Streptococcal Group B Invasive Disease of the Newborn

Manitoba
Public Health Branch

1. Case Definition

1.1 Confirmed Case:

Clinical illness* in an infant up to one month of age with laboratory confirmation of infection:

- Isolation of group B *Streptococcus* (*Streptococcus agalactiae*) from a normally sterile site such as blood or cerebrospinal fluid);

OR

- Demonstration of group B *Streptococcus* DNA in a normally sterile site (1).

1.2 Probable Case:

Clinical illness* in an infant up to one month of age with laboratory confirmation of infection:

- Detection of group B *Streptococcus* antigen in a normally sterile site (1).

*There are two forms of clinical illness. Early-onset disease is defined as occurring up to7 days after birth and is characterized by sepsis, respiratory distress, apnea, shock, pneumonia and meningitis (1). Although late-onset disease may occur in infants older than one month of age, for the purposes of this protocol, late-onset disease is defined as occurring greater than 7 days and up to one month after birth and is characterized by bacteremia, meningitis and other focal infections (1).

2. Reporting Requirements

Laboratory:

- All specimens isolated from sterile sites (refer to case definition) in infants up to one month of age that are positive for *S. agalactiae* are reportable to the Public Health Surveillance Unit by secure fax (204-948-3044).

Health Care Professional:

- Probable (clinical) cases of Streptococcal Group B invasive disease of the newborn are reportable to the Public Health Surveillance Unit using the *Clinical Notification of Reportable Diseases and Conditions* form (http://www.gov.mb.ca/health/publichealth/cdc/protocol/form13.pdf) ONLY if a positive lab result is not anticipated (e.g., poor or no specimen taken, person has recovered).
- Cooperation in Public Health investigation (if required) is requested.

Regional Public Health or First Nations Inuit Health Branch (FNIHB):

- Cases will be referred to Regional Public Health or FNIHB. Completion and return of the *Communicable Disease Control Investigation Form* is generally not required, unless otherwise directed by a Medical Officer of Health.

3. Clinical Presentation/Natural History

The presenting signs are nonspecific and are indistinguishable from those in neonates with serious infections of other causes (2). Clinical syndromes of group B Streptococcal (GBS) disease in newborns include sepsis, pneumonia, meningitis, cellulitis, osteomyelitis, and septic arthritis (3). Infections in newborns occurring within the first week of life are designated early-onset disease (4). Late-onset disease typically occurs at three to four weeks of age but may occur in infants up to three months after birth (5). Approximately 98% of colonized newborns are without symptoms, but 1% to 2% of these infants develop early-onset disease (6). Preterm infants are at increased risk of early-onset disease (4). Infants with early onset GBS disease generally present with respiratory distress, apnea, or other signs of sepsis within the first 24-48 hours of life (4). The most common clinical syndromes of early-onset disease are sepsis and pneumonia (4). Meningitis occurs less frequently (4). For both early and late-onset GBS disease, and particularly

for babies who had meningitis, there may be long-term consequences of the infection such as deafness and developmental disabilities (7). The case fatality ratio in term infants ranges from 1% to 3% but is higher in preterm neonates (20% for early-onset disease and 5% for late-onset disease) (5).

4. Etiology

Group B Streptococci (*Streptococcus agalactiae*) are gram-positive, aerobic cocci (5). The organisms are divided into 10 types (Ia, Ib, II and III through IX) based on their capsular polysaccharide (5). In the United States, approximately 95% of cases are caused by types Ia, Ib, II, III and V (5). In 2014 in Canada, of the early-onset disease isolates submitted to the National Microbiology Laboratory for typing, 57% were serotype III (8). The same percentage of isolates (57%) from late-onset disease were serotype III also (8). Serotype III was also the most common type found in other World Health Organization regions where serotyping was performed (9). The serotypes causing neonatal infections do not appear to be changing (9, 10).

5. Epidemiology

5.1Reservoir:

The gastrointestinal tract serves as the primary reservoir for GBS and is the likely source of vaginal colonization (4). Approximately 10% to 30% of pregnant women are colonized with GBS in the vagina or rectum (4).

5.2 Transmission:

Most newborns with early-onset GBS disease acquire the organism when GBS ascends from the vagina to the amniotic fluid after onset of labour or rupture of membranes, although GBS also can invade through intact membranes (4). GBS can be aspirated into the fetal lungs which can lead to bacteremia (4). Infants can also become colonized with GBS during passage through the birth canal, but most of these infants remain healthy (4). A high maternal genital inoculum at delivery significantly increases the likelihood of transmission (2). In the absence of any intervention, an estimated1% to 2% of infants born to colonized mothers develop early-onset GBS infections (4).

Some cases of late-onset disease probably reflect acquisition of the organism through passage through the birth canal (3). Nosocomial and community sources are likely involved in some cases of late-onset disease but acquisition of late-onset disease is not well understood (3).

5.3 Occurrence:

General: Globally, the mean incidence of invasive group B streptococcal disease in infants younger than three months of age is estimated to be 0.5 cases per 1,000 live births (2). With the implementation of intrapartum antibiotic prophylaxis in the United States of America, the incidence of early-onset GBS disease declined approximately 80% since the early 1990s to an estimated 0.28 cases per 1,000 live births in 2008 (11). However, in 2010, GBS disease remained the leading cause of early-onset neonatal sepsis (11). Use of intrapartum antibiotic prophylaxis has had no impact on late-onset (age 7 through 89 days) disease incidence, which still occurs at a rate of approximately 0.3 per 1,000 live births (2). Rates of early-onset disease vary considerably across developed countries, in part a reflection of different prevention strategies (12). The United Kingdom reported an early-onset GBS incidence of 0.41 per 1,000 live births in 2010 (12).

Studies from developing countries reported an overall neonatal GBS incidence of 0 - 3.06 per 1,000 live births (13). Case fatality rates were greater than 10% across all studies reporting GBS (13). This is likely an underestimation of early-

onset GBS as it did not capture births occurring outside of the hospital (13).

Canada: Based on cases reported to the Canadian Notifiable Disease Surveillance System (CNDSS), the incidence of newborn GBS disease fluctuated between 0.26 and 0.39 per 1,000 live births (with an average incidence of 0.34) in Canada from 2000 – 2014 (14). This data does not include cases in Manitoba or Quebec and only includes cases in Alberta from 2012-2014.

Manitoba: Invasive GBS disease of the newborn became reportable in Manitoba on January 1, 2015. Seven cases were reported to Manitoba Health, Seniors and Active Living in 2015.

5.4 Incubation Period:

The incubation period in early-onset disease is up to seven days (1). In late-onset disease, the incubation period from GBS acquisition to disease is unknown (5).

5.5 Risk Factors for Neonatal Infection:

Maternal colonization with GBS in the genitourinary or gastrointestinal tracts is the primary risk factor for disease (4). Because colonization can be transient, colonization early in pregnancy is not predictive of early-onset GBS disease (4). Other factors that increase the risk for early-onset disease include low birth weight (15) gestational age < 37 weeks (15-17), longer duration of membrane rupture (15), intra-amniotic infection (15), young maternal age, black race (5), and low maternal levels of GBS-specific anticapsular antibody (4). Previous delivery of an infant with invasive GBS disease is a risk factor for early-onset disease in subsequent deliveries (4).

5.6 Period of Communicability:

The period of communicability is unknown but can extend throughout the duration of colonization or disease (5). Infants can remain colonized for several months after birth and after treatment for systemic infection (5). Recurrent GBS disease affects an estimated 1% to 3% of appropriately treated infants (5).

6. Diagnosis

Diagnosis is based on clinical presentation and laboratory results. Growth of GBS from blood or other normally sterile sites in the newborn confirms the diagnosis (2). The sensitivity of blood culture can be low among newborns exposed to intrapartum antibiotics (4). Among infants with signs of early-onset disease, the detection of GBS can be increased by performing culture of both blood and cerebrospinal fluid (CSF) (4).

7. Control

No Public Health follow-up is required.

7.1 Management of Cases:

- Management is in hospital. The primary medical care provider is a neonatologist, pediatric intensive care specialist or a hospitalist. A pediatric infectious disease specialist is also involved.
- Infection Prevention and Control: Routine Practices. Refer to page 103 of the Manitoba Health, Seniors and Active Living document *Routine Practices and Additional Precautions: Preventing the Transmission of Infection in Health Care* available at: http://www.gov.mb.ca/health/publichealth/cdc/docs/ipc/rpap.pdf .
- Any newborn with signs of sepsis should receive a full diagnostic evaluation and receive antibiotic therapy pending the results of the evaluation (4).
- Well-appearing newborns whose mothers had suspected chorioamnionitis should undergo a limited evaluation and receive

antibiotic therapy pending culture results (4).

7.2 Management of Contacts:

Not applicable.

7.3 Preventive Measures:

7.3.1 Prenatal Screening:

Currently in Manitoba, there is no rapid GBS screening program available to women at the onset of labour and delivery. Pregnant women (including those expected to undergo caesarean deliveries as they may go into labour or have membrane rupture prior to the scheduled delivery) should be screened for GBS with a combined vaginal/anorectal swab at 35-37 weeks gestation. Exceptions include women who have had GBS isolated from the urine at any time during the current pregnancy or who have had a previous infant with GBS as they already meet the high-risk criteria required for intrapartum antibiotic prophylaxis (4). The swab should be placed in Amies Charcoal Transport Medium and forwarded to a microbiology laboratory using the appropriate requisition. Please indicate on the requisition if the patient is penicillin allergic as isolates from these patients will require antimicrobial susceptibility testing. As GBS is a transient colonizer, a negative culture does not guarantee absence of GBS at time of labour. Intrapartum antibiotic prophylaxis (refer to 7.3.2 below) is recommended for women with a positive culture.

7.3.2 Intrapartum Antibiotic Prophylaxis:

Intrapartum prophylaxis is a preventive measure for early-onset GBS disease (4). Analyses of late-onset disease incidence trends in the 1990s suggest that intrapartum chemoprophylaxis does not prevent late-onset disease (18).

Prophylaxis should be given at the time of labour or rupture of membranes to the following women in addition to those who tested positive during prenatal screening. In women who tested positive, the exception would be if a caesarean delivery is performed before onset of labour in a woman with intact amniotic membranes (4).

- GBS was isolated from the urine at any time during the current pregnancy;
- An infant with GBS disease was delivered in a previous pregnancy;
- Regardless of GBS colonization status if any of the following occurs:
    - Delivery at less than 37 weeks' gestation;
    - Amniotic membrane rupture ≥ 18 hours;
    - Intrapartum temperature ≥ 38.0°C (4).

Recommended Antibiotic Regimen:

Penicillin G (5 million units IV, followed by 2.5 – 3 million units IV every 4 hours until delivery) is the agent of choice for intrapartum antibiotic prophylaxis (4). Ampicillin (2 g IV initial dose, then 1 g IV every 4 hours until delivery) is an acceptable alternative (4).

- Penicillin-allergic women who do not have a history of anaphylaxis, angioedema, respiratory distress or urticaria following administration of a penicillin or a cephalosporin should receive cefazolin (2 g IV initial dose, then 1 g IV every 8 hours until delivery) (4).
- Penicillin-allergic women at high risk for anaphylaxis:
    - Should receive clindamycin (900 mg IV every 8 hours until delivery) if:
        - The GBS isolate is susceptible to clindamycin and erythromycin, as determined by antimicrobial susceptibility testing; or

    - The isolate is sensitive to clindamycin, and resistant to erythromycin, but testing for inducible clindamycin resistance is negative (4).
- Should receive vancomycin (1 g IV every 12 hours until delivery) if:
    - The isolate is intrinsically resistant to clindamycin as determined by antimicrobial susceptibility testing;
    - The isolate demonstrates inducible resistance to clindamycin; or
    - Susceptibility to both clindamycin and erythromycin is unknown (4).

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