Revisiting the 2002 Group B Streptococcal Disease Guidelines

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In 1996, the Centers for Disease Control and Prevention (CDC) released guidelines for the prevention of perinatal Group B Streptococcus (GBS) disease (Prevention of Perinatal Group B Streptococcal Disease: A Public Health Perspective. MMWR 1996; 45[RR-7]:1-24). In 2002, the CDC released a new set of guidelines (Prevention of Perinatal Group B Streptococcal Disease Revised Guidelines from CDC. MMWR 2002; 51[RR-11]:1-28) in reaction to evidence and expert opinion which indicated that more effective methods exist to prevent perinatal GBS disease. The new guidelines specify that culture-based screening is substantially more effective than the risk-based approach. The guidelines also recommend that laboratories perform antimicrobial susceptibility testing for women at high risk for penicillin anaphylaxis. In addition, it explained that laboratories are advised to report the presence of GBS in the urine specimens from pregnant women.

The following information was taken from the August 2002 MMWR.

GBS Colonization

The gastrointestinal tract serves as the natural reservoir for GBS and is the likely source of vaginal colonization. Approximately 10% to 30% of pregnant women are colonized with GBS in the vagina or rectum. Maternal intrapartum GBS colonization is a major risk factor for early-onset disease in infants, and vertical transmission of GBS from mother to fetus primarily occurs after the onset of labor or membrane rupture. Culture screening of both the vagina and rectum for GBS late in gestation during prenatal care can detect women who are likely to be colonized with GBS at the time of delivery and are thus at higher risk of perinatal transmission of the organism. Heavy colonization, defined as culture of GBS from direct plating rather than only from selective broth, is associated with higher risk for early-onset disease. GBS identified in clean-catch urine specimens is considered a surrogate for heavy maternal colonization and also is associated with a higher risk for early-onset GBS disease; it has been included among indications for intrapartum antibiotic prophylaxis.

GBS Laboratory Screening Guidelines

Numerous studies have documented that the accuracy of prenatal screening cultures in identifying intrapartum colonization status can be enhanced by careful attention to the timing of cultures, the anatomic sites swabbed, and the precise microbiologic methods used for culture and detection of organisms. Collection of cultures between 35 and 37 weeks gestation is recommended to improve the sensitivity and specificity of detection of women who remain colonized at the time of delivery. Swabbing both the lower vagina and rectum (i.e., through the anal sphincter) increases the yield substantially compared with sampling the cervix or sampling the vagina without also swabbing the rectum.

Studies have indicated that when women in the outpatient clinic setting collect their own screening specimens, with appropriate instruction, GBS yield is similar to when specimens are collected by a health-care provider. Although swabbing both sites is recommended and use of two swabs can be justified, both swabs should be placed in a single broth culture medium because the site of isolation is not important for clinical management and laboratory costs can thereby be minimized. Because vaginal and rectal swabs are likely to yield diverse bacteria, use of selective enrichment broth is recommended to maximize the isolation of GBS and avoid overgrowth of other organisms. When direct agar plating is used instead of selective enrichment broth, as many as 50% of women who are GBS carriers have false-negative culture results.

Procedure for collecting clinical specimens for culture of GBS at 35–37 weeks gestation

- Swab the lower vagina (vaginal introitus), followed by the rectum (i.e., insert swab through the anal sphincter) using the same swab or two different swabs. Cultures should be collected in the outpatient setting by the healthcare provider or the patient herself, with appropriate instruction. Cervical cultures are not recommended and a speculum should not be used for culture collection.
- Place the swab(s) into a nonnutritive transport medium. Appropriate transport systems (e.g., Amies or Stuart's without charcoal) are commercially available. If vaginal and rectal swabs were collected separately, both swabs can be placed into the same container of medium. Transport media will maintain GBS viability for up to 4 days at room temperature or under refrigeration.
- Specimen labels should clearly identify that specimens are for GBS culture. If susceptibility testing is ordered for penicillin-allergic women (Box 2), specimen labels should also identify the patient as penicillin allergic and should specify that susceptibility testing for clindamycin and erythromycin should be performed if GBS is isolated.

Procedure for processing clinical specimens for culture of GBS

- Remove swab(s) from transport medium.* Inoculate swab(s) into a recommended selective broth medium, such as Todd-Hewitt broth supplemented with either gentamicin (8 µg/ml) and nalidixic acid (15 µg/ml), or with colistin (10 µg/ml) and nalidixic acid (15 µg/ml). Examples of appropriate commercially available options include Trans-Vag broth supplemented with 5% defibrinated sheep blood or LIM broth.
- Incubate inoculated selective broth for 18–24 hours at 35º–37ºC in ambient air or 5% CO2. Subculture the broth to a sheep blood agar plate (e.g., tryptic soy agar with 5% defibrinated sheep blood).
- Inspect and identify organisms suggestive of GBS (i.e., narrow zone of beta hemolysis, gram-positive cocci, catalase negative). Note that hemolysis may be difficult to observe, so typical colonies without hemolysis should also be further tested. If GBS is not identified after incubation for 18–24 hours, reincubate and inspect at 48 hours to identify suspected organisms.

Various streptococcus grouping latex agglutination tests or other tests for GBS antigen detection (e.g., genetic probe) may be used for specific identification, or the CAMP test may be employed for presumptive identification.

* Before inoculation step, some laboratories may choose to roll swab(s) on a single sheep blood agar plate or CNA sheep blood agar plate. This should be done only in addition to, and not instead of, inoculation into selective broth. The plate should be streaked for isolation, incubated at 35–37ºC in ambient air or 5% CO2 for 18–24 hours and inspected for organisms suggestive of GBS as described above. If suspected colonies are confirmed as GBS, the broth can be discarded, thus shortening the time to obtaining culture results.

Procedure for clindamycin and erythromycin disk susceptibility testing of isolates, when ordered for penicillin-allergic patients

- Use a cotton swab to make a suspension from 18–24-hour growth of the organism in saline or Mueller-Hinton broth to match a 0.5 McFarland turbidity standard.
- Within 15 minutes of adjusting the turbidity, dip a sterile cotton swab into the adjusted suspension. The swab should be rotated several times and pressed firmly on the inside wall of the tube above the fluid level. Use the swab to inoculate the entire surface of a Mueller-Hinton sheep blood agar plate. After the plate is dry, use sterile forceps to place a clindamycin (2 µg) disk onto half of the plate and an erythromycin (15 µg) disk onto the other half.
- Incubate at 35ºC in 5% CO2 for 20–24 hours.
- Measure the diameter of the zone of inhibition using a ruler or calipers. Interpret according to NCCLS guidelines for *Streptococcus* species other than *S. pneumoniae* (2002 breakpoints: clindamycin: >19 mm = susceptible, 16–18 = intermediate, <15 = resistant; erythromycin: >21 mm = susceptible, 16–20 = intermediate, <15 = resistant).

Molecular Testing

In 2004 a molecular based GBS assay was approved by the Food and Drug Administration (FDA) for use on the Smart Cycler analyzer. This test utilizes polymerase chain reaction (PCR) for the amplification of a cfb gene sequence of GBS and fluorogenic target-specific hybridization for the detection of amplified DNA. The NPHL is currently validating this assay for use in the Microbiology Department.

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