PIONEERING DIAGNOSTICS

LEARNING LOUNGE EXCLUSIVE : NEONATAL SEPSIS AND GROUP B STREP

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Group B Streptococcus (GBS) often lives in the gastrointestinal and genital tracts of healthy adults without causing harm. However, it can pose a danger to infants, elderly patients, and patients with diabetes. GBS infections are a leading cause of neonatal sepsis and meningitis, and antibiotic prophylaxis is recommended during labor for pregnant women who test positive for Group B Strep within their third trimester. In this article, Toni Rodriguez speaks to the importance of identification and management of GBS strains in pregnant women and infants to reduce the risk of neonatal sepsis. Toni Rodriguez is currently an associate director of Global Medical Affairs at bioMerieux and she has previously worked for various biotechnology, pharmaceutical, and diagnostic companies with responsibilities in Medical Affairs. Her early nursing career included working as an RN at several acute care hospitals in California.

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bioMérieux: GBS is a leading cause of meningitis and sepsis in newborns.[1] What are the consequences of neonatal sepsis in both the short term and the long term?

Rodriguez: In the short term, within hours, a baby with sepsis can be in a life-threatening situation. Without timely treatment, it can rapidly lead to tissue damage, organ failure, and death.[5] Babies may also have long-term problems, such as deafness and developmental disabilities. Babies who had meningitis are especially at risk for having long-term problems.[1]

Babies who get GBS disease in their first week of life are considered to have early-onset disease (EOD). Babies who develop GBS disease from the first week through three months of life have late-onset disease (LOD).[1] Although care for sick babies has improved in the US, the infant mortality rate is at 4-6% for those who develop GBS.[1]

bioMérieux: In 2020, the American College of Obstetricians and Gynecologists and the American Academy of Pediatrics published new guidelines for management of GBS.[2] What prompted the change and what are the most notable differences in the new guidance?

Rodriguez: The American College of Obstetricians and Gynecologists recommends performing universal GBS screening between 36 and 37 weeks of gestation. Notable differences include expanded recommendations regarding management and treatment of women with penicillin allergy and review of appropriate antibiotic regimens for intrapartum antibiotic prophylaxis (IAP).[2]

The changes are intended to strengthen the current obstetric practices and processes designed to identify and optimize treatment of maternal GBS colonization, thereby decreasing rates of GBS early-onset disease in newborns.[2]

bioMérieux: Serotype III ST-17 has been associated with neonatal meningitis and sepsis when present in GBS isolates.[3] Why is this particular serotype associated with more severe disease states?

Rodriguez: Serotype III accounts for 62% of fetal and neonatal disease cases. Serotype III ST-17 GBS strains are especially concerning given their disproportionately high associations with EOD, LOD, sepsis, and meningitis. In a retrospective analysis of serotype and ST laboratory-based surveillance in 10 U.S. states, it was found that ST-17 accounted for 78% of EOD (49/63) and 87% of LOD (161/186) cases caused by serotype III GBS. This tight correlation between ST-17 and invasive neonatal disease stems from the presence of multiple mobile genetic elements that harbor ST-17-specific virulence factors that facilitate invasion of the neonatal brain. Hypervirulent ST-17 GBS strains account for 90% of clinical isolates in meningitis cases.

bioMérieux: Screening for GBS at 36/37 weeks of pregnancy is typical in the U.S., but GBS screening may not be as accessible in other regions.[4] What recommendations would you give to healthcare professionals (HCP) in low- and middle-income countries (LMIC) for reducing the risk of neonatal sepsis from GBS?

Rodriguez: IAP prevents most early-onset GBS, but there is no data for how IAP is used around the world. The GBS Intrapartum Antibiotic Investigator Group performed a review to estimate the burden of GBS disease and determine the GBS screening policies and IAP implementation worldwide. Source of data was through (1) systematic review of the published literature and (2) reviews of online policies and an online survey submitted to clinicians, researchers, and relevant professionals worldwide. An existing IAP policy was identified in 95 countries out of 195 UN member states.[4]

Data gathered from the review demonstrated that only 13% of low-income, and 25% of lower-middle–income countries had any IAP policy. The review showed there is considerable heterogeneity in IAP screening policies and coverage worldwide.[4] HCPs in LMICs must find alternative strategies, such as maternal GBS vaccination – which may be more likely to reach the poorest at higher coverage than IAP – to enhance the scope of global prevention of GBS disease.[4]

bioMérieux: Neonatal sepsis is a leading cause of infant mortality that is worsening due to antibiotic resistance.[5] What are the challenges to finding improved treatment for neonatal sepsis?

Rodriguez: Research to identify new treatment strategies for neonatal sepsis in hospitals, especially in LMICs, has been held back by:

- limited knowledge of current approaches to treatment and care
- incomplete data on the most common pathogens and resistance patterns
- a lack of suitable tools for characterizing neonatal sepsis

Improved clinical care and the ability to run robust clinical trials are needed. However, the lack of use of standardized definitions of neonatal sepsis, difficulty in collecting appropriate samples, and inadequate diagnostics stand in the way. In most cases, blood culture does not identify a causative pathogen, and culture results are typically not obtained for several days.[5]

bioMérieux: A recent study by the Global Antibiotic Research and Development Partnership (GARDP) showed that last-line antibiotics were prescribed to 15% of babies with neonatal sepsis.[5] What does this mean for the future treatment of neonatal sepsis derived from GBS infections? How can we slow the climb of resistant GBS infections?

Rodriguez: In the GARDP study, only a minority of patients (13%) received the WHO standard of care: ampicillin and gentamicin. There was increasing use of last-line agents such as carbapenems or even polymyxins. This is cause for alarm and serves as a warning of the impending crisis of a lack of antibiotics to treat sepsis caused by multidrug-resistant organisms (MDRO).[5]

GARDP recommends that policymakers, researchers, the private sector and funders take steps to strengthen the international response to neonatal sepsis and to mitigate the impacts of antibiotic resistance upon children and babies.[5] Prescribers need to monitor the proper use of antibiotics and encourage this practice in health centers and pharmacies. Diagnostics are a part of a holistic antimicrobial stewardship strategy designed to improve patient safety and ensure the right medication is given at the right time and in the right amount. Early time to diagnosis in cases of sepsis is a decisive factor in determining patient outcomes.

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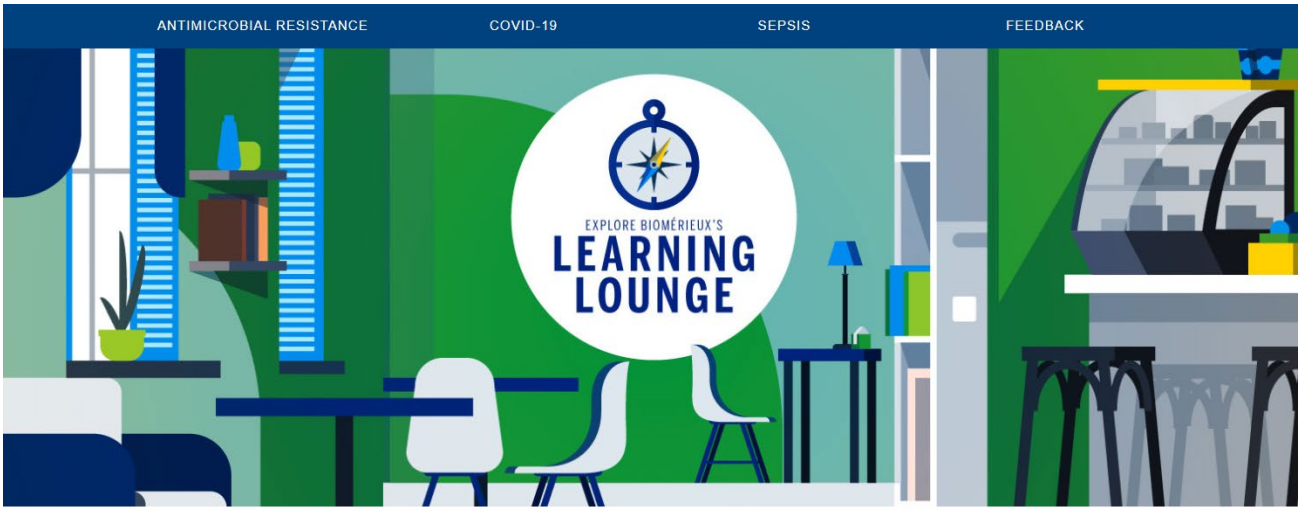

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