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Group B Streptococcus in Pregnancy

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Introduction

- Group B Streptococcus (GBS) is a bacterium present in the vaginal and/or anorectal flora of women and is considered to be normal flora which generally does not cause infection; however, if a pregnant woman is GBS positive and left untreated during birth, the newborn passing through the birth canal is at risk for becoming colonized (Bicheno & Geraghty, 2015, p. 224).

- GBS is the "leading infectious cause of neonatal morbidity and mortality in the United States" (Colicchia, Lauderdale, Du, Adams, & Hirsch, 2015, p. 173).

- Up to 30% of pregnant women carry GBS bacteria in their lower gastrointestinal or genitourinary tract and up to 1% of neonates born to colonized mothers become infected in utero or during delivery (Fabbrini et al., 2018).

Diagnosis

- GBS samples are collected using a single swab technique, where the vagina is swabbed first, followed by the rectum (Sheehy et al., 2013). The GBS cultures take 24 to 48 hours to result and the results are considered valid for five weeks (Bicheno & Geraghty, 2015).

- A neonate may be tested and diagnosed with GBS from either a blood test, urine specimen, or by cerebrospinal fluid (Bicheno & Geraghty, 2015, p. 225).

- GBS status can be variable between pregnancies and even transient during a given pregnancy, so the mother must be tested each pregnancy (Colicchia et al., 2015).

Signs and Symptoms

Maternal

- "Women who colonize GBS may be asymptomatic in pregnancy. It is possible, however, for women to become unwell in the postnatal period. Infections caused by GBS colonization can include urinary tract infections, endometritis, wound infections, puerperal sepsis, meningitis, and septic thrombophlebitis" (Bicheno & Geraghty, 2015, p. 225).

Maternal Risk Factors that Increase Chance of Transmitting GBS to Infant:

- Labor or rupture of membranes before 37 weeks gestation
- Membrane rupture more than 18 hours before birth
- Urinary tract infection with GBS during pregnancy
- Previous baby with GBS infection
- Fever during labor
- Chorioamnionitis
- Positive culture for GBS colonization at 35-37 weeks (CDC, 2018)

Neonates

- Neonates exposed to GBS, "may develop symptoms of rapidly invasive disease including sepsis, pneumonia, and meningitis within the first week after birth (early-onset disease) or after a week and up to three months of life (late-onset disease)" (Kawa, 2017, p. 20).

- Infants can become ill with early-onset GBS disease from either aspirating or ingesting of GBS positive amniotic fluid during birth, which could "cause the neonate to experience a variety of signs and symptoms, which include low temperature, pyrexia, bradypnea, tachypnea, bradycardia, tachycardia, appear floppy, have the inability to feed, and appear pale or irritable" (Bicheno & Geraghty, 2015, p. 225).

- Early-onset GBS disease occurs more often and is more fatal than late-onset GBS disease (Sheehy, Davis, & Homer, 2013).
- Infected infants who survive may experience life-long impairments, such as deafness, blindness, or developmental issues (CDC, 2018).

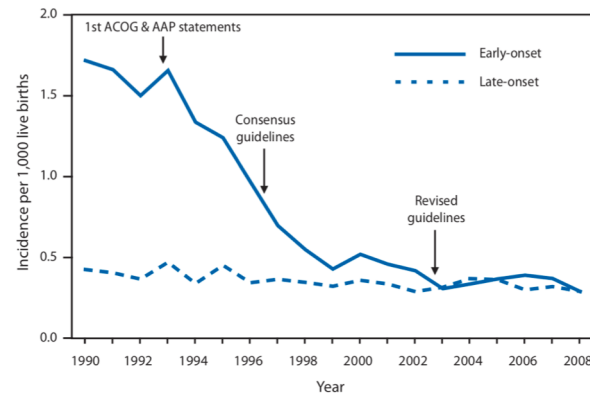


Figure 1. Incidence of early-onset and late-onset invasive GBS disease and activities of prevention of GBS disease (Verani, McGee, & Schrag, 2010).

Underlying Pathophysiology

- The process of neonatal infection by GBS is complex and multifactorial. "Host factors play a central role in determining the pathogenic potential of GBS, but bacterial virulence factors also assist GBS in the pathogenesis within the host" (Melin, 2011, p. 1296).

- "The first stage in the pathogenesis of GBS is the establishment of vaginal colonization in the pregnant woman including adherence to vaginal epithelial cells and resistance to mucosal immune defenses. To gain access to the fetus, GBS may ascend into the amniotic cavity. Bacterial proliferation allows GBS to colonize the skin or mucous membranes of the fetus or to enter the fetal lung through aspiration of infected amniotic fluid. After birth, GBS must successfully replicate within the alveoli of the neonate, adhere to respiratory epithelium and avoid clearance by pulmonary macrophages. Pneumonia with lung cell injury is characteristic of GBS and may be mediated in part by the cytotoxic properties of GBS...and the influx of host neutrophils. The invasion by GBS of the pulmonary epithelial and endothelial cells may allow GBS to enter the bloodstream causing septicemia. This blood stream dissemination may lead to meningitis and osteomyelitis. This disease progression indicates that GBS has to evade the host's natural immune defenses to adhere, to invade, and to transcytose several cell barriers" (Melin, 2011, p. 1296-1297).

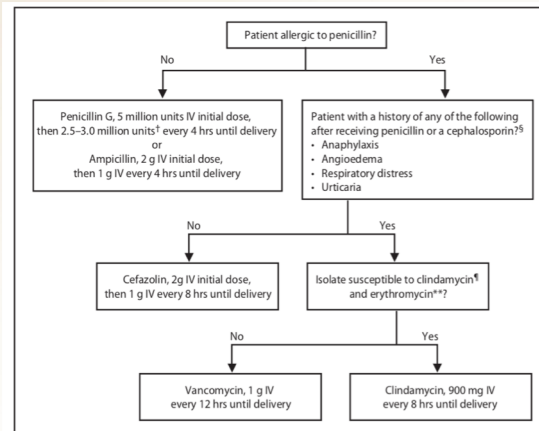


Figure 2. Recommended intrapartum antibiotic regimen (Verani, McGee, & Schrag, 2010)

Significance of Pathophysiology

GBS is an encapsulated gram-positive diplococcus frequently found in the human gastrointestinal or lower genital tract (Cho, et al., 2017). The significance of GBS can be devastating on an infant if not correctly detected or treated on a GBS positive mother as GBS is the leading cause of neonatal sepsis and meningitis, which could lead to death (Melin, 2011). GBS can also cause invasive bacterial infections and pneumonia during the first week of life (Melin, 2011). Infants that survive GBS meningitis have a 50% chance of having long-term impairments and up to 30% have severe neurological deficits (Melin, 2011). Per Melin (2011), about 30-70% of neonates born to GBS positive mothers become transiently colonized by their mother's organism. Most of them remain asymptomatic, but among these infants 1-3% develop a severe disease from the GBS (Melin, 2011, p. 1295).

Treatment

- If a woman who is pregnant tests positive for GBS, it is recommended that she is treated with penicillin G at least four hours before delivery (with at least two doses) for maximum effectiveness. If a mom is allergic to penicillin G, with a low concern for an anaphylaxis reaction, then cefazolin is recommended. If there is a risk for an anaphylactic reaction, then clindamycin is the next option with vancomycin also being available if a mom's culture indicates resistance to clindamycin (Appar et al., 2005, p. 903).

- If a woman tests negative for GBS, then no antibiotic or treatment is necessary.
- If a pregnant carrier of GBS receives IV antibiotics during delivery, her baby has a 1 in 4,000 chance of developing GBS infection. Without antibiotics, her baby has a 1 in 200 chance of developing GBS infection (CDC, 2018).
- The antibiotics used to prevent early-onset group B strep disease in newborns only help during labor. Pregnant women cannot take them before labor, because the bacteria can grow back quickly (CDC, 2018).

Implications for Nursing Care

- Health care providers need to be vigilant about screening for GBS in pregnancy. All women who are pregnant should be tested for GBS at 35 to 37 weeks' gestation in each pregnancy (Zolotor & Carlough, 2014).
- Individuals who have a history of preterm labor or exhibit signs of preterm labor, may need to be tested sooner or every five weeks for GBS.
- When caring for a neonate, the health care provider should review maternal testing to ensure that the GBS result for the mother was obtained and she was treated during labor.
- GBS positive may be spread from infant to infant if precise handwashing technique is not used when handling newborns

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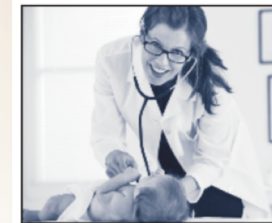
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Conclusion

In conclusion, GBS screening and treatment will facilitate early detection and antibiotic treatment that will decrease the probability of neonatal infection, thereby reducing damage, regrets, and medical expenditure" (Hung et al., 2018, p. 2). All women should be screened for GBS at prenatal appointments since a GBS vaccine is not yet available (Fabbrini et al., 2018). By screening women at prenatal appointments for GBS, it could help prevent infants from contracting early-onset GBS or late-onset GBS disease and possibly preventing the infants from death or life-long disabilities. Antibiotic administration during labor to pregnant women colonized with GBS can help prevent the transmission of GBS infection, and thus decrease the incidence of early and late onset GBS disease in newborns.



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