

# Lab Facets

## Group B Streptococcal Disease in the Newborn

### Introduction

For the last several years, the standard of care for prevention of group B streptococcal (GBS) infection in the newborn has been to offer intrapartum antibiotics to women colonized by GBS.<sup>1</sup> Colonization has been detected via anorectal-vaginal culture in selective broth medium.

Using the protocol outlined by the Centers for Disease Control and Prevention, the culture is incubated for 72 hours before being reported as negative. Bourbeau and colleagues demonstrated that a DNA probe for GBS used in conjunction with the selective broth culture at 24 hours could achieve detection equivalent to the 72-hour culture.<sup>2</sup>

### Background

Group B streptococcal disease continues to be a major cause of illness and death among newborns. Most GBS infections can be prevented through the use of intrapartum antimicrobial prophylaxis in women who are at increased risk for transmitting the infection to their newborns. In addition to maternal GBS colonization, other risk factors are intrapartum fever, prolonged rupture of membranes, less than 37 weeks' gestation, GBS bacteriuria during pregnancy, and previous delivery of an infant with GBS disease.

### Detection of GBS

Currently, the best indicator of maternal colonization is determined by selective broth culture of the lower vagina and rectum during the third trimester, preferably between 35 and 37 weeks of gestation. The isolation of GBS depends on sites cultured and the medium used for culture. Because the gastrointestinal tract is the most likely reservoir of GBS in humans, culture of specimens from both the anorectum and vagina increase the recovery of GBS compared to use of a vaginal culture alone.<sup>3,5</sup>

The yield of specimens collected from these sites can also be increased by as much as 50% through the use of one of two broth medium formulations, SBM or LIM.<sup>1</sup> According to the cul-

ture protocol outlined by the CDC consensus statement, one or two swabs of the vaginal introitus and anorectum should be placed in transport medium for delivery to the lab at room temperature or refrigerated. At the lab, the swabs should be inoculated into the selective broth medium. After 18-24 hours of incubation, the broth should be subcultured to a sheep blood agar plate that is then incubated for up to 48 hours to detect the presence of hemolytic or nonhemolytic group B streptococci that are identified by conventional methods.<sup>1</sup>

The DNA probe test for GBS uses the same specimen collection and selective broth culture medium, but substitutes the use of a DNA probe test performed directly on the LIM selective broth for the subsequent subculture and examination. This procedure allows both positive and negative results to be available 48 hours sooner.<sup>2</sup>

### Issues in Chemoprophylaxis

Prior to the onset of labor or the rupture of membranes, administration of antibiotics is not likely to prevent GBS disease.<sup>1</sup> Administration of antibiotics for one week during the third trimester does not alter the proportion of women who remain colonized at the time of delivery.<sup>6,7</sup>

Alternately, both early onset disease of the newborn and maternal infection will most likely be prevented by intrapartum chemoprophylaxis; however, indiscriminate use of antibiotics on all women may have an unacceptably high number of adverse consequences.

One investigator estimated that administration of antimicrobial agents to all women who are GBS carriers would lead to 10 deaths per year due to anaphylactic shock.<sup>8</sup> In addition, the fetus can suffer significant and severe complications even when maternal anaphylaxis is not life threatening.<sup>9</sup> In this regard, it is important to note that GBS isolates have not developed clinically important resistance to penicillin although some penicillin-tolerant GBS have been described, and for this reason susceptibility testing is not recommended.<sup>1,2</sup> The indiscriminate use of antibiotics may increase the

antimicrobial resistance of other peripartum pathogens that can also infect newborns. For the penicillin-allergic patient the CDC has recommended prevention schemes with intrapartum administration of clindamycin or erythromycin.<sup>1</sup>

## Prevention of GBS Disease: A Screening-based Approach

The combination of late prenatal screening combined with an empiric management has been estimated to prevent approximately 86% of early-onset disease.<sup>11</sup> The use of late GBS culture screening means that few women will become colonized with GBS by the time of delivery. Because a high proportion of carriers is identified by this strategy, the exposure of these women to the adverse effects of antibiotic administration may be justified.<sup>1</sup>

In addition, because the physician does not have to wait for the development of intrapartum risk factors, antibiotic administration may be given earlier in labor thus allowing time for antibiotic levels to achieve appropriate levels in the amniotic fluid.

### Group B Streptococcus Colonization Detection With Selective Broth Culture and DNA Probe ..... 188128

**CPT** 87081, 87797.

**Test Includes** Selective broth culture and detection of group B streptococci by DNA probe.

**Specimen** One or two bacterial culture swabs collected from the vaginal introitus and anorectum at 35 – 37 weeks' gestation.

**Container** Bacterial swab transport system.

**Collection** A speculum should not be used for collection of this specimen.

**Storage instructions** Maintain specimen at room temperature.

**Causes for Rejection** Unlabelled specimen, expired transport medium; specimens received after a prolonged delay (usually greater than 96 hours).

**Reference Interval** Negative; no group B streptococci detected.

**Use** This type of culture is primarily used to identify women who are colonized by group B streptococci at 35–37 weeks' gestation so that intrapartum antibiotics can be administered.

**Limitations** There are other risk factors for the development of early-onset disease not detected by this culture. In addition, this culture does not address the development of maternal infection or late-onset neonatal disease.

**Methodology** Selective broth culture and DNA probe.

## References

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