

Lack of Association Between Serum Immunoreactivity and *Chlamydia pneumoniae* Detection in the Human Aortic Wall

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Background—Only a few studies have focused the attention on the relation between elevated anti-*Chlamydia pneumoniae* (CP) antibodies and the detection of CP in the arterial wall. The aim of our study is thus to investigate the relationship between immune response to CP and detection of CP in the aortic walls of patients with abdominal aortic aneurysm.

Methods and Results—A specimen of aortic wall was obtained from 102 consecutive patients who underwent abdominal aneurysm repair. The possible presence of CP was studied by polymerase chain reaction and confirmed by nonradioactive DNA hybridization. Antibody response to CP was studied (IgG, IgA titers). We found 33 patients (32.4%) with CP DNA+. No correlation between CP DNA detection and antibody titers was found (IgG $P=0.52$, IgA $P=0.66$). High correlation between IgG and IgA titer was observed ($P<0.01$). Endovascular presence of CP and antibody titers was not related to the age of the patient.

Conclusions—CP antibody titers are not associated with the presence of CP in the aortic wall of patients with abdominal aortic aneurysm. (*Circulation*. 2002;106:2647-2648.)

Key Words: atherosclerosis ■ aorta ■ infection ■ coronary disease

Seroepidemiological studies have shown an association between ischemic heart disease and *Chlamydia pneumoniae* (CP) infection. Moreover, increasing evidence exists that CP might play a role in atherosclerosis, as well. Most of the studies concerning the relationship between CP infection and atherosclerosis are based on serology, but the correlation between endovascular infection with CP and antibody titers is still unclear.^{1,2,3}

The aim of our study was thus to investigate the relationship between immune response to CP and detection of CP in the aortic wall of patients with abdominal aortic aneurysm.

Methods

Between June 1999 and June 2000, 102 consecutive patients underwent abdominal aortic aneurysm repair at our hospital. A specimen from the aortic aneurysm was obtained from each patient, and the possible presence of CP was studied by polymerase chain reaction (PCR). Sera were tested for CP-specific antibodies.

PCR

Aortic tissue was cut into 0.2-cm segments. Genomic CP DNA was detected by a nested PCR protocol (AMS, Clonit). For confirmation, nonradioactive DNA hybridization was performed with oligonucleotide HM-1 to 3' labeled with digoxigenin-ddUTP (Boehringer).

Serology

A separate determination of IgG, IgA with the indirect immunofluorescent method, was performed. An anti-CP titer ≥ 16 was considered significant for previous CP infection (BIOS TestKit 42060).

Variables are reported as mean and relative frequencies or mean \pm SD. For comparison between groups, Student's *t* test or Fisher's exact test were used as appropriate.

Results

CP DNA was detected in abdominal aortic wall of 33 of 102 patients (32.4%). There was no evidence of a difference between patients with CP DNA+ and CP DNA- with regard to conventional risk factors for atherosclerosis (age, sex, smoking history, hypertension, hypercholesterolemia, diabetes).

IgG titer $\geq 1/16$ was present in 60 of 102 patients (61%). IgA titer $\geq 1/16$ was present in 41 patients. No relationship between serology to CP and presence of CP in the abdominal aortic wall was observed (Table). A high correlation between IgG and IgA serology was found ($P<0.01$). Endovascular presence of CP and antibody rates were not related to the age of the patients ($P=0.30$, $P=0.40$).

Discussion

To our knowledge, this is one of the largest series of patients who underwent abdominal aneurysm repair to be investigated for CP detection in the aortic wall. Interestingly, our study did not identify an association between CP presence in the aortic wall and antibody response to CP. Previous studies reported different prevalence of CP by PCR in specimens obtained

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Crosstabulation Between Serum Immunoreactivity to CP (IgG, IgA) and Detection of CP DNA in Abdominal Aortic Aneurysm

| | N=102 Patients | CP DNA+ [n=33 (32.4)] | CP DNA- [n=69 (67.6)] | P |
|-------------------------------|-------------------|--------------------------|--------------------------|------|
| Patients with IgG \geq 1/16 | 60 (61) | 21 (64) | 39 (59) | 0.52 |
| Patients with IgA \geq 1/16 | 41 (40) | 12 (35) | 29 (44) | 0.66 |

Values are n (%).

from abdominal aortic aneurysm, ranging from 20% to 49%.^{4,5,6,7} Therefore our positivity rates are within the expected range. In our study, an optimized DNA extraction protocol to reduce any underestimation of CP prevalence was used, and our data were confirmed by nonradioactive DNA hybridization to enhance specificity.

Only a few studies have focused the attention on the relation between elevated anti-CP antibodies and the detection of CP in the arterial wall. Bartels⁸ and Campbell⁹ reported that CP antibody titer is not associated with the endovascular presence of CP in patients with coronary artery disease. In contrast to these observations, Blasi et al¹⁰ reported a significant relationship between anti-CP antibodies and CP detection in aortic wall specimens obtained from abdominal aortic aneurysm.

In the past, the relationship between CP infection and atherosclerotic disease was based on seropositivity.¹¹ However, Ericson et al¹² reported that the degree of immune response is not a predictor of the degree of infection or the extent of coronary atherosclerosis, but rather intracellular infection with CP may relate to the severity of the disease. These observations are consistent with our data that show that the immune response to CP is not a predictor of CP infection of the abdominal aorta.

If data reporting a lack of association between endovascular presence of CP and antibody response will be confirmed, the value of the seroepidemiological approach to investigating CP induced atherosclerosis should be reevaluated.

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