In asymptomatic term newborns at risk for sepsis, is a six-hour CBC a better predictor of sepsis than a one-hour CBC?

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Background

Neonatal sepsis is an invasive infection and remains one of the leading causes of morbidity and mortality among both term and preterm infants (Shah, Padbury, 2014). The current practice at Inova Fairfax Medical Campus is to obtain a complete blood count (CBC) at one hour and again at 12 hours of life on all newborns at risk for sepsis. At one hour of life, there is normal decreased perfusion to limbs making it difficult to obtain viable blood sample from a newborn. Multiple venous punctures are often utilized to obtain the sample which can be distressing to parents and their newborns. New practice guidelines from CDC and the American Academy of Pediatrics (AAP) support a CBC to be performed at 6-12 hours of life for low-risk, well-appearing infants (Merck Manual, 2019).

Purpose

The purpose of this Evidence Based Practice Project is to analyze the newest data on prevention of neonatal sepsis put out by CDC in collaboration with the American Academy of Family Physicians, American Academy of Pediatrics, American College of Nurse-Midwives, American College of Obstetricians and Gynecologists, and American Society for Microbiology. As clinicians working for a facility that prides itself on excellence in patient care, education, and research, it is our duty to implement the changes necessary to provide the highest quality health care to our patients.

Methodology

Databases Utilized

- PubMed, UpToDate, AAPPublications

Key Terms

- Neonatal sepsis guidelines, newborn risk for sepsis, neonatal sepsis complete blood count

Inclusion Criteria

- Published in English between January 2009-July 2018
- Containing Key Terms
- Academic, peer-reviewed journals

Exclusion Criteria

- >10 years old publication date

Quality and Level of Evidence

- 4 Level III Articles of good to high quality
- 1 Level V Article of high quality

Data Collection

- Number of positive CBCs collected for one-month period

Implementation of Evidence

- Brought data collected and evidence of best practice to Nursery Advisory Committee

Methodology (continued)

Findings

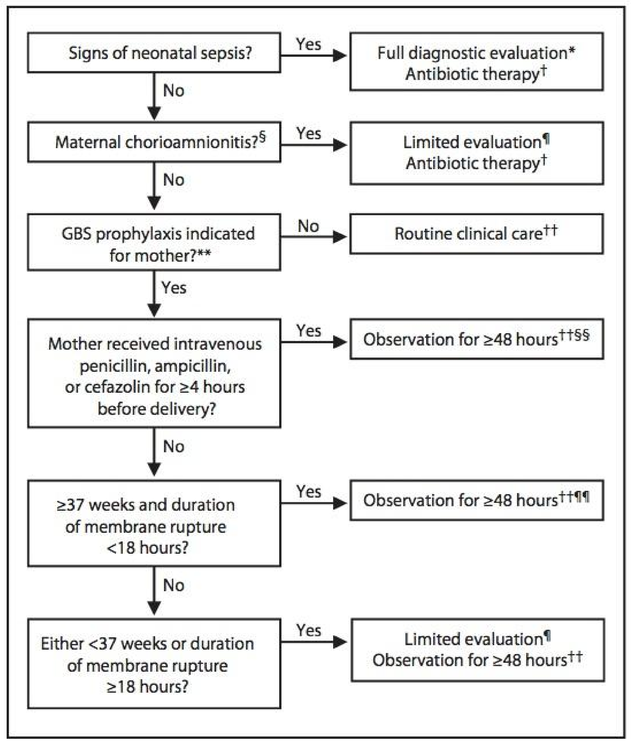
-The evidence shows that values obtained after six hours of life are better predictors of sepsis and more clinically useful than those obtained immediately after birth (Merck Manual).

-If chorioamnionitis is present, preterm and term neonates should have CBC with differential at 6-12 hours of life (Brady, Polin, 2013).

-If maternal GBS prophylaxis was indicated and given appropriately, infants should be observed and testing should be done if symptoms occur. If GBS prophylaxis was not given, CBC with differential should be done at 6-12 hours of life (Brady, Polin, 2013).

-If neonate is either <37 weeks gestation or membrane rupture is >18 hours, CBC with differential should be done at 6-12 hours of life (Brady, Polin, 2013).

FIGURE 9. Algorithm for secondary prevention of early-onset group B streptococcal (GBS) disease among newborns



* Full diagnostic evaluation includes a blood culture, a complete blood count (CBC) including white blood cell differential and platelet counts, chest radiograph (if respiratory abnormalities are present), and lumbar puncture (if patient is stable enough to tolerate procedure and sepsis is suspected).
† Antibiotic therapy should be directed toward the most common causes of neonatal sepsis, including intravenous ampicillin for GBS and coverage for other organisms (including *Escherichia coli* and other gram-negative pathogens) and should take into account local antibiotic resistance patterns.
§ Consultation with obstetric providers is important to determine the level of clinical suspicion for chorioamnionitis. Chorioamnionitis is diagnosed clinically and some of the signs are nonspecific.
¶ Limited evaluation includes blood culture (at birth) and CBC with differential and platelets (at birth and/or at 6–12 hours of life).
** See table 3 for indications for intrapartum GBS prophylaxis.
†† If signs of sepsis develop, a full diagnostic evaluation should be conducted and antibiotic therapy initiated.
§§ If ≥37 weeks' gestation, observation may occur at home after 24 hours if other discharge criteria have been met, access to medical care is readily available, and a person who is able to comply fully with instructions for home observation will be present. If any of these conditions is not met, the infant should be observed in the hospital for at least 48 hours and until discharge criteria are achieved.
¶¶ Some experts recommend a CBC with differential and platelets at age 6–12 hours.

November 2010

GBS | Prevention Guidelines Algorithms and Tables | Group B Strep | CDC. (2016, May 23). Retrieved February 11, 2019, from https://www.cdc.gov/groupbstrep/guidelines/algorithms-tables.html

Implications for Practice

The evidence is consistent in that well appearing neonates at risk for sepsis should not receive a complete blood count (CBC) until at least six hours of life. Values obtained at or after six hours are more clinically useful as compared to those obtained immediately after birth.

The evidence reviewed is consistent across all of the research and provides a compelling indication for practice change in support of the implementation of the algorithm pictured on this board. This was taken to the Nursery Advisory Committee at Inova Fairfax Medical Campus in attempt to change current practice to support this new evidence. With continued data collection and support from the Nursery Advisory Committee, we plan to implement these best practice recommendations in order to provide the highest quality health care to our patients and their families.

References

Brady, M.T., & Polin, R.A. (2013). Prevention and Management of Infants with Suspected or Proven Neonatal Sepsis. *Pediatrics*, *132*(1), 166-168. doi:10.1542/peds.2013-1310

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