

Hysterectomy in the Second Trimester of Pregnancy after *In vitro* Fertilization-embryo Transfer: A Case Report and Analysis of Its Risk Factors

Chan-Wei Jia, Yan-Min Ma, Shu-Yu Wang

Reproductive Centre, Beijing Obstetrics and Gynecology Hospital, Capital Medical University, Beijing 100026, China

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In vitro fertilization-embryo transfer (IVF-ET) is an effective method and an elective procedure to treat infertility caused by various factors, for example, endometriosis, tubal obstruction, and polycystic ovary syndrome. However, this technique leads to a higher rate of complications and are therefore always iatrogenic such as ovarian hyperstimulation syndrome, thrombosis, multiple pregnancy, adnexal torsion, pelvic inflammatory disease (PID), which may threaten fetal or maternal well-being during the whole pregnancy.^[1]

Hysterectomy during pregnancy is a disaster for women, especially who are in reproductive age. Here, we reported a case of hysterectomy because of septic shock and disseminated intravascular coagulation (DIC) resulting in refractory obstetric hemorrhage following repeated operation involving pelvic and uterine cavity after IVF-ET.

CASE REPORT

A 35-year-old woman, gravida 3, para 0, with a history of 4-year infertility due to adenomyosis resorted to IVF for the treatment of her infertility. Her past medical history suggested that she once underwent amnion cavity acrinol-induced labor. The patient was treated with 3.75 mg intramuscular injections of a slow-release gonadotropin-releasing hormone agonist during menstrual period. Thirty days later, she began the control ovulation stimulation with HP-HMG 225 IU/day for 12 days. Two embryos were transferred 3 days after the aspiration of ten oocytes and vaginal administration progesterone 0.6 g/day for luteal support started on the day of oocyte retrieval.

Triplet (one monozygotic twin and one singleton) was found by ultrasound test at 35 days after transfer, and

ultrasound-guided selective pregnancy reduction for monozygotic twin was performed.

During the 13th week of pregnancy, ultrasound test indicated that fetal nuchal translucency was 4.6 mm, its forearms and wrist joints being abnormal and that single umbilical artery was found. During the 18th week of pregnancy she was hospitalized in the Department of Perinatology in our hospital for testing the genetic factor of fetal malformation and then artificial abortion. Umbilical cord blood samples were tried to gain for genetic analysis, and labor induction by injecting rivanol into amniotic cavity was tried to carry out but both failed because of the position of fetus and oligohydramnios. In next day afternoon, physical examination indicated that she had a fever, with the highest temperature of 40°C, and right upper quadrant tenderness without rebound. The patient was administrated antibiotic and carboprost to induce labor. However, after delivery of the fetus, the patient continued to be febrile and became hypotensive on account of postpartum hemorrhage. Blood test indicated HBG: 84 g/L, white blood cell: $14.61 \times 10^9/L$, platelet: $81 \times 10^9/L$, and D-D: 135,337 ng/ml. Blood pressure was 79/41 mmHg. All these symptoms and signs implicated that the patient could be diagnosed as septic shock, DIC, and hemorrhagic shock. Hence, the patient was transferred into Intensive Care

Address for correspondence: Dr. Shu-Yu Wang,
Reproductive Centre, Beijing Obstetrics and Gynecology Hospital, Capital
Medical University, Beijing 100026, China
E-Mail: yushu572000@126.com

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Unit to carry out a total abdominal hysterectomy for septic shock and intractable obstetric hemorrhage. The results of the pathologic examination revealed endometritis and uterus cellulitis. Moreover, she was continuously administrated to antibiotics for the management of infection. When the patient recovery from infection, she underwent the surgery of abdominal debridement and suturing. Sixteen days later, she recovered well from that procedure and discharged from the hospital and did not have any postoperative problems.

DISCUSSION

A peripartum hysterectomy is the most severe issue in obstetrics. It means a disastrous end to a pregnancy and a fertility end for a woman. The cause of a peripartum hysterectomy is majorly due to intractable life-threatening obstetric hemorrhage. The incidence of emergency peripartum hysterectomy ranged from 0.20 to 5.09 per 1000 deliveries with a median incidence rate of 0.61 per 1000 deliveries.^[2] Cromi *et al.* found that Assisted Reproductive Technology (ART) history leads to a greater than five-fold increase in the odds of having a peripartum hysterectomy to control hemorrhage.^[3] Healy *et al.* reported that the possible factors of obstetric hemorrhage in the IVF/intracytoplasmic sperm injection patients, showing associations with fresh ETs in stimulated cycles, endometriosis, and hormone treatments, were the events around the time of implantation being responsible, and suboptimal endometrial function being the critical mechanism.^[4]

Review of the literature shows the facts that the pyometra after ovum retrieval, uterine rupture following successful tubal blastocyst transfer after laparoscopic cervical cerclage and placenta accreta causing uterine rupture in the second trimester of pregnancy after IVF resulted in hysterectomy. Hence, infection and hemorrhage was the main cause for hysterectomy after ART.

In our case, the patient, with a history of two-time spontaneous abortion, resorted to IVF was to some extent at the high risk of infection and peripartum hemorrhage because, on one hand, the second time abortion of the patient was missed abortion and then curettage had been carried out which may cause residue placenta in later delivery; on the other hand, the patient with adenomyosis was at the increased risk of infection after IVF treatment. Moreover, many factors may contribute to the situation of this patient. First, repeated pelvic operation: (1) transvaginal oocyte retrieval; (2) transvaginal selective pregnancy reduction; (3) transabdominal umbilical cord blood sampling cordocentesis; and (4) abortion by rivanol injected in amniotic cavity. Second, the patient had the history of two-time spontaneous abortion, especially missed abortion. Third, the patient suffered adenomyosis, which was reported more likely to develop PID or tubo-ovarian abscess and severe maternal morbidities such as eclampsia and

peripartum hysterectomy following infertility interventions, particularly IVF treatment,^[5] which may have increased this patient's susceptibility.

Vaginal discharge sample was not cultured except conventional test such as bacterial vaginosis, trichomonas, and monilial vaginitis. After delivery of the fetus, *Escherichia coli* was found during the culture of vaginal discharge sample and also found during the culture of uterine discharge sample after hysterectomy.

The commonly found microorganisms are *E. coli*, *bacteroides fragilis*, *Enterococcus*, and *Peptococcus* after transvaginal oocyte retrieval and other transvaginal operation.

Because the fetus was found multiple malformation, the patient wanted to testing karyotype of the fetus by umbilical cord blood samples, which was failed on account of too fine umbilical cord and the unfavorable position of the fetus. Although the patient was carried out a conventional amniocentesis, several tries were failed due to the unfavorable position of fetus and oligohydramnios. All these operations may result in infection disease except oocyte retrieval and selective pregnancy reduction. Therefore, we should get skin samples for DNA test after delivery instead of umbilical cord blood samples for karyotype analysis.

In summary, to avoid such serious infection, patients should be very prudent to repeated pelvic operation, especially those with endometriosis following IVF-ET.

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Conflicts of interest

There are no conflicts of interest.

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