DISCUSSION

Several articles have recently discussed an extensive experience in the delivery of oxygen by the transtracheal route.4,7 The problems associated with this technique are not infrequent and include subcutaneous emphysema, infection at the insertion site, catheter malposition and fracture, and the accumulation of mucus balls.2,7 One report suggested that mucus plugging may be a problem with the SCOOP system since it employs a wider-gauge catheter having multiple side vents,8 while another indicated that catheters designed for infrequent change are prone to clog at the tip.6 Although the occurrence of large mucus plugs has not been noted with the use of small-diameter catheters having a single terminal opening, there has been a recent case8 in which a SCOOP I catheter could not be removed because of a large mass of inspissated mucus and inflammatory tissue became adherent to its distal end.

SCOOP catheters in 30 of our patients have generally been well-tolerated; however, others have reported the stripping of mucus into the trachea and the need for frequent catheter cleaning and removal.8,9 The two patients described in this report appear to have developed late complications requiring hospitalization in large part due to the accumulation of inspissated mucus in the trachea despite twice daily removal and cleaning of their catheters. In the first case, sputum was noted shortly before the mucus plug was expectorated while in the second, hypventilation may have prevented sufficient airflow to generate tracheal noise. A retrospective review of the hospital admission chest roentgenograms with particular attention to the tracheal air column did not suggest any compromise of the lumenal diameter.

Unfortunately, the direct visualization of a large tracheal mucus cast was not bronchoscopically verified so we cannot be certain that the plug was initially present. The temporal sequence of dramatic improvement following the expectoration of a large mucus glob, however, suggests that tracheal obstruction by this mass played a crucial role in the patients' respiratory compromise. Also noteworthy was the fact that the plug remained within the trachea despite the regular removal and cleaning of the TTO catheter. The "dimple" noted at one end of the cast expectorated by case 2 suggests that the catheter's entrance position in the trachea may have been the nidus for the mucus accumulation. Alternatively, it may simply have been due to catheter tip pressure on the mucus after it had been stripped off. Bronchoscopy was performed to determine if granulation tissue was present at the TTO site and while none was seen, catheter extraction during the examination induced a stripping action that caused a 1-cm-sized mucus plug to develop at the tracheal entry point.

We have described two patients who have suffered significant late clinical complications caused by a large mucoid accumulation in the trachea following the placement of a SCOOP transtracheal catheter. We suggest that patients admitted to the hospital for respiratory failure or increasing cor pulmonale who are receiving oxygen via TTO catheters may benefit from bronchoscopy to rule out tracheal mucoid obstruction if the response to an appropriate therapeutic regimen is unsatisfactory.

REFERENCES


Transmission of Tuberculosis to Hospital Workers By a Patient with AIDS*

J Rush Pierce, Jr., M.D.; Sandra L. Sima, R.N.; and Gerald H. Holman, M.D.†

A patient with acquired immunodeficiency syndrome (AIDS) was admitted to a hospital with cough and fever and after 29 days was transferred to a hospice. He was eventually shown to have active pulmonary tuberculosis. This diagnosis was obscured clinically by simultaneous infection with Pneumocystis carinii and Mycobacterium avium complex (MAC). Laboratory recognition of Mycobacterium tuberculosis was delayed because of overgrowth of cultures by MAC but was later established using DNA probe techniques. Thirty (19 percent) of 158 health care workers who had been exposed to this patient had conversion of their tuberculin skin tests. Diagnostic difficulties and nosocomial transmission of tuberculosis may occur when patients with AIDS have mixed mycobacterial infections.

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DNA = Deoxyribonucleic acid; HIV = human immunodeficiency virus; MAC = Mycobacterium avium complex; MTB = Mycobacterium tuberculosis

Patients with acquired immunodeficiency syndrome (AIDS) are predisposed to infection with a variety of organisms which usually pose no threat to healthy care-

*From the Amarillo Bi-City-County Health Unit and the Texas Tech University School of Medicine, Regional Academic Health Center, Amarillo.
†Clinical Associate Professor of Medicine.
‡Clinical Professor of Medicine.

CHEST / 101 / 2 / FEBRUARY, 1992 581
givers. An important exception is Mycobacterium tuberculosis (MTB), which may infect patients with AIDS and be transmitted to healthy contacts.1,2 We recently investigated a case of nosocomial transmission of tuberculosis by a patient with AIDS, in whom the diagnosis was delayed because of simultaneous pulmonary infection with Pneumocystis carinii and Mycobacterium avium complex (MAC).

CASE REPORT

A patient with human immunodeficiency virus (HIV) infection was admitted to a hospital with weight loss, cough, and fever. A chest roentgenogram was normal, and a Mantoux tuberculin skin test was nonreactive (0 mm). Three sputum samples were smear-negative for acid-fast bacilli (AFB) and culture-negative for mycobacteria. The patient did not improve after empiric therapy with trimethoprim-sulfamethoxazole combined therapy and then intravenous pentamidine. Ten days after admission, the findings from bronchoscopic inspection of the tracheobronchial tree were normal, and histologic examination of a transbronchial biopsy of the lung revealed P carinii. Smears of lavage fluid were negative for AFB; cultures were reported one month later as showing heavy growth of MAC.

The patient continued to cough and to have high fever, despite the administration of zidovudine and daily aerosol pentamidine. The findings from pathologic examination of aspirated bone marrow were normal; marrow cultures eventually grew MAC. On the 26th day of hospitalization, the patient was transferred to a hospice for terminal care. A chest roentgenogram on that day showed a new right middle lobe infiltrate. Repeat sputum examination revealed numerous AFB. Culture of this specimen also grew MAC.

Treatment with isoniazid, rifampin, ethambutol, zidovudine, and aerosol pentamidine resulted in clinical improvement and resolution of cough and fever. A repeat chest roentgenogram showed a resolving right middle lobe pneumonia, and the patient was discharged. One month after discharge, his chest roentgenogram was normal. Repeat sputum specimens obtained at this time were smear-negative for AFB but grew MTB.

Five months after they had been obtained, mycobacterial cultures of bronchial lavage fluid obtained in the hospital and of sputum obtained at the hospice showed growth of a morphologically different colony type in the midst of heavy MAC growth. These colony types were identified as MTB by DNA probe techniques. Epidemiologic investigation showed that of those exposed to this patient, 19 (20 percent) of 93 hospital workers and 11 (17 percent) of 65 hospice workers had conversion of their tuberculin skin tests to positive. One of the infected hospital workers developed active pulmonary tuberculosis. Five (45 percent) of 11 individuals who had visited the patient at the hospital had positive tuberculin tests.

DISCUSSION

Our patient failed to respond to treatment for confirmed P carinii pneumonia (PCP) because he simultaneously developed active pulmonary tuberculosis. Laboratory recognition of MTB was delayed due to overgrowth of mycobacterial cultures by MAC, but was later recognized by DNA probe techniques. This delay in laboratory diagnosis and the simultaneous presence of PCP (which offered an alternative explanation for symptoms which in reality were due to tuberculosis) contributed to the nosocomial transmission of tuberculosis to hospital workers and visitors.

We are aware of two other cases of simultaneous infection with MAC and MTB in which MTB was especially difficult to isolate because of MAC overgrowth of culture media.3,4 In one of these cases,5 the diagnosis of mixed mycobacterial infection was established promptly using rapid diagnostic laboratory methods, in addition to conventional agar media. In the other case,6 only conventional agar media were used; and, as in our case, the diagnosis of mixed mycobacterial infection was delayed.

Patients with AIDS are at risk for developing pulmonary tuberculosis,8 and MAC may be cultured from as many as one third of the patients with AIDS.9 Thus, it is likely that some patients with AIDS will develop simultaneous symptomatic infection with both MTB and MAC. This case illustrates the diagnostic difficulties and laboratory delays that may arise when patients with AIDS do have mixed mycobacterial infections. Newer diagnostic laboratory methods, such as a combination of radiometric culture techniques and DNA probes, may provide a more sensitive and rapid means of correct diagnosis in these cases.7 Clinicians should consider a diagnosis of pulmonary tuberculosis in HIV-infected patients with PCP who fail to respond to appropriate therapy. Furthermore, clinicians should be aware that HIV-infected patients may have tuberculosis even when mycobacterial cultures grow MAC.

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