Group B Streptococcus

Approved – November 2001 Revised – February 2010

Preamble

Guidelines outline recommendations, informed by both the best available evidence and by midwifery philosophy, to guide midwives in specific practice situations and to support their process of informed decision-making with clients. The midwifery philosophy recognizes the client as the primary decision maker in all aspects of her care and respects the autonomy of the client.[1]

The best evidence is helpful in assisting thoughtful management decisions and may be balanced by experiential knowledge and clinical judgment. It is not intended to demand unquestioning adherence to its doctrine as even the best evidence may be vulnerable to critique and interpretation.

The purpose of practice guidelines is to enhance clinical assessment and decision-making in a way that supports practitioners to offer a high standard of care. This is supported within a model of well-informed, shared decision making with clients in order to achieve optimal clinical outcomes.

Background & Relevance

Group B streptococcus (GBS) is a gram-positive coccus commonly found in the gastrointestinal tract.[2] Between 10 and 35% of women are colonized with GBS vaginally and/or rectally at any given time, with Canadian women screening positive at an incidence of 11-19.5%. [2,3,4,19] Maternal colonization with GBS is a recognized risk factor for neonatal colonization and sepsis.

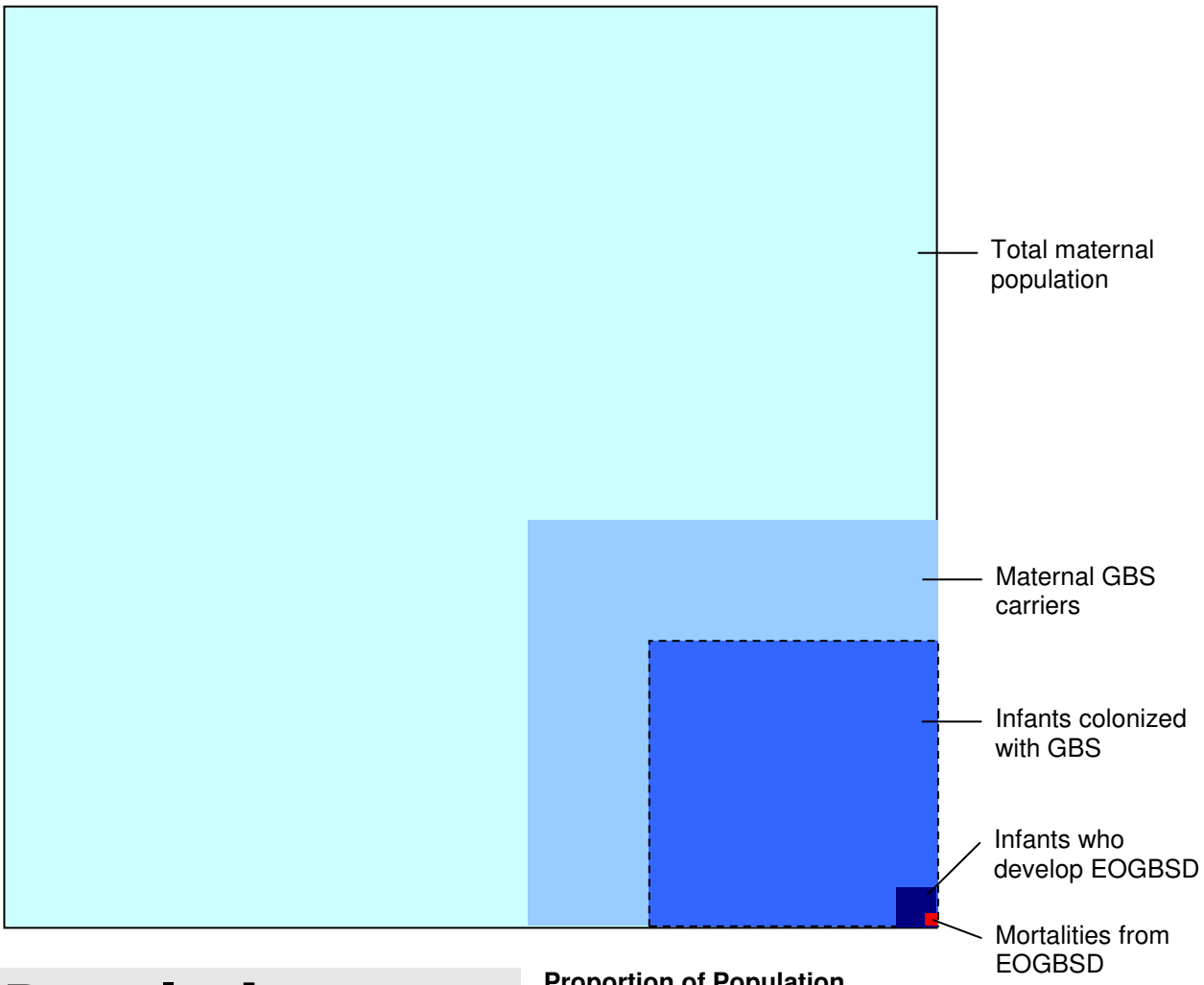
GBS vaginal colonization is asymptomatic. However, 2 to 4% of pregnancies are complicated by GBS bacteriuria[2,4] and urinary tract colonization with GBS is associated with an increased risk of preterm labour and PPROM.[2,4] Maternal colonization is also associated with endometritis and wound infection.[2]

Group B streptococcus is the most common cause of life-threatening infections in newborns. Neonatal GBS disease is classified as early-onset GBS disease (EOGBSD) when it presents in the first seven days of age or late-onset GBS disease when it presents at 8 days of age or older.[2,5,19] Eighty percent of GBS disease cases are early-onset, 90% of which present in the first 24 hours after birth and 70% of cases are declared within the first 12 hours.[3] The incidence of late-onset GBS disease is 3 out of 10,000 infants and only half of these cases are linked to a mother carrying GBS at the time of birth.[3,19]

Intrapartum chemoprophylaxis is only effective in preventing early-onset disease.[2,3] In the absence of intrapartum chemoprophylaxis, 50% of babies born to women colonized with GBS will be colonized at birth, of which 2% of infants will develop early-onset GBS disease, with sepsis, pneumonia, or meningitis being the most common sequelae.[2] The incidence of EOGBSD in newborns born to untreated mothers of unknown GBS status is generally 0.5 per 1000.[25] The risk of mortality is 3 in 10,000 babies of GBS positive mothers, where the incidence of mortality for infected term infants is 2-8% and 25-30% in preterm infants.[19]

There has been a 70% decrease in the incidence of neonatal GBS disease since the introduction of intrapartum antibiotics.[2,3] The incidence is now 0.34-0.77 per 1000 births.[2,3,19]

Early-Onset GBS Disease in Canada – SOGC 2004



Population	**Proportion of Population**
Total maternal population	—
Maternal GBS carriers (GBS screen positive)	11 to 19.5% of total maternal pop.
Infants colonized by maternal GBS carriers	40 to 50% of infants born to GBS-positive women
Colonized infants who develop EOGBSD	2% of all infants colonized with GBS
Mortalities from EOGBSD	5 to 9% of all infants with EOGBSD

Risk Factors

Factors associated with an increase the incidence of early-onset GBS disease in the neonate are:[2,3,5-7]

- Preterm labour (<37 weeks gestation)
  Rupture of the membranes >18 hours: 8.7-fold increase[4]
  Maternal fever >38°C unresponsive to therapy: 11-fold increase[4]
  GBS bacteriuria in pregnancy: 4.3 fold increase[4]
  Previous child with GBS disease

Screening Recommendations

The current recommendation for the prevention of GBS disease in North America is to offer all pregnant women a vaginal/ano-rectal swab cultured in selective broth between 35-37 weeks gestation and offer intrapartum chemoprophylaxis to those women found to be GBS positive.[2,3,5,6]

- Evidence suggests self-swabbing is an acceptable alternative to physician/midwife-administered swabbing.[3]
- Women noted to have GBS bacteriuria in the current pregnancy and women who have a previous child who developed early-onset GBS disease should be offered intrapartum antibiotics without documentation of vaginal colonization before birth.[2,4,6]
- Vaginal-rectal cultures obtained within 5 weeks of birth have a positive predictive value of 87% and a negative predictive value of 96%.[4] Test performance is similar 1-5 weeks before birth but diminishes significantly if more than 6 weeks have elapsed, so consider rescreening if post-dates.
- For those women with antibiotic allergies, antibiotic sensitivities should be ordered with the culture.
- The current screening-based strategy was adopted over a risk-factor approach as the screening-based approach is more effective at reducing disease while treating the smallest number of women.[2,3] However, none of the recommended strategies have been subjected to RCTs or comparative analyses.[4,7]
- No method of screening can prevent all GBS-related deaths.

Treatment

- Intrapartum intravenous chemoprophylaxis for GBS-colonized women has been shown to reduce colonization rates by 80-90%[5] and produce a 30-fold reduction in early-onset GBS disease.[2,7]
- Current international, national, and provincial recommendations support the initiation of antibiotics following rupture of the membranes or at the onset of active labour in GBS-colonized women, women with GBS bacteriuria in pregnancy, and women with a previous baby with GBS disease.[2,3,6,20]
- Women with unknown GBS culture results should be offered antibiotics in the presence of a risk factor for early-onset GBS disease, namely: gestational age <37 weeks, ROM >18hrs, or intrapartum fever.[2,3] Women who are known to be GBS negative do not need antibiotics for the prevention of GBS disease in the event they develop one of these risk factors.[3]
- Women who are GBS positive and planning a homebirth may receive all doses of antibiotics at home, administered by registered midwives. [8]
- GBS is consistently sensitive to the penicillins. Intravenous Penicillin G is preferred over Ampicillin for its selective spectrum, however either is acceptable.[2,8,20] Cefazolin is the preferred antibiotic for penicillin-allergic women with no history of anaphalaxis such as shortness of breath or airway edema.[2]
- According to ACOG SOGC guidelines, the aim of treatment is to deliver four hours of antibiotics prior to delivery. [2,8] However, recent research shows that fetal antibiotic serum levels where greater in infants whose mothers received antibiotics less than four hours prior to birth when compared to a group who had antibiotics more than four hours before delivery.[17] Serum levels initially rose linearly in the first hour followed by a rapid decline. The risk of for neonatal GBS disease was shown to decrease significantly between one to two hours post-antibiotic administration, with little significant change among longer treatment durations.[17] Thus present evidence suggests that infants whose mothers received antibiotics less than four hours prior to delivery should not be considered particularly at risk for GBS disease.
- The Canadian Task Force on Preventative Health found in 2001 fair evidence for a strategy of screening all women at 35-37 weeks of pregnancy followed by selective treatment of only those GBS-colonized women that have risk factors may be the most efficient strategy to reduce the incidence of early-onset GBS disease.[4,5,7]
- Some evidence suggests that neonatal mortality due to GBS disease could be reduced if women presenting at term with rupture of membranes but no contractions are induced with IV oxytocin.[9] Current SOGC recommendations include induction with oxytocin following rupture of the membranes in GBS positive women as a strategy to reduce early-onset GBS infection.[2]
- Chemoprophylaxis before the onset of labour has been shown to be ineffective, recurring 67% of the time. [2,14,15] To date there is no evidence that oral antibiotics have been proven effective at reducing GBS colonization.

- Emerging data on alternative methods of prevention, diagnosis and therapeutic regimes includes information on the use of a prophylactic GBS vaccine, rapid polymerase chain reaction test, vaginal chlorhexidine Aqueous allicin (garlic), Bacteriophage lysins, Tea tree oil, and efficacy of oral antibiotics for GBS+ women with prelabour ROM.

Recommendations for Intrapartum Antibiotics[8]

Name	Indication	First Dose	Follow-Up Dose	Frequency
Penicillin G	1st Choice	5 million units IV	2.5 million units IV	Q 4 hours
Cefazolin	Allergic to Penicillin but not at risk for anaphylaxis	2 grams IV	1 gram IV	Q 8 hours
Clindamycin	Allergic to Penicillin and at risk for anaphylaxis	900mg IV	900mg IV	Q 8 hours
Erythromycin	Allergic to Penicillin and at risk for anaphylaxis	500mg IV	500mg IV	Q 6 hours

Risks of Treatment

- Universal screening and treatment results in the use of antibiotics in labour for approximately 24% of women.[4] Wide-spread use of penicillin could lead to the emergence of resistant organisms and/or an increase in maternal allergic reactions.[4] There is a risk of neonatal sepsis due to the ampicillin-resistant organisms other than GBS, such as E. Coli.[2,5,18,24] Infants colonized with resistant organisms are more common to have low birth weights, earlier gestational age, and exposure to antenatal antibiotics.[18,24]
- The incidence of anaphylactic reaction to penicillin is between 4 in 10,000 and 4 in 100,000.[8,21] Anaphylactic reactions to penicillin noted in women treated specifically for GBS colonization is between 1 in 10,000 and 5 in 10,000, with an incidence of maternal mortality between 0.9 per 100,000 and 2 per 100,000.[21]
- Exposure to intrapartum antibiotics is associated with breast candidiasis (OR 2.1 95% confidence interval 1.08-4.08) and is associated with neonatal thrush, both of which pose potential complications for breastfeeding.[10,22] The effectiveness of prophylactic use of probiotics for prevention of candidiasis has yet to be definitely proven, however some clinical trials have demonstrated a benefit and adverse effects are rare, so many midwives recommend this therapy to clients.[12]
- New evidence suggests that early exposure to antibiotics may be linked to asthma in small children.[16]
- Women may experience discomfort throughout labour at the IV site, which can affect mobility and focus.

Benefits of Treatment

- 1 in 500 newborns will develop GBS disease if the mother has an unknown GBS culture result and no intrapartum antibiotics are given
- 1 in 200 newborns will develop GBS disease if the mother has a known positive GBS culture result and no intrapartum antibiotics are given
- 1 in 20 newborns will develop GBS disease if the mother has a known positive culture result and no intrapartum antibiotics are given and she has any risk factors during labour
- Less than 1 in 4000 newborns will develop GBS disease if the mother has a known positive culture result and receives intrapartum antibiotics 4 hours before delivery

Identifying Early-Onset Group B Strep Disease

- SOGC recommendations state that neonates of GBS-colonized women who received ≥4hours of antibiotics should be observed in hospital for 24 hours, and neonates of GBS-colonized women who received <4hours of antibiotics should be observed in hospital for 48 hours.[2] Many midwifery clients opt for early discharge from hospital and/or homebirth despite being colonized with GBS, making 24 or 48-hour observation impossible. In this case, the community standard in Vancouver is to educate parents about the following signs and symptoms of early-onset GBS infection and to assess the baby at home in the first week.
- Respiratory distress, specifically grunting

- Fever or inability to thermoregulate
- Seizures
- Inability to nurse or difficulty feeding
- Lethargy
- Stiffness or extreme limpness
- Recent research shows that fetal antibiotic serum levels are at a highest level within the first hour of maternal antibiotic therapy, accompanied by a significant reduction in neonatal GBS colonization, which did not change significantly with longer durations of antibiotic therapy.[17] Thus present evidence suggests that infants whose mothers received antibiotics less than four hours prior to delivery should not be considered particularly at risk for GBS disease.

Clients' Choices

Following an informed choice discussion in which the midwife explains the risks and benefits of GBS screening and prophylaxis as well as the community standard and recommendations, some clients elect to decline screening and/or antibiotics and/or induction of labour following ROM. The midwifery model in British Columbia supports the woman as the primary decision-maker in her care,[1] and this applies to the choice about whether to accept or decline these treatments. Midwives will document this discussion and the client's choice in the client's antenatal record.

Midwives acknowledge that many women pursue alternative remedies to prevent or eliminate GBS colonization, and midwives may discuss such alternative remedies with their clients, with the proviso that to date there is no herbal or natural protocol that has been proven to be effective for this purpose.

References

1. College of Midwives of British Columbia. Philosophy of care. No date.
2. Society of Obstetricians and Gynecologists of Canada. The prevention of early-onset neonatal Group B streptococcal disease 2004. 2004.
3. Centers for Disease Control and Prevention. Perinatal group B streptococcal disease after universal screening recommendations--United States, 2003-2005. MMWR. 2007 Jul;56(28):701-5.
4. American College of Nurse-Midwives (USA). Clinical bulletin: Early-onset Group B strep infection in newborns: prevention and prophylaxis. April 2003: Number 2.
5. Shah and Ohlsson. Prevention of early-onset Group B streptococcal (GBS) infection in the newborn: Systematic review and recommendations. The Canadian Task Force on Preventive Health Care. 2002.
6. British Columbia Reproductive Care Program. Group B streptococcus in the perinatal period. 2003.
7. Smaill, F. Intrapartum antibiotics for Group B streptococcal colonization. Cochrane Database of Systematic Reviews, 2003.
8. College of Midwives of British Columbia. Guidelines for prescribing, ordering, and administering drugs. 2008.
9. Chen KT, Puopolo KM, Eichenwald EC, Onderdonk AB, Lieberman E. No increase in rates of early-onset neonatal sepsis by antibiotic-resistant group B Streptococcus in the era of intrapartum antibiotic prophylaxis. American Journal of Obstetrics & Gynecology. 2005 Apr;192(4):1167-71.
10. PT - Comparative Study Dinsmoor MJ, Viloria R, Lief L, Elder S. Use of intrapartum antibiotics and the incidence of postnatal maternal and neonatal yeast infections. Obstet Gynecol. 2005 Jul;106(1):19-22.
11. Jolivet, R R. Early-onset neonatal group B streptococcal infection: 2002 guidelines for prevention. 2002 Nov; 47(6): 435-446.
12. Falagas ME, Betsi GI, Athanasiou S. Probiotics for prevention of recurrent vulvovaginal candidiasis: a review. J Antimicrob Chemother. 2006 Aug;58(2):266-72.
13. Chueh HY, Liu CM. Risk factors for recurrence of group B streptococcus colonization in a subsequent pregnancy. Obstetrics & Gynecology. 2008 Mar;111(3):704-9.

14. Glass N.E., Schulkin J., Chamany S., Riley L.E., Schuchat A., Schrag S. Opportunities to reduce overuse of antibiotics for perinatal group B streptococcal disease prevention and management of preterm premature rupture of membranes. *Infectious Diseases in Obstetrics & Gynecology. 2005 Mar; 13(1):5-10.*
15. Baecher L, Grobman W. Prenatal antibiotic treatment does not decrease group B streptococcus colonization at delivery. International Journal of Gynaecology & Obstetrics. 2008 May; 101(2):125-8.
16. McKeever TM. Early exposure to infections and antibiotics and the incidence of allergic disease: A birth cohort study with the West Midlands General Practice Research Database. J of Clinical Immunology; 109(1): 43-50.
17. Barber E, Zhao G, Buhimicshi I, Illuzzi J. Duration of intrapartum prophylaxis and concentration of penicillin G in fetal serum at delivery. Obstet Gynecol 2008; 112(2):265-270.
18. Bizarro MJ. Changing patterns in neonatal Escherichia coli sepsis and ampicillin resistance in the era of intrapartum antibiotic prophylaxis.
19. Hamada S, Vearncombe M, McGreer A, Shah PS. Neonatal GBS disease: Incidence, presentation, and mortality. J Maternal-Fetal & Neonatal Medicine 2008; 21(1):53-57.
20. Ohlasson A, Shah VS. Intrapartum antibiotics for known maternal group B streptococcal colonization (review). The Cochrane Library 2009 (3).
21. Berthier A. Antibiotics at term: Questions about five severe allergic accidents. Gynecologie Obstetrique & Fertilite 2007; 35:464-472.
22. Dinsmoor MJ, Viloria R, Leif L, Elder S. Use of intrapartum antibiotics and the incidence of postanatal maternal and neonatal yeast infections. Obstet Gynecol 2005; 106:19-22.
23. Koenig JM, Keenan WJ. Group B Streptococcus and early-onset sepsis in the era of maternal prophylaxis. Pediatr Clin N Am 2009; 56:689-708.
24. Panda B, Iruretagoyena I, Stiller R, Panda A. Antibiotic resistance and penicillin tolerance in ano-vaginal GBS. J Maternal-Fetal & Neonatal Medicine 2009; 22(2):111-114.
25. Makoul IR, Sprecher H, Sawaid R, Jakobi P, Smolkin T, Sujov P. early-onset GBS sepsis in high risk neonates born after PROM. IMAJ 2009; 11:34-38