CHLAMYDIA PNEUMONIAE INFECTION IN THAI CHILDREN : SEROLOGICAL DIAGNOSIS

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Abstract. Recent *Chlamydia pneumoniae* infections were investigated in children with respiratory tract infections and in normal children. Four groups of sera were tested for *C. pneumoniae* antibody IgG and IgM serum fraction by the method of MIF test. A total of 7 cases of recent infection were detected, 3 of 116 with pneumonia, 3 of 123 with other respiratory tract infections, 1 of 263 normal school children and none in sera from cord blood. The cases with recent *C. pneumoniae* infection were as young as 24 days and 2 months old.

INTRODUCTION

Chlamydia pneumoniae is an important human respiratory pathogen associated with lower respiratory tract infections such as pneumonia and also cause bronchitis, pharyngitis, sinusitis, otitis and flu-like febrile illness (Grayston *et al*, 1990). The infections are transmitted from man to man by the respiratory tract, occur worldwide, and frequently occur in young children. The knowledge of *C. pneumoniae* infection in developing countries is not well established due to the difficulty of isolating the organism and detecting antibodies. In Thailand, a previous study of high prevalence of antibodies to *C. pneumoniae* indicated that infections occurred among the population and infection increased by aging (Nunthapisud *et al*, 1992). Therefore we investigated further recent *C. pneumoniae* involvement in children with respiratory tract infection.

MATERIALS AND METHODS

Children's sera

The tested sera were grouped into (A) sera from sick children, with respiratory tract infections including pneumonia, who were admitted in the hospital during September 1990 - August 1993 (group 1); sera for studying antibodies to streptolysin 0 and *Mycoplasma pneumoniae* (group2); (B) sera from normal children, including cord blood (group 3), and normal school children aged between 12-17 years whose sera were submitted to the hepatitis B laboratory (Group 4). All sera obtained were single samples except 22 pairs in group 1.

Antibody detection

The method of microimmunofluorescence (MIF) was used to detect IgM and IgG antibodies to *C. pneumoniae*. The presence of specific chlamydial antibody was determined by using fluorescein isothiocyanate conjugated anti-human globulin monospecific to IgM and IgG (Kallestad). The *C. pneumoniae* antigen was provided by the Washington Research Foundation, Seattle, USA. Serologic evidence of recent *C. pneumoniae* infection was defined as 1) seroconversion, 2) greater than four-fold rising antibody titer to IgG, 3) presence of serum IgM $\geq$ 1:16 (Grayston *et al*, 1989b).

RESULTS

One hundred and sixteen, 123, 66 and 263 sera in groups 1, 2, 3 and 4 were examined. Except for the third group with cord blood, the age of children in each group ranged from 24 days - 14 years, 4 months - 15 years and 12-17 years, respectively.

In seven sera, it was found that the *C. pneumoniae* antibody of these children reflected an acute infection. In 6 cases *C. pneumoniae* antibody was in the IgM serum fraction, while the seventh showed a four-fold rising titer of IgG. Ages and *C. pneumoniae*

antibody titers are listed in Table 1. The prevalence of antibodies against *C. pneumoniae* in each of serum groups 1, 2, 3 and 4 occurred in 37 (32%), 43 (35%), 34 (51%) and 91 sera (35%), respectively.

Table 1
C. pneumoniae antibody IgG, IgM titer and age of cases whose sera demonstrated recent *C. pneumoniae* infection.

Cases in group sera	Age	Sex	*C. pneumoniae* reciprocol Ab titer	
			IgM	IgG
Group 1	2 M+	M	32	128
Group 1	14 Y+	F	16	32
Group 1	24 D+	M	-	64 (1st sera)** 256 (2nd sera)
Group 2	4 Y	F	32	-
Group 2	12 Y	F	32	-
Group 2	NK*	M	32	64
Group 4	17 Y	M	16	256

+Y = years, M = months, D = days
*NK = Not known
**Acute and convalescent sera were taken 10 days apart

DISCUSSION

The detection of *C. pneumoniae* antibody by microimmunofluorescence demonstrated acute infection in 2 babies aged younger than those reported in children (Saikku *et al*, 1988). *C. pneumoniae* is another etiologic agent of pneumonia in neonates, possibly transmitted from mother during or a short time after the birth. The four-fold rising titer in IgG serum fraction of *C. pneumoniae* antibody without detection of IgM in a 24 days old boy suggested that natural immunity against *C. pneumoniae* occurred. Infection of *C. pneumoniae* therefore will not necessarily have an IgM antibody response. the IgG antibody response is similar to the pattern in reinfection of *C. pneumoniae* in older children (Grayston *et al*, 1989a). For serological diagnosis *C. pneumoniae* infection in neonates, obtaining paired sera is necessary.

In group 2, all sera indicating an acute infection of *C. pneumoniae* were from the *Mycoplasma pneumoniae* laboratory. Antibody to mycoplasmal infection was negative. In group 4, the school children from whom the sera were taken were from the same school, they showed high titers of *C. pneumoniae* antibody ≥ 1:512 in IgG serum fraction (Table 2).

Table 2

Number of sera in each study group with detecting *C. pneumoniae* antibody IgG titer ≥ 1:512.

Sera group	No. of sera with IgG titer ≥1:512/total	(%)
Group 1	1/116	(0.8)
Group 2	3/123	(2.4)
Group 3	0/66	(0)
Group 4	16/263	(6.0)

The blood samples were originally taken for studying antibody to hepatitis B virus. Clinical data of respiratory tract infection of these children were not available. High titers *C. pneumoniae* IgG antibodies ≥ 1: 512 were detected more often in sera obtained from older children than in those obtained from young children, as described in a previous study (Nunthapisud *et al*, 1992). In other studies, a single IgG titer of ≥ 1: 512 has been considered to reflect acute infection (Aldous *et al*, 1992), suggesting that acute infection of *C. pneumoniae* in young adult is common, possibly mild or subclinical (Hyman *et al*, 1991). Our study provides additional information of the serological response in *C. pneumoniae* infection in neonates.

ACKNOWLEDGEMENTS

We recognize with gratitude Dr JT Grayston, Washington Research Foundation for providing the *C. pneumoniae* MIF antigen, and Dr Yong Poovorawan, Pediatrics Department, Chulalongkorn Hospital, for school children's sera.

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