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Chlamydia Pneumoniae and Acute Aortic Syndrome: A Call for a Multi-Institutional Study

Clamidia Pneumoniae e Sindromi aortiche acute: necessità di uno studio multicentrico

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ABSTRACT: ***Chlamydia Pneumoniae and Acute Aortic Syndrome: A Call for a Multi-Institutional Study. E. Bossone, S. Trimarchi, G. Esposito, S. Aliberti, R. Citro, L. Allegra, F. Blasi.***

Chlamydia Pneumoniae (CP) infection is strongly associated with coronary artery disease, as well as with atherosclerosis of the carotid and peripheral arteries. However, the role of CP in the pathogenesis of aortic disease remains controversial. Our present experience suggests no correlation between a current infection with *C. pneumoniae* and acute aortic dissection. Well-designed large prospective studies are needed in order to clarify the pathophysiologic role of CP infection in acute and chronic aortic disease.

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Introduction

The association between *Chlamydia pneumoniae* infection and cardiovascular diseases has been widely investigated in the literature [1]. *C. pneumoniae* has been proven to infect macrophages, endothelial and smooth muscle cells in arteries and particularly to be involved in aortic diseases [2-3]. However, the role of *C. pneumoniae* in development and progression of acute aortic dissection (AAD) remains controversial. We report the incidence of *C. pneumoniae* infection in a case series of patients affected by AAD.

Clinical Summary

Twenty consecutive patients with a AAD (Type A AAA = 12; Type B AAD = 8) were prospectively enrolled in the study. AAD was diagnosed by imaging studies and/or during surgery. Data including demographics, past medical history, clinical presentation and physical findings on admission, imaging studies, details regarding medical and surgical management, and clinical outcomes were collected for each patient.

Specimen collection

Aortic specimens were collected in the operating room under sterile conditions. Arterial segments of approximately 4-5 cm^2 were placed in tubes containing physiological solution. Transport vials were sealed in the operating room and subsequently opened in laminar air flow safety cabinets at the microbiology laboratory.

All the specimens were kept at –70 °C until processing. Each aortic artery was subsequently cut transversely into smaller sections of 5 mm that were pooled and assayed by specific nested polymerase chain reaction (PCR). Chromosomal DNA was extracted by a commercial kit (Roche diagnostics, Germany).

PCR amplification

To confirm extraction, each DNA sample was tested for its ability to be amplified with B-globin specific primers. Primers amplifying 207-bp fragment of the major outer membrane protein genes (ompA) were used to detect *C. pneumoniae* by nested PCR. After amplification, a 4% agarose gel electrophoresis and ethium bromide staining were used to visualize PCR products.

Serology

At the time of diagnosis a blood sample (8 mL) was collected for each patient in vacutaneir for isolation of peripheral blood mononuclear cells (PBMC) and serum.

Serum antibodies (IgG, IgA, IgM) to *C. pneumoniae* were searched by a ANI Labsystems microimmunofluorescence (MIF) test. Serum samples were considered positive for titers ≥1:64 for IgG antibodies and ≥ 1:16 for IgA and IgM.

Results

Demographics, past medical history, clinical, electrocardiographic and radiological findings, management and clinical outcomes of the study population are summarized in Table 1. *C. pneumoniae* IgG and IgA antibodies were detected in 14 (6 TA-AAD/8 TB AAD) out of 20 (70%) and in 15 (7 TA AAD/8 TB AAD) out of 20 (75%) of patients, respectively. *C. pneumoniae* IgM were not detected in any patient. Only one TB AAD patient was PBMC PCR positive. *C. pneumoniae* DNA was not detectable in any of TA AAD tissue samples.

Table 1. - Demographics, clinical history and presentation, diagnosis, management and outcomes of the study population.

Variable	Type A AAD n = 12 (60%)	Type B AAD n = 8 (40%)	Overall n = 20 (100%)
Demographics			
Age (yrs)	64 ± 11	59 ± 11	62 ± 11
Age > 70yrs	7 (58%)	1 (12%)	8 (40%)
Male	6 (50%)	4 (50%)	10 (50%)
Clinical history			
Marfan's syndrome	1 (8%)	0	1 (5%)
Hypertension	10 (83%)	5 (62%)	15 (75%)
Atherosclerosis	5 (42%)	4 (50%)	9 (45%)
Bicuspid aortic valve	1 (8%)	1 (12%)	2 (10%)
Previous aortic dissection	1 (8%)	1 (12%)	2 (10%)
Previous aortic aneurysm	3 (25%)	0	3 (15%)
Previous cardiac surgery	1 (8%)	2 (25%)	3 (15%)
Clinical presentation			
Abrupt onset of chest pain	11 (92%)	8 (100%)	19 (97%)
Migrating pain	0	2 (25%)	2 (7%)
Any focal neurologic deficits	4 (33%)	0	4 (13%)
Coma/altered consciousness	3 (25%)	0	3 (10%)
Syncope	5 (42%)	0	5 (17%)
Any pulse deficit	3 (25%)	4 (50%)	7 (23%)
Chest x-ray			
Normal	1 (8%)	2 (15%)	3 (10%)
Pleural effusion	1 (8%)	1 (12%)	2 (7%)
Widened mediastinum	11 (92%)	2 (25%)	13 (43%)
Electrocardiogram			
Normal	4 (33%)	6 (75%)	10 (33%)
New Q or ST deviations	2 (17%)	0	2 (7%)
Diagnostic imaging			
Transesophageal echocardiography	7 (58%)	3 (37%)	10 (33%)
Computed tomography	8 (40%)	8 (100%)	16 (53%)
Aortography	2 (17%)	2 (25%)	4 (13%)
Diagnostic imaging findings			
Arch involvement	5 (42%)	1 (12%)	6 (20%)
Periaortic hematoma	3 (25%)	3 (37%)	6 (20%)
False luminal thrombosis	5 (42%)	3 (37%)	8 (27%)
Aortic regurgitation	5 (42%)	0	5 (17%)
Coronary artery compromise	1 (8%)	0	1 (3%)
Definitive management			
Surgical	12 (100%)	–	12 (80%)
Medical	0	8 (100%)	8(40%)
In-hospital complications and outcome			
Any focal neurologic deficits	6 (50%)	1 (12%)	7 (35%)
Coma/altered consciousness	4 (33%)	0	4 (20%)
Myocardial ischemia	3 (25%)	0	3 (15%)
Mesenteric ischemia	1 (8%)	0	1 (5%)
Acute renal failure	3 (25%)	2 (25%)	5 (25%)
Limb ischemia	0	1 (12%)	1 (5%)
Mortality	2 (17%)	0	2 (10%)

Discussion

Acute aortic syndrome (AAS), namely classic aortic dissection, intramural hematoma and aortic ulcer, is a highly lethal entity secondary to several genetic and acquired conditions. Complex mechanisms weakening the aortic media layers lead to higher wall stress eventually resulting in the clinical manifestations of the AAS [2].

Our present experience suggests no correlation between a current infection with *C. pneumoniae* and AAD. These findings support previous data: in the two small reports by Sodeck G *et al.* and Nyström-Rosander C *et al.*, no signs of *C. pneumoniae* infections were detected in patients with TA-AAD [3-5]. However, two third of the patients presented a serologic evidence of previous *C. pneumoniae* infection.

Thus, the pathophysiological role of a potential concomitant *C. pneumoniae* infection in AAD remains not yet fully explored. Because of this and in light of the small number of patients studied, a need arises for well-designed large prospective studies in order (a) to further clarify the molecular mechanisms that link *C. pneumoniae* to the full spectrum of acute and chronic aortic disease, (b) to fully investigate the clinical impact of *C. pneumoniae* infection in the development of AAS and (c) whether medical treatment may have a place in the prevention of this major life-threatening condition [1, 5].

Riassunto

L'infezione da Clamydia Pneumoniae (CP) è associata alla aterosclerosi coronarica, carotidea e pe-

riferica. Peraltro, il ruolo della CP nella patogenesi della patologia aortica rimane controverso. La nostra presente esperienza suggerisce l'assenza di correlazione tra una infezione corrente da CP e la dissezione aortica acuta. Ampi studi prospettici sono necessari per chiarire un eventuale ruolo fisiopatologico della CP nelle patologie aortiche acute e croniche.

References

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