

BEST PRACTICES IN HEALTHCARE

Obstetrics

Case Study:

# Placenta Previa



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*Placenta Previa is defined as a condition where the placenta lies in the lower region of the uterus, partially or entirely covering the opening of the cervix. Symptoms include bright red vaginal bleeding during the second half of pregnancy as well as cramps, sharp pains or contractions. Risk factors include history of smoking, age over 35, previous pregnancies, multifetal pregnancy, having had previous cesarean section deliveries and previous uterine surgeries (Dulay, 2020).*

*Obstetric and pregnancy complications include a wide scope of childbirth challenges that may have fatal consequences to the mother and newborn. Consistent checkups and examinations with a primary healthcare provider during pregnancy can help early diagnosis and treatment. Placenta previa can lead to serious complications such as an emergency cesarean section, premature labor, and life-threatening bleeding (hemorrhage). The purpose of this research paper is to discuss the risks of Placenta Previa, difficult airway management during emergency cesarean sections, preparation for potential hemorrhaging during the operation, and the role of the anesthesia technologist to best prepare for this scenario.*

## Patient History

The Anesthesia care team is presented with the case of a 38-year-old female, gravida 3, para 2, who is 34 weeks pregnant. The patient arrived at the hospital due to experiencing vaginal bleeding, contractions, and abdominal pain. She has a blood pressure of 120/60, weighs 200 pounds, and is 165 cm tall upon admission. According to Swamy (2018), "3 to 4% of women have vaginal bleeding" during the late pregnancy stage after 20 weeks. Bleeding

during the third trimester of pregnancy can indicate possible complications such as placenta previa (low implantation of the placenta in the uterus) and abruptio placentae (premature separation of the placenta from the uterus). In order to work out what is causing the bleeding, the patient would need to have a vaginal examination, an ultrasound scan and blood tests to check her hormone levels. After a vaginal examination, her bleeding increased drawing concern to its bright red color. An emergency caesarean section under general anesthesia is scheduled to deliver her fraternal twins.

The patient does not have any preexisting medical conditions. However, she exhibits risk factors for placenta previa which include "multiparity, older maternal age over 35 years old, and multifetal pregnancy" (Dulay, 2020). The placenta is normally located where a developing embryo implants itself into the lining of the uterus, which is usually in the upper part of the uterus. Placenta previa is a condition where the placenta is at the lower region of the uterus, partially or entirely covering the opening of the cervix. Therefore, the placenta is prone to antepartum bleeding and doctors will need to use ultrasonography to check the location of the placenta. Due to the "high risk of massive bleeding, general anesthesia is usually recommended for a patient who has more than 1500mL of vaginal bleeding" and performing an emergency cesarean section will help avoid the potential for fatal hemorrhage (Eldemrdash, 2017). The use of general anesthesia is preferred in this scenario due to the potential for hemodynamic instability, risk of ongoing massive hemorrhage, and prolonged surgery time. It will also provide a very rapid and reliable onset, control over the airway and ventilation, help with patient discomfort for extreme anxiety in parturients, and ensure focus on volume resuscitation.

## Proper Equipment

As anesthesia technologists, our role in the anesthesia care team is to prepare all anesthesia equipment that will be used in surgical procedures. We begin by doing a full FDA anesthesia machine checkout and ensuring that all auxiliary equipment is in good working order prior to any case. As we will see in this case, all that prior preparation will be useful and necessary. Furthermore, checking that the suction apparatus is in working condition as it is extremely important for the provider to suction and clear any secretions throughout the surgical procedure. Warming devices such as convective warming blankets are needed to keep the patient warm to prevent hypothermia associated with coagulation abnormalities. Have a bag-valve mask available nearby the anesthesia machine. The patient needs to be monitored

continuously for rapid hemodynamic changes by setting up and placing standard ASA monitors. However, special care should be placed on pulse oximetry and blood pressure, as those will be important factors to keep an eye on. Two large-bore intravenous (IV) lines would be preferable. However, in most instances the patient will only have one. Therefore, we would need to discuss with the anesthesia care provider if we should begin a second large bore IV prior to surgery starting. Placing the largest possible bore IV will help if fluid resuscitation is needed. Colloids in general and crystalloids such as ringer's lactate or normal saline are infused to achieve and/or maintain hemodynamic stability. We are selecting to prepare units of blood on type and cross instead of type and screen, because we are almost assured that this patient will need blood.

The units of blood are readily available in an active or passive cooler in the operating room where we can start those units and maintain their refrigerated temperature when not utilized. Furthermore, a rapid infuser machine and fluid warmer should be available in the room. Consult with the anesthesia care provider if an arterial line (A-line) will be needed to have ready for this case. During pregnancy, "engorgement of the respiratory mucosa predisposes the upper airway to trauma, bleeding, and obstruction" (Butterworth et al., 2018, p.845). Setting up a smaller cuffed endotracheal tube (6.5mm-7mm) and a Macgrath with MAC 3 disposable laryngoscope blade is recommended.

## Potential Complications

A preoperational examination of the "neck, mandible, dentition, and oropharynx" will help predict if the patient has or may have potential airway complications (Butterworth et al., 2018, p.876). Again, according to Butterworth, there are useful predictors for a difficult intubation including "Mallampati classification, short neck, receding mandible, or prominent maxillary incisors" (p. 876). Anticipation of a difficult endotracheal intubation helps decrease the incidence of failure to intubate. However, a clear plan can be formulated using an algorithm for a difficult intubation in obstetric patients. Additional equipment to have

readily available are the difficult airway cart, "a variety of laryngoscope blades, a short laryngoscope handle, a styletted endotracheal tube, Magill forceps, a laryngeal mask airway, intubating supraglottic airway, a fiberoptic bronchoscope, a video assisted laryngoscope, the capability for transtracheal jet ventilation, and possibly an esophageal-tracheal Combitube" (Butterworth et al., 2018, p.876).

**"According to Stoelting, we may experience issues that were not planned because the patient has many physiologic alterations in their anatomy..."**

We should keep in mind that when we are dealing with pregnancy. According to Stoelting, we may experience issues that were not planned because the patient has many physiologic alterations in their anatomy including cardiovascular, gastrointestinal, and pulmonary systems. The patient is undergoing an emergent surgical delivery without an elective fasting period, so an H2 blocking

drug, orally or intravenously, "should be considered in high risk patients and in those expected to receive general anesthesia" to reduce gastric volume and pH (Butterworth et al., 2018, p.863). Therefore, according to Butterworth, the patient should be given a clear antacid 30 minutes prior to the procedure in order to maintain gastric pH and reduce the risk of severe aspiration pneumonitis (p. 863).

Since there is a high risk for hemorrhage, the patient will need to be monitored continuously and providers must be prepared to initiate massive transfusion protocol when necessary. The patient may need blood transfusion, so they will need to have intravenous access prepared in preop. If time permits, an arterial line should also be inserted to measure blood pressure more accurately during the procedure. Lab tests should be run immediately before the procedure. Type and screen is appropriate upon admission for "patients who are at low risk of bleeding, not pregnant, and have not had a prior positive antibody screen" (Bennett, 2016).

However, type and cross is the best option as the possibility for rapid infusion is significant. External monitoring of the baby should be set up to check if they are in distress and monitor the mother's vital signs to ensure they are not going into shock during surgery. Finally, serial sampling such as arterial blood gas with hematocrit, type and cross, complete

blood count for platelets, coagulation profile fibrinogen and a thromboelastogram are some of the potential tests that will be run for this procedure.

"In pregnant and obstetric patients, we should consider that the increased cardiac output, increased oxygen consumption, and decreased Functional Residual Capacity (FRC) may potentially become a serious matter that can impact the anesthesia care plan." (Thompson, 2020). The other potential problem for cesarean section surgeries is Venous Air Embolism (VAE). This problem takes place due to Trendelenburg surgical positioning, hemorrhage, surgical site, and some other medical procedures. Air embolism lowers EtCO<sub>2</sub> level and increases EtN<sub>2</sub> levels in blood. VAE could be fatal. Indeed, symptoms and signs that may occur because of VAE include dyspnea, cyanosis, hypoxia, and chest pain. If a VAE is determined, it can be mitigated by frontloading fluids to the patient, begin central venous catheterization (CVC), repositioning the patient to place the heart level above the level of incision, and administering 100% Oxygen. Fluid administration or hydration is the effective way to reduce the risks of air embolism. "VAE can be prevented significantly by proper positioning during surgery, optimal hydration, and avoiding use of nitrous oxide" (Shaikh, et al, 2009). Since CVC requires sterile technique and sterile field, the anesthesia technologist should be aware of proper methods of scrubbing, sterile gowning and gloving, and how to prepare the ultrasound machine. Therefore, preoperative CVC line placement could be a good choice for high risk obstetric cases.

## Plan of Anesthesia

Prior to entering the operating room, the patient should be positioned with her left side laying to increase perfusion to the uterus, more perfusion to the baby via the placenta. The anesthetic medication plan will be as follows: The patient receives intravenous Versed to decrease anxiety and sedate for induction. Steroids can be given to increase maturity of both fetuses so they can be ready for delivery. Once the patient enters the operating room and is

transferred to the operating table, the anesthesia technologist can help by placing the standard ASA monitors, obtain the initial set of vital signs, and place a rolled towel under the shoulders of the patient to elevate the chest. Extending the neck and positioning the head to facilitate insertion of the laryngoscope blade will improve visualization of the glottis.

## Induction of Anesthesia

The induction of general anesthesia starts with rapid sequence technique using cricoid pressure after denitrogenating and preoxygenating for 3 minutes has occurred. "The combination of decreased Functional Residual Capacity (FRC) and increased oxygen consumption promotes rapid oxygen desaturation during periods of apnea," therefore, preoxygenation prior to induction of general anesthesia is an absolute to avoid hypoxemia (Butterworth et al., 2018, p.876). A standard induction agent is Propofol (2 to 4 mg/kg IV) followed by Succinylcholine (1 to 1.5 mg/kg IV) or Rocuronium to help ease the tracheal intubation. Propofol produces "neonatal depression, but is rapidly redistributed and cleared from the neonate resulting in a rapid emergence" (Nagelhout, 2018, p. 1081). Usually tracheal

intubation increases systemic blood pressure. "Drugs that could be useful to control the blood pressure during the operation are: sublingual Nitroglycerin, Esmolol, Fentanyl, and Lidocaine" (Varon, J. et al, 2008).

Intraoperative hypertension might be controlled by volatile anesthetics. Induction of anesthesia is delayed until the surgical team confirms that they have fully prepped the patient with chlorhexidine gluconate solution and draped. All surgical

tools and staff are ready to follow the anesthetic and surgical plan stated during the surgical timeout. The operating surgeon delays incision until the anesthesiologist verifies correct endotracheal tube placement through "capnography, auscultation of breath sounds over the chest, and bilateral chest expansion" (Nagelhout, 2018, p. 1081). Drugs such as vasodilators, antihistamines, ephedrine, and  $\beta$ -adrenergic blockers are transferred to the fetus. Therefore, immediately after the patient has been induced and an endotracheal tube

**"The combination of decreased Functional Residual Capacity (FRC) and increased oxygen consumption promotes rapid oxygen desaturation during periods of apnea..."**

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is in place, the obstetrician will begin cutting immediately to minimize fetal exposure to depressant drugs.

## Maintenance of Anesthesia

Risk of failed intubation is higher in the obstetric patients, than in non-pregnant patients (Nagelhout, 2018). The main logic behind it is physiological and biochemical changes that occurs in the body during pregnancy such as elevation of intragastric pressure due to gravid uterus, a relaxed gastroesophageal sphincter because of progesterone imbalance, and etc. any of these situations increase the risk of aspiration. High

probability of having allergies to sedation, muscle relaxants, and analgesia drugs in the operating room greatly increase the cause of pulmonary aspiration and difficult intubation. Preoxygenation for 3-5 minutes, using a well-fitting mask is mandatory before intubation. Rapid sequence induction as mentioned above, in the general anesthesia is the best choice in these scenarios. The most important role of anesthesia technologist in this part could be helping to provide cricoid pressure, that is the best way to prevent

aspiration and help the provider to do a safe intubation. In the case of failed intubation, the anesthesia tech should maintain oxygenation and have a difficult intubation cart close to the provider. On the other hand, aspiration of gastric fluids leads to serious clinical consequences such as bronchospasm, hypotension, hypoxemia, and tachypnea. Possible edema of the upper airway structures in emergency cesarean delivery will require preparation of different sized endotracheal tubes and oral airways.

According to Stoelting, "during the maintenance of general anesthesia for cesarean section, both Sevoflurane and Propofol are the proper choices. Volatile agents with or without nitrous oxide can be administered for maintenance." Inhaled agents are appropriate in emergency obstetric patients, but otherwise would be avoided to not affect the fetus. Inhalation agents generally produce little fetal

depression when they are given in limited doses and delivery occurs within 10 minutes of induction. In cesarean deliveries, "opioids are administered after the delivery in order to avoid the side effects or concern of placental transfer to the neonate" (Stoelting et al., 2006, p.495). Newborns are more sensitive to the respiratory depressant effects of morphine compared to other opioids. Fentanyl has minimal neonatal effects unless larger intravenous doses are given immediately before delivery. An interval of 3 minutes between uterine incision to delivery is ideal to prevent neonatal depression. In the event that complications

arise, and the infant delivered becomes depressed, they will require active resuscitation by a neonatologist.

**"Regional anesthesia is appropriate for elective cesarean delivery in a woman with known placenta previa, but for emergency situations with active hemorrhage, general anesthesia may be required, and ketamine is useful drug for induction of anesthesia."**

"Regional anesthesia is appropriate for elective cesarean delivery in a woman with known placenta previa, but for emergency situations with active hemorrhage, general anesthesia may be required, and ketamine is useful drug for induction of anesthesia." (Stoelting et al., 2006, p.496). Based on Eldemrardash's (2017) article, "the estimated blood loss in patients from the general anesthesia group [is] higher than average of the regional anesthesia group, and

the proportion of patients who receive fresh frozen plasma and packed red cells [is] significantly higher in the general anesthesia group". Rapid blood loss during the operation can lead to serious consequences both for mother and the fetus. Such as a drop in the mother's blood pressure and even shock. The rapid infuser should be ready and available in the room for this situation to infuse the blood at high speed in order to compensate for the blood loss.

## Anesthesia Emergence

Once the surgery has ended, the patient is extubated awake after they have recovered neuromuscular function and extubation criteria is met. Tocolytics can be given to stop contractions. Airway obstruction is common in the postoperative period, so before extubation we have to make sure that the patient is awake and breathes on her own, the risk of (cannot ventilate cannot intubate) is one of the main

disadvantages of general anesthesia. Patients should receive supplemental oxygen after surgery and the whole time in the recovery room because of hypoxemia after surgery. The other postoperative issue is hypotension due to blood loss and hypertension because of surgery pain or anxiety, therefore postoperative pain management is needed. The patient's blood pressure, heart rate and rhythm should be monitored carefully in the recovery room. Making sure that the oxygen tank is full during transportation to the post-op area, and have the nasal cannula or oxygen mask ready next to the patient could be important points that anesthesia technicians take into consideration.

## Conclusion

Taking care of all patients in the operating room is the moral and professional responsibility of all individuals during the whole case. Communication with the provider and following the scope of practice and job description are essential. Helping with positioning the patient, preoxygenation, rapid sequence induction, difficult airway cart set up, prepare laryngoscope, extra O2 tank, bag-valve-mask are alternatives that might be useful in critical situations. Caring for the patient, anticipating, and providing for the best outcome, having a clear understanding of potential problems, and being able to assist the provider in any unexpected events, makes for a successful anesthesia technologist. 

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# Continuing Education Quiz

To test your knowledge on this issue's article, provide correct answers to the following questions on the form below. Follow the instructions carefully.

**1. What is the function of oral antacid medication given to obstetric patients 30 minutes prior surgery?**

- a. Reduce aspiration risk
- b. Maintain blood pressure
- c. Increase pH level
- d. To ease intubation

**2. All these are predictors of possible difficult airway management in OB patients, EXCEPT:**

- a. Mallampati I
- b. short neck
- c. receding mandible
- d. prominent maxillary incisors

**3. The risk of aspiration high in pregnant patient due to:**

- a. relaxed gastroesophageal sphincter.
- b. low level of progesterone.
- c. low level of O2 in blood.
- d. difficult airway.

**4. Obstetric patient may desaturate quickly due to:**

- a. bleeding.
- b. decreased functional residual capacity.
- c. increased tidal volume.
- d. decreased blood volume.

**5. Failed intubation is high in the obstetric patient due to:**

- a. reaction to anesthetic drugs.
- b. decreased pulmonary capacity.
- c. physiological changes.
- d. Increased opioids use.

**6. Where is the placenta located in placenta previa?**

- a. Superior of uterus
- b. Anterior of uterus
- c. Posterior of cervix
- d. Superior of cervix

**7. Which vasopressor is useful to control blood pressure during surgery?**

- a. Propofol
- b. Nitroglycerin
- c. Ketamine
- d. Sevoflurane

**8. Why are opioids administered following delivery of the baby for a cesarean section?**

- a. Avoid allergic reactions to mother
- b. Patients' preferences
- c. Avoid the side effects to neonate
- d. Control bleeding

**9. In OB patients, the cardiac output \_\_\_\_\_ while oxygen consumption \_\_\_\_\_.**

- a. decreases, increases
- b. increases, increases
- c. increases, decreases
- d. decreases, decreases

**10. Intraoperative blood loss may cause which of the following?**

- a. Hypercarbia
- b. Hyperthermia
- c. Hypervolemia
- d. Hypotension

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The answers to the Winter 2021 "Placenta Previa" Quiz are:  
(circle answers)

- 1: A B C D
- 2: A B C D
- 3: A B C D
- 4: A B C D
- 5: A B C D
- 6: A B C D
- 7: A B C D
- 8: A B C D
- 9: A B C D
- 10: A B C D

**Quiz 2 of 2**

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