obstruction. Because of the irregular rhythm, the redundant (and unresected) anterior mitral valve leaflet may be in a more open position at the time of ventricular systole, predisposing to an enhanced Venturi effect and hence greater obstruction. Since drug therapy, heart rate, blood pressure, body position (at the time of echocardiogram), and volume status were similar at the time of both studies, it is unlikely that these mechanisms can be invoked as the source of our observations.

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Successful Medical Therapy of Rhodococcus equi Pneumonia in a Patient with HIV Infection*

James D. Curry, M.D.; Paul T. Harrington, M.D.; and Ian K. Hosein, M.D.

A 34-year-old HIV-infected man was successfully treated with antimicrobial therapy alone for Rhodococcus equi pneumonia and has survived longer than six months. In the current literature, only two of seven HIV-infected patients so treated have survived as long as six months. Based on our experience and the available literature, it seems reasonable to treat HIV-infected patients with R equi pneumonia who do not require surgical intervention with prolonged intravenous therapy followed by long-term oral therapy with at least two effective antibiotics. The optimal choice and duration of antibiotic therapy need to be determined. (Chest 1992; 102:1619-21)

Rhodococcus equi is a cause of pneumonia in individuals with cell-mediated immunodeficiency including those

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HIV = human immunodeficiency virus
with HIV infection. There have been 16 cases of HIV-related pulmonary involvement with \textit{R equi} described in the literature\textsuperscript{1-14} with a great deal of variability in the treatment of these individuals. Only two patients have had prolonged survival with antimicrobial therapy alone.\textsuperscript{1,13} Both of these patients received either prolonged or continuous therapy with two effective antibiotics. We present another patient who had resolution of his \textit{R equi} pneumonia and prolonged survival with medical treatment alone. Although the number of reported cases is small, we believe that this case and those previously described have important implications for the treatment of this unusual infection.

\textbf{Case Report}

A 34-year-old man was admitted to the hospital with complaints of fever, cough, chest pain and weight loss. Seven weeks prior to admission he was noted to be infected with HIV and to have cavitary pneumonia caused by \textit{R equi} at another institution. At that time, he was treated with intravenous vancomycin for four weeks and was discharged on a regimen of trimethoprim-sulfamethoxazole, one double-strength tablet twice daily. He did not take this medication and began to have the previously mentioned symptoms one week prior to admission.

On admission the patient was noted to be thin and in no distress. His oral temperature was 38.3°C. Physical examination was within normal limits except for oropharyngeal lesions consistent with pseudomembranous candidiasis and rales in the left upper lung field. Laboratory studies revealed a mild normochronic normocytic anemia, with an absolute lymphocyte count of 454 cells/\mu l with a CD4\textsuperscript+ lymphocyte count of 50 cells/\mu l; the T4/T8 ratio was 0.2. The initial radiograph is shown in Figure 1. Cultures of blood, bronchoalveolar lavage fluid and bone marrow aspirate all revealed \textit{R equi}, which is sensitive to chloramphenicol, erythromycin, gentamicin, tetracycline, trimethoprim-sulfamethoxazole and vancomycin. The isolate was resistant to ampicillin, cefazolin, clindamycin, oxacillin and penicillin. His echocardiogram was normal.

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{figure1.png}
\caption{Chest radiograph on admission showed a cavitary left upper lobe pneumonia.}
\end{figure}

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{figure2.png}
\caption{Chest radiograph 12 weeks after discharge showed an almost complete resolution of the left upper lobe pneumonia.}
\end{figure}

Therapy with intravenous vancomycin (1 g each day), erythromycin (1 g every 6 h) and clindamycin (900 mg every 8 h) was begun. He had continuous fevers as high as 39.4°C for the first 20 days of therapy but then improved markedly and was without fever from hospital days 20 to 27. He then became febrile again on hospital days 28 to 32 and blood cultures again grew \textit{R equi} with the same susceptibilities. He was afebrile on hospital days 33 and 34 and was discharged on a regimen of oral therapy with erythromycin (1 g every 6 h), clindamycin (300 mg every 6 h) and trimethoprim-sulfamethoxazole (one double-strength tablet daily); in addition, he was given 16 more days of intravenously administered vancomycin. Twelve weeks later he was asymptomatic and the chest radiograph (Fig 2) revealed nearly total resolution of the left upper lobe cavitary infiltrate. Therapy with erythromycin and trimethoprim-sulfamethoxazole was continued for life.

\textbf{Discussion}

\textit{Rhodococcus equi} (formerly \textit{Corynebacterium equi}) is an aerobic Gram-positive weakly acid-fast bacillus that has been noted to cause cavitary pneumonia, empyema and brain abscesses in immunocompromised hosts.\textsuperscript{16} Prior to this report, there have been 16 cases of HIV-related pulmonary \textit{R equi} infections described in the literature.\textsuperscript{1-14} Pneumonia caused by \textit{R equi} in the setting of HIV infection frequently cavitates,\textsuperscript{4} frequently leads to empyema, has a relapsing and remitting course with intermittent bacteremia and can cause extrapulmonary abscesses.\textsuperscript{6}

Of the 16 reported cases, eight patients underwent surgical procedures for a variety of indications\textsuperscript{5-10} including the failure of antimicrobial therapy.\textsuperscript{4} One of the 16 reports does not give enough information to draw conclusions concerning therapy and outcome.\textsuperscript{14} Seven patients received medical therapy alone;\textsuperscript{1,5,10-15} of these, two patients survived longer than six months.\textsuperscript{1,4} Of the five patients who died, three patients\textsuperscript{5,11,18} were receiving one antibiotic, one patient...
was noncompliant and the therapy of one patient was not described.  

Although it is hard to draw many conclusions on such a limited number of patients, the two patients who survived longer than six months and the currently described patient have similarities in treatment that separate them from the non-long-term survivors. All three long-term survivors received and had good response to prolonged treatment with two antibiotics to which the R equi isolate was proven to be sensitive. The patient described by Weingarten et al. was treated with erythromycin, clindamycin and tetracycline, which resulted in improvement for six months. The patient described by Sirera et al. was treated with intravenously administered ciprofloxacin and chloramphenicol for three weeks and was discharged on a regimen of the same oral drugs for suppression. These cases and the current case suggest that R equi pneumonia should be treated intravenously for three to six weeks with at least two antibiotics to which the R equi isolate has proven sensitivity. Also, since this organism is a central nervous system pathogen, the choice of antibiotics with good central nervous system penetration should be considered. Intravenous therapy should then be followed by two oral antibiotics for an indefinite period of time and perhaps for life.

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Clearance of Theophylline by Hemodialysis in One Patient with Chronic Renal Failure

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The clearance of theophylline by hemodialysis was determined in one patient who had polycystic kidney with chronic renal failure and bronchial asthma. The serum levels of theophylline were determined by enzymatic immunoassay on two consecutive days, once on a dialysis day and again on a nondialysis day. Clearance of theophylline by hemodialysis was 119 ml/min, and the extraction efficiency was 0.56. The elimination half-life of theophylline shortened from 5.7 h to 1.6 h during hemodialysis. The dialysis rate constant (Kd) was 0.32 h, and 79 percent of the total body store of the drug was removed during a 4-h dialysis. Patients receiving theophylline who are maintained on hemodialysis should be closely monitored for bronchospasm during and after the hemodialysis procedure. Measurement of serum concentrations of theophylline should be employed to facilitate increases in dosage during hemodialysis. (Chest 1992; 102:1621-23)

Hemodialysis has been regularly utilized therapeutically as a supportive treatment for end-stage renal disease; however, the effects of renal failure and hemodialysis on elimination of theophylline are not clear, and dosage guidelines for administering theophylline during hemodialysis are not well defined. In nonsmoking subjects with normal hepatic and cardiac function, total body clearance of theophylline is highly variable, ranging from 30 to 120 ml/kg/h. Only 7 to 13 percent of the parent compound is excreted unchanged in the urine, and renal theophylline clearance ranges from 3 to 9 ml/min/m² in persons with normal renal function. It is assumed that total body clearance and dosing requirements should be relatively unchanged in renal failure.

Since theophylline (molecular weight, 180) is only partially protein-bound (53 to 65 percent) and since the volume of distribution is small (0.3 to 0.7 L/kg), a significant fraction of the drug should be cleared by hemodialysis. Moreover, hemodialysis was suggested to be a treatment for patients with theophylline intoxication. Therefore, to clarify the effects of hemodialysis on elimination of theophylline, we administered aminophylline to one patient who had polycystic kidney with chronic renal failure and bronchial asthma

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