

GROUP B STREPTOCOCCUS

Lauren MacHattie – UBC Midwifery

What is Group B Streptococcus?

Group B Streptococcus (GBS) is a type of bacteria that some women carry as part of their normal vaginal flora. Normally, women who carry GBS do not encounter health problems due to the presence of GBS. In North America, pregnant women are universally screened for the presence of GBS at 35-37 weeks gestation using vaginal-rectal swabs that are collected in clinic and cultured in the lab¹⁰.

Why is GBS a concern?

Some women who carry GBS can pass the bacteria on to their infants during labour and birth, and rarely, these infants can become sick with Early-Onset GBS Disease (EOGBSD). Among those who become sick, a few infants (especially those who are born before 36 weeks gestation) can become seriously ill. In North America, the standard of care for women who screen GBS positive (or who have risk factors for neonatal GBS disease) is to have an informed choice discussion and to offer women intravenous antibiotics for GBS during active labour¹⁰.

What is neonatal Early-Onset GBS Disease?

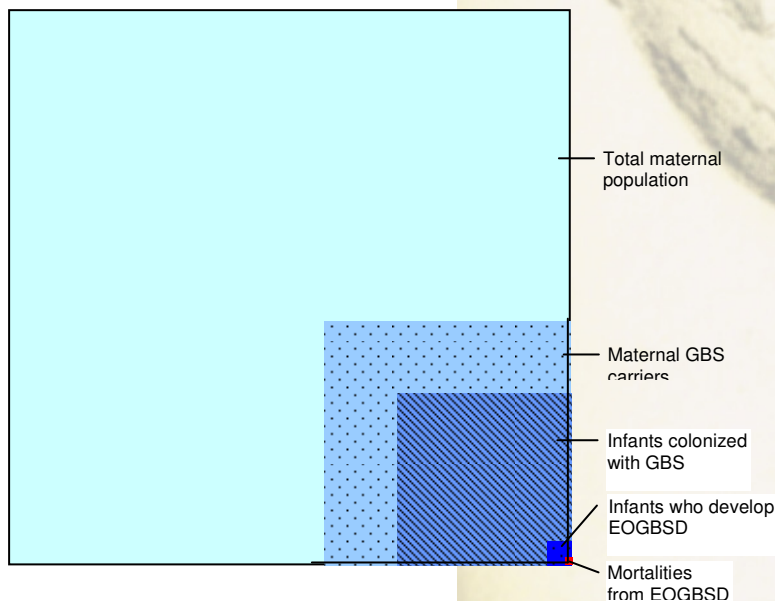
GBS disease is separated into early- and late-onset. Early-onset GBS Disease occurs in the neonate within the first week of life, while Late-onset GBS Disease usually occurs from the seventh day to the third month of life^{1,2}. Late-onset GBS Disease is rare, and is not prevented by the use of antibiotics for GBS in labour¹⁻⁴. Therefore, this information sheet will focus on the prevention of Early-Onset GBS Disease (EOGBSD).

EOGBSD develops when GBS causes an infection in an infant (e.g., sepsis, pneumonia, meningitis, osteomyelitis, or septic arthritis), within the first 7 days after birth¹. Most infants with EOGBSD (70%) develop symptoms within the first 12 hours of life⁵. In the Netherlands, neurological damage occurs in 5% of EOGBSD cases, particularly following meningitis⁵. The mortality rate from EOGBSD in the Netherlands is 5%⁵. Compared to preterm infants, babies who are born at full term (≥ 37 weeks gestation) are much less likely to develop EOGBSD or suffer consequences from the disease such as brain damage or death⁶.

What are the risk factors for Early-Onset GBS Disease?

The following factors increase the risk of an infant developing Early-Onset GBS Disease: preterm labour (≤ 36 weeks gestation), prolonged rupture of membranes (> 18 hours), heavy colonization with GBS in current pregnancy (i.e. a urinary tract infection from GBS), maternal fever in labour $> 38^{\circ}\text{C}$ (100.4°F), previous baby with GBS disease, preterm premature rupture of membranes (≤ 36 wks gestation), young maternal age, Black or Hispanic ethnicity, and intrauterine fetal monitoring^{1-5,7-10}.

How common is Early-Onset GBS Disease?



The diagram to the left is an accurately scaled representation of the following Canadian statistics¹⁰:

- 11-19.5% of pregnant women screen positive for GBS
- 40-50% of infants born to GBS-Positive women are colonized at birth
- 2% of infants who are colonized with GBS develop Early-Onset GBS Disease
- 5-9% of infants with EOGBSD do not survive (most fatalities are premature infants)

Overall in Canada, neonatal Early-Onset GBS Disease occurs in 0.34-0.77 per 1000 live births^{4,6}. Among women who screen positive for GBS in pregnancy and who do not receive antibiotics during labour, EOGBSD occurs between 0.2 and 50 per 1000 live births^{2,4}. In Israel and the UK, women are not routinely swabbed for GBS or routinely given antibiotics in labour, and yet the incidence of EOGBSD is similar to ours in Canada, at 0.5 per 1000 live births^{2,11}.

What are the Treatment Options?

In Canada, the standard treatment for preventing the transmission of GBS from GBS-Positive mothers to their babies is to give intravenous penicillin G for ≥ 4 hours prior to delivery, with an initial dose of 5 million units followed by 2.5 million units every 4

hours until the birth¹². However, there are three different approaches available for the prevention of GBS disease. If you screen GBS Positive, you and your health care provider should discuss your individual health factors and choose one of the following options:

Prevention Strategy	Method	Theoretical reduction in EOGBS Disease
Bacteriological screening only	All pregnant women at 35-37 weeks gestation are swabbed for GBS. All women who screen positive are treated with intrapartum antibiotics, regardless of the presence of risk factors for neonatal GBS Disease.	65 – 86% ^{2,11,13}
Risk-factor only	No swab for GBS is performed at 35-37 weeks gestation. Women with ≥ 1 risk factor for GBS Disease are treated with intrapartum antibiotics.	50 – 62% ^{2,14}
Combined screening & risk factor strategy	All pregnant women at 35-37 weeks gestation are swabbed for GBS. Only women who screen positive <i>and</i> have ≥ 1 risk factor for neonatal GBS Disease are treated with intrapartum antibiotics.	51 – 75% ^{2,3}

Benefits of IAP

Reduction in GBS Colonization – Intrapartum Antibiotic Prophylaxis is effective in reducing GBS colonization 80-90%⁴.

Reduction in GBS Disease – A study on IAP for GBS found that increased use of IAP from 1992-1997 resulted in a significant decrease in the incidence of GBS sepsis (from 1.7 per 1000 live births to 0 per 1000; $p=0.02$)¹⁵.

Risks of IAP

Antibiotic Resistance by GBS strains – Since the introduction of intrapartum antibiotic prophylaxis for GBS, antibiotics such as ampicillin, clindamycin, and erythromycin have become significantly less effective at killing GBS bacteria^{1,4,13,16,17}.

Antibiotic Resistance by Bacteria other than GBS – Levine et al.¹⁵ found that the increased use of IAP between 1992-1997 resulted in a 4.5-fold increase in cases of infant sepsis from antibiotic-resistant bacteria. This increase in sepsis balanced the decrease in neonatal GBS sepsis to cause an unchanged overall rate of neonatal sepsis¹⁵. Bizzarro et al.¹⁸ conducted a retrospective review from 1979 to 2006, which showed an increase in use of intrapartum antibiotics for GBS positive women from 16% to 85%, and a corresponding increase in neonatal ampicillin-resistant *E. coli* sepsis from 0% to 64% in Very Low Birth Weight neonates.

Thrush – The use of IAP for GBS has been associated with increased incidence of thrush and breast candidiasis in mothers and infants^{14,19}. This is a concern because the discomfort of thrush can discourage women from continuing breastfeeding¹⁹.

Maternal anaphylactic reactions to antibiotics – In women treated with Penicillin for GBS, the incidence of Anaphylactic reactions is reported from 1-5 per 10,000 recipients^{2,3,20,21}. The incidence of maternal death from this cause is 0.9-2 per 100,000^{4,20,21}.

Maternal birth experience – Labouring women who receive IAP for GBS can experience discomfort and reduced mobility at the IV site. Women who are GBS positive face logistical issues if they are planning home births because many Registered Midwives in B.C. prefer to administer the first dose of antibiotics in hospital in case an adverse reaction occurs. However, all RMs have the option to prescribe and administer IAP at home, and they carry medications and equipment for use if an adverse reaction occurs. In rural areas, the travel time to the hospital for the administration of IAP can be disruptive to the process of home labour & birth.

Strategies for reducing GBS colonization in pregnancy

From 32 weeks gestation onward, the following natural methods can be used to boost your immune system and reduce your likelihood of being GBS positive at term. These methods have been successful in small populations of midwifery clients, but there is no available scientific evidence proving their efficacy in reducing GBS colonization in all pregnant women.

- Probiotics- such as *HMF Intensive* by *Genestra* (Swallow 1 capsule a day with food)
- Echinacea- *Mediherb Echinacea Premium* tablets (Swallow 1 tablet 3x a day without food)
- Vitamin C- take a 500mg supplement orally each day
- Garlic- eat fresh garlic every day, preferably raw (swallowed with honey or used in a salad). Take daily garlic perles orally.

Burdock Root & Echinacea Root Infusion

Steep 0.5oz of each herb in 4c boiling water for 2h. Strain, drink 1 cup/day. Store extra in the fridge for the next day.

References

1. Centre for Disease Control (2002). Prevention of perinatal group B streptococcal disease: Revised guidelines from CDC.
2. Royal College of Obstetricians and Gynaecologists (2003). Prevention of early onset neonatal group B streptococcal disease. Clinical Practice Guideline No. 36.
3. American Academy of Pediatrics. Revised guidelines for prevention of early-onset group B streptococcal infection. *Pediatrics* 1997; 99(3):489-496.
4. Canadian Task Force on Preventive Health Care (2001). Prevention of early-onset GBS infection in the newborn: Systematic review and recommendations.
5. Nederlandse Vereniging voor Obstetrie en Gynaecologie (2008). Preventie van neonatale groep-B-streptokokkenziekte (GBS-Zietke). Richtlijnen.
6. Hamada S, Vearncombe M, McGeer A, & Shah PS. Neonatal GBS disease: Incidence, presentation, and mortality. *J Maternal-Fetal & Neonatal Medicine* 2008; 21(1):53-57.
7. American College of Nurse-Midwives (2003). Early-onset group B strep infection in newborns: Prevention and prophylaxis. Clinical Bulletin No. 2.
8. New Zealand College of Midwives (2004). Group B streptococcus. Consensus Statement.
9. Royal Australian and New Zealand College of Obstetricians and Gynaecologists (2007). Screening and treatment for group B streptococcus in pregnancy. College statement.
10. Society of Obstetricians and Gynecologists Canada. The prevention of early-onset group B streptococcal disease. Clinical practice guideline No. 149; 2004.
11. Makhoul 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.
12. Barber E, Zhao G, Buhimschi I, & Illuzzi J. Duration of intrapartum prophylaxis and concentration of penicillin G in fetal serum at delivery. *Obstet Gynecol* 2008; 112(2): 265-270.
13. 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.
14. Ohlsson A, Shah VS. Intrapartum antibiotics for known maternal group B streptococcal colonization (review). *The Cochrane Library* 2009 (3).
15. Levine E, Ghai V, & Barton J. Intrapartum antibiotic prophylaxis increases incidence of gram negative neonatal sepsis. *Infectious Diseases Obstet Gynecol* 1999; 7: 210-213.
16. Barcaite E, et al. Prevalence of maternal group B streptococcal colonisation in European countries. *Acta Obstetrica et Gynecologica Scandinavica* 2008; 87(3):260-271.
17. 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.
18. Bizzarro MJ, et al. Changing patterns in neonatal Escherichia coli sepsis and ampicillin resistance in the era of intrapartum antibiotic prophylaxis. *Pediatrics* 2008; 121:689-96.
19. Dinsmoor MJ, Viloria R, Leif L, Elder S. Use of intrapartum antibiotics and the incidence of postnatal maternal and neonatal yeast infections. *Obstet Gynecol* 2005;106:19-22.

20. Chaudhuri K, et al. Anaphylactic shock in pregnancy: A case study and review of the literature. *International Journal of Obstetric Anesthesia* 2008; 17: 350-357.
21. Berthier A, et al. Antibiotics at term: Questions about five severe allergic accidents. *Gynecologie Obstetrique & Fertilité* 2007; 35: 464-472.