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/mm³, 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 re instituted with zidovudine, didanosine, delavirdine, nefl navir, 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 iso form 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 hyper triglyceridemia, 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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References

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 mucus membranes as well as funduscopic findings were normal. The C-reactive protein level was 114 mg/L. The leukocyte count was 13,400/mm³, 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 fluocoxacinil, 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.
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 operative area, necessitating repeated surgery with mass removal of the valve, necessitating repeated surgery with mass removal of the valve. On day 18, the results of the widespread presence of *C. pneumoniae* in the cardiovascular system increased, clinicians are likely to face more diagnostic dilemmas, as in our case.

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

<table>
<thead>
<tr>
<th>Test (method) for:</th>
<th>Antibody</th>
<th>Day 10</th>
<th>Day 21</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Chlamydia</em> (CF)</td>
<td>Ig</td>
<td>1:30</td>
<td>1:15</td>
</tr>
<tr>
<td><em>C. pneumoniae</em> (MIF)*</td>
<td>IgG</td>
<td>1:160</td>
<td>ND</td>
</tr>
<tr>
<td><em>C. pneumoniae</em> (MIF)*</td>
<td>IgM</td>
<td>1:&lt;20</td>
<td>1:&lt;20</td>
</tr>
<tr>
<td><em>C. pneumoniae</em> (MIF)*</td>
<td>IgA</td>
<td>1:1280</td>
<td>1:320</td>
</tr>
<tr>
<td><em>C. psittaci</em> (MIF)</td>
<td>Ig</td>
<td>1:64</td>
<td>1:&lt;80</td>
</tr>
<tr>
<td><em>C. pneumoniae</em> (MIF)*</td>
<td>IgM</td>
<td>1:&lt;20</td>
<td>ND</td>
</tr>
<tr>
<td><em>C. pneumoniae</em> (MIF)*</td>
<td>IgA</td>
<td>1:&lt;20</td>
<td>ND</td>
</tr>
<tr>
<td><em>C. trachomatis</em> (MIF)</td>
<td>Ig</td>
<td>ND</td>
<td>1:&lt;80</td>
</tr>
<tr>
<td><em>C. pneumoniae</em> (MIF)*</td>
<td>IgG</td>
<td>ND</td>
<td>ND</td>
</tr>
</tbody>
</table>

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

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

References