

# **Preventing Early-Onset Neonatal Sepsis: A Collaborative Approach to Promoting Adaptation for Asymptomatic Neonates**

Wendi Gines, DNP, RN

Structured Abstract

## **LOCAL PROBLEM**

Early-Onset Neonatal Sepsis (EONS) is the leading cause of neonatal mortality and morbidity occurring in the first seven days of life. Symptoms usually develop within 12-24 hours after birth. Maternal chorioamnionitis, usually caused by Group B Streptococcus or Escherichia coli presents the greatest risk for development of EONS. Healthcare professionals are challenged with identification, management, and treatment of infants exposed to maternal chorioamnionitis while decreasing the unintended consequences of antibiotic use, including toxicity and antimicrobial resistance. Evidence demonstrates timely initiation of antibiotics reduces morbidity and mortality in infants with infections such as sepsis. However, clinicians prescribe antibiotics inappropriately or unnecessarily 20-50% of the time. Interprofessional collaboration is a key factor in improving patient outcomes. Measures to increase antibiotic stewardship requires a multilayered interprofessional approach in implementation of policies and procedures to guide physicians, nurses, and pharmacists.

## **PROJECT PURPOSE**

This project aimed to develop and implement an interprofessional collaborative protocol to increase standardization of early identification, management, and treatment of neonates at risk for EONS, improve antibiotic stewardship, and provide education for the perinatal healthcare team.

## **METHODOLOGY**

Kotter's Eight Step Change Theory was used to guide development, implementation, and evaluation of the quality improvement project. Change strategies included (1) development of an interprofessional chorioamnionitis task force comprised of perinatal physicians and nurses, a women's health educator, and a pharmacist, (2) the development of an interprofessional institutional algorithm and, (3) an education campaign focused on promoting interprofessional collaboration and shifting away from current practices of prophylactic antibiotic prescriptions to all neonates exposed to maternal chorioamnionitis.

Initially, Baptist Health System provided the Doctor of Nurse Practice (DNP) student with CERNER access to maternal and newborn records of neonates born at the practice site. The DNP student collected maternal and newborn data of all neonates born to mothers diagnosed with chorioamnionitis between September 2019 and January 2020 to apply pre-algorithm data to the institutional algorithm retrospectively and support its use.

The institutional algorithm was implemented prospectively between February 2020 and March 2020 and data were collected over a 3-week period. Due to Covid-19 pandemic full implementation was not feasible. An asymptomatic neonate exposed to maternal chorioamnionitis in labor and delivery (L&D) triggered the use of the institutional algorithm and continued in the newborn nursery (NBN) when the neonate was transferred. Analysis included review of maternal and neonatal characteristics. Maternal data consisted of GBS status, maternal

temperature  $\geq 100.4$  F, rupture of membranes  $\geq 18$  hours, and histological chorioamnionitis. Neonatal data consisted of gestational age, lab results (initial CBC results  $\geq 30$  thousand, initial I:T ratio  $\geq 0.2$ , repeat CBC results  $\geq 30$  thousand, repeat I:T ratio  $\geq 0.2$ , and blood culture results), any admission to the neonatal intensive care unit, clinical presentation or vital signs outside of normal limits, and administration of antibiotics. A valid evaluation tool was developed to assess the perceptions of healthcare professional use of the algorithm. Due to practice dynamics, the implementation of the evaluation tool was not feasible and could not be done.

## **RESULTS**

When pre-algorithm data (n=56) were applied to the algorithm retrospectively, second CBC's should have been obtained on 15 neonates, however 21 second CBC's were obtained. All blood cultures were negative after 48-72 hours. Four (4%) neonates met algorithm criteria to receive prophylactic antibiotics, however 100% (n=56) received prophylactic antibiotics. During the three-week implementation period, six neonates were exposed to maternal chorioamnionitis. All blood cultures for the six neonates were negative after 48-72 hours. In 50% (n=3) of the cases the algorithm was applied effectively. These neonates had normal clinical presentation, WBC, and I:T ratios. In the other 50% (n=3) the institutional algorithm was not utilized due to a combination of opting out and unknown factors. Two of the six neonates would have required antibiotics but did not receive them, and one neonate received antibiotics and did not meet algorithm requirements. The implementation of a chorioamnionitis institutional algorithm resulted in a decrease of prophylactic antibiotics.

## **IMPLICATIONS FOR PRACTICE**

A chorioamnionitis institutional algorithm supported interprofessional collaboration and provided perinatal healthcare professionals with a standardized protocol for identification, management, and treatment of EONS. The algorithm integrates a diverse set of variables to promote antibiotic stewardship. To our knowledge, the chorioamnionitis institutional algorithm is the first interprofessional algorithm used at the practice site and while there was some resistance by nurses and physicians, the algorithm was well received by most. During the implementation of the institutional algorithm, the practice site was preparing for Joint Commission on Accreditation of Healthcare Organizations (JCAHO) followed by the COVID-19 pandemic and could have contributed to barriers and limitations of implementing the institutional algorithm. Further research regarding the efficacy of the institutional algorithm is indicated.

*Keywords:* maternal chorioamnionitis, early-onset neonatal sepsis, antimicrobial stewardship, algorithm, interprofessional collaboration

Team Leader: Dr. Ellen Buckner

Team Member(s): Dr. Patricia Fichter-Patrick