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The Incidence of Neonatal Pneumococcal Septicemia in Sweden 1991–92

The result of a national survey

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ABSTRACT

Johnsson H, Ewald U. The incidence of neonatal pneumococcal septicemia in Sweden 1991-92. The result of a national survey.

In a survey of the incidence of pneumococcal neonatal septicemia in Sweden 1991-92, to our knowledge the first nationwide survey of this kind, an incidence of 3.6/100 000 was found. Based on this, the relative incidence of neonatal septicemia caused by pneumococci was calculated to be 0.9-1.3%. Despite recent reports of pneumococci resistant to antibiotics, no resistant strain was found, and among the affected neonates, all treated with conventional antibiotics, there was a lower mortality as compared to prior reports. This might reflect the facts that the infants were less often born preterm, were less often born after premature rupture of membranes, and had a higher proportion with a late onset of symptoms than in earlier surveys.

INTRODUCTION

Neonatal septicemia is rarely caused by pneumococci (*Streptococcus pneumoniae*). Several local clusters of cases have been reported, but in larger hospital-based reports of the etiology of neonatal septicemia, the incidence was less than 2 percent (5). In the majority of cases, the pneumococci are probably transmitted from the mother's genital tract before or during parturition, and the disease is manifested within 48 hours of birth. In these cases with an early onset the predominant symptom is reported to be respiratory distress, indistinguishable from that seen when the septicemia was caused by Group B streptococci, but with twice the mortality. With a later onset, the source of transmission was multifarious, the symptoms were mainly neurological and gastrointestinal, and the mortality was low (2,3,5).

Having previously witnessed two cases in our department (4), we decided to make a nationwide survey to see if there was any indication of an increased incidence of neonatal pneumococcal septicemia. We were also interested in finding out whether the clinical picture

in these patients was in accordance with that reported in the literature (2-5). Since earlier studies were based either on cases admitted to hospital or on diagnosed cases in a limited area, they might give a biased view of the disease, and it was considered that a nationwide survey might yield a different result.

Contributing to our interest in pneumococcal diseases were recent reports of the increasing prevalence of pneumococcal strains resistant to penicillin and other antibiotics (6), though not reported in association with neonatal septicemia.

METHODS

In Sweden during 1991 and 1992 all the pediatric clinics sent their bacteriological cultures to their respective county microbiological laboratory. The 31 county microbiological laboratories in Sweden, together covering the entire country, were asked for a copy of any record of growth in blood cultures of pneumococci in patients less than one month old during 1991 or 1992. All 31 laboratories responded, and a total of 9 cases were reported. The positive answers were followed up by asking the referring pediatric clinic for some basic clinical information (Table 1).

RESULTS

Our survey revealed 9 cases of neonatal pneumococcal septicemia. During 1991 and 1992, 123 737 and 122 848 live births, respectively, were recorded in Sweden (7), which meant an incidence of 3.6/100 000 live births. Calculating on the basis of an incidence of neonatal septicemia of all causes of between 2.8 and 4/1000 live births, as reported from western Sweden for the years 1975-86 (8) and from Stockholm, Sweden, 1981-85 (1), the relative incidence of pneumococcal neonatal septicemia was between 0.9 and 1.3%.

In 7 of the 9 neonates the symptoms began within 48 hours after birth. All but one had respiratory symptoms at the onset. Three of these 7 were born preterm and one of the 7 died (Table 1).

The two infants whose symptoms were manifested more than 48 hours after birth were both born at term. They both showed general disease symptoms at onset, and one of them had a concomitant meningitis (as did his mother). They both survived.

A total white blood cell count was performed in 7 cases, and 4 of these yielded a value below $5x10^9$ white blood cells/l.

Five of the infants were treated with a cephalosporin, alone or in a combination, and the other four with an aminoglycoside and ampicillin. No resistant strains of pneumococci were reported.

Table 1. Some clinical characteristics of the 9 cases of neonatal pneumococcal septicemia in Sweden 1991-92.

case no.	gestational age (w)	sex	birth weight (g)	age at onset (h)	symptoms	WBC at onset (10 L)	maternal symptoms	cervical culture	ROM (h)	outcome
1	40	M	4330	18	respiratory, fever	7.0	fever		3	well
2	33	M	2070	8	respiratory	4.2	no	no GBS	2	died after 1 day
3	35	F	3034	0	respiratory		fever	GBS	8	well
4	38	M	2910	12	respiratory	2.7 (P 1.6)	cold	pnc	15	well
5	38	M	3110	<24	respiratory, general		fever	negative	0	well
6	39-40	F	3655	72	general, fever	2.5 (P1.9)	meningitis		5	well
7	34	F	2550	48	general, fever	2.2(P 1.0)			2	well
8	38	M	3320	76	general	14.2(P10.7)	no		5	well
9	38	M	3430	4	respiratory, fever	10.1	no	pnc	<48	well

Abbreviations: WBC = white blood cells, P = polynucleated, GBS= group B Streptococci, pnc = pneumococci, ROM = rupture of membranes. An empty space signifies a non-performed investigation.

DISCUSSION

We are not aware of any previous nationwide survey undertaken to determine the incidence of neonatal septicemia caused by pneumococci. In several hospital- or area-based studies of the etiologic agents in neonatal septicemia, a relative incidence of pneumococci of below 2% has been found (5). Our finding of an incidence of 3.6/100 000 live births is comparable to a relative incidence of 0.9 -1.3%, in accordance with earlier studies.

Compared to recent reviews of neonatal pneumococcal septicemia (2,3,5), there were findings in our survey that differed. The mortality (1/7; 14%) among the infants with an early onset of symptoms was low compared to the 43-53% in earlier reports. This difference may be partly due to the general improvement in neonatal care with time, and partly to the low proportion of preterm babies (3/9; 33%) in this material, as opposed to 54-79% of the cases in the reviews (2,3,5). The proportion of infants with a late onset of symptoms (2/9; 22%), which in prior reports has been associated with lower mortality, was also twice that found in the previously reported cases (9-12%).

Notable also is the low proportion (1/7; 14%) of premature rupture of membranes (PROM) (>24 hours) among the infants with early onset of symptoms, as compared to earlier findings of 39-58%. This might not indicate a change in the natural behaviour of the disease, but may reflect a change of attitude among obstetricians towards PROM. Since rupture of the fetal membranes is known to facilitate pneumococcal growth *in uteri* (5), shortening of the time between rupture and birth might decrease the amount of bacteria transmitted, also making recovery more likely.

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