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Prevention of group B streptococcal infection in newborns

Recommendation statement from the Canadian Task Force on Preventive Health Care

Recommendations

- There is fair evidence (level II-1 and II-2) that universal screening for group B streptococcal (GBS) colonization at 35–37 weeks' gestation followed by selective intrapartum chemoprophylaxis (IPC) given to colonized women who have risk factors reduces the incidence of colonization and early-onset infection in neonates. This appears to be the most efficient strategy (grade B recommendation).
- There is fair evidence (level II-2) that universal screening for GBS colonization at 35–37 weeks' gestation followed by IPC of all colonized women reduces the incidence of colonization in neonates and prevents early-onset neonatal infection, but this strategy is associated with a much larger proportion of women being treated (grade B recommendation).
- There is insufficient evidence to evaluate the effectiveness of IPC given on the basis of risk factors alone (grade C recommendation).

Two forms of group B streptococcal (GBS) infection — early onset and late onset — in infants are well recognized, and the distinctions between them are described in Table 1. Risk factors for GBS infection in general include (a) preterm labour (< 37 weeks' gestation), (b) prolonged rupture of membranes (≥ 18 hours), (c) maternal fever (temperature ≥ 38.0°C), (d) GBS bacteriuria during pregnancy and (e) previous delivery of a newborn with GBS infection regardless of current maternal GBS colonization status. In the absence of intrapartum chemoprophylaxis (IPC), colonization will occur in about 40%–50% of infants of mothers who are GBS positive on screening. IPC is effective in reducing the incidence of colonization by 80%–90%. In the absence of treatment, early-onset infection will develop in a small but important proportion of infants of colonized mothers.

Preventive strategies

- Universal screening of pregnant women for GBS colonization followed by selective IPC given to colonized women with risk factors
- Universal screening of pregnant women for GBS colonization followed by IPC given to all colonized women
- IPC given on the basis of risk factors only

Potential benefits

- Prevention of GBS colonization and early-onset infection in neonates

Potential harms

- Increased incidence of GBS strains resistant to erythromycin (reported rates ranging from 3.2% to 16.0%) and clindamycin (reported rates ranging from 2.5% to 15%)[9–11]
- Increased incidence of neonatal sepsis due to ampicillin-resistant organisms other than GBS (possibly related to widespread use of antepartum and intrapartum antibiotics)[12,13]

Recommendations by others

The Society of Obstetricians and Gynaecologists of Canada,[14] the US Centers for Disease Control and Prevention (CDC)[15] and the American Academy of Pediatrics[16] have published guidelines

Table 1: Description of group B streptococcal (GBS) infection in newborns by age at onset

Onset	Definition and signs at presentation	Incidence	Death rate, %
Early	• Occurs in infants < 1 wk old • Acquired through vertical transmission from colonized mothers • Clinical presentations include sepsis, pneumonia and meningitis[1,2]	1–3 per 1000 live births (declined to 0.6 per 1000 live births in active surveillance areas in the United States)[3–6] 0.42 per 1000 total births in Alberta during 1995–1999[2]	4.7[6] 9.0[2]
Late	• Occurs in infants older than 1 wk • Acquired either by vertical transmission (delayed infection after early colonization in 50% of cases)[7] or by horizontal transmission (in hospital or in the community)[8] • Meningitis is most common presentation (in 85% of cases)[1]	0.22 per 1000 total births in Alberta during 1995–1999[2]	2.8[7] 2.0[2]

regarding the prevention of perinatal GBS infection. They recommend either of 2 strategies: universal screening at 35–37 weeks' gestation and offer of IPC to colonized women, or offer of IPC on the basis of maternal risk factors. The American College of Obstetricians and Gynecologists[17] and the CDC recommend that individual obstetricians choose one of these 2 strategies to establish consistent management of patients. No intervention will be able to prevent all cases of early-onset GBS infection in neonates.

Evidence and clinical summary

- There is no direct evidence regarding the effectiveness of screening for GBS colonization in pregnant women as no study to date has compared the outcomes of screened and unscreened women.
- None of the randomized clinical trials evaluating the effectiveness of universal screening for GBS colonization followed by selective IPC given to colonized women with risk factors[18] or of universal screening for GBS colonization followed by IPC given to all colonized women[19,20] has shown a statistically significant reduction in the incidence of early-onset neonatal infection. Although they show a trend toward reduction, none of these studies had enough power to show a significant difference in incidence of early-onset neonatal infection between the treatment and control groups (possible type II error). There is evidence that both strategies reduce neonatal colonization.
- There is cumulative evidence from cohort studies that either universal screening followed by selective IPC given to colonized women with risk factors[21–23] or universal screening followed by IPC given to all colonized women[24,25] is effective in preventing early-onset GBS infection in neonates. The efficacy of IPC given on the basis of risk factors alone has not been tested.
- Two to 3 women need to be treated with IPC to prevent 1 case of neonatal colonization with either the universal or selective IPC strategies. To prevent 1 case of early-onset neonatal infection, 6 colonized women with risk factors (95% confidence interval [CI] 4–10) need to be treated with selective IPC. In comparison, evidence from 2 studies indicates that 16 colonized women (95% CI 9–84)[24] and 2059 colonized women (95% CI 1062–32 968)[25] need to be treated to prevent 1 case of early-onset infection if IPC is administered to all colonized women (the rates of early-onset infection in the control groups were 7% and 0.1% respectively). (In view of statistically significant heterogeneity [$p = 0.0062$], the results of the 2 studies were not combined.) Thus, a much larger proportion of pregnant women will receive antibiotics if universal screening for GBS colonization and IPC is adopted as a preventive strategy than if universal screening and selective IPC given on the basis of risk factors is adopted. The point estimates for effectiveness for the different strategies have likely been overestimated because of poor study quality, including heterogeneity.
- Collection by swab of antenatal specimens (from lower vagina and rectum) for culture should occur at 35–37 weeks' gestation. Specimens should be inoculated into selective broth medium, followed by overnight incubation, and then subcultured onto solid blood agar medium.
- Adequate IPC consists of at least 1 dose of penicillin (5 million units) given intravenously at least 4 hours before birth. If labour continues beyond 4hours, penicillin (2.5 million units) should be administered every 4 hours until delivery. Intravenous administration of clindamycin (900 mg every 8 hours) or erythromycin (500 mg every 6 hours) until delivery is recommended for women allergic to penicillin.
- With the emerging resistance to erythromycin and clindamycin among GBS strains, the currently recommended antibiotic therapy in cases of penicillin allergy may need modification. The increased use of antibiotics in the perinatal period may lead to an increased incidence of bacteria resistant to antibiotics that are currently used as initial therapy for suspected perinatal infections.

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This statement is based on the technical report: "Prevention of early-onset group B streptococcal (GBS) infection in the newborn: systematic review and recommendations," by V. Shah and A. Ohlsson, with the Canadian Task Force on Preventive Health Care. The full technical report is available online (www.ctfphc.org) or from the task force office (ctf@ctfphc.org).

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