Provincial Maternal Sepsis Order Set

Additional Information

September, 2022

Created By:

Maternal & Children's Provincial Program KMU

Acknowledgments

We would like to thank the creators of the order set:

- Dr. Sivertson – Provincial Department Head
- Dr. C. Lett – ADL – Obstetrics and Gynecology - Regina
- Dr. Regush - QAS Lead - Saskatoon
- Karen Robertson – CNE - JPCH
- Justin Kosar – JPCH Pharmacy Manager

Any questions about the Maternal Order Set or Maternal Sepsis Informational Package please contact the Maternal and Children's Provincial Program at:

MatChildKMU@saskhealthauthority.ca

Provincial Maternal Sepsis
Order Sets: Additional Information

Purpose

To assist in successful utilization of the **Maternal** Sepsis Order Sets and provide additional information and resources to health care providers.

Maternal – refers to an individual during pregnancy, childbirth and the postnatal period (up to 6 weeks after childbirth).

OBJECTIVES

- Understand maternal sepsis
- Identify differences/ variations between the obstetrical and non-obstetrical patient
- Recognize signs and symptoms of maternal sepsis with adequate assessment
- Recognize risk factors for maternal sepsis
- Apply the maternal sepsis algorithm in practice with early recognition of maternal sepsis

Table of Contents

Provincial Maternal Sepsis Order Set

Saskatchewan health care professionals need to be aware of the early warning signs of sepsis in the obstetrical patient and prepared to actively manage these cases in a timely manner. Expediency is crucial once diagnosed and critical to survival of the maternal patient. This order set has been developed to prepare and guide health care professionals across Saskatchewan.

These documents can be located from the following resources:

1. **Maternal Sepsis Provincial Order set and Additional Information** can be found on the Saskatchewan Health Authority Clinical Standard and Professional Practice Clinical Resources page at: https://www.saskhealthauthority.ca/intranet/departments-programs-resources/clinical-standards/clinical-resources/care-area-specific-resources/maternalchildrens-health

2. **This Maternal Sepsis Order package** can be found on the Moms and Kids website at: https://momsandkidssask.saskhealthauthority.ca/about-us/provider-resources/pregnancy-birth-newborn-resources

Maternal Sepsis

Sepsis is a national health concern and is the leading cause of maternal deaths worldwide[1]. Maternal sepsis is defined as organ dysfunction in the maternal patient caused by infection during pregnancy, delivery, puerperium, or after an abortion. Appropriate bedside assessment will aid in early detection of maternal sepsis and allow for early intervention. Timely and targeted antibiotic therapy and fluid resuscitation are critical for survival in patients with suspected sepsis[5].

There are physiologic, immunologic and mechanical changes that occur throughout pregnancy which make the maternal patient more susceptible to infections. These changes may also obscure the signs and symptoms of infection and sepsis, which could then delay the recognition and treatment. A standardized and clear diagnostic approach is key in stopping the progression from sepsis to septic shock. Implementation of an effective management protocol **within the first hour of sepsis** diagnosis is essential for the reduction of maternal mortality [2].

Once maternal sepsis is diagnosed, the approach should become multidisciplinary, with escalation of care when necessary to reduce maternal morbidity and mortality[5].

Maternal Signs and Symptoms

When it comes to sepsis remember it is about TIME[3]:
Temperature – higher or lower than normal
Infection – signs and symptoms of infection
Mental Decline – confusion, lethargy, difficulty to arouse
Extremely ill – feeling unwell, severe pain or discomfort, shortness of breath

Variations between Obstetrical and Non-Obstetrical Patient

Systemic Inflammatory Response Syndrome (SIRS) – variations between obstetric and non-obstetric patient[4]. This is a comparison in the signs and symptoms in comparison of the obstetrical and non-obstetrical adult patient which includes modifications due to the physiological, immunological and mechanical changes that happen in the obstetrical patient.

Parameters	Obstetric Patient	Non-obstetric adult Patient
Fetal Heart Rate	Fetal tachycardia >160	Not included
Temperature	Oral temperature less than 36°C or greater than or equal to 38°C	Same Values
Patient Heart Rate	Greater than 110 bpm	Greater than 90bpm
Respiratory Rate	Greater than 24 breaths per minute	Greater than 20 breaths per minute
White Blood Cell Count	Greater than 15 x 10^9/L or less than 4 x 10^9/L **OR** Greater than 10% immature neutrophils in last 24h	Greater than 12x10^9/L or less than 4x10^9/L
Mental Status	Agitated, confused or unresponsive	Same Value

Table 1: Variations between obstetrical and non-obstetrical patients[4]

Maternal Risk Factors

Although every obstetrical patient is at risk for sepsis, there are specific patient characteristics that are associated with increased risk. Patients with identified risk factors should be closely observed during the prenatal and postpartum periods[5].

Perinatal Risk Factors:

- Obesity
- Diabetes
- Anemia
- Immunosuppression (e.g. HIV)
- Previous pelvic infection
- IV drug use
- Exposure to Group A and/or B Streptococcus
- Chronic patient conditions such as:
    - Congestive heart failure
    - Chronic kidney disease

Obstetrical Risk Factors:

- Recent surgery, operative delivery or invasive procedure such as:
  - Cesarean delivery
  - Retained placental products
  - Cervical cerclage
  - Amniocentesis or other invasive procedures
  - Complex perineal lacerations
  - Wounds
- Retained products of conception
- Prolonged rupture of membranes

Causes of Maternal Infection

Causes of maternal sepsis differ from those for the non-obstetric adult population. The most common causes of maternal sepsis during and after hospitalization were genitourinary and respiratory [5]. The more common sources of maternal sepsis vary in relation to the stage of pregnancy (for example antenatal, intrapartum or postpartum periods)[5].

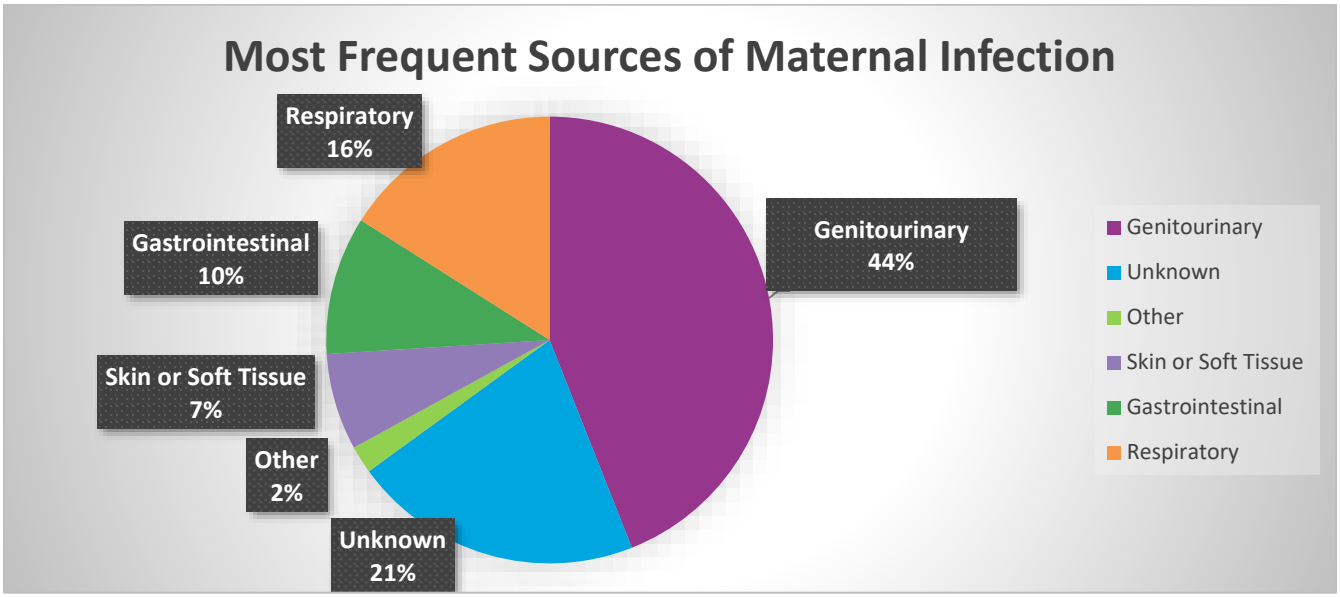

Chart 1: Causes of Maternal Infection[5,6]

Recognizing Maternal Sepsis and Assessment

ALERT: The Golden Hour of Maternal Sepsis

Give IV fluid bolus and first dose of antibiotics STAT within this hour

It is important for health care professionals to always maintain a high level of suspicion for maternal sepsis and, if detected, have rapid escalation of care[5]. Early recognition of the signs and symptoms of maternal sepsis is vital, and success of subsequent management is dependent upon the time from symptom recognition to initiating the appropriate interventions [7].

Maternal symptoms:

- Lethargy
- Chills
- Generalized malaise
- Rashes
- Lower abdominal pain or pelvic pain
- Foul lochia
- Contractions
- Vaginal discharge
- Breast engorgement
- Diarrhea and/or vomiting

Assessing maternal vital signs and recognizing the **early warning signs in the patients' blood pressure, heart rate, respiratory rate, temperature, saturation levels and mental status** will play a key role in identifying early infection.

Maternal Signs:

- Fever or hypothermia
- Tachycardia
- Hypotension
- Uterine tenderness
- Preterm labour or preterm pre-labour rupture of membranes
- Altered mental status
- End-organ dysfunction
- Decreased urinary output
- Shortness of breath

It is important to consider external influences such as blood loss during delivery, common infections (i.e. chorioamniotisis), fluid administration, medications and effects of anesthesia. These could alter the clinical picture. There is often no obvious source, which can make recognizing maternal sepsis more challenging and can result in delays in treatment[5].

Maternal sepsis is an obstetrical emergency. Fluid resuscitation and antibiotic administration should be initiated within the first hour after identifying maternal sepsis. Applying the "golden hour" concept is crucial to improve patient outcomes[5]. Survival rates drop with delays in treatment past an hour. Poor outcomes and an increased risk for maternal death have been seen with a delay in recognition, treatment and escalation of care in the obstetric population[5].

Management of Maternal Sepsis

Initiate Fluid Resuscitation.

Provide **first dose of antibiotics within first hour of sepsis diagnosis.**

Draw blood cultures prior to antibiotic therapy ****DO NOT** delay antibiotics if unable to obtain blood cultures!

Consider transfer to closest critical care and/or obstetrical site if additional care is required.

Ongoing Maternal Assessment

Maternal Assessments

- 1:1 nursing with continuous presence
- Continuous $Sp0_2$ monitoring
- BP, HR, and RR every 15 minutes
- Temperature every 30 minutes
- Level of Consciousness hourly
- Input and Output hourly
- Appropriate fetal surveillance for gestational age

Maternal Sepsis Clinical Algorithm

The Maternal Sepsis Clinical Algorithm is a screening tool to guide health care providers in the primary and acute care settings. This algorithm will assist the provider in the initial assessment, diagnosis and prioritization of treatment for maternal sepsis. The patient at risk for maternal sepsis is evaluated with a scoring tool and the health care provider can then determine if their patient meets the criteria for maternal sepsis or has identified risk factors.

Following diagnosis of maternal sepsis, the algorithm will guide health care providers through the critically important "golden hour" for initiating fluid resuscitation and antibiotic therapy. Guidance is given for ongoing assessment, appropriate steps in management, and the indications for critical care consultation.

The algorithm should be printed and posted in all assessment/clinical settings to be used as an early identification tool, thereby facilitating rapid resuscitation in order to decrease morbidity and mortality of the obstetrical patient.

- **Maternal Sepsis Clinical Algorithm – link and QR code below**

https://www.saskhealthauthority.ca/system/files/2022-09/CS-A-0003-Maternal-Sepsis-Algorithm.pdf

References

1. Vaught AJ. Maternal Sepsis. Semin Perinatal 2018;42:9-12. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8015781/

2. Escobar MF, Echavarria MP, Zambrano MA, Ramos I, Kusanovic JP. Maternal Sepsis. Am J Obset Gynecol MFM 2020;2:100149. https://pubmed.ncbi.nlm.nih.gov/33345880/

3. Symptoms. Sepsis Allicance n.d. https://www.sepsis.org/sepsis-basics/symptoms/

4. Champagne HA, Garabedian MJ. Routine Screening for Sepsis in an Obstetric Population: Evaulation of an Improvement Project. Perm J 2020;24:19.232. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7849262/

5. Shields A, de Assis V, Halscott T. Top 10 Pearls for the Recognition, Evaluation, and Management of Maternal Sepsis. Obstet Gynecol 2021; 138:289-304. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8288480/#FB1

6. Hensley MK, Bauer ME, Admon LK, Prescott HC. Incidence of Maternal Sepsis and Sepsis-Related Maternal Deaths in the United States. JAMA 2019;322:890. https://doi.org/10.1001/jama.2019.9818

7. Dawkins JC, Fletcher HM, Rattray CA, Reid M, Gordon-Stracjam G. Acute Pylenonephritis in Pregnancy: A Retrosprective Desciptive Hosptial Based-Study. ISRN Obstetrics and Gynecology 2012;2012:1-6. https://doi.org/10.5402/2012/519321

8. Edwards W. Dore S, van Schalkwyk J, Armson BA. Priotitizxing Maternal Sepsis: National Adoption of an Obstetrical Early Warning System to Prevent Morbidity and Mortality. Journal of obstetrics and Gynecology Canada 2020;42:640-3. http://doi.org/10.1016/j.jogc.2019.11.072

Saskatchewan Health Authority

CS-LM-0018