

## Short Communication

# *Chlamydomphila pneumoniae* Specific Antibodies in Thai Patients with Myocardial Infarction

Piyada Wangroongsarb\*, Puchaniyada Phuekfen<sup>1</sup>, Pimjai Naigowit and Toshikatsu Hagiwara

National Institute of Health, Department of Medical Sciences,  
Ministry of Public Health, Nonthaburi 11000 and  
<sup>1</sup>Cardiology Division, Bhumibol Adulyadej Hospital,  
Bangkok 10220, Thailand

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**SUMMARY:** To investigate the correlation between *Chlamydia pneumoniae* infection and acute myocardial infarction (AMI), a total of 101 serum specimens collected from patients with AMI admitted to the coronary care unit, Bhumibol Adulyadej Hospital, and serum specimens collected from healthy blood donors (control group) were examined by using the micro-immunofluorescence test. *C. pneumoniae* antibody-positive cases were found in 52 (52%) patients, consisting of 30 males and 22 females, though no significant difference of prevalence rate was observed when compared with the rate in the control group. However, the level of IgG titers in patients was higher than that in the controls, and this finding may support an association between *C. pneumoniae* infection and AMI. Among patients with AMI, several cases were suspected to have current infections because of a fourfold or higher titer increase in IgG or titers in IgM antibody of 1:32 or 1:64. There is no significant correlation between serologic test results and diabetes mellitus, hypertension, hyper cholesterol, a smoking habit, or the location of myocardial infarction among patients with AMI.

*Chlamydomphila (Chlamydia) pneumoniae*, an obligate Gram-negative bacterium, has been known as a cause of respiratory tract infection (1). In 1988, Saikku et al. (2) found an association between *C. pneumoniae* antibody and coronary artery disease (CAD). Subsequently, Shor et al. (3) found in coronary artery atheroma by electron microscopy pear-shaped structures that appeared to be identical to *C. pneumoniae*. Since then, the organism has been suspected to play a certain role in the pathogenesis of CAD. In a recent study (4), *C. pneumoniae* was detected in 79% of coronary atherectomy specimens from symptomatic patients by using direct immunofluorescence (IF) test and/or electron microscopy, the results suggesting that *C. pneumoniae* infection might be associated with the development of CAD. In Thailand, CAD is a major cause of morbidity and mortality. However, little is known regarding the prevalence of *C. pneumoniae* infection among patients with CAD (5,6). The aim of the present study was to evaluate *C. pneumoniae* infection in patients with acute myocardial infarction (AMI) admitted to Bhumibol Adulyadej Hospital.

Sixty-five male patients (mean age of 59 years, range: 37 to 85) and 36 female (mean age of 62.7 years, range: 36 to 83) with AMI admitted to the coronary care unit (CCU), Bhumibol Adulyadej Hospital from July 1998 to April 2000 were enrolled in the study. Serum specimens were obtained from all hospitalized patients. The second serum specimens were available 2 to 3 weeks later from 32 male and 18 female patients. Subjects with non-cardiac chest pain or unstable angina were excluded. For the control group, 31 males (mean age of 51.9 years, range: 39 to 62), and 10 females (mean age of 51.5 years, range: 42 to 58) were gathered from apparently healthy blood donors. Informed consent was obtained from

all the subjects.

For the detection of IgG and IgM antibodies to *C. pneumoniae*, the micro-IF test (7) was used. As an antigen of the test, formalinized purified elementary bodies of strain TW-183 provided by Dr. Grayston were applied. Immunoglobulin-specific *Chlamydia* antibodies were measured using FITC-labeled anti-human IgG and IgM (Dako Co., Denmark). The criteria for seropositivity were as follows (7): Current infection; IgM > 1:16, IgG > 1:512, or fourfold rise in IgG titers. Past or chronic infection: IgG > 1:16, < 1:256. Statistical analysis was carried out using the  $\chi^2$  test.

The overall prevalence rate of IgG antibody to *C. pneumoniae* among patients with AMI was 52% (52/101). Seropositive cases were found in 30 (46%) of 65 male patients and in 22 (61%) of 36 female patients with titers ranging from 1:16 to 1:64 (the geometric mean titer of IgG was 26.8). Gender- or age-specific significant difference in seropositivity was not significant (Table 1). In the control group, the overall prevalence rate of IgG antibody to *C. pneumoniae* was 56% (23/41) and there were no cases with IgG antibody titers of 1:32 and over (the geometric mean titer of IgG was 16.0) as shown in Table 1. The rate of seropositivity among the patient group was almost the same as in the control group, but the level of IgG titers in patients was higher than that in the control. Among the male patients, most of the cases showed the same antibody level in paired sera, but five cases showed a fourfold or higher increase in IgG antibody titer and one of them had IgM antibody titer of 1:32, suggesting current infection of *C. pneumoniae*. The other four male cases also had IgM antibody titer of 1:32, though the titer in IgG antibody was less than 1:32. Among the female patients, four cases had IgM antibody titer of 1:32 or 1:64, suggesting current *C. pneumoniae* infection. In patients with AMI, there was no association between the presence of antibodies to *C. pneumoniae* and risk factors such as diabetes mellitus,

\*Corresponding author: Fax: +66-2-589-9863, E-mail: piyada@dmsc.moph.go.th

Table 1. Prevalence of *C. pneumoniae* antibody by gender and age in patients with acute myocardial infarction

Age	Patients						Control					
	Male			Female			Male			Female		
	No. tested	IgG titer(%)		No. tested	IgG titer(%)		No. tested	IgG titer(%)		No. tested	IgG titer(%)	
	64-16	<16		64-16	<16		16	<16		16	<16	
31-40	4	2(50)	2 <sup>#</sup>	3	2(67)*	1	3	3(100)	0	0	0	0
41-50	16	5(31)*	11 <sup>#</sup>	4	1(25)	3	12	7(64)	5	4	1(25)	3
51-60	12	4(33)**	8 <sup>#</sup>	5	2(40)	3	13	7(60)	6	6	3(50)	3
61-70	23	13(57)*	10 <sup>##</sup>	11	9(82)***	2	3	2(66)	1	0	0	0
71-	10	6(60)*	4	13	8(62)*	5	0	0	0	0	0	0
Total	65	30(46)	35	36	22(61)	14	31	19(61)	12	10	4(40)	6

\*: Includes one patient with IgM 1:32.

\*\* : Includes two patients with IgM 1:32.

\*\*\*: Includes two patients with IgM 1:64.

<sup>#</sup>: Includes one patient with a four- or eightfold rise in IgG titer.

<sup>##</sup>: Includes two patients with a four- or 16-fold rise in IgG titer.

hypertension, hyper cholesterol, a smoking habit, and other characteristics, namely the location of myocardial infarction and non-Q wave-myocardial infarction (non-Q-MI) (Table 2).

Leowattana et al. (6) had reported on the basis of the results of ELISA test that the prevalence rate of IgG antibody to *C. pneumoniae* among CAD patients was 73.7%, while the rate in normal healthy groups was 59.4%, or a significant difference of seroprevalence between patients with CAD and healthy controls. In the present study, 52 (52%) of patients with AMI were found to have IgG and IgM antibodies to *C. pneumoniae*. The level of seropositivity in the controls was almost the same as in the patients. However, the level of IgG titers in patients was higher than that in the control, and this finding may support an association between *C. pneumoniae* infection and AMI. To confirm this fact, further studies are needed. Furthermore, some of the patients with AMI had detectable IgM antibody to *C. pneumoniae*, 1:32 to 1:64, and as well some patients showed a fourfold rise in IgG titer. Although the pretreatment of serum specimens with anti-human IgG to eliminate the rheumatoid factor was not performed, current *C. pneumoniae* infection should occur among the patients. However, the influence of current *C. pneumoniae* infection on AMI is not

clear and therefore further investigation will be required. The risk factor for AMI was usually independent but sometimes synergistic with two factors such as age and smoking. Previous findings (8,9) indicating that an association between *C. pneumoniae* infection and AMI was limited to smokers raised the possibility that current or past smokers may be more likely to develop myocardial infarction with *C. pneumoniae*. In the present study, however, such a tendency was not observed.

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Table 2. The clinical characteristics among *Chlamydia* antibody-positive patients

Characteristics	Seropositive (n=52) no. (%)	Seronegative (n=49) no. (%)	P value
Male	30(58)	35(71)	NS
Female	22(42)	14(29)	NS
Diabetes mellitus	20(38)	18(37)	NS
Hypertension	22(42)	26(53)	NS
Hypercholesterol	38(73)	28(57)	NS
Cigarette smoking			
current	17 (33)	10(20)	NS
past	10(19)	9(18)	NS
non-smoking	25(48)	11(22)	NS
MI Location			
anterior	22(42)	27(55)	NS
inferior	13(25)	12(24)	NS
Non-Q-MI	16(31)	8(16)	NS

MI: myocardial infarction

Non-Q-MI: non-Q wave-myocardial infarction

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