Prevalence and significance of group B *Streptococcus* in a large obstetric population

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Between Jan. 1 and Dec. 31, 1985, vaginal swabs were obtained for culture for group B β-hemolytic *Streptococcus* (GBS) from 3078 women admitted for labour and delivery to Regina General Hospital. Seventy-one women had positive results; thus, the colonization rate was only 2.3%. The charts of the 71 women and their 73 babies were analysed. Of the 58 babies from whom swabs were obtained, 20 had GBS at one or more sites; the transmission rate was therefore 34%. Early-onset GBS disease developed in one infant. Two infants died within the first month; however, death was not directly attributable to GBS. Higher rates of preterm delivery and of low birth weight were noted among the babies of the colonized women than among the babies of all women admitted for labour and delivery in 1985. Given the low rate of GBS disease in our centre, we suggest that emphasis be placed on GBS as a possible source of obstetric complications such as preterm labour.

Entre le 1 janvier et le 31 décembre, 1985, on pratique, chez 3078 femmes se présentant au Regina General Hospital pour être accouchées, des écouvillonnages vaginaux à la recherche de streptocoques β-hémolytiques du groupe B (SB). La culture est positive chez 71 d'entre elles, soit un taux de colonisation de seulement 2,3%. Analyse des dossiers de ces femmes et de leurs 73 bébés. On a pratiqué des prélèvements sur 58 de ces derniers et trouvé des SB chez 20 d'entre eux à au moins un endroit, soit un taux de transmission de 34%. Un nourrisson manifeste une maladie streptococcique B précoce; deux nourrissons mourront, mais leur décès n'est pas rapporté directement au SB. Les nouveau-nés des mères porteuses de SB ont des taux plus élevés de prématurité et de faible poids de naissance que l'ensemble des nouveau-nés en 1985. Vu le bas taux de maladie SB dans cet hôpital, nous proposons d'y mettre l'accent sur le rôle du SB comme facteur de complications obstétricales, notamment la prématurité.

Over the past 20 years group B β-hemolytic *Streptococcus* (GBS) has emerged as a leading cause of neonatal sepsis. Two types of GBS septicemia in newborns, early- and late-onset, have been described.[1-3] The early-onset type, which is more common and more severe, is generally acquired via transmission of GBS from the mother's birth canal to the infant during labour. The recognition of the mother as a major source of GBS for her newborn has prompted widespread investigation of colonization rates in parturients and their infants. Reported rates of maternal vaginal colonization range from 4%[4] to 29%.[5] This large variation in rates reflects in part the uneven geographic distribution of GBS. Since there are few Canadian data, we determined the colonization rates among parturients and their babies and the neonatal septicemia rates at Regina General Hospital, a tertiary-care obstetric unit.

Methods

Until January 1986 it had been the practice at Regina General Hospital to obtain vaginal swabs for culture for GBS from all women upon admission for labour and delivery. Between Jan. 1 and Dec. 31, 1985, 3078 women were admitted; swabs were obtained from all. The specimens were cultured on blood agar plates and incubated in an atmosphere of 7% carbon dioxide at 37°C. After 18 to 24 hours of incubation, latex agglutination grouping was carried out to specifically identify

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group B streptococci.[6-8] The charts of women with positive results and of their newborns were abstracted by one person. The following information was recorded from the women's charts: age, gravidity, numbers of previous abortions, infants carried to term, premature infants and live-born infants, results of culture at the time of delivery, intrapartum antibiotic treatment and type of delivery. Data from the babies' charts included birth weight, gestational age, congenital anomalies, results of culture of swabs of the ear, nose, throat, eye, umbilicus and rectum and of blood, and any antibiotic treatment.

Results

Of the 3078 women 71 (2.3%) had positive results of culture for GBS. Their ages ranged from 14 to 42 (mean 25.5) years. There were 29 primigravidas and 42 multigravidas. The 71 women gave birth to 73 living babies (there were two sets of twins). Fifty-eight (82%) of the women gave birth vaginally, 13 (18%) by cesarean section. Four of the women were given predelivery antibiotic prophylaxis, as is now advocated by Boyer and Gotoff.[9]

Swabs were not obtained from 15 of the babies, as they were asymptomatic and were discharged in satisfactory condition. Swabs were obtained from the 58 remaining babies at least once after delivery. Of the 58, 20 (34%) had GBS at one or more sites. Two of their mothers had received antibiotic prophylaxis during labour.

Two infants died during the neonatal period (within 28 days after delivery). Both were premature and of low birth weight and had positive results of culture. However, death was not directly attributable to GBS. The cause of death in one of the infants, a twin with a gestational age of 32 weeks, was prematurity, hyaline membrane disease, congenital herpes infection and patent ductus arteriosus. The cause of death in the other infant was extreme prematurity; his gestational age was 21 weeks.

GBS septicemia was diagnosed in only one infant. This 1950-g boy was delivered by emergency cesarean section at a gestational age of 32 weeks because of fetal distress occurring approximately 54 hours after the membranes had ruptured. The newborn had severe perinatal asphyxia. GBS was cultured from several sites, including the blood. On admission to the neonatal intensive care unit he was given antibiotics, and his condition gradually improved.

Of the 71 deliveries 17 (24%) were preterm (defined as occurring at or before 37 weeks' gestation), whereas the overall rate of preterm delivery at the hospital in 1985 was 9.6%. Furthermore, six of the deliveries (8%) were at 32 weeks' gestation or less; the corresponding overall rate at the hospital was 3.0%.

Of the 73 infants 11 (15%) were of low birth weight (2500 g or less). The overall rate at the hospital was 8.7%. It is the policy of the neonatologists at the hospital to treat with prophylactic antibiotics all newborns weighing 2500 g or less.

Discussion

Rates of GBS colonization of the maternal genital tract have been reported to range from 4%[4] to 29%[5] in North America and Europe. Our rate was 2.3%. In the only other Canadian study of which we are aware that determined rates of maternal vaginal but not rectal colonization the rate was 7.6%.[10] This higher rate may have been due in part to the use of a selective broth culture medium, which is more sensitive than a solid medium.[5]

Other experimental variables may complicate the comparison of colonization rates. Since GBS is found intermittently in the genital tract, sampling several times during pregnancy will increase the overall isolation rate.[11] Furthermore, various studies have shown that carriage rates may be higher when more than one site, including in particular the rectum, is sampled.[12-15] In 1979 MacDonald and Mackenzie[16] reported a maternal colonization rate at delivery of 20% for the Ottawa region; this higher rate may be attributed to the culturing of both vaginal and rectal swabs. Differences in sexual activity, ethnic background, socioeconomic status, parity and age may account for geographic variation in rates.[17-19]

At our hospital, swabs were obtained from 58 infants born to women with colonization at the time of delivery; 20 of the infants had GBS at one or more sites. Since the infant presumably acquires the infection from the mother's genital tract during labour, our data represent a transmission rate of 34%, which is comparable to the rates of 23.5%[20] and 34%[15] reported from other studies; however, rates as high as 72% have been reported.[11] The incidence rate of early-onset GBS disease among the infants born to the 3078 women was 1/3000, or 0.3/1000, close to British[21] and Danish[22] rates; a higher rate (3.7/1000 live births) has been reported from the United States.[23] Since 11 of the babies with GBS at our hospital weighed 2500 g or less, the hospital's policy of routinely administering antibiotics to infants of such low birth weight may have been in part responsible for the low incidence rate of early-onset GBS disease at our hospital.

The reported incidence rate of GBS septicemia among colonized infants is relatively low, at approximately 1%.[24] The rate at our hospital was 5%. Regan and colleagues[25] speculated that the threat of GBS lies not in the possibility of infection but in that of prematurity. They found a significant difference in the rate of preterm labour (that occurring at less than 32 weeks' gestation) between colonized women (5.7%) and noncolonized women (1.7%). Similar rates (5.4% and 1.8% respectively) were recorded by Regan and associates[26] in another

study. At our hospital the rate among colonized women was 8%, compared with an overall rate of preterm labour of 3.0% in 1985.

Preterm labour has in turn been implicated as a risk factor for neonatal acquisition of early-onset GBS disease. The potential role of prolonged rupture of the membranes, intrapartum fever, twin pregnancy, low birth weight, lack of antibodies to GBS type III in mothers and invasive fetal monitoring has also been examined.[27,28] In the one case of GBS septicemia at our hospital several of these risk factors were present. The true significance of these factors, however, has yet to be determined.

In summary, colonization rates at our centre were low compared with rates reported from other centres. The incidence rates of neonatal GBS disease and death were correspondingly low. Over the years, studies have focused primarily on GBS as a cause of neonatal septicemia. Our low rates suggest, however, that GBS sepsis in neonates may not play as significant a role at our centre. The real threat of GBS may lie in its potential to induce preterm labour and delivery.

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