Group B Streptococcal colonization dynamics and serotype distribution in Japanese mother-infant pairs

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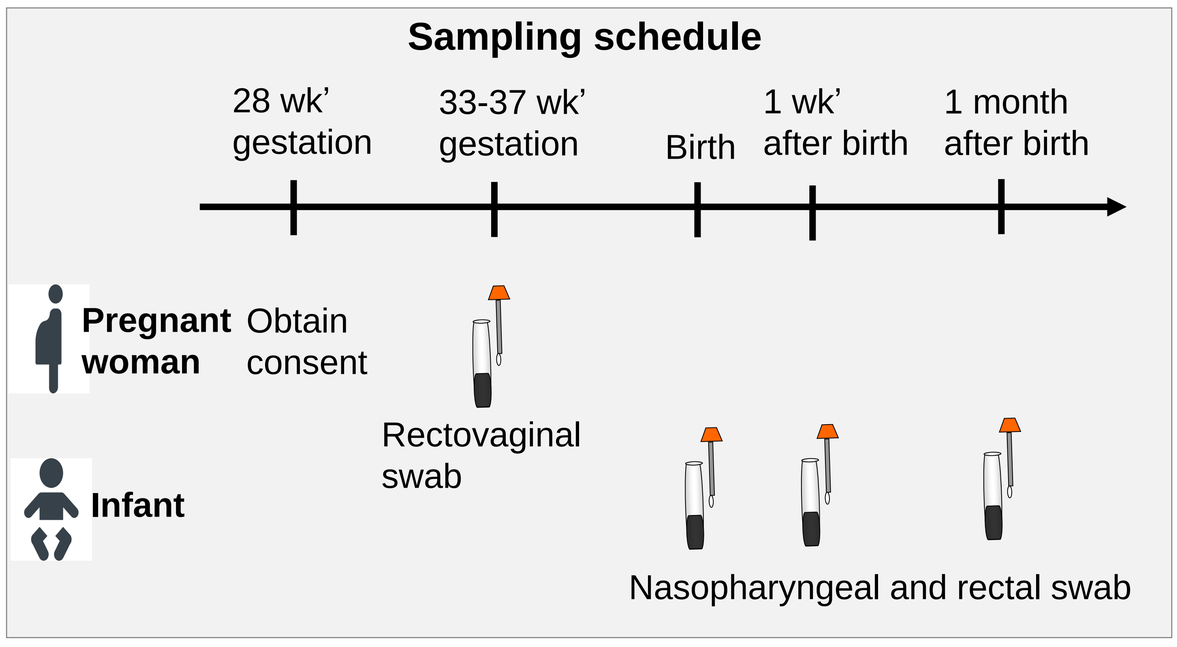
Introduction

In Japan, universal screening for group B streptococcal (GBS) colonization in pregnant woman and intrapartum antibiotic prophylaxis (IAP) have been recommended to prevent neonatal GBS infection.
The object of this study was to describe GBS colonization dynamics and serotype distribution in Japanese mother-infant pairs under universal screening and IAP.

Methods (1)

Period : July 2018 to March 2019
Exclusion : Pregnant woman with multiple pregnancy
Laboratory procedures : Colonization was detected using our in-house real-time polymerase chain reaction (PCR) method as well as bacterial culture. GBS-positive isolates subsequently underwent capsular typing and multilocus sequence typing (MLST).

Methods (2)



Results

The overall maternal GBS colonization rate was 22.7% (57/251).
55 colonized mothers (96.5%) were given IAP. 34 of 55 women colonized (61.8%) were given IAP initiated 4 hours or more before birth.

The overall infant GBS colonization rate was 8.8% (22/252). 11 of 57 infants born to colonized mothers were colonized. These 11 mothers were exposed to IAP before delivery. Capsular typing analysis (available for 10 of 11 pairs) confirmed the same serotypes in all mother-infant pairs. Moreover, MLST analysis (available for 4 of 11 pairs) confirmed the same sequence types. No infants developed invasive GBS disease during the period of this study.

Figure 1. Flow chart of transmission of GBS

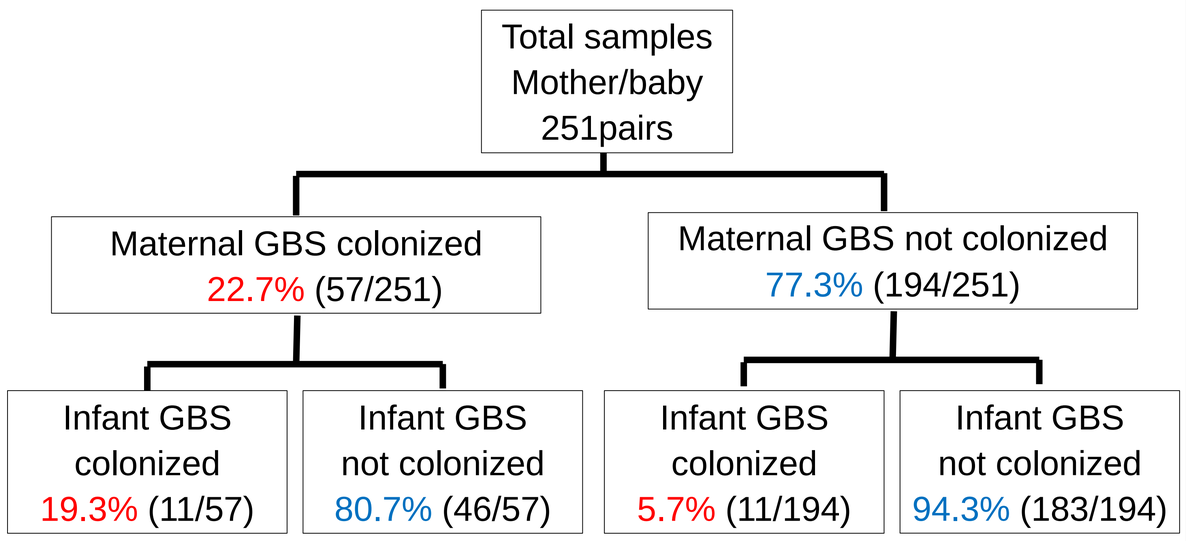


Table 1. Risk factor for GBS colonization in infants

	Infant GBS positive n=22	Infant GBS negative n=229	*p* value
Maternal GBS colonization, n (%)	11 (50%)	46 (20.1%)	0.001
Preterm births, <37 wk' gestation, n (%)	0	9 (3.9%)	0.34
Birthweight <2500g, n (%)	1 (4.5%)	13 (5.7%)	0.83

Figure 2. Distribution of capsular serotypes and sequence types

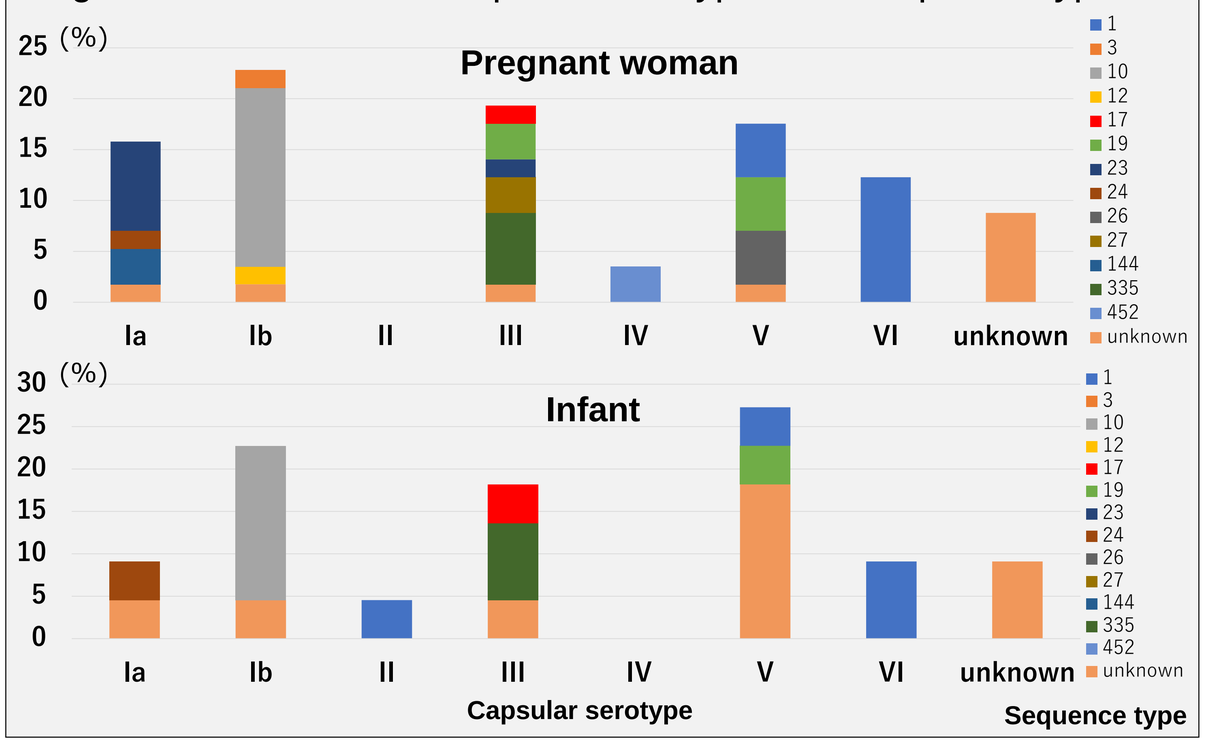


Table 2. Serotypes among both mother and infant positive pairs

Pair	Pregnant woman	Infant	Timing of infant colonizing		
			birth	1 week	1 month
1	Ib	Ib	+	-	-
2	Ib	Ib	+	-	-
3	Ib	Ib	-	+	-
4	III	III	-	-	+
5	V	V	+	-	-
6	V	V	-	-	+
7	V	V	-	-	+
8	V	V	-	-	+
9	VI	VI	-	+	+
10	VI	VI	-	-	+
11	VI	unknown	+	-	-

Conclusions and future work

- Even if GBS-positive mothers receive IAP, the risk of GBS carriage among their infants is likely to be high.
- Maternal immunization is required to protect infants.
- A GBS vaccine which is in clinical development containing 6 serotypes Ia, Ib, II, III, IV, V would cover approximately 80% of the isolates carried by pregnant women and infants in Japan.
- Future work is needed to measure antibody concentration distribution among these mothers and infants.

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