مدیریت خونریزی دردوران بارداری ، زایمان و پس از زایمان

دکترعاطفه قصوری

متخصص بیهوشی و مراقبتهای ویژه

- An estimated 303,000 maternal deaths occurred worldwide in 2015.

- Developing regions account for approximately 99% of the global maternal deaths.

- **Hemorrhage**, **hypertensive disorders of pregnancy**, and **sepsis** are the leading causes of maternal deaths worldwide.

- A study examined pregnancy-related deaths from 2006 to 2010 in the United States using data from the Pregnancy Mortality Surveillance System and found the number one cause of death to be **cardiovascular conditions** (14.6%).
- Other causes of pregnancy-related death included **infection** (13.6%), **non cardiovascular medical conditions** (12.7%), **cardiomyopathy** (11.8%), **hemorrhage** (11.4%), **thrombotic pulmonary** or other **embolism** (9.6%), and **hypertensive disorders of pregnancy** (9.4%).

OBSTETRIC HEMORRHAGE

- **Hemorrhage** during pregnancy carries significant **morbidity** and is a leading cause of **maternal death** worldwide.

- Most of these hemorrhage-related deaths are **preventable**, and appropriate training, simulation, team communication, and education are all essential elements needed to improve patient outcome.

Common **difficulties with hemorrhage management** include inaccurate **determination of blood loss**, **unrecognized hemorrhage risk factors**, **delayed intervention**, and **improper or inadequate transfusion of blood products**.

- **Placenta previa** and **placental abruption** are the major causes of bleeding during the third trimester. **Uterine rupture** can be responsible for uncontrolled hemorrhage that manifests during active labor.
- **Postpartum hemorrhage** occurs after **3%–5%** of all vaginal deliveries.
- **Uterine atony** and **placenta accreta** are two leading causes of peripartum hemorrhage. **Placenta accreta** is the most common indication for a cesarean hysterectomy.

- Retained products of conception and cervical or vaginal lacerations may also lead to postpartum hemorrhage.
- Because of the increased blood volume and relative good health of the average pregnant patient, parturient women **tolerate mild to moderate hemorrhage** with **few clinical signs or symptoms**.
- Clinical signs may be absent until 15% of total blood volume is lost. This can lead to underestimation of blood loss.

Placenta previa

- **Placenta previa** is diagnosed when the placenta is located **low in the uterus** and **in front of the presenting fetus**, either **covering or encroaching on the cervical os.**
- The incidence is approximately **0.5%** of all pregnancies.
- Associated risk factors include **advanced maternal age** , **assisted pregnancy** , **multiparity**, **prior placenta previa** , and **uterine scarring** from infection or prior surgery.
- Placenta previa normally manifests as painless vaginal bleeding, with the first occurrence being self-limited.

Placenta previa

- The diagnosis is confirmed or determined by **ultrasonography**.

- **Cesarean delivery** is required with placenta previa unless the placenta significantly **changes position** during gestation away from the cervical os before the time of delivery.

- **Preoperative:** Mild to moderate blood loss is well tolerated by the patient and thus may result in underestimation of bleeding by the anesthesiologist.
- **Typing and cross-matching** should be performed for all patients to ensure continuous availability of packed red blood cells (PRBCs) and component products.

- **Intraoperative :** Anesthetic management will depend on **maternal and fetal status** and the **urgency of the surgery**.
- If the patient has **not had recent bleeding** and is scheduled for an **elective procedure**, regional anesthesia is preferred, as it is for all patients undergoing cesarean delivery.
- Large-bore IV access should be established because the patient is at greater risk of intraoperative bleeding.

- If hemorrhage necessitates **emergency delivery**, **general anesthesia** is the anesthetic of choice.
- Ketamine and etomidate are the preferred induction agents in the hypovolemic patient.
- **Drug selection** for maintenance of anesthesia will be determined by the **mother's hemodynamic status**.

placenta accreta

- The term placenta accreta is often used to include the three subtypes of **accreta** vera**, increta**, and **percreta**.
- **Placenta accreta** vera is an **abnormal adherence to the myometrium** with an **absent decidual line of separation**.
- **Placenta increta** is **abnormal implantation and growth of the placenta into the myometrium**, and
- **placenta percreta** is growth of the placenta through the **uterine wall with placental implantation** onto surrounding tissue that might include **bladder, bowel, ovaries, or other organs** surrounding the uterus.

placenta accreta

- Presence of accreta occurs in approximately **0.04%** of pregnancies in developed countries; however, the rate is **increasing** and appears to affect from **0.17 to 0.34%** of deliveries.
- **Rates of accreta** are significantly affected by the presence of **placenta previa** and the number of **prior hysterotomies**.
- The diagnosis of accreta is not certain **until the time of hysterotomy**, and **in patients with significant risk factors, massive hemorrhage could occur**, regardless of imaging study result.

placenta accreta

- **Elective cesarean** delivery at **34–35 weeks**' gestation to avoid emergent delivery is recommended.
- A small focal placenta accreta can sometimes be excised and oversutured, allowing uterine sparing; however, in the majority of cases, cesarean hysterectomy is warranted. The magnitude of hemorrhage may be significantly reduced if attempts to separate of the placenta are avoided.
- If an attempt is made to extract the placenta manually, profound hemorrhage may occur.

Management of Anesthesia Preoperative

- Significant hemorrhage should be anticipated, and thus at least two large-bore IV catheters should be placed. Insertion of an arterial catheter should be considered. PRBCs and component products should be immediately available.
- As soon as it is known that a patient with suspected placenta accreta will be undergoing surgical delivery, the **anesthesiologist should communicate directly** with the blood bank, request blood products, and provide information about the possibility for massive transfusion.

- **Intraoperative:** A cesarean hysterectomy can be performed successfully under neuraxial anesthesia.
- Transfusion of a fibrinogen-containing product (either cryoprecipitate or fibrinogen concentrate; the efficacy of these has been shown to be equivalent) should be provided to prevent decrease in fibrinogen below 2 g/dL.
- With this goal-directed strategy, transfusion of other blood products is usually not necessary.

Placental Abruption

- **Placental abruption** is defined as **partial or complete separation** of the placenta from the uterine wall **after 20 weeks**' gestation but before delivery.
- The incidence is approximately **1%** of pregnancies, and **risk factors** include **advanced maternal age** , **chorioamnionitis** , **cocaine use** , **excessive alcohol use**, **hypertension** , **premature rupture of membranes** , **history of abruption** , **smoking** , and **trauma**.
- Abruption often manifests with **vaginal bleeding** and **uterine tenderness** with examination. However, a significant **volume of blood** can be trapped **behind the placenta and remain in the uterus**.

- When the separation involves only the **placental margins**, the escaping blood can appear as vaginal bleeding.
- On the other hand, large volumes of extravasated blood can remain concealed within the uterus.

- Severe blood loss from placental abruption presents as maternal **hypotension**, **uterine irritability** and **hypertonus**, and **fetal distress** or demise. **Clotting abnormalities** can occur.
- The classic hemorrhage picture includes **thrombocytopenia**, **depletion of fibrinogen**, and **prolonged plasma thromboplastin times**.
- **DIC** can occur and may be accompanied by acute **renal failure** occurring as a result of fibrin deposition in renal arterioles. Fetal distress reflects the loss of functional placenta and decreased uteroplacental perfusion because of maternal hypotension.

- Diagnosis is made before delivery using **ultrasonography** and at delivery by examination of the placenta.
- Treatment Definitive treatment of placental abruption is delivery of the fetus and placenta. Delivery may be vaginal if the abruption is not jeopardizing maternal or fetal well-being.
- Otherwise, delivery is by cesarean section.

- **prognosis Maternal complications** associated with placental abruption include **DIC**, **acute renal failure**, and **uterine atony**, which may lead to **postpartum hemorrhage**.
- **DIC** occurs in approximately **10%** of patients with placental abruption.
- **Neonatal complications** are significant. **Perinatal mortality** is **25-fold** higher if a term pregnancy is complicated by abruption. Fetal distress is also common owing to the disruption of placental blood flow.

Uterine Rupture

- Uterine rupture can be a **life-threatening emergency** for both the **mother and the fetus**. The occurrence rate for women undergoing a trial of labor after cesarean delivery ranges between **0.4% and 1%** and includes a range of pathologic processes from cases of **scar dehiscence** to **complete uterine wall rupture**.
- **Other risk factors** for uterine rupture include **fetal malposition**, **instrumented delivery**, **macrosomia**, **excessive oxytocin administration**, **rapid delivery**, **trauma**, and **tumor**.

- **Typical clinical presentation** includes fetal bradycardia, cessation of uterine contractions, abdominal pain, vaginal bleeding, and loss of station.

- A nonreassuring FHR tracing is the most reliable and sensitive clinical sign, and breakthrough pain may be present in only a minority of patients and unrelated to epidural use.

Uterine Atony

- **Uterine Atony** Postpartum uterine atony is the **most common** cause of **severe postpartum hemorrhage**. The associated hemorrhage is the leading cause of maternal death worldwide and is increasing in incidence.
- **Risk factors** include **chorioamnionitis** ; **oxytocin use during labor, high parity, macrosomia , multiple births, prolonged labor , retained products of conception**, and use of **volatile anesthetics , magnesium sulfate** , or **terbutaline.**

Uterine Atony

- Uterine atony may occur **immediately** after delivery or may manifest **several hours later.**
- **After bimanual massage**, **oxytocin** should be administered as the initial treatment and prophylactic drug for uterine atony.

- Specific dosing of **oxytocin** varies across institutions and countries. Although the WHO recommends **20 international units of oxytocin administered in 1 L of crystalloid** after uncomplicated cesarean delivery.

Uterine Atony

- Although a dilute oxytocin solution administered over a long time has minimal hemodynamic effects and is typically well tolerated, **larger doses and bolus infusion oxytocin** can result in significant **hypotension**, **tachycardia**, **nausea**, and **headache**.

- If oxytocin is not sufficient in controlling postpartum hemorrhage, **methylergonovine** 0.2 mg intramuscularly, **carboprost** (which is **prostaglandin F2α** [PGF2α]) 0.25 mg intramuscularly, or **misoprostol** (which is a **prostaglandin E1 analog** [PGE1]) 600 to 800 μg orally, sublingually, vaginally, or rectally should be considered.

Side effects

- Side effects of **methylergonovine**, an ergot derivative, include nausea, hypertension (systemic and pulmonary), and coronary artery spasm, and it is relatively *contraindicated* in patients with *preeclampsia* and those with *cardiac disease*.
- **PGF2α** is associated with pulmonary hypertension, bronchospasm, desaturation, nausea, and tachycardia, and is *contraindicated* in patients with *asthma*.
- **PGE1** does not have significant cardiovascular effects but may result in mild hyperthermia. If postpartum hemorrhage is not controlled with drugs, **invasive and surgical techniques** described in the following section should be considered.

Retained placenta

- Retained placenta occurs in approximately 1% of all vaginal deliveries and usually necessitates manual exploration of the uterus.
- If **epidural analgesia** has been used for vaginal delivery, manual removal of the retained placenta may be attempted under epidural anesthesia.
- Spinal anesthesia (**saddle block**) or **low-dose IV ketamine** may provide adequate analgesia if an epidural catheter is not in place. In rare cases a **general anesthetic** may be needed. Low doses of IV nitroglycerin (40-µg boluses) are used to relax the uterus for placental removal when indicated.

Management of Massive Obstetric Hemorrhage

- Successful management of a massive obstetric hemorrhage requires excellent communication and coordination of all perioperative disciplines, including **anesthesiologists**, **obstetricians**, **labor and operating room nurses, neonatologists**, **interventional radiologists**, **gynecologic surgeons**, and **blood bank staff**.

- **Early diagnosis** of hemorrhage and timely intervention are key to minimizing patient morbidity and mortality.

- **Cryoprecipitate** or **fibrinogen concentrate** should be considered if decreased fibrinogen is present or likely.
- **TEG** and rotational thromboelastometry (**ROTEM**) can be used as tools for both diagnosis and treatment of hemorrhage-related coagulopathy.
- Recombinant **activated factor VII** is not universally recommended as multiple adverse events have been reported to the FDA with the off-label use of treating massive hemorrhage with factor VIIa.

- **Tranexamic** acid is an **antifibrinolytic** that is used in trauma, cardiac surgery, and multiple surgical populations to decrease blood loss. It is a **lysine analogue** that binds to receptors on plasminogen and plasmin, which results in inhibition of plasmin-mediated fibrin degradation.
- A large randomized, double-blind, placebo-controlled trial randomized 20,060 women to receive either **tranexamic acid** or placebo at the time postpartum hemorrhage was diagnosed. The authors found a **reduction in death due to bleeding in women with postpartum hemorrhage if given within 3 hours** .

- **Tranexamic** acid can cross the placenta and into breastmilk and it is recommended to wait until the **cord is clamped** to administer the drug.
- Evidence about the effectiveness of **prophylactic administration** of tranexamic acid to prevent postpartum hemorrhage is still lacking.

- Tranexamic acid is **contraindicated** in patients with **active venous thromboembolism**, **significant renal disease**, and **subarachnoid hemorrhage**.

- In parturients who are Rh negative, anti-D immunoglobulin should be used as soon as possible in coordination with KleihauerBetke testing to prevent alloimmunization.

- When **standard resuscitation methods are not adequate** to control the obstetric hemorrhage, the peripartum obstetric team should consider use of **invasive options**, including **uterine balloon tamponade**, **compression sutures**, **ligation of uterine vessels**, and use of **interventional radiology for arterial embolization** if the patient is stable for transport.

- ……**Hysterectomy**


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