steroids and underwent emergency intuba-
tion. On day 4, he started having fevers
(temperature, 38.6°C) and required in-
creased ventilatory support. Chest radiog-
raph revealed bilateral pulmonary infiltr-
ates. The patient developed progressive
respiratory distress and died on day 8.
Cultures of sputum and blood samples
grew Acinetobacter baumannii.

Case 2. A man aged 71 years pre-
sented with 5 days of facial swelling after
beginning treatment with ARBs 12 days
earlier. At presentation, he began treat-
ment with corticosteroids, but he required
intubation on day 6. Chest radiograph re-
vealed bilateral pulmonary infiltrates. The
patient died on day 10. Cultures of sput-
um and blood samples were positive for
A. baumannii.

Case 3. A man aged 53 years pre-
ented with 1 day of tongue swelling. He
had been receiving ARBs for an unknown
duration. At presentation, he began treat-
ment with corticosteroids and underwent
emergency intubation. He developed fe-
ers (temperature, 39.0°C) and worsening
respiratory distress on day 8. Chest radio-
graph showed right middle-lobe pulmo-

nary infiltrates, and 2 cultures of blood
samples grew Escherichia coli. His treat-
ment course was complicated by empy-
ema. The patient subsequently underwent
extubation and was discharged home on
day 18.

These 3 cases were included in our ret-
rospective study of all adult inpatients
(age, ≥18 years) over 3 years (April 2004
through March 2007) who were hospital-
ized with the discharge diagnosis of an-
gioedema. Medical records were reviewed
retrospectively, and information was col-
clected on each patient’s clinical presenta-
tion, underlying comorbid condition(s),
medication(s), microbiology reports, and
hospital course. All cases of pneumonia
involving patients after episodes of an-
gioedema were included as cases. Ninety-
five episodes of angioedema were encoun-
tered, including 63 (66.3%) due to ACEI
and/or ARBs, 22 (23.2%) due to other
medications, and 10 (10.5%) that were id-
iopathic. Among the ACEI/ARB group, 8
(12.7%) were patients undergoing dialysis,
and 3 (37.5%) of the 8 developed gram-
negative pneumonia with bacteremia (i.e.,
the 3 cases described above), whereas none
of the other 55 patients developed pneu-
monia.

These cases illustrate the unique asso-
ciation of severe gram-negative pneu-
monia in patients undergoing dialysis with
angioedema. Underlying host factors, cor-
ticosteroid use, and development of re-
spiratory colonization with gram-negative
bacteria likely contributed to rapidly pro-
gressive pneumonia and bacteremia. In 2
cases, the patient died of multidrug-resis-
tant Acinetobacter infection. Patients un-
dergoing dialysis are known to have im-
paired chemotaxis, phagocytosis, and ac-
celerated apoptosis of granulocytes [1,
2]. The well-known impairment of neu-
rophil function seen with corticosteroid
treatment may have also contributed to an
increased risk of infectious complications.
In a study examining the microbiology of
pneumonia in patients undergoing dialy-
sis, gram-negative bacilli were present in
55% of patients with community-acquired
pneumonia and in 65% of patients with nos-
ocomial pneumonia [3]. Although larger
multicenter studies are needed to con-
firm this observation, physicians car-
ing for patients with angioedema who are
undergoing dialysis should be aware of
this potentially fatal complication.

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Abacavir and Cardiovascular Risk in HIV-Infected Patients:
Does T Lymphocyte Hyperactivation Exert a Pathogenic Role?

To the Editor—The association between abacavir exposure and cardiovascular dis-
eease in HIV-infected patients is intensely debated. The Data Collection on Adverse
Events of Anti-HIV Drugs Study Group recently described an increased risk of my-
ocardial infarction in patients with current or recent abacavir exposure [1], whereas
repository data from GlaxoSmithKline clinical trials failed to find any association
[2]. While clinicians are forced to await confirmatory research that uses cardio-
vascular disease as an end point, plausible biological mechanisms of abacavir-driven
cardiovascular damage must be thor-
oughly investigated. If abacavir increases cardiovascular risk, this might be driven
by adverse antiretroviral or immunologic
effects that hasten preexisting arterial
inflammation.

Because of the association between lym-
phocyte hyperactivation and cardiovas-
cular disease [3] and the major role of T
cell hyperactivation in HIV infection and
AIDS, we investigated T cell immuno-
phenotype and proinflammatory cytokine
kinetics in a group of 12 HIV-infected pa-
tients who were receiving abacavir-con-
taining regimens at baseline, 3 months,
and 6 months of therapy. We observed a
significant increase in activated
CD38+CD8+ cell count and percentage
and a reduction in CD95+CD4+ and CD8+
Table 1. Clinical and immunophenotypic characteristics of 12 HIV-positive patients who were receiving abacavir-containing HAART.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Baseline</th>
<th>3 Months of therapy</th>
<th>6 Months of therapy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age, mean years (range)</td>
<td>50 (33–67)</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Current smoking, proportion of patients</td>
<td>3/12</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Sex, M:F</td>
<td>9:3</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>CD4+ cell count, cells/μL</td>
<td>312 (91–1650)</td>
<td>348 (132–1664)</td>
<td>476 (234–1908)</td>
</tr>
<tr>
<td>CD4+ cell percentage</td>
<td>25 (7–55)</td>
<td>24 (11–52)</td>
<td>26 (21–53)</td>
</tr>
<tr>
<td>HIV RNA level, log10 copies/mL</td>
<td>1.77 (1.77–4.30)</td>
<td>1.77 (1.77–2.40)</td>
<td>1.77 (1.77–3.90)</td>
</tr>
<tr>
<td>CD38+CD8+ cell percentage</td>
<td>1 (0–47)</td>
<td>1 (1–4)</td>
<td>2 (1–5)</td>
</tr>
<tr>
<td>CD38+CD8+ cell count</td>
<td>23 (0–42)</td>
<td>23 (10–69)</td>
<td>33 (12–46)</td>
</tr>
<tr>
<td>CD95+CD4+ percentage</td>
<td>2 (1–9)</td>
<td>1 (0–4)</td>
<td>1 (1–2)</td>
</tr>
<tr>
<td>CD95+CD8+ percentage</td>
<td>1 (0–42)</td>
<td>21 (0–42)</td>
<td>19 (12–36)</td>
</tr>
<tr>
<td>CD95+CD8+ cell count</td>
<td>33 (12–130)</td>
<td>33 (12–46)</td>
<td>33 (12–46)</td>
</tr>
<tr>
<td>Total cholesterol level, mg/dL</td>
<td>225 (154–301)</td>
<td>246 (159–339)</td>
<td>241 (186–366)</td>
</tr>
<tr>
<td>Low density lipoprotein cholesterol level, mg/dL</td>
<td>133 (76–401)</td>
<td>50 (82–505)</td>
<td>53 (32–74)</td>
</tr>
<tr>
<td>Triglyceride level, mg/dL</td>
<td>136 (90–571)</td>
<td>169 (36–923)</td>
<td>227 (132–1137)</td>
</tr>
<tr>
<td>Homocysteine level, mg/dL</td>
<td>12.0 (4.6–23.5)</td>
<td>ND</td>
<td>11.0 (3.4–17.4)</td>
</tr>
<tr>
<td>IMT, mm</td>
<td>ND</td>
<td>0.99 (0.79–1.49)</td>
<td>ND</td>
</tr>
<tr>
<td>Right carotid</td>
<td>ND</td>
<td>ND</td>
<td>0.99 (0.82–1.61)</td>
</tr>
<tr>
<td>Left carotid</td>
<td>ND</td>
<td>ND</td>
<td>0.96 (0.83–1.24)</td>
</tr>
<tr>
<td>Right femoral</td>
<td>ND</td>
<td>1.01 (0.92–1.75)</td>
<td>ND</td>
</tr>
<tr>
<td>Left femoral</td>
<td>ND</td>
<td>ND</td>
<td>ND</td>
</tr>
</tbody>
</table>

NOTE. Data are median value (range), unless otherwise indicated. IMT, intima-media thickness; NA, not applicable; ND, not determined.

a $P<.05$ for comparison with all other time points.

b $P=.01$ for comparison with all other time points.

c $P<.01$ for comparison with all other time points.

d vs. baseline.

By suggesting that T lymphocyte hyperactivation is relevant to the pathogenesis of abacavir-related cardiovascular disease, these data, although preliminary, support a thorough assessment of possible immunologic biomarkers of abacavir-related cardiovascular damage.

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