Maternal sepsis: Causes, management and Nursing Management: A Review Article

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I. INTRODUCTION

Maternal sepsis is "a life-threatening condition defined as an organ dysfunction caused by an infection during pregnancy, delivery, puerperium, or after an abortion," with the potential to save millions of lives if a proper approximation is made. Undetected or poorly managed maternal infections can lead to sepsis, death, or disability for the mother, and an increased likelihood of early neonatal infection and other adverse outcomes. Physiological, immunologic, and mechanical changes that occur in pregnancy make pregnant women more susceptible to infections than nonpregnant women and may obscure signs and symptoms of infection and sepsis, resulting in a delay in the recognition and treatment of sepsis. Prioritization of the creation and validation of tools that allow the development of clear and standardized diagnostic criteria of maternal sepsis and septic shock, according to the changes inherent to pregnancy, correspond to highly effective strategies to reduce the impact of these conditions on maternal health worldwide. After an adequate diagnostic approach, the next goal is achieving stabilization, trying to stop the progression from sepsis to septic shock, and improving tissue perfusion to limit cell dysfunction. Management protocol implementation during the first hour of treatment will be the most important determinant for the reduction of maternal mortality associated with sepsis and septic shock.

Maternal sepsis (organ dysfunction due to infection) and postpartum hemorrhage (excessive blood loss) aretwo leading, interconnected causes of maternal mortality worldwide. They often overlap; severe blood loss can lower the body's immunity and trigger sepsis, while severe infections can induce bleeding complications like coagulopathy.

Maternal Sepsis: A life-threatening condition defined as organ dysfunction resulting from an infection during pregnancy, childbirth, post-abortion, or the postpartum period. It frequently stems from infections like chorioamnionitis (infection of the fetal membranes), urinary tract infections, or post-cesarean wound infections.

Maternal Hemorrhage: Severe bleeding after birth, widely known as postpartum hemorrhage (PPH), is the #1 global cause of maternal death. It is most often caused by the uterus failing to contract properly after delivery (uterine atony).

Hemorrhage Leads to Sepsis: Massive blood loss causes shock, reducing oxygen and blood flow to vital organs. This can result in tissue damage, lower the body's natural immune defenses, and make the mother highly susceptible to bacterial infections.

Sepsis Leads to Hemorrhage: Severe systemic infections (sepsis) can disrupt the body's normal blood-clotting mechanisms, leading to a dangerous condition called Disseminated Intravascular Coagulation (DIC). DIC causes simultaneous uncontrolled bleeding and clotting, which can trigger severe, hard-to-control hemorrhaging.

II. WARNING SIGNS

Both conditions can rapidly progress to septic or hemorrhagic shock, making immediate recognition essential.

Sepsis Symptoms:

- High fever (>38.3°C / 101°F) or abnormally low body temperature.
- Rapid heart rate (>100 beats/min) and rapid breathing.

- Confusion, extreme drowsiness, or feeling a sense of "impending doom."
- Shivering, muscle pain, or extreme malaise.
- Decreased or no urination.

Hemorrhage Symptoms:

- Excessive or heavy vaginal bleeding that does not slow down or stop.
- A significant drop in blood pressure resulting in dizziness, lightheadedness, or fainting.
- A rapid, weak pulse.
- Swelling and pain in the vaginal or perineal area (which can indicate a hematoma).
- Pale, cold, or clammy skin.

Treatment & Management

For Sepsis: Immediate administration of broad-spectrum antibiotics, intravenous (IV) fluids, and close monitoring of organ function are required. If an infection source (like retained placental tissue or an abscess) is present, source control (often via surgery) is critical.

For Hemorrhage: Immediate uterine massage, medications to stimulate uterine contractions (like oxytocin), IV fluids, and potentially blood transfusions or surgical intervention are required

III. NURSING MANAGEMENT

Maternal sepsis and postpartum hemorrhage (PPH) are life-threatening obstetric emergencies that often occur together (eg, retained products causing infection and bleeding). Nursing management prioritizes aggressive airway, breathing, and circulation (ABC) support; rapid fluid resuscitation; administration of uterotonics and broad-spectrum antibiotics; and continuous maternal vital sign monitoring.

IV. RAPID TRIAGE & EMERGENCY ASSESSMENT

Because both conditions cause rapid clinical deterioration, identifying them early is critical.

Maternal Early Warning Score (MEWS): Monitor vital signs (temperature, heart rate, respiratory rate, blood pressure continuously to detect early signs of shock.

Quantification of Blood Loss (QBL): Weigh pads and chux meticulously rather than visually estimating blood loss.

Lab Assessments: Urgently check serum lactate, complete blood count (CBC), and coagulation studies (PT/INR, PTT, fibrinogen).

V. POSTPARTUM HEMORRHAGE (PPH) MANAGEMENT

Fundal Massage: Assess the uterine fundus. If it is boggy, perform firm fundal massage to stimulate contraction.

Bladder Decompression: A full bladder displaces the uterus and prevents contractions. Insert a Foley catheter to keep the bladder empty.

Medication Administration: Administer prescribed first-line uterotonics (eg, Oxytocin) followed by second-line medications (eg, Methylergonovine, Carboprost, Misoprostol) as ordered.

Hemodynamic Support: Infuse crystalloids (Normal Saline or Lactated Ringer's) rapidly to maintain blood pressure.

Prepare for Interventions: Assist with bimanual compression, uterine balloon tamponade, or surgical interventions (eg, laceration repair, D&C, or hysterectomy) if bleeding persists.

VI. MATERNAL SEPSIS MANAGEMENT

The "Sepsis Six" Bundle: Initiate the following within one hour of recognizing severe sepsis:

- Administer Oxygen: Maintain adequate oxygenation (target\(\text{SpO}_2 > 94\%\)).
- Blood Cultures: Draw blood cultures before administering antibiotics.
- Broad-Spectrum IV Antibiotics: Give within 1 hour, typically a combination targeting genitourinary and soft-tissue infections.
- Serum Lactate & FBC: Evaluate lactate levels and organ function.
- IV Fluid Resuscitation: Administer a fluid bolus (eg,\(30\text{ mL/kg}\)or\(500\text{ mL}\)over 15 minutes for hypotension).
- Measure Urine Output: Monitor hourly urinary output (aim\(> 0.5\text{ mL/kg/hr}\)).
- Source Control: Faclitate the removal of the infection source. This may involve the evacuation

of retained placental products, perineal wound care, or abscess drainage.

- Vasopressor Therapy: If hypotension persists despite aggressive fluid resuscitation, initiate vasopressors (eg, Norepinephrine) in an ICU setting.

VII. MULTIDISCIPLINARY COORDINATION & EDUCATION

Team Collaboration: Immediately notify the primary obstetrician, anesthesia team, and critical care (ICU) specialists.

Infection Control: Enforce strict aseptic technique during invasive procedures (eg, catheterizations, laceration repairs).

Emotional Support: Provide clear, compassionate communication and updates to the patient and her family regarding the emergency interventions being performed

VIII. PREVENTION OF METERNAL SEPSIS

- Sepsis can't always be prevented, but the risk can be reduced significantly by taking certain steps to prevent or quickly treat infections. Here are some suggestions:
- Be up-to-date on routine vaccinations
- If doctor recommends an invasive procedure, ask why it is necessary and if there are any non-invasive options
- Reduce the number of vaginal examinations during labor
- Ask anyone who touches if they have washed their hands first
- Contact healthcare provider if membranes rupture prematurely
- If a Cesarean section is recommended, ask why and if there is an option for a vaginal birth when possible
- Following childbirth, report if experience a fever, any increase of abdominal pain or bleeding, or any foul-smelling vaginal discharge
- Contact healthcare provider if suspect you have an infection
- After childbirth, follow your provider's instructions regarding care of your vaginal area or your surgical incision

IX. CONCLUSION

Sepsis during and following pregnancy remains an important cause of maternal death globally, accounting for 11% of all maternal deaths. Sepsis is thought to be the consequence of the body's inflammatory response to bacterial endotoxins and exotoxins. Cytokines and immunomodulators are produced by the body to fight infections and in large quantities their release causes a succession of critical events involving multiple organ systems. When an infection is untreated, this response can cause organ dysfunction, septic shock and death.

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