for both the mother and fetus. The highest incidence of torsion during pregnancy is in the first trimester, but occurrences in the second and third trimester have also been reported [2,3]. Ovarian torsion usually results from twists in both the infundibulopelvic and ovarian ligaments, which can compress the ovarian vessels and induce adnexal tissue ischemia and necrosis. Right ovarian torsion happens more frequently than left due to its longer ovarian ligament and the presence of the sigmoid colon at the left adnexa, which may prevent torsion in the left ovary.

Traditional risk factors for ovarian torsion are increased ovarian size, ovarian tumors, ovarian hyperstimulation, and pregnancy. Among which, ovarian size is considered to be one of the most important factors. An ovarian mass measuring 6–8 cm is most likely to undergo torsion, although torsion has occurred in women with masses that were 10–20 cm [8,9].

Currently, it is not uncommon to use ovulation induction for infertility treatments. In order to achieve a better pregnancy rate,

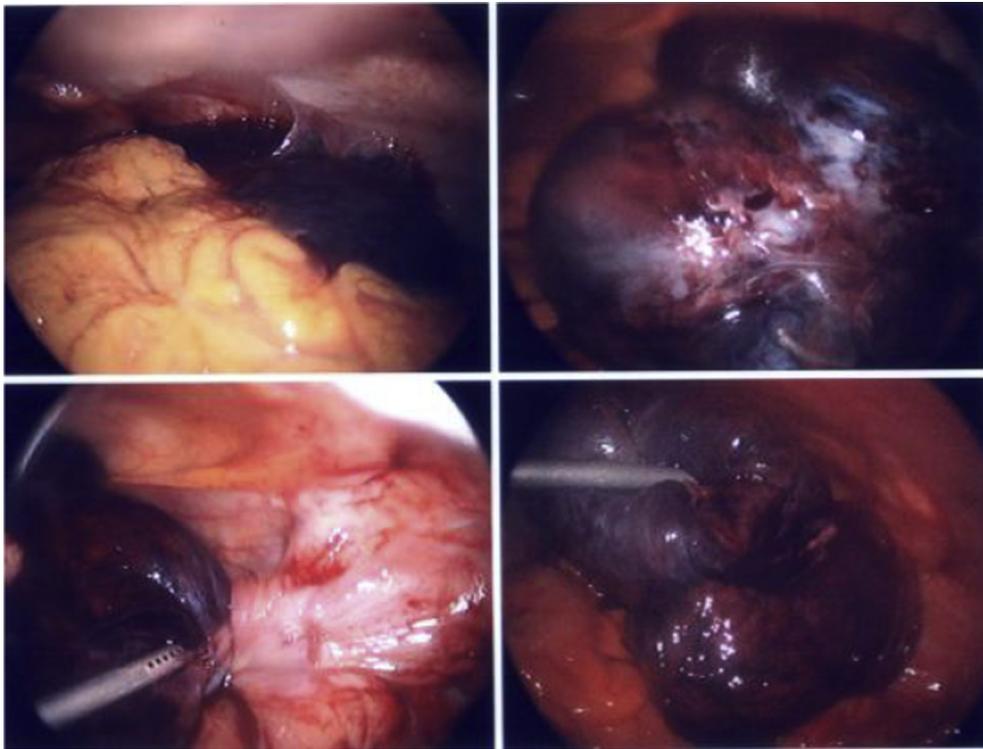


Figure 2. Bilateral ovaries are enlarged with torsion. Right ovary shows necrotic and ischemic changes.

ovarian hyperstimulation for more oocytes before AIH or IVF is the standard regimen. These multiple, stimulated follicular cysts can increase the volume of the ovary and predispose the ovary to torsion. The estimated rate of ovarian torsion after IVF treatment has been reported as 0.025–0.2% [10]. However, the risk increased if the patient had OHSS or if the patient was pregnant [4,5,11]. Especially in patients with OHSS, the excessively enlarged ovarian size coupled with the presence of ascites to facilitate ovarian mobility and increase the chance of torsion.

The clinical symptoms and signs of ovarian torsion are nonspecific, but the typical presentations include abdominal/pelvic pain, nausea, vomiting, fever, and leukocytosis. Gray-scale ultrasound combined with Doppler is a useful first-line diagnostic modality. Under gray-scale ultrasound, an enlarged ovary located between the uterus and the bladder is the most consistent finding. Doppler ultrasound can evaluate the presence of blood flow. If there is an absence of arterial and venous flow, a nonviable ovary is suggested [12,13].

Although conservative treatment has been proposed in patients with adnexal masses during pregnancy [14,15], surgical intervention is the treatment of choice once ovarian torsion is highly suspected [3,8,16]. Oophorectomy was once routinely performed even if there were no ischemic signs, to prevent thromboembolism after untwisting the torsion. Today, detorsion of the twisted ovary is considered safe if the ovary appears viable without ischemia and necrotic changes. According to our experience and previous reports, the best time for surgical intervention is within 24 hours of the diagnosis. Laparoscopy is preferable to laparotomy in early pregnancy because there is less postoperative pain, a smaller wound, shorter hospital stay, and rapid recovery [3].

However, there are some special considerations when performing laparoscopy in early pregnancy. First, due to uterine enlargement, positioning the Verres needle and the trocars should be done more carefully [6]. Although previous reports have demonstrated that laparoscopic surgery during early pregnancy is

safe both for the mother and the fetus, there is always a concern that increased abdominal pressure will result in decreased uterine blood flow due to vascular compression. Therefore, it is important to keep the intra-abdominal CO₂ pressure as low as possible during the operation to prevent the insufflation effect of CO₂. Routine prophylactic tocolysis is not suggested. However, if an oophorectomy is performed, progesterone supplementation is recommended until the 12th week of gestation.

While ovarian hyperstimulation for more oocytes before AIH or IVF is standard, suboptimal excess ovulation induction may induce OHSS and increase the chance of torsion. When the risk of torsion is taken into account, the risk and benefit ratio of hyperstimulation should be reconsidered. Individualized and mild stimulation may decrease the risk of ovarian torsion and bring other advantages such as decreased cost, decreased instances of OHSS, and better patient tolerance.

Considering the increased number of IVF pregnancies, ovarian torsions are likely to become more common than in the past. Early diagnosis and appropriate surgical management of adnexal torsion is the only way to prevent complications and preserve the pregnancy. Laparoscopic surgery in early pregnancy causes no harm to the fetus and should be encouraged once the diagnosis is confirmed. Delaying the operation may induce serious infection and jeopardize both the fetus and the mother. Mild ovarian stimulation should be considered to decrease the risk of ovarian torsion.

Conflicts of interest

The authors have no conflicts of interest relevant to this article.

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