Two weeks later, he was seen in our lipid clinic. He was thin (weight, 63 kg) and muscle wasting was noted, but otherwise the examination findings were unremarkable. The CD4^{+} lymphocyte count was 517/mm^3, and the viral load, as determined by HIV-RNA PCR, was 8,815 copies/mL. Blood glucose, hemoglobin Alc, thyroid-stimulating hormone, and serum aminotransferase levels were normal. The triglyceride level, however, had again risen to 25.24 mmol/L (2,234 mg/dL). The total cholesterol value was 7.26 mmol/L (281 mg/dL), and that of HDL cholesterol was 0.41 mmol/L (16 mg/dL). Gemfibrozil therapy was initiated. Antiretroviral therapy was reinstituted with zidovudine, didanosine, delaviridine, nelfinavir, and saquinavir, and no complications were noted. Currently his cholesterol level is 4.91 mmol/L (190 mg/dL), and the triglyceride level is 4.79 mmol/L (424 mg/dL).

Markowitz et al. [3] demonstrated triglyceride level elevations in excess of 200% over baseline values in 65% of patients receiving ritonavir. These effects on serum lipids appear to be dose-related and can be seen as early as 1 week after initiation of therapy with ritonavir [2].

The mechanisms leading to hyperlipidemia with ritonavir are not known. Although ritonavir inhibits the CYP3A4 isoform of cytochrome P450 [4], there is no definitive evidence that inhibition of this enzyme leads to hyperlipidemia [5]. Recently, it has been suggested that protease inhibitors may alter the structure or function of the peroxisome proliferator–activated receptor type gamma (PPAR-gamma), but this has yet to be studied fully [6].

HIV infection alone is associated with hypertriglyceridemia, and the triglyceride level correlates inversely with the CD4^{+} lymphocyte count [7]. The degree of hypertriglyceridemia attributed to HIV infection, however, is generally less than that described in this case [8]. Furthermore, triglyceride levels tend to be normal in HIV-infected individuals who have no manifestations of AIDS [9].

Clinicians need to be familiar with the association between ritonavir and hyperlipidemia, and serum lipids should be monitored during the early stages of ritonavir treatment or with escalation of the dose. It is not yet known if use of ritonavir is safe for patients with abnormal lipid values at baseline; however, further investigation is warranted.

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Myocardial Infarction, Culture-Negative Endocarditis, and *Chlamydia pneumoniae* Infection: A Dilemma?

The role of *Chlamydia pneumoniae* infection in cardiovascular diseases remains unclear. Herein we describe a case in which the many aspects of possible involvement are illustrated.

A 67-year-old woman previously in good health was admitted for pulmonary edema. An electrocardiogram showed typical signs of acute myocardial infarction. Echocardiography revealed severe aortic-valve regurgitation, moderate mitral-valve regurgitation, and a vegetation (5 × 14 mm) on the right coronary leaflet of the aortic valve. There was no history of fever, weight loss, or shaking chills in the preceding weeks.

The axillary temperature was 36.2°C, pulse was 110/min, and blood pressure was 120/70 mm Hg. A 3/6 holosystolic murmur and a 2/6 diastolic decrescendo murmur were noted. Skin and mucous membranes as well as funduscopic findings were normal.

The C-reactive protein level was 114 mg/L. The leukocyte count was 13,400/mm^3, with a normal differential, and the serum chemistry was compatible with recent myocardial infarction. Three pairs of aerobic and anaerobic cultures of blood drawn before administration of antibiotics remained negative. Antibiotic therapy with high-dose intravenous flucloxacillin, later replaced by penicillin and gentamicin, was initiated. Body temperature was <37°C, except for two spikes to 38.4°C on days 14 and 16. Doxycycline and rifampicin were added on day 14.

Table 1. Serological evaluation of a 67-year-old woman presenting with acute pulmonary edema.

Test (method) for:	Antibody	Titer	
		Day 10	Day 21
Chlamydia (CF)		1:30	1:15
C. pneumoniae (MIF)*	Ig	Positive	ND
	IgG	1:160	1:80
	IgM	1:<20	1:<20
	IgA	1:1280	1:320
C. psittaci (MIF)	Ig	Positive	ND
	IgG	1:64	1:<80
	IgM	1:<20	ND
	IgA	1:<20	ND
C. trachomatis (MIF)	Ig	Equivocal	ND
	IgG	ND	1:<80

NOTE. CF = complement fixation; MIF = microimmunofluorescence; ND = not determined. Slides from MRL Diagnostics, Cypress, CA.

* Results confirmed by S.-P. Wang (Department of Pathobiology, University of Washington, Seattle).

On day 15, pain and swelling of the right knee were noted. Cultures of joint fluid remained sterile. On day 18, the results of various serological examinations were reported and revealed a positive reaction for *C. pneumoniae* (see table 1), while antibodies to *Brucella, Coxiella burnetii, Legionella, Bartonella,* and *Treponema* were undetectable. On day 19, the aortic valve was replaced. The right coronary leaflet was partially destroyed and contained a grayish vegetation with a diameter of ~4 mm. Aerobic and anaerobic cultures of valve tissue remained negative. PCR for *C. pneumoniae* (performed at the Department of Pathobiology, University of Washington, Seattle [1]) was positive in a specimen from the left aortic leaflet but negative in material from the right leaflet.

The postoperative course was complicated by severe bleeding in the operative area, necessitating repeated surgery with mass transfusions. The patient died 15 days later, following progressive multiorgan failure due to invasive candidiasis. Necropsy was not permitted by the patient's relatives.

A MEDLINE search revealed only three reports of possible and probable endocarditis due to *C. pneumoniae* [2–4]. There was evidence of myocardial infarction in our patient, possibly due to a thromboembolic event. In fact, coronary angiography showed normal coronary arteries except for a complete obstruction of the first marginal vessel. The recently diagnosed aortic insufficiency with a large vegetation and observations during surgery were compatible with infective endocarditis.

Microbiological evaluation revealed an evolving antibody response to *C. pneumoniae,* with rapidly decreasing titers of IgG and IgA after surgery and adequate antibiotic treatment. Evaluation for IgM was always negative, suggesting either reinfection or reactivation of *C. pneumoniae* infection. In contrast to the patient described by Marrie et al. [2], our patient had no fevers, sweats, chills, or productive cough. That patient had declining IgM titers during the observation period, suggesting primary infection. In another report, an increase in IgG titers from 1:64 to 1:512, followed by a decrease to 1:32 without IgM response, suggested reinfection [3]. The third case also involved increasing IgG against *C. pneumoniae,* without IgM [4].

In none of the previously published cases was PCR examination of the valve performed. Immunohistochemistry proved to be negative when performed, as it was in our case. In a recent report, nonrheumatic stenotic aortic valves without evidence of endocarditis were frequently positive for *C. pneumoniae,* either by immunostaining or PCR [5]. These findings question the relevance of the positive PCR in our case. Although it is conceivable that our patient did have *C. pneumoniae* endocarditis with concurrent myocardial infarction, an etiologic role for this pathogen in any of these events is not proven.

This case report suggests that *C. pneumoniae* infection, with its tropism for the human vascular system, may be simultaneously activated in various parts of the system, such as coronary arteries and heart valves, producing complex diseases [6]. As evidence of the widespread presence of *C. pneumoniae* in the cardiovascular system increases, clinicians are likely to face more diagnostic dilemmas, as in our case.

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