Background

- Group B Streptococcus (GBS) is a gram-positive opportunistic pathogen that colonizes the gastrointestinal tract and genitourinary tracts of up to 50% of healthy adults. This pathogen can cause sepsis, meningitis and pneumonia in neonates, and is a leading cause of neonatal morbidity and mortality in the US.  

- In infants, GBS is classified as either early onset (EO) (<7days of age) or late onset (LO) (7 – 89 days of age) 1,2. 

- There are a number of well-established risk factors associated with GBS including 3-5:
  - maternal GBS bacteriuria 
  - maternal infection in the peripartum period 
  - in utero prematurity 
  - prematurity and prolonged rupture of membranes 
  - fetal tachycardia 
  - longer hospital stays for infants following delivery 

- Risk factors and routes of GBS transmission are poorly understood 3-5. Risk factors associated with GBS include:
  - maternal GBS bacteriuria 
  - premature birth (<37 weeks gestation) 
  - low birth weight (<2500g) 
  - maternal age 35+ years 
  - non-white race

- Following the implementation of the 1996 CDC guidelines for the prevention of perinatal GBS, data showed a significant protective effect of culture-based relative to a risk-based screening approach.  

- In 2002, CDC published a revised prevention strategy recommending universal culture-based prenatal screening for vaginal and rectal colonization of GBS in all pregnant women between 35 and 37 weeks gestation. 

Methods

- Through the Emerging Infections Program (EIP) collaboration between CDC and ten state health departments, the NYS Active Bacterial Core Surveillance (ABCs) has conducted active population-based surveillance for GBS since 2000 in 15 counties in the Albany and Rochester regions (pop. 2.1 million)  

- National rates were taken from CDC’s national ABCs network. The national surveillance areas represent a population of 33.1 million people, and 424,908 live births. 

- Standardized case report forms are completed for all EO and LO GBS cases through medical record reviews. EO and LO cases identified between 2000 and 2014 were analyzed using SAS version 9.4. 

- NYS vital records data was used to calculate incidence rates per 1,000 live births in ABCs counties, stratified by race. 

Results

- There were 99 cases of EO, and 112 cases of LO GBS in ABCs counties in NYS between 2000 through 2014. Rates fluctuated between 0.40 EO cases and 0.30 LO cases per 1,000 live births in 2000, and 0.35 EO and 0.31 LO cases per 1,000 live births in 2014. 

- As shown in Table 1, EO and LO GBS cases were comparable in terms of gender, maternal age, delivery type and likelihood of receiving prenatal care. A greater proportion of EO-GBS cases resulted in death compared to LO cases (8.1% compared to 1.8%).

Table 1. Characteristics of Infants with Early- and Late-Onset Group B Streptococcal GBS Disease, 2000–2014 (N = 211)

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>EO (N = 99)</th>
<th>LO (N = 112)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Birth Weight</td>
<td>&lt;2500 g</td>
<td>&lt;2500 g</td>
</tr>
<tr>
<td>Maternal Age</td>
<td>&lt;35 years</td>
<td>&gt;35 years</td>
</tr>
<tr>
<td>Race</td>
<td>White</td>
<td>Black</td>
</tr>
<tr>
<td>GBS Bacteriuria</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Prenatal Care</td>
<td>Received</td>
<td>Not Received</td>
</tr>
<tr>
<td>Delivery Type</td>
<td>Vaginal</td>
<td>C-Section</td>
</tr>
<tr>
<td>Pregnancy History</td>
<td>No NGS</td>
<td>No NGS</td>
</tr>
<tr>
<td>Hospital Stay</td>
<td>&gt;37 days</td>
<td>&lt;37 days</td>
</tr>
</tbody>
</table>

- Figure 1. Early Onset GBS Incidence in NYS ABCs Counties and US by Race, 2000 – 2014

- The incidence rate of LO GBS has shown little change over the 15-year period, including the disparity seen between black and white infants. 

- Black infants continue to experience disproportionately high rates of GBS compared to white infants (1.0 vs 0.23 per 1,000 live births in 2014) 

- The proportion of LO GBS cases that were born low birthweight and/or premature was considerably higher than that of EO cases. Both black and white, with over 50% of cases, were born low birthweight and/or <37 weeks’ gestation. 

- Compared to white infants, those born premature were more likely to be black (38.0% vs 27.7%), born preterm GBS cases (47.8% vs 23.5%), weigh less than 2500g at birth (43.5% vs 18.2%), and less likely to have been screened for GBS prior to delivery (75.0% vs 64.1%).

- Table 1 shows that, compared to EO-GBS cases, infants with LO-GBS were more likely to be born (100.0% vs 92.7%), born preterm (47.8% vs 23.5%), weight less than 2500g at birth (43.5% vs 18.2%), and less likely to have been screened for GBS prior to delivery (75.0% vs 64.1%).

- Table 2 shows the number of infants with EO and LO GBS were similar for LO cases who were discharged from their hospital of birth compared to those who remained in hospital, 36.0 days and 37.3 days, respectively.

Conclusions

- Improvements seen in the incidence of EO GBS following CDC’s 2002 revised screening guidelines have plateaued over the past decade, particularly among white infants. Similarly, there has been virtually no change in the incidence of LO GBS over the 15-year period. 

- Although the low number of cases of EO and LO GBS in NYS makes it difficult to assess true trends, the disparity in incidence by race, has not diminished even after adjusting for gestational age.

- NYS data is consistent with literature suggesting that race, gestational age and birthweight are significant risk factors in the development of LO GBS. Furthermore, this study shows that black infants experience higher rates of both low birth weight and premature birth. Further research should seek to understand the interaction and extent of the impact of these risk factors on EO and LO GBS.

- In order to address the plateau in incidence rates seen over the past decade, future research should focus on understanding additional risk factors and mechanisms of infection.

References


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