

ANESTHETIC IMPLICATIONS OF A PARTIAL MOLAR PREGNANCY AND ASSOCIATED COMPLICATIONS

Introduction

The critical nature of complications associated with a molar pregnancy, as well as postoperative complications following surgical procedures aimed at treating this disease, requires advanced perioperative anesthetic management. The following is a case report detailing our experience with the anesthetic management of a 34-year-old woman with a partial molar pregnancy who required a dilation and curettage procedure following therapeutic termination of a coexisting fetus at 18 weeks' gestation.

Case summary

A 34-year-old gravida 5, para 3 at 18 weeks' gestation initially was brought to the operating room for a scheduled exploratory laparotomy and excision of a pelvic mass. The preoperative anesthesia assessment revealed an anxious 56-kg, ASA physical status II woman with an 11-cm pelvic mass and complaints of increasing abdominal pressure, rectal pain, and vaginal bleeding. Her medical history was unremarkable. Her surgical history included 2 previous cesarean sections, an appendectomy, and a tonsillectomy. She denied a history of problems associated with anesthetics. Her obstetric history included a spontaneous vaginal delivery at 40 weeks; cesarean section for severe preeclampsia complicated by hemolysis, elevated liver enzymes, and low platelets, otherwise known as HELLP syndrome, at 30 weeks with her second pregnancy; a repeated cesarean section with her third pregnancy; and a spontaneous abortion. The course of the current pregnancy was uncomplicated before she sought care because of abdominal pressure and rectal pain.

Preoperative laboratory values included the following: hemoglobin, 11.0 g/dL; hematocrit, 35%; platelet count, 159,000/ μ L; sodium, 139 mEq/L; potassium, 3.9 mEq/L; chloride, 100 mEq/L; carbon dioxide, 24 mEq/L; serum urea nitrogen, 8.0 mg/dL; creatinine, 0.7 mg/dL; and glucose, 71 mg/dL. Before induction of anesthesia, a normal fetal heart rate was established via Doppler ultrasound. Continuous fetal monitoring throughout the case was not conducted.

The exploratory laparotomy, right salpingo-oophorectomy, and partial left oophorectomy for bilateral multicystic ovaries were successful; a combined technique consisting of general endotracheal and continuous lumbar epidural anesthesia was used. The case proceeded uneventfully with a minimal blood loss of 150 mL. At the conclusion of surgery, the patient was awakened, extubated, and taken to the postanesthesia care unit. Fetal heart tones were reestablished and were stable. Her immediate recovery was uneventful, and the patient was discharged to the ward.

During the next 12 hours, the patient's hemoglobin and hematocrit gradually declined to low values of 7.6 g/dL and 22%, respectively, before the decision was made to transfuse 2 U of packed red blood cells. Also during this time, her blood pressure began to increase from a systolic measurement in the 120s over a diastolic measurement in the 70s to 150 to 160 systolic over 90 to 100 diastolic. A magnesium sulfate infusion was started at 2 g/h for seizure prophylaxis. Despite adequate ventilatory effort and level of consciousness, the patient's SpO₂ was noted to consistently be in the low 90s while breathing room air, and it increased to 97% with the addition of oxygen by

In the United States, molar pregnancy occurs between 1 in 1,200 and 1 in 2,500 pregnancies. The critical nature of complications associated with a molar pregnancy requires advanced perioperative anesthetic management.

This case report details the perioperative events of a 34-year-old gravida 5, para 3, with a partial molar pregnancy who underwent general anesthesia for a dilatation and curettage procedure, following therapeutic termination of a coexisting fetus at 18 weeks' gestation. Her initial presentation, anesthetic and operative management, and postoperative course are described clearly.

The medical and anesthetic interventions required for treatment of molar pregnancy are reviewed. Of molar pregnancies, 80% are uncomplicated and follow an unremarkable course. However, for the remaining 20%, complications can be severe and may lead to substantial morbidity and mortality in otherwise healthy women.

Key words: Gestational trophoblastic neoplasia, hydatidiform mole, molar pregnancy,

nasal cannula. The lumbar epidural anesthetic that had been placed preoperatively was replaced with intravenous patient-controlled analgesia because of poor analgesic effect.

During the next 24 hours, the patient's condition gradually worsened. Nausea and vomiting developed, and the patient's blood pressure remained elevated. Her urine output decreased to less than 30 mL/h despite intravenous fluid replacement, and her SpO₂ remained between 88% and 94% while breathing room air. A repeated serum sample obtained to determine the beta-human chorionic gonadotropin (hCG) level showed more than 200,000 mIU/mL. Normal values for this gestational age range between 50,000 and 100,000 mIU/mL. A repeated pelvic ultrasonogram was obtained and revealed a thickened placenta and evidence of early fetal hydrops (abdominal ascites). The completed pathology report on the excised ovary revealed the presence of ovarian theca-lutein cysts.

On postoperative day 2, a maternal-fetal medicine specialist was consulted to evaluate the patient's worsening pregnancy-induced hypertension, complicated now by hyperemesis. In the light of her increasing blood pressure, thickened placenta, fetal hydrops, increasing hCG levels, hyperemesis gravidarum, and mild pulmonary edema, a diagnosis of a partial molar pregnancy was made. The patient was counseled at this time that her condition could be life-threatening and that a therapeutic termination of the pregnancy was indicated. The obstetrical plan was to dilate the cervix with an indwelling urinary catheter, deliver the fetus, and perform a dilatation and curettage.

Seven hours after placement of the urinary catheter through the cervix, the patient spontaneously delivered a nonviable infant. She was transferred immediately to the operating room for urgent removal of a retained placenta and molar products of conception. On arrival in the operating room, the patient was somewhat somnolent because of the morphine administered by intravenous patient-controlled analgesia and intravenous lorazepam, which she had been receiving on the labor ward. She had not had oral intake for more than 24 hours. Despite continued vaginal bleeding since delivery of the fetus, her vital signs were stable (blood pressure, systolic, in the 160s and diastolic, 80 to 90; heart rate, in the 90s; and respiratory rate, 16 breaths per minute and nonlabored). Her initial SpO₂ readings were in the 95% range. She was typed and cross-matched for 2 U of packed red blood cells. Her most recent laboratory work revealed the following: hemoglobin, 10.3 g/dL; hematocrit, 32.2%; prothrombin time, 10 seconds; partial thromboplastin time, 18.4 seconds; serum sodium, 129

mEq/L; potassium, 3.5 mEq/L; chloride, 101 mEq/L; carbon dioxide, 20 mEq/L; serum urea nitrogen, 6 mg/dL; creatinine, 0.8 mg/dL; and glucose, 63 mg/dL. An arterial blood gas measurement indicated a pH of 7.45, HCO₃ of 27 mEq/L, oxygen saturation of 87%, and a PaCO₂ of 48.

Two large-bore intravenous catheters were in place, infusing normal saline and magnesium sulfate at 2 g/h. Immediately before administration of anesthesia, 30 mL of sodium citrate was given orally. Monitors, including a pulse oximeter, electrocardiogram, noninvasive blood pressure monitor, and temperature probe, were applied. After preoxygenation with 100% oxygen for 5 minutes, a rapid-sequence intravenous induction with cricoid pressure was performed using etomidate 12 mg and succinylcholine 100 mg. A 7.0 internal diameter endotracheal tube was placed successfully. Immediately after induction, an 18F orogastric tube was placed, and the stomach contents were aspirated. A left radial arterial line was placed and connected to a standard heparinized arterial pressure transducer for direct arterial pressure monitoring. Anesthesia was maintained with fentanyl, 50% nitrous oxide, 50% oxygen, sevoflurane, and rocuronium for neuromuscular blockade. Ventilations were controlled with the ventilator set at 500 mL tidal volume, a rate of 10 breaths per minute, with a peak airway pressure of 21 cm H₂O maintained.

Once anesthesia was induced and an adequate level of anesthesia was obtained, the placenta was delivered manually, and the uterus was evacuated by curettage. Following curettage, 250 µg of carboprost tromethamine was given intramuscularly, and 20 U of oxytocin in 1 L of normal saline was infused. Droperidol, 0.625 mg, was given intravenously to prevent postoperative nausea and vomiting. During the procedure, the patient required labetalol, 40 mg, to maintain the blood pressure in the 160/90-100 range.

The case proceeded uneventfully with an estimated blood loss of 300 mL reported. At the termination of the case, neuromuscular blockade was reversed with 3 mg of neostigmine and 0.6 mg of glycopyrrolate given intravenously. Train-of-four stimulation demonstrated 4 of 4 twitches and sustained tetany of greater than 5 seconds. Spontaneous respirations had resumed with a rate of 24 breaths per minute, a tidal volume of 240 mL, SpO₂ of 97%, end-tidal CO₂ of 34 mm Hg, and a negative inspiratory force of 18 cm H₂O pressure. After removal of the orogastric tube and suctioning of the pharynx, the patient was extubated under positive pressure. No respiratory difficulty was noted, and the patient was transferred to the postanesthesia care unit in stable condition.

A 24-hour stay in the intensive care unit postoperatively was unremarkable; the patient's respiratory status, anemia, and preeclamptic condition improved. The patient then was transferred to the ward, and her condition steadily improved. She was discharged home on hospital day 6.

Discussion

The abnormal proliferation of trophoblastic tissue in the developing human placenta results in a condition known as gestational trophoblastic neoplasia (GTN). Hydatidiform mole, more commonly known as a molar pregnancy, is 1 of 4 neoplastic manifestations of GTN.¹ The incidence of molar pregnancy in the United States ranges from 1 in 1,200 to 1 in 2,500 pregnancies.^{2,3} In some Asian countries, the occurrence of molar pregnancies is substantially greater, with an incidence as high as 1 in 82 pregnancies.^{2,3}

Risk factors for developing a molar pregnancy include advanced maternal age, inadequate nutrition, environmental factors, and a history of a hydatidiform mole.^{4,5} Molar pregnancies develop as a result of abnormal fertilization and are categorized as complete or partial.^{4,6} Complete hydatidiform moles, in most cases, originate from the fertilization of an empty or inactive ovum by a haploid sperm containing only X chromosomes.^{4,6-8} In a complete molar pregnancy, the placenta becomes edematous secondary to grossly enlarged hydropic chorionic villi, and in most cases, the fetus, cord, and amniotic membranes are absent.^{3,4,8} Patients with a complete molar pregnancy have excessively high levels of hCG and a larger than expected uterus for gestational dates.^{2,3} Women with complete molar pregnancies experience a 20% incidence of associated complications, including advancement of the disease to malignant GTN and associated metastasis.^{2,9}

Partial moles occur when a normal haploid ovum is fertilized by 2 sperm, resulting in an abnormal zygote with 69 chromosomes.^{4,8} Unlike the complete hydatidiform mole, the partial mole usually develops in conjunction with identifiable fetal tissue, and only some of the chorionic villi are swollen.^{4,8,10} Partial molar pregnancies account for only about 10% of all hydatidiform moles, and of these, only about 5% are diagnosed before a spontaneous miscarriage or missed abortion occurs.² Although they are possible, malignant sequelae associated with partial molar pregnancy are uncommon, occurring in only 2% to 6% of patients.¹¹

As a result of the high risk for associated morbidity, the obstetric management for both partial and complete molar pregnancies requires therapeutic termination of the pregnancy to protect the life of the mother.

Methods of termination involve complete evacuation of the uterus, either through suction curettage or hysterectomy if the woman is beyond the usual child-bearing years or uncontrollable hemorrhage is present.^{3,7} The induction of labor as a means of expelling the molar pregnancy and associated fetal tissue is not recommended because of an increased risk of trophoblastic embolization.^{3,4,10} Anesthetists are consulted to administer anesthesia for the aforementioned procedures and to assist as needed with invasive monitor placement and intubation during the preoperative and postoperative periods.

The following list of complications associated with a molar pregnancy is extensive and should be well known to the anesthetist.^{3,12,13}

1. Acute cardiopulmonary distress
2. Hyperthyroidism with potential for thyroid storm
3. Severe anemia
4. Pregnancy-induced hypertension
5. Trophoblastic emboli
6. Malignant neoplasm
7. Hyperemesis gravidarum
8. Disseminated intravascular coagulation
9. Hemorrhage
10. Ovarian theca-lutein cysts

The most potentially lethal complication of a molar pregnancy is acute cardiopulmonary distress following evacuation of a molar complex. Cardiopulmonary failure occurs most often in patients with uterine enlargement greater than 16 weeks' gestational size, but it has been observed in as many as 27% of all patients with a molar pregnancy.^{1,12} The cause of cardiopulmonary arrest in more than 50% of cases is trophoblastic embolization.² Symptoms of cardiopulmonary failure usually develop within 4 to 12 hours after evacuation of the uterus and vary in severity among patients, with some requiring mechanical ventilation, vasopressor drugs, and invasive hemodynamic monitoring.^{2,4} In the most severe cases, massive trophoblastic embolism can lead to death.

Pregnancy-induced hypertension with all the associated complications is seen in 11% to 27% of women with molar pregnancies.² Hyperthyroidism in these patients is thought to occur as a manifestation of excessive levels of circulating human chorionic gonadotropin or from a thyrotropin-like substance released from the mole.^{4,14} Thyroid storm has been reported in patients with molar pregnancy during the induction of anesthesia.^{15,16}

Anemia in these patients is secondary to chronic occult bleeding from multiple hemorrhagic areas throughout the placenta and from massive blood loss

during surgery.^{2,7} Chronic bleeding from a friable molar placenta can stress the clotting mechanisms leading to disseminated intravascular coagulation and severe hemorrhage following evacuation of the uterus. Hyperemesis gravidarum can lead to serious fluid and electrolyte disturbances.²

Communication between the anesthetist and the obstetrician ideally should begin soon after the diagnosis of molar pregnancy has been established to provide adequate time for a comprehensive preoperative workup. The anesthetic workup should begin with identification of associated complications. Particular emphasis is placed on the patient's cardiopulmonary status, electrolyte abnormalities, coagulation status, and oxygen-carrying capacity. Baseline preoperative laboratory tests will vary based on the patient's condition and associated complications but may include the following: (1) coagulation studies, (2) electrolyte panel, (3) complete blood cell count with platelet count, (4) thyroid function tests, and (5) baseline chest radiograph.⁵ A baseline arterial blood gas measurement is recommended for patients who demonstrate signs and symptoms of pulmonary edema preoperatively or other manifestations of cardiopulmonary failure.^{5,15,16} Anesthetic concerns related to physiological changes during pregnancy, as well as any medications used to manage related complications, should be taken into consideration. It is recommended that before evacuation of the uterus, arrangements for postoperative care in a setting capable of invasive hemodynamic monitoring be made for patients with a uterus size greater than 16 weeks.¹⁰ Because of the potential for substantial blood loss, adequate intravenous access and the immediate availability of blood products should be established before induction.

A review of the literature about the anesthetic technique for surgical procedures aimed at removing or evacuating the uterus with a molar pregnancy suggest general anesthesia as the technique of choice.^{2,13,15,16} Chantigan and Chantigan² recommend general anesthesia with endotracheal intubation for evacuation procedures because of the potential for acute intraoperative hemorrhage and the possible need for invasive catheter placement. For patients with a uterus size greater than 16 weeks', decreased PaO₂, evidence of pulmonary edema, severe pregnancy-induced hypertension, or thyrotoxicosis, it is recommended that invasive monitor placement be considered before induction of anesthesia.^{2,10,16,17}

Induction and intubation should be achieved by a rapid-sequence technique using agents considered safe for patients who may be severely volume depleted, anemic, preeclamptic, or hyperthyroid or in

a state of cardiovascular instability. Ackerman and Mushtaque¹⁶ recommend using a nitrous oxide–narcotic combination technique, while avoiding or minimizing, if possible, the use of potent inhalational agents, which may contribute to bleeding from excessive uterine relaxation. For patients who are in stable condition, without a coexisting coagulopathy and are determined by the obstetrician to be a low risk for acute hemorrhage, a regional anesthetic may be a reasonable alternative. Unique to the anesthetic management of these cases is the use of an oxytocin infusion before or during uterine evacuation as a mechanism of avoiding trophoblastic embolism and to control hemorrhage.^{2,15,16}

Of molar pregnancies, 80% are uncomplicated and follow an unremarkable perioperative course. However, for the remaining 20%, the complications, as stated earlier, can be severe and may lead to substantial morbidity and mortality in otherwise healthy women. To safely care for these patients, the anesthetist should be well equipped with an anesthetic armamentarium that includes a solid understanding of the related pathophysiology and anesthetic techniques geared to maximize the outcomes for patients with molar pregnancies.

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