

Case Report

Anesthetic Management of Heterotopic Pregnancy for Emergency Exploratory Laparotomy

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ABSTRACT

Heterotopic gestation is an uncommon entity with natural conception but has increased in recent years due to assisted reproduction techniques. Sometimes it causes maternal morbidity and occasional fetal mortality. It possess a great challenge for anesthetist to manage ruptured heterotopic gestation as both maternal and fetal safety are at risk. We are reporting a case of 25 years old G₂P₀A₁L₀ who presented to us at 8 weeks of pregnancy with complain of persistent lower abdominal pain for 5 days. Subsequently her pain was increasing in intensity and spreading to whole abdomen. On admission ultrasound revealed single living intrauterine pregnancy with a heterogeneous mass on left adnexal region. Then she underwent diagnostic laparotomy and successfully managed with the left sided salpingectomy. In anticipation of hemorrhage, general anesthesia was administered with the use of multiple large bore intravenous accesses. The patient's condition remained stable throughout the procedure, with moderate blood loss effectively managed through the administration of crystalloid fluids, blood products, and tranexamic acid. As a result, the patient experienced an excellent recovery. She was extubated immediately in operating room and was discharged on post-operative day 4 with no issue. She delivered a healthy baby at 36 weeks of gestation via cesarean section without further complication.

Key word: Heterotopic pregnancy, Ectopic pregnancy, Ultrasonography, Obstetrics anesthesia.

INTRODUCTION

Heterotopic pregnancy defined as simultaneous presence of intrauterine and ectopic pregnancy. It is rare condition in natural conception but due to the use of artificial reproductive technique the incidence is increasing. Most of extrauterine pregnancies are found in fallopian tubes but abdominal implantations have also been observed. The heterotopic pregnancy is reported incidence is 1 in 30000 pregnancies of natural conception. But the incidence of heterotopic pregnancy has been raised to approximately 1 in 100 to 1 in 500 pregnancies of using artificial reproductive technique.¹ Additional significant risk factors associated with the development of

heterotopic pregnancy include a family history of multiple pregnancies, elevated levels of fetal hormones, tubal disease, and a history of pelvic inflammatory disease.² The present case represents a rare instance of heterotopic pregnancy complicated by hemoperitoneum.

CASE REPORT

A 25-year-old female with past medical history of hypothyroidism who was treated with thyroid hormone and became euthyroid during her pregnancy. It was her second pregnancy and she had a history of abortion during her first pregnancy. She was presented with lower abdominal pain for 5 days and she felt intense pain for last 12

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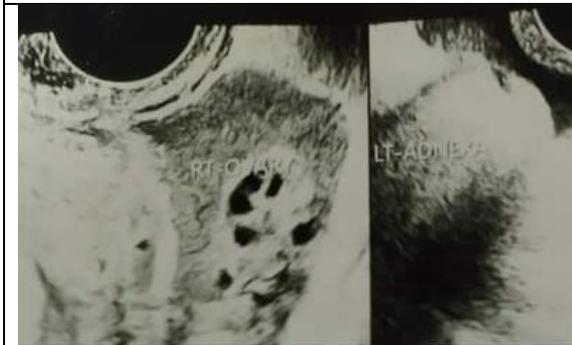
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hours. At presentation, she stated that she was pregnant for 8 weeks, she took ovulation induction drug before her pregnancy. Her quantitative β -HCG level was 16696 mIU/mL confirming pregnancy. Initial ultrasonography finding showed single live intrauterine pregnancy of about 7 weeks and 6 days (Photograph 1), fetal heart rate was 170 beats/min, a heterogeneous mass isolated on left adnexal region, free fluid



Photograph 1: Ultrasonogram at 7 weeks 6 days of gestation

collection in hepatorenal angle and pelvic region. A presumed diagnosis was rupture heterotopic pregnancy. Patient was scheduled for emergency laparoscopy. On pre-anesthetic evaluation patient was clinically pale, blood pressure was 110/70

mm (Hg), heart rate 115 beats/min, hemoglobin was 9.7 g/dl, platelet was 12600/ μ L, hTSH was 1.31 μ IU/mL. The general anesthesia was planned for urgent diagnostic laparoscopy. Anesthesia was induced after premedication with glycopyrronium bromide 0.2mg and fentanyl 75 μ g. Patient was preoxygenated with 100% oxygen. Induction was carried out with propofol 2mg/kg and intubation was done with suxamethonium 1.5 mg/kg. The patient was intubated with 7mm size cuffed endotracheal tube. The anesthesia was maintained with Oxygen: air by 60: 40 ratio, 0.4 MAC isoflurane and remifentanyl infusion 100-200 μ g/hour according to patient's hemodynamic status. Muscle relaxation of the patient was maintained by vecuronium bromide.

During laparoscopy, a ruptured left fallopian tube was observed, accompanied by active bleeding. The surgical view was significantly obstructed due to the substantial amount of bleeding, prompting the obstetric team to convert to an open laparotomy. The ectopic pregnancy was successfully removed, and a left salpingectomy was performed, along with the evacuation of hemoperitoneum.

The patient was stable throughout course of surgery and postoperative period. Adequate volume resuscitation along with ephedrine was done. She was resuscitated with 2 unit of packed red blood cell, 1000ml Hartman solution and 500 ml 6% hexa ethyl starch during operation period. One-gram tranexamic acid was given to controlled active bleeding from surgical site. At the end of surgery neuromuscular blockade was reversed and patient was extubated successfully. Fetal monitoring was done though post-operative period by ultrasonography. Multimodal analgesia was maintained by intravenous paracetamol injection and intramuscular pethidine

injection during post-operative period according to patient's condition. During post-operative period fetal's parameters are well, and no fetal abnormality was found. At the 36 week of pregnancy patient gave birth a healthy baby by cesarean section. There was no abnormality found in neonate and vital signs were within normal limit. The APGAR score of the neonate at 1 and 5 minutes was 10.

DISCUSSION

A ruptured heterotopic pregnancy requires careful consideration of maternal and fetal physiology, pharmacodynamic, pharmacokinetic in addition management of hypovolemic shock. In previous study showed that, on based on limited evidence the maternal and fetal outcome are no different in general and regional anesthesia.³ But for exploratory laparotomy in ruptured heterotopic pregnancy neuroaxial anesthesia is less suitable than general anesthesia due to patient's hypovolemic state.³

The principal goals of anesthetic management were to maintain maternal hemodynamic stability, preserving maternal ventilation and oxygenation to prevent fetal asphyxia during intra and post-operative period. Given the first-trimester pregnancy in this case, a major concern was to ensure that any drugs or techniques utilized during surgery did not interfere with normal embryological development or pose a risk of teratogenicity to the fetus.⁴ Our primary goal was to prioritize the safety and well-being of the developing fetus.

We prefer general anesthesia although regional anesthesia provide less fetal drug exposure, better airway security, lesser blood loss but it causes hypotension resulting from sympathetic nerve blockade,

which decrease uterine blood flow and perfusion to the fetus.⁵

Measures that were taken for maternal and fetal safety are discussed in the following section.

Aspiration prophylaxis and rapid sequence induction: As there was an increase the risk of regurgitation and aspiration due to decrease lower esophageal sphincter tone in pregnancy.⁶ We used proton pump inhibitor and antisialgogue such as glycopyrolate in premedication. We used RSI protocol for this purpose.

Maternal blood pressure: Prolong maternal hypoxemia causes utero-placental vasoconstriction which can decrease utero placental perfusion that can result fetal hypoxemia, acidosis and death.⁷ We used isotonic saline, colloid, Packed red cell along ionotropic agents to maintain normovolemia.

Maintaining normocapnia: Hypercapnia can cause uterine artery vasoconstriction and reduce uterine blood flow.⁸ we maintained ETCO₂ level 30-35 mm (Hg). We did ABG in preoperative period and took adequate measure to maintain pH within physiological limit. We kept insufflation pressure of CO₂ within 8 to 10 mm (Hg) to produce pneumoperitoneum of the patient during laparoscopy.

Avoid teratogenic anesthetic agent: We avoided the use of N₂O as it inhibits methionine synthetase which is necessary for DNA synthesis. Teratogenic effects are shown in animal studies after giving high concentration for long period.⁹ We used air as carrier gas instead of nitrous oxide and low dose remifentanyl infusion as analgesic during intra operative period. We avoided NSAID and benzodiazepine as these drugs may produce cleft palate and cardiac anomaly specially in 1st trimester.

CONCLUSION

This case was challenging for us as we were dealing with not one but two patients simultaneously. Our primary concern was maternal safety and our real success lay in an ongoing pregnancy and better fetal outcome. We ensured early diagnosis, early resuscitation, multidisciplinary team approach for better outcome of patient and fetus. So early diagnosis and timely management of heterotopic pregnancy may reduce the danger of life of mother as well as fetus.

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