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Case Report

Maternal Sepsis in Pregnancy: Peripartum Management -

**Jean Claude Uwimana^{1*}, Francoise Nizeyimana¹, Megan Olejniczak²,
and Jean Bonaventure Uwineza³**

¹Department of Anesthesia, University of Rwanda, College of Medicine and Health Sciences, Kigali, Rwanda

²Department of Anesthesiology, Minneapolis, Minnesota, USA

³Centre Hospitalier Universitaire de Kigali (CHUK), Rwanda

***Address for Correspondence:** Jean Claude Uwimana, Department of Anesthesia, University of Rwanda, College of Medicine and Health Sciences, Kigali, Rwanda, Tel: +250-782-752-037; ORCID: <https://orcid.org/0000-0001-8483-7737>; E-mail: uwijenclau9@gmail.com; uwijenclau@gmail.com

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INTRODUCTION

Sepsis is one of the most frequent causes of maternal mortality worldwide. It affects millions of people each year, killing as many as one in four, resulting in 75 000 maternal deaths annually [1-10]. There have been numerous attempts at refining the definition of sepsis in pregnancy. The 2016 Third International Consensus Definitions for Sepsis and Septic Shock (Sepsis-3) have replaced the earlier definitions. To reach a greater global consensus, WHO developed and proposed a new definition of maternal sepsis underpinning the medical concepts in Sepsis-3 definitions [2].

Sepsis (as per Sepsis-3 definitions) is now defined as life-threatening organ dysfunction caused by a deregulated host response to infection. The clinical criteria for sepsis include suspected or documented infection and an acute increase of two or more Sequential Organ Failure Assessment (SOFA) points as a proxy for organ dysfunction [1,3,5].

Based on Sepsis-3, WHO's definition of maternal sepsis states that it 'is a life-threatening condition defined as organ dysfunction resulting from infection during pregnancy, childbirth, post-abortion or postpartum period [2,6,11]. This new definition shifts the focus from inflammatory response to life-threatening organ dysfunction. Early recognition and treatment of infection can prevent organ failures. Healthcare professionals caring for pregnant women require a high degree of vigilance and skill to recognize early signs of sepsis [2].

CASE REPORT

A 26 years old (G1P0) female at 34 weeks and 3 days gestational age, presented to Centre Hospitalier Universitaire De Kigali (CHUK) with fever, chest pain and difficulty breathing for 6 days. 5 days prior to admission at CHUK, She had been diagnosed with simple malaria at health center and put on Artemether and Lumefantrine combination pill (Coartem). Despite treatment, symptoms persisted and she was transferred to district hospital and put on ceftriaxone and paracetamol with no improvement and she was transferred to CHUK for further management. On arrival at CHUK, she was dyspneic, ill-appearing, and had altered mental status with a Glasgow Coma Scale (GCS) score = 13/15. Respiratory Rate (RR) was 43 breaths/min on oxygen therapy 5l/min. SpO₂ = 95% Heart Rate (HR) was 136beats/min. Blood Pressure (BP) was 95/41 mmHg. Crackles were auscultated in the right lung base. There were no other abnormal findings on physical exam. Modified quick SOFA score = 2 based on her RR and her GCS score.

The differential diagnosis at this point included severe pneumonia, pulmonary embolism or malaria

Complete blood count revealed mild anemia (Hemoglobin (Hb): 9.2 g/dl, Hematocrit (Ht): 26.5%) and thrombocytopenia (platelet count 58,000), normal white blood cells count (7540/ μ l) with neutrophil (88.2%). Electrolytes were also normal. Liver enzymes were elevated (ASAT: 420.2 IU/L, ALAT: 111.4 IU/L). HIV test was negative. Chest X ray was not done at this time. CT angiography was negative for pulmonary embolus.

Despite these treatments, the patient showed no improvement. She had persistent fever and tachycardia, and tachypnea as well as worsening hypotension. At this point she met SIRS criteria with presumed sepsis due to pneumonia or malaria.

Fluid resuscitation was initiated with 2 litres of normal saline. Antibiotics were broadened to include cefotaxime and erythromycin and antimalarial treatment was changed to Artesunate. Fetal monitoring began on admission and was normal.

Despite these treatments, the patient remained hypotensive and Tachypneic. Her oxygenation worsened (SpO₂ = 90% on oxygen therapy 10l/min). Urine output remained adequate 1.2 ml/kg/h and there were no signs of pulmonary edema. Fetal Heart Rate (FHR) was appropriated (138 bpm) Adrenaline infusion 0.1-1 μ cg/kg/min was initiated to support blood pressure and organ perfusion since norepinephrine was not available at our hospital. Intravenous fluids (infusion) were continued at 150 ml/kg and oxygen therapy administered as 15 l/min by face mask

9 hours post start of broad spectrum antibiotics, due to declining respiratory status and need for mechanical ventilation, the anesthesia and obstetric team felt it was appropriate to perform an immediate cesarean section to help alleviate maternal distress and improve fetal outcome.

Emergency caesarean section was done under general anesthesia with fentanyl 100 μ cg, thiopental 400 mg, Suxamethonium 100 mg, intubation with Endotracheal Tube (ETT) 7 cuffed, Vecuronium 6 mg and morphine 6 mg.

Extraction of a female baby, APGAR = 7/10 at 1 minute, 8/10 at 5 minutes and 8/10 at 10 minutes. Weight = 1890 grams. Newborn was transferred to Neonatal Intensive Care (NICU) for management of prematurity, neonatal infection and respiratory distress syndrome with no need of any respiratory support. And 9 days later, she was discharged from the hospital in good health.

Intraoperatively, patient was transfused with 1 unit of platelets and 1 unit of packed red blood cells for anemia and thrombocytopenia. Tracheal aspirate was performed and grew Klebsiella and Acinetobacter sensitive to imipenem. Urine specimen was negative for infection.

After caesarean section, the patient was admitted to the intensive care unit for continued mechanical ventilation, antibiotics, vasopressors and fluids resuscitation. She was weaned off vasopressors over 48 hours and was extubated 6 days post-operatively. She was discharged from the Intensive Care Unit (ICU) to obstetrics and gynecology department on post-operative day 9.

LITERATURE REVIEW

The World Health Organization (WHO) in 2017 has adopted the following definition of maternal sepsis: Maternal sepsis is a life-threatening condition defined as organ dysfunction resulting from infection during pregnancy, childbirth, post-abortion, or postpartum period [2,6]. Risk factors for maternal sepsis include obesity, diabetes, impaired immunity, anaemia, vaginal discharge, history of pelvic infection, history of group B streptococcal infection, amniocentesis, cervical cerclage, prolonged spontaneous rupture of membranes, Group A Streptococcal (GAS) infection in close contacts, retained products of conception & Caesarean birth [6].

The quick SOFA (qSOFA), has been described to screen patients likely to have sepsis in a timely manner. In the non-pregnant patient, this score incorporates: systolic blood pressure of 100 mmHg or less, respiratory rate of 22/min or greater and altered mentation; Glasgow Coma Score (GCS) less than 15. For each variable present, a score



of 1 is attributed resulting in a score range of 0-3. A qSOFA score of greater than or equal to 2 has predictive validity for discriminating patients with an increased risk of in-hospital mortality [7].

A woman's gravid state will significantly impact several of the variables in the qSOFA. Sepsis (as distinct from infection) in pregnant women should be considered where 2 or more of the following are present: Systolic blood pressure of 90 mmHg or less, respiratory rate of 25/min or greater, altered mentation (any state other than 'Alert' on maternal observation charts) [7].

Septic shock is defined by the clinical criteria of sepsis and vasopressor therapy needed to elevate mean arterial pressure \geq 65 mmHg and lactate $>$ 2 mmol/L (18 mg/dL) despite adequate fluid resuscitation [1,3].

A target MAP of 65 mmHg is generally recommended in nonpregnant individuals. However, lower blood pressures may be acceptable during pregnancy, provided no signs of hypoperfusion are present (Such as altered mental status, oliguria, elevated serum lactate, cold extremities, or evidence of fetal compromise) [10].

DISCUSSION

The decision of delivering the fetus or continuing the pregnancy is influenced by patient's condition, gestational age, fetal status, presence of chorioamnionitis, and labour. The well-being of the fetus is compromised if sepsis reduces maternal arterial pressure and placental perfusion, whereas the gravid uterus beyond 20 weeks may cause decrease in lung volumes and venous return. Maternal sepsis may induce both labour and fetal death. After surgery, high dependency unit care is needed for continuous close observations of vital parameters. If the patient is critically ill, transfer to critical care is needed for mechanical ventilation, vasopressor support, or hemofiltration. The decision process should involve a multidisciplinary approach and discussion among obstetrician, neonatologist, microbiologist, intensivist, anaesthetist, and patient is essential. Septic vasodilated hypotensive patients may not tolerate the sympathetic block associated with spinal anaesthesia. There may be associated coagulopathy or thrombocytopenia and there is a risk of epidural abscess or meningitis. General anaesthesia is highly likely to be required in a septic parturient [4]. For our patient, we chose general anaesthesia to avoid the above mentioned risks associated with spinal anaesthesia in septic vasodilated hypotensive patients.

Based on the fact that there was deteriorating clinical status of the mother and need of mechanical ventilation with potential fetal

distress, the decision taken by the obstetric team was reasonable. The mother needed to be delivered to improve her oxygenation and ventilation and to increase the chances of survival for the newborn. While guidelines from the Society for Maternal-Fetal Medicine (SMFM) in the United States do not recommend fetal delivery based solely on the presence of maternal sepsis, this case illustrates that delivery of a mother with sepsis and deteriorating clinical status may improve her oxygenation and ventilation and increases the chances of survival for both mother and the newborn [11].

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