

Cesarean Birth Complications

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Objectives

- Review assessments and interventions for complications of *hemorrhage, surgical site infection and venous thromboembolism* following cesarean birth
- Discuss use of *evidence-based bundles* in management of cesarean birth complications.

10 group classification system – Robson

- Allows standardized comparisons of data
- Identifies clinical scenarios driving changes in cesarean rates.
- Hospitals and health organizations can use the Robson 10-Group Classification System to evaluate quality and processes associated with cesarean delivery.
- Supported by WHO

Severe Maternal Morbidity (SMM)

- SMM affects more than 50,000 women/year
- Women delivering by cesarean are at greater risk compared to women who deliver vaginally.

Obstetric hemorrhage with cesarean birth

Hemorrhage Definition

Cumulative blood loss of greater than or equal to **1000mL** or blood loss accompanied by **signs and symptoms of hypovolemia** within 24 hours after the birth process (includes intrapartum loss) **regardless of route of delivery**

Risk Assessment tools

Risk assessment tools have been shown to **identify 60-85%** of patients who will experience a hemorrhage in the postpartum period

Examples:

Postpartum Hemorrhage Risk Assessment Tool (AWHONN)

Risk assessment tool: ACOG Safe Motherhood Initiative; CMQCC Obstetric Hemorrhage Toolkit

When should I do hemorrhage risk assessment?

Antepartum, On admission, Throughout birthing process, Postpartum

Underlying Etiology for Hemorrhage: **Tone, Tissue, Trauma, Thrombin**

Volume vs. symptoms

Management plan Goals: Maintain SBP > 90mmHg; Urine output \geq 30mL/hr (Foley required); Normal mental status

- Identify source of hemorrhage
- AWHONN recommends that cumulative blood loss be formally measured or quantified after every birth.

- Requires additional resources
- 2 large bore IV's
- Judiciously infuse crystalloids while blood products are being obtained
- Lactated Ringer's - mildly hypotonic solution for large-volume fluid replacement.
- Sodium chloride at 0.9% concentration is close to the concentration in the blood
- Accurate vital signs
- Prevent hypothermia via use of external adjuncts for patient warming.
- Use pulse ox
- Maintain oxygenation 8-10L/min via nonrebreather mask
- Discuss with anesthesia or ICU team need for invasive hemodynamic monitoring especially with large volume replacement and ease of blood draws with central line
- Insert Foley catheter with urometer
- Evaluate mental status
- Critical labs: CBC, ABG and coagulation studies (fibrinogen, platelet count, fibrin degradation products).
- **Communicate!** Alert charge nurse, OR team, IR readiness, blood bank
- Make the mental shift from "normal delivery" to Life threatening emergency
- Clarify between the Obstetrician and Anesthesiologist regarding who will primarily manage blood loss quantification, laboratory assessment, and blood component therapy
- Insist that the MD evaluate at the bedside, not just on the phone
- Learn from past experiences

Surgical site infection following cesarean birth

Incidence of SSI

- Cesarean birth is the single most important factor associated with postpartum infection and carries a 5-20 fold increased risk of infection when compared to vaginal delivery
- Some studies show up to **20% of all women develop a postpartum infection** as:
 - Endometritis (3X more common after C/S in Stage 2 vs. Stage 1)
 - Wound infection and
 - Urinary tract infection
 - 85% occurring within 7 days of hospital discharge

SSI Definition / Category

- Superficial incisional
- Deep incisional
- Organ/space

Evidence based bundle – surgical site infection

- **Preoperative washing for scheduled cesarean:**
 - Lowers the microbial load and risk of surgical site contaminants
 - Shower or bathe with antimicrobial soap night before C/S
- **Consider vaginal cleansing**
 - Immediately prior to the cesarean birth, especially for women with ruptured membranes and those who have labored prior to surgery.

- Currently, only povidone-iodine is approved for use in the vagina, (swab for 30 seconds) however, off-label use of chlorhexidine solutions can be considered, especially in women with allergies to iodine
- **Utilize intraoperative skin preparation**
 - chlorhexidine products or povidone iodine products
- **Prophylactic Antibiotics**
 - A narrow-spectrum, first-generation cephalosporin: **cefazolin (Rx)**
 - Women with a penicillin allergy: A single dose combination of clindamycin with an aminoglycoside is a second option
 - **Timing:** Ideally, the administration of prophylactic antibiotics should occur **60 minutes prior to skin incision**, whenever possible.
 - Administer additional doses of antibiotics or higher doses of antibiotics if indicated:
 - Surgical procedures lasting longer than 3–4 hours; Obesity; Excess blood loss
- **Hypothermia prevention**
 - Hypothermia is associated with cardiac events, delayed surgical wound healing, surgical site infections, increased blood loss, increased hospital stay, and thermal discomfort.
 - Suggested methods to maintain temperature:
 - Forced air
 - Warmed blankets
 - Warmed IV fluid
 - OR temperature at 20–23° C (68–73° F)

When should I do an infection risk assessment?

Antepartum, On admission, Throughout birthing process, Postpartum

[Venous thromboembolism following cesarean birth](#)

Venous Thromboembolism (VTE)

Deep Vein Thrombosis (DVT) 80% Pulmonary Embolism (PE) 20%

Evidence based bundle: VTE prophylaxis

- All women undergoing cesarean birth require
 - Knee-high mechanical prophylaxis (SCD) while in bed, prior to cesarean and continued postop until ambulatory
 - Early /encourage ambulation
 - Adequate hydration
- Empiric prophylaxis is a reasonable option for strict antepartum bed rest ≥ 72 hrs. / or 1 week
- Anticoagulant therapy in pregnancy
 - Heparin (Safe in pregnancy, does not cross placenta)
 - Unfractionated (UFH)
 - Low molecular weight (LMWH) ex: Enoxaparin (Lovenox)
 - fewer adverse effects
 - More predictable therapeutic response
 - Lower incidence of HIT (heparin induced thrombocytopenia)

Longer half-life (risk with neuraxial anesthesia) wait 12-24 hours

- Protamine Sulfate 1mg by slow infusion is antidote

When should I do VTE risk assessment?

Antepartum (especially hospitalization) On admission, Throughout birthing process, Postpartum

Risk factors for VTE

Major Risk Factors	Minor risk factors
<ul style="list-style-type: none"> • BMI \geq 35kg/m² at delivery • Immobility (strict antepartum bed rest \geq72 hrs. / or 1 week) • Postpartum hemorrhage with C/S requiring blood transfusion or IR • Previous VTE • Preeclampsia with fetal growth restriction • Thrombophilia: e.g. Factor V Leiden • Medical condition: Lupus, heart disease, sickle cell disease 	<ul style="list-style-type: none"> • Postpartum infection • BMI > 30 kg/m² • Multiple gestation • Age > 40 • Emergency cesarean • Smoking > 10 cigarettes/day • Fetal growth restriction • Preeclampsia

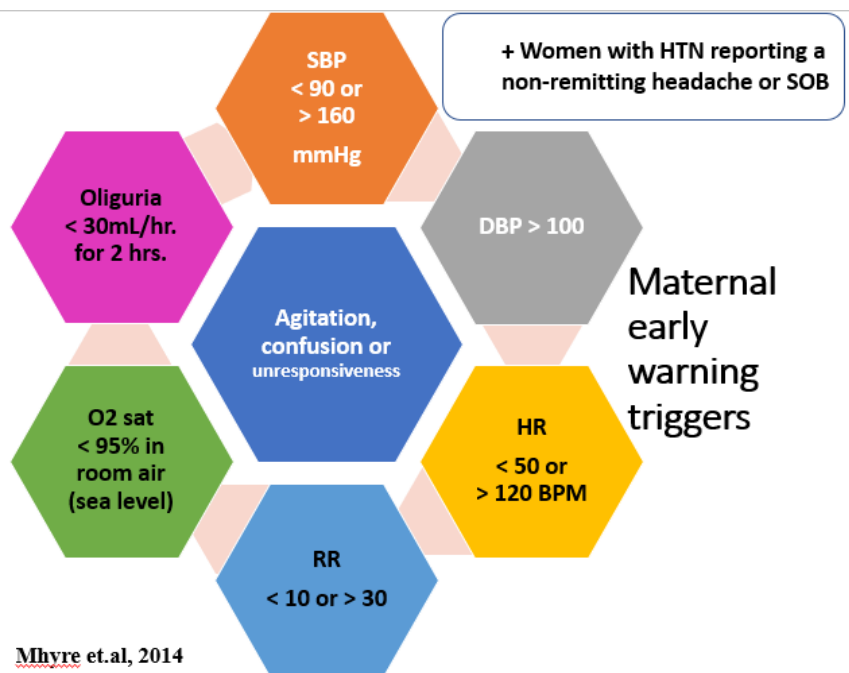
Early Warning Systems

Screening systems

Progress is being made in the development of several obstetric early warning systems that will assist obstetric personnel in early identification of patients with suspected clinical deterioration in the most common areas of maternal mortality, including sepsis

Maternal early warning criteria

Early warning tools are activated by nonsevere, severe, or single abnormal triggers. Once triggers are noted or if a nurse is clinically uncomfortable with the woman’s presentation, the obstetric care provider is notified for additional evaluation. It is important to note these parameters when implementing an obstetric early warning system, since pregnancy and delivery alter the values compared to the non-pregnant state.



Mhyre et.al, 2014

Enhanced Recovery After Surgery (ERAS)

ERAS pathways enhance maternal recovery time and reduce short-term maternal morbidity

- **Minimal interruption of oral intake**
 - Women are encouraged to drink clear fluids until 2 hours prior to surgery, and solid food is encouraged up to 6 hours prior to surgery.
- **Mitigation of intraoperative hypothermia**
- **Provision of fluids and food in recovery**
- **Thromboprophylaxis**
- **Scheduled postoperative nonopioid oral analgesia**
 - scheduled use of acetaminophen and NSAID
 - opioid medications reserved for breakthrough pain
- **Early removal of indwelling catheters**
 - removed in the immediate postoperative period
- **Early mobilization**

Nursing Implications

1. Participate in Severe Maternal Morbidity Reviews

- Were significant risk factors for complications identified?
 - Was the suspicion of hemorrhage, sepsis or DVT made in a timely fashion?
 - Were appropriate uterotonics, antibiotics or anticoagulants used after diagnosis? How long to treatment?
 - Did the woman receive appropriate volume of IV fluids?
2. Use **risk assessment tools** during the antepartum, intrapartum and postpartum periods to identify women giving birth by cesarean who are at increased risk for hemorrhage, surgical site infections, and venous thromboembolism
 3. **Prepare for an obstetric hemorrhage** through unit-based drills that use a rapid response team, access to vital resources, a hemorrhage supply cart, medications, and activation of an obstetric massive blood transfusion protocol.
 4. Reduce risk of a surgical site infection when following an evidence-based safety bundle including **vaginal cleansing, skin preparation, timely antibiotic administration, and maintenance of thermoregulation.**
 5. Use interventions such as **early ambulation, adequate hydration, and pneumatic compression** devices to reduce risk of venous thromboembolism.
 6. Review the **Enhanced Recovery After Cesarean (ERAC)** protocol and adopt it as part of routine care for women having cesarean birth (summary of the protocol, Killion, 2019)
 7. Continued work to reach consensus with **maternal early warning systems** to improve communication, reduce desensitization, and improve response
 8. Use the **AWHONN (2019) evidence-based guideline of perioperative care of the pregnant woman** to update unit policies and practices.
 9. Consider using the **AWHONN postbirth warning signs** handout for all women giving birth and educate women on early warning signs and potential complications of a cesarean birth as part of their discharge teaching.

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