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## Stevens-Johnson Syndrome Associated with Abacavir Therapy

Sir—Adverse cutaneous reactions to drugs are commonly observed in HIV-infected patients [1]. We describe what is, to our knowledge, the first case of Stevens-Johnson syndrome in an HIV-1–infected patient that is associated with use of abacavir, a nucleoside reverse-transcriptase inhibitor.

A 37-year-old man was admitted to the hospital in October 2001 because of neurological disorders and dyspnea. Diagnosis of toxoplasmic encephalitis and *Pneumocystis carinii* pneumonia was made. At this time, the patient had HIV-1 infection diagnosed. The plasma HIV-1 RNA level was 118,000 copies/mL, and the CD4 cell count was 1 cell/mm$^3$. Treatment with pyrimethamine-sulfadiazine was started. Ten days after he began receiving therapy, the patient presented with a febrile maculopapular rash; sulfadiazine was switched to clindamycin (for treatment of toxoplasmic encephalitis) and atovaquone (for treatment of *P. carinii* pneumonia), and pyrimethamine therapy was continued. Cutaneous manifestations resolved completely within 2 days. The patient was discharged from the hospital 15 days after the switch without neurological or pulmonary manifestations.

In December 2001, the patient began receiving antiretroviral treatment with zidovudine (300 mg b.i.d.), lamivudine (150 mg b.i.d.), and abacavir (300 mg b.i.d.). Thirteen days after he began receiving antiretroviral therapy, the patient presented with a nonfebrile, generalized maculopapular rash. At admission to the hospital, his temperature was 37°C, his pulse was 86 beats/min, and his respiration rate was 16 breaths/min. The patient's blood pressure was 130/60 mm Hg. Physical examination revealed a disseminated cutaneous eruption of discrete dark-red macules on 90% of the body surface area, a detachment of 5% of the epidermis, genital ulcerations, erosive stomatitis, and conjunctival lesions with hyperemia, and a pseudomembranous formation occurred without keratitis or corneal erosions. Nikolsky's sign was noted.

Hematologic test findings, blood chemistry findings, enzyme values, and chest radiograph findings were normal. No infectious agent was found. Histopathologic evaluation of skin biopsy specimens yielded findings compatible with Stevens-Johnson syndrome. The results of immunofluorescence studies were negative.

Antiretroviral treatment was stopped, and therapy with pyrimethamine, clindamycin, and atovaquone was continued. A week later, the epidermis began to regrow, and the condition resolved completely within 3 weeks. The patient was rechallenged with zidovudine and lamivudine and commenced therapy with ritonavir and indinavir without recurrence of clinical manifestations.

These findings clearly suggest that there is a link between abacavir use and Stevens-Johnson syndrome. In patients with HIV infection, cases of Stevens-Johnson syndrome have been reported in association with other antiretroviral agents, such as nevirapine [2]. Until now, to our knowledge, only hypersensitivity reactions to abacavir have been reported [3]. Abacavir should now be added to the list of antiretroviral agents associated with Stevens-Johnson syndrome.

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## Successful Treatment of *Enterococcus faecalis* Prosthetic Valve Endocarditis with Linezolid

Sir—Linezolid possesses a broad spectrum of activity against gram-positive organisms, including *Enterococcus faecalis* [1]. Like other agents used for the treatment of *E. faecalis* endocarditis, linezolid possesses only bacteriostatic activity [2].

Although the US Food and Drug Administration has not approved linezolid specifically for the treatment of endocarditis, there have been reports of its use both in animals and in patients with endocarditis due to vancomycin-resistant *Enterococcus faecium* (VREF) [3, 4]. To our knowledge, no cases of *E. faecalis* endocarditis involving either a native valve or a prosthetic valve have been successfully treated with linezolid. We report the successful use of linezolid therapy for a case of bioprosthetic aortic valve endocarditis due to a strain of *E. faecalis* with high-level resistance to gentamicin.

The patient was a 78-year-old white man who had type II diabetes mellitus and coronary artery disease. In June 2001, he underwent aortic valve replacement with a bioprosthesis and coronary artery bypass. The patient was well until November 2001, when he was admitted to University of Pittsburgh Medical Center South Side (Pittsburgh) with anemia and weakness but without fever, chills, or sweats. Pertinent findings of physical examination included a diastolic murmur of grade 2/4 and guaiac-positive stool specimens.

The patient underwent gastrointestinal endoscopy with antibiotic prophylaxis that consisted of ampicillin (2 g iv) plus gentamicin (1.5 mg/kg), both of which were given within 30 min of the start of the procedure, and ampicillin (1 g iv) given 6 h later, as per the 1997 recommendations of the American Heart Association and the Infectious Diseases Society of America [5, 6]. Gastric arteriovenous malformations and rectal telangiectasia were noted and were treated with electrocoagulation and laser ablation.

During the patient's hospitalization, he was noted to have a temperature of 38.4°F, and 6 sets of blood cultures performed during a 6-day period were positive for *E. faecalis.* Transesophageal echocardiography confirmed the presence of vegetations on the bioprosthetic aortic valve. Ampicillin, 12 g/day, was given in divided doses along with gentamicin, 1 mg/kg per dose adjusted to creatinine clearance. The isolate was found to be susceptible to ampicillin and vancomycin, but it had high-level resistance to gentamicin. Administration of gentamicin was discontinued. The patient was not considered to be a candidate for surgery. By day 4 of hospitalization, the patient developed acute renal failure and experienced an increase in the serum level of creatinine (from 1.3 mg/dL to 4.4 mg/dL). Antimicrobial therapy was changed to linezolid, 600 mg b.i.d. The isolate was found to be susceptible to linezolid (MIC, 1.0 $\mu$g/mL).

The patient tolerated 6 weeks of the therapy and experienced minimal nausea, which was easily managed with symptomatic treatment. The results of blood cultures performed during and after therapy remained negative. The patient was monitored closely for myelosuppression. His hemoglobin level remained stable, but his WBC count decreased from 7.6 cells/mm$^3$ to 2.4 cells/mm$^3$ and his platelet count decreased from $263 \times 10^3$ platelets/$\mu$L to $41 \times 10^3$ platelets/$\mu$L on day 42 of therapy. Linezolid therapy was discontinued, and the patient remained asymptomatic.

Three weeks after discontinuation of linezolid therapy, the patient's WBC count and platelet count returned to normal. The results of additional blood cultures performed 4 months after discontinuation of linezolid remained negative. The patient has remained hemodynamically stable and has returned to work.

To our knowledge, this is the first reported case of prosthetic valve endocarditis due to high-level gentamicin-resistant *E. faecalis* that has been successfully treated with linezolid. In view of the patient's pathologic gastrointestinal findings, the gastrointestinal tract was the likely source of endocarditis. Linezolid has been shown to be effective in the treatment of VREF endocarditis in experimental settings [3]. Recently, a patient with VREF endocarditis was successfully treated with linezolid after sequential monotherapy with chloramphenicol and quinupristin-dalfopristin failed [4]. A report of the use of linezolid therapy for gram-positive infections described 2 patients with VREF endocarditis, both of whom had a bacteriologic response but died of an unrelated cause while receiving therapy [1].

Linezolid may be an effective alternative for the treatment of enterococcal endocarditis. The 100% bioavailability of the oral formulation of linezolid makes it an attractive alternative option for long-term outpatient treatment. The patient described here received ampicillin for 4 days. It is unlikely, however, that this course of therapy would have cured his prosthetic valve endocarditis. The hematological adverse effects of linezolid, which may be encountered when therapy is prolonged, are usually mild, gradual, and predictable. Such adverse effects can be monitored by weekly assessment of the complete blood count, and reverses in these effects can occur within a few days of discontinuation of the therapy [7, 8]. Linezolid may be an option for the treatment of this challenging disease entity. Additional prospective studies are needed to confirm this observation.



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