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Anesthesia considerations and management in a case of abdominal pregnancy undergoing emergency laparotomy: A case report

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Abstract

Abdominal pregnancy is a very rare form of ectopic pregnancy associated with high mortality and morbidity of the mother as well as the fetus. It is often observed in developing nations with poor outcomes as in most cases there is fetal demise. We report a 28-year-old parturient diagnosed with abdominal pregnancy and shifted for an emergency laparotomy. General anesthesia was provided with multiple wide bore intravenous access in anticipation of hemorrhage. Our primary concern was maternal safety and the patient did extremely well with blood loss successfully managed with tranexamic acid, crystalloids, colloids and blood products. She was extubated postoperatively, was shifted to Critical care unit for 2 days for post operative monitoring and was discharged on post operative day 10.

Keywords: Ectopic pregnancy, abdominal pregnancy, obstetrics anesthesia, hemorrhagic shock

Introduction

Abdominal pregnancy is a very rare form of ectopic pregnancy where implantation of fertilized ovum occurs directly in the abdominal cavity. The prevalence of ectopic pregnancy is 1-2%, amongst that 95% occur in fallopian tube ^[1]. The incidence of abdominal pregnancy is even rare with incidence ranging from 1:1000 to 1:30,000 and mostly seen in developing nations ^[2]. First documented case of abdominal pregnancy was found in 1708 where the diagnosis was made based on excessive hemorrhage during a laparotomy ^[3]. Similar case reports showed the fatal risks associated with abdominal pregnancy as majority of cases resulted in extraction of the dead fetus with high rate of maternal mortality ^[4]. The maternal mortality rate associated with abdominal pregnancy is seven times higher than general ectopic pregnancy and 90 times greater than delivery in the third trimester. This presents a major challenge to anesthetists caring for these patients as the most common cause of death are hemorrhage and anesthetic complications ^[1]. Management of such pregnancy depends on gestational age and invariably involves surgical intervention i.e., laparoscopy or laparotomy. Due to the advancements and improved access to prenatal care, discovery of ectopic pregnancy earlier in the gestational period is more feasible that allows for careful planning and improved outcome. As this is rare and as there are lack of standard management for this condition, we present our anesthetic management of a patient diagnosed with abdominal pregnancy who underwent exploratory laparotomy for surgical removal of the abdominal pregnancy.

Case report

We report a case of 28-year-old female gravida 4, parity 3 and living 3. Patient was married for the past 9 years and came with 14 weeks of amenorrhea, with pain in abdomen, with severe anemia. The ultrasound report was suggestive of abdominal pregnancy showing an extra uterine gestation sac of 14.6 weeks in right hemipelvis. Patient had no history of infertility or use of any assisted reproductive technologies or any risk factor for ectopic pregnancy.

On pre anesthetic evaluation we had a lean thin patient with blood pressure of 104/62mm Hg and heart rate of 88/minute with pallor +++. On airway assessment, the patient had adequate mouth opening, no loose teeth, no caps or crowns and the Mallampatti grade I. there were no

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masses palpable in neck and the temporo-mandibular distance was 3 finger breadths. She was afebrile, heart and lung were clear on auscultation. There was severe generalized tenderness of the abdomen. All routine investigations showed hemoglobin of 4 gm/dl while all other investigations like renal and liver function tests, serum electrolytes, coagulation profile, blood sugar levels were within normal limits.

With high-risk consents for anesthesia and surgery from the patient and the spouse and confirming nil per oral, the patient was taken inside OT. Peripheral venous cannulation of 16G 18G and 20G were secured. Aspiration prophylaxis was given. Blood and blood products were reserved. Foley's catheterization was done for intraoperative urine output monitoring.

Pulse oximetry, electrocardiogram, non-invasive blood pressure and capnography was used for intraoperative monitoring.

We preoxygenated the patient for 4 minutes. We administered inj. Glycopyrrolate 0.004mg/kg, inj. Ondansetron 0.08mg/kg, inj. Midazolam 0.02 mg/kg and inj. Fentanyl 2 mcg/kg as premedication. Patient was induced using inj. Propofol 2 mg/kg and inj. Atracurium was used as muscle relaxant. Patient was intubated with 7.0 mm oral cuffed endotracheal tube. Oxygen: N2O in ratio 50:50 and sevoflurane were used as maintenance agent. One gram tranexamic acid was given before incision. During laparotomy, 1.5 litres of hemoperitoneum with 500 gm clots were evident with extrauterine fetus of 14 weeks.

Intraoperatively she was transfused 3 whole blood and 4 fresh frozen plasma before hemostasis was achieved. Urine output was around 1700ml. Arterial blood gas sample was sent. Intraoperatively, cardiothoracic surgeons were also present in case of need for embolization. The surgery concluded without any further complications. Inj. Paracetamol 1 gm iv infusion was administered for analgesia. Arterial Blood Gas report sent came to be normal. After completion of the procedure, as breathing attempts were good, reversal was given and patient was extubated. She was sent to critical care unit for monitoring.

Discussion

Abdominal pregnancy is an extremely rare obstetric emergency with limited literature discussing its surgical and anesthetic managements. This is mostly due to improved gestational control leading to early diagnosis and treatment to terminate the ectopic pregnancy.

There are two classified types of abdominal pregnancy

- **Primary abdominal pregnancy** is where implantation of fertilized ovum occurs directly in the abdominal cavity as seen in our patient.
- **Secondary abdominal pregnancy** occurs following an extrauterine tubal pregnancy that ruptures and gets re-implanted within the abdomen [5].

Abdominal pregnancy is often multifactorial, but common risk factors include previous ectopic pregnancy, endometriosis, pelvic inflammatory disease, advanced maternal age, assisted reproductive techniques, tubal occlusions, and multiparity [6]. Presenting clinical signs can be vague and include abdominal pain, vaginal bleeding, nausea, vomiting, general malaise, and the ability to easily palpate fetal parts on abdominal examination. It should be

noted that patients most commonly complain of abdominal or other gastrointestinal symptoms throughout pregnancy which should alert obstetricians for possible ectopic pregnancy [1].

The incidence of ectopic pregnancy has been noted to increase with maternal age, with patients over 44 years of age having five times higher risk compared to patients under 22 years of age. The diagnosis of abdominal pregnancy should be made early in pregnancy in order to improve outcomes. One report reviewing 163 cases of abdominal pregnancy demonstrated that the diagnosis of this condition is frequently missed, with only about 45% of cases diagnosed during the antenatal period. For our patient, the abdominal pregnancy was discovered early during her early prenatal care allowing us to formulate a plan and coordinate appropriate care for the surgery. Morbidity and mortality are most commonly due to massive hemorrhage from complete or partial placental separation [7]. The placenta can implant at various sites in ectopic pregnancy, which includes uterine wall, adnexa, bowel, omentum, liver, spleen, and pouch of Douglas [8]. Placental separation is highly unpredictable and can occur at any point during pregnancy which may cause sudden massive hemorrhage as well as possible exsanguination and death.

For the anesthetist, it is critical to establish adequate intravenous access and be prepared to manage hemorrhage. We made the decision to insert multiple wide-bore intravenous cannulas to ensure rapid infusion if needed, and also coordinated with the blood bank for multiple whole blood and fresh frozen plasma products available in the room before the start of the surgical procedure. Tranexamic acid was administered before the laparotomy as it has been demonstrated to reduce mortality from postpartum hemorrhage with minimal adverse effects [9]. Surgery in pregnant patients brings up an additional set of considerations. Increased edema of airway and increased soft tissue mass, as occurs in pregnant females, can make airway management difficult. But in our case, intubation was achieved with direct laryngoscopy, though we were prepared for difficult intubation too. Preoperatively, it is important to know the arterial blood supply to the placenta as this can predict the severity of bleeding and the difficulty of placenta extraction. Preoperative angiogram is a useful diagnostic tool in abdominal pregnancy as it can help to find out the exact vascular supply to the placenta. Embolization by interventional radiologist or cardiothoracic surgeons may be performed on vessels difficult to ligate intraoperatively [10]. In addition, studies suggested that unless the placenta can be easily tied off or extracted, it is preferable to leave it in place and allow for natural regression. However, this is not commonly performed as leaving the placenta in situ has been associated with delayed hemorrhage and increased mortality [5]. Postoperative embolization can also be performed in these situations and has shown to decrease postoperative hemorrhage.

The key success in our case were

- Aspiration prophylaxis
- Airway management
- Use of antifibrinolytic agent
- Cross matched blood made immediately available
- Aggressive intraoperative fluid management which included use of 1 pint lactated ringer's USP, 1 pint 6% hetastarch, 3 whole blood and 4 Fresh frozen plasma

- Availability of vasopressors like dopamine, epinephrine, ephedrine, phenylephrine.



Fig 1: Intraoperative picture showing 12-14 weeks foetus with umbilical cord and placenta intact



Fig 2: Postoperative removed specimen showing 12-14 weeks foetus with placenta

Conclusion

Abdominal pregnancy is an extremely rare condition in today's world. We present this case to demonstrate the comprehensive planning, coordination of care, and the anesthetic management involved in ensuring optimal outcome in this patient population as maternal safety is our primary concern.

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Author's Contribution

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Conflict of Interest

Not available

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