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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. 214).

- GBS is the leading infectious cause of neonatal morbidity and mortality in the United States (Caldwell, Lautdakul, Ou, Adams, & Hirsch, 2015, p. 173).

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

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, pneumonia, infectious, peripartum sepsis, meningitis, and sepsis, thrombophlebitis (Bicheno & Geraghty, 2015, p. 225).

- Neonates
  - Neonates exposed to GBS, “may develop symptoms of rapidly invasive disease including sepsis, pneumonia, and meningitis, and within the first week after birth (early-onset disease) or after a week and up to three months of life (late-onset disease)” (Knaa, 2017, p. 20).
  - Infants can become ill from early-onset GBS disease from either aspirations or ingestion of GBS positive amniotic fluid during birth, which could “cause the neonate to experience a variety of signs and symptoms, which include low body temperature, pyrexia, bradypnea, tachypnea, tachycardia, cyanosis, respiratory distress, 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 et al., 2015, p. 132).
  - Infected infants who survive may experience life-long impairments, such as deafness, blindness, or mental retardation, or develop long-term disabilities (CDC, 2018).

Maternal Risk Factors that Increase Transmission of 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

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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 factors also play a role. Women who are asymptomatic and colonization in the pregnant woman without evidence of vaginal or uterine lesions, infection or inflammation, and vaginitis (Knaa, 2017, p. 1295).

- 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 evade the defenses of the newborn, adhere to respiratory epithelium and avoid clearance by pulmonary macrophages. Pneumonia with lung injury is characterized by inflammation and edema mediated in part by the pyrogenic exotoxins of GBS and the influx of neutrophils. The invasion by GBS of the pulmonary epithelium and endothelial cells may allow GBS to enter the bloodstream causing sepsis. This blood stream dissemination may lead to meningitis and osteomyelitis. This disease progression indicates that GBS has to evade the host’s immune defenses to progress, to invade, and to translocate several cell barriers” (Melin, 2011, p. 1296-1297).

- The antibiotics used to prevent early-onset group B streptococcal disease in newborns only help during labor. Pregnant women cannot take them before labor, because the bacteria can grow back quickly (CDC, 2018).

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. Any positive maternal test for GBS as 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 sequelae such as hearing loss, tremors, seizures, and delayed growth and development (Melin, 2011, p. 1320).

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