Maternal and neonatal colonization with group B streptococci in Ottawa

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Group B streptococci are now recognized as an important cause of neonatal sepsis, a theoretically preventable disease. In the period June 1977 to July 1978 there were nine cases of proven group B streptococcal sepsis known to us in the Ottawa region, an area in which there are about 12 000 deliveries per year. Because the institution of rational prophylactic measures demands knowledge of the epidemiologic situation in a particular locality, we undertook the following study of the rates of colonization by this organism in parturient women and their newborn infants in Ottawa.

Methods

In the fall of 1977, 132 parturient women consecutively admitted to the Ottawa Civic Hospital were studied along with their newborn infants (including one set of twins). Vaginal and rectal swabs were taken from the mothers at the time of admission to the caseroom. Umbilical, groin and ear swabs were taken from the infants within 5 minutes of delivery. All swabs were taken by the caseroom nurses, placed directly in the selective medium described by Baker, Clark and Barrett,[1] and transported to the laboratory the same day. Organisms were identified as group B streptococci by the CAMP test[2] and by immunodiffusion. The strains were typed by Dr. J.C. Huang, of the Laboratory Centre for Disease Control, Ottawa.

Results

Colonization by group B streptococci was detected in 26 (20%) of the women and 11 (8%) of the infants; 35% of the colonized women had colonized infants.

The frequency of the group B subtypes is shown in Table I. All subtypes were seen. In eight instances the same subtype was detected in both mother and infant. In one instance subtype 1c was found in the mother and an "untypable" strain in the infant. This may have been a strain that had become untypable through loss on subculture of the type-specific capsular antigen, and this does not necessarily indicate a discrepancy between the serotypes of mother and infant.

Six infants were delivered by cesarean section from women in whom colonization by group B streptococci was detected. The organism was isolated from four of the six infants, two of whom were delivered by elective cesarean section prior to rupture of the membranes and onset of labour.

In none of the infants did meningitis or septicemia develop.

Discussion

The incidence of maternal and neonatal colonization with group B streptococci in the Ottawa region is comparable to that reported in the United States[3] and Great Britain.[4] We are aware of one previously published study from Canada, that of Embil, Belgaumkar and Macdonald,[5] who found a colonization rate for infants of 2.17% and did not report a corresponding maternal rate. They, however, examined only rectal swabs, which we did not include in our specimens from infants. The higher colonization rate in our group of infants, 8%, is probably partially related to the fact that swabs were taken from three areas — umbilicus, groin and ear — in our study.

Overt infection develops in approximately 1 of every 100 babies with group B streptococcal coloniza-

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Table I—Subtypes of isolated group B streptococci

Source of organism	Subtype; no. of cases					Total no. of cases
	1a	1b	1c	2	3	
Mother and infant	2	0	1*	4	2	9
Mother only	0	3	2	4	8	17
Infant only	0	1	0	0	1	2

*The mother's strain was type 1c, while the infant's was "untypable".

tion.[6] The prophylactic administration of antibiotics to all babies born of women with colonization and to all babies with colonization would mean the administration of approximately 100 to 200 unnecessary doses for each case of overt infection prevented. It is therefore essential to find some means of identifying more specifically the infants that are at high risk for sepsis. We believe, on the basis of the results of our study, that a positive culture of either vaginal swabs from the mother or swabs from the baby is not a selective enough criterion for a classification of high risk.

Baker and Kasper[7] have demonstrated that type-III-specific opsonic antibodies are absent in mothers of children with group B streptococcal colonization, and they are developing a vaccine containing the type-III-specific polysaccharide. It might also be possible to identify infants at high risk by examining the mother's serum for opsonins. This presently requires technologically demanding and expensive tests that are unsuitable for widespread routine use.

Four of the babies in our series with group B streptococcal colonization were delivered by cesarean section; in two instances the procedure was performed electively before rupture of the membranes. This lends support to the conclusion of Baker[8] that group B streptococcal infection in infants can occur in utero. This view is supported by the short interval (as little as 3 hours) between delivery and the recognition of symptoms that has been reported by others.[9] It is possible that well timed administration of penicillin might prevent colonization in utero, although it is not possible to cure established maternal colonization in this way.[10]

Pending the development and application of an effective vaccine, priority should be given to the development of tests for maternal type-specific opsonins suitable for large-scale use. With such tests it might be possible to recognize the small proportion of infants at high risk for sepsis rather than colonization and to take appropriate measures.

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