

## Short reports

### Bronchoscopy of symptom free patients infected with human immunodeficiency virus for detection of pneumocystosis

JENS D LUNDGREN, MARIANNE ORHOLM, THYGE L NIELSEN,  
JOHAN IVERSEN, JESPER HERTZ, JENS O NIELSEN

From the Departments of Infectious Disease and Microbiology, Hvidovre Hospital, Copenhagen University, Hvidovre, Denmark

**ABSTRACT** No evidence of *Pneumocystis carinii* infection was found in eight symptom free patients who were positive for the human immunodeficiency virus and who underwent bronchoscopy, bronchoalveolar lavage, and brush biopsy. This suggests that the presence of *Pneumocystis carinii* in bronchoscopy material is likely to indicate pneumocystis infection.

Sixty per cent of patients with the acquired immunodeficiency syndrome (AIDS) will present with *Pneumocystis carinii* pneumonia.<sup>1</sup> The specificity of *Pneumocystis carinii* in persons infected with human immunodeficiency virus (HIV) as a marker of *Pneumocystis carinii* infection is unknown. It is suggested that pneumocystis pneumonia develops from a latent infection,<sup>1</sup> so the relevance of a small number of pneumocystis organisms in bronchoscopy material is uncertain. We report the results of bronchoscopies in eight HIV infected patients without clinical signs of pneumonia.

#### Methods

Eight HIV antibody positive homosexual men volunteered to undergo bronchoscopy. The project was agreed by the Copenhagen Scientific Ethical Committees. Subjects had a chest radiograph, and blood was taken for a differential white cell count with determination of the lymphocyte CD4:CD8 ratio and CD4 count and for detection of HIV antigen.

Subjects were studied only if they were HIV antibody positive and had no history of pneumonia, no current respiratory symptoms, and normal respiratory findings on clinical examination, and if they were receiving no antibiotic treatment. All were afebrile with a normal chest radiograph.

Bronchoscopy was carried out by the transnasal route after sedation with diazepam 5-15 mg intravenously and local anaesthesia with 2% lignocaine (lidocaine). The right lower lobe was lavaged with 10 ml saline aliquots repeated 8-13 times. The same area was then brushed with a protected catheter brush and the material directly transferred to slides.

The specimens obtained were sent to the department of microbiology and handled in a routine way. Bronchoalveolar lavage fluid was spun down and multiple smears were made. Lavage and brush biopsy material was stained with Giemsa and Grocott's methanamine silver and examined by light microscopy for the presence of *Pneumocystis carinii* cysts or trophozoites.

#### Results

The mean age of the eight patients was 37 (range 30-45) years, and the mean known duration of HIV infection was 19 (range 9-32) months (table). One patient had lymphopenia. Three patients had reversed CD4:CD8 ratios and three had CD4 counts below normal. Three patients were HIV antigenaemic.

Of the lavage fluid instilled, 55-82% was retrieved. No *Pneumocystis carinii* was detected in any patients from lavage or brush biopsy material.

All patients were well three to five months after bronchoscopy.

#### Discussion

The eight HIV positive patients in this study had immunological features that varied from normal to severely abnormal. Nevertheless, none of the lavage or brush biopsy specimens from these patients without signs of pneumonia contained *Pneumocystis carinii*. As bronchoalveolar lavage has been reported to have a sensitivity and specificity in detecting pneumocystis similar to that of transbronchial biopsy<sup>12</sup> biopsies were not performed.

This is the first study to address the issue of latent *Pneumocystis carinii* infection in HIV infected patients without respiratory symptoms. Necropsy studies of non-HIV infected patients have shown occasional cysts in a few cases.<sup>3-6</sup> Necropsy studies of healthy HIV positive patients who died unexpectedly failed to show evidence of pneumocystis pneumonia.<sup>7</sup> Our subjects, representing a range of impaired cellular immunity, might have been harbouring low grade *Pneumocystis carinii* infection. The organism was not, however, detectable with the diagnostic procedures that commonly<sup>8</sup> and in our laboratory (personal communication) are able to detect *Pneumocystis carinii* in over 95% of patients with pneumocystis pneumonia. None of our patients developed pneumocystis pneumonia in the months following bronchoscopy.

Address for reprint requests: Dr J D Lundgren, Building 10/Room 10D48, National Institutes of Health, Bethesda, Maryland 20892, USA

Accepted 4 August 1988

## Clinical and laboratory results

Patient No	Age (y)	HIV AB/AG	Duration* (mo)	Lymphocyte count ( $\times 10^9/l$ )†	CD4:CD8‡	CD4 (cells/ml)§
1	30	+/+	18	1.3	0.32	140
2	38	+/-	26	4.0	0.63	960
3	45	+/-	9	0.7	1.33	280
4	42	+/+	11	1.5	1.17	630
5	30	+/-	18	1.5	1.57	660
6	44	+/+	21	1.1	0.19	70
7	31	+/-	32	1.7	0.83	650
8	39	+/-	16	2.3	1.30	810

\*Known duration of HIV infection.

†Normal range 1.0–4.8  $\times 10^9/l$ .

‡Normal > 0.80.

§Normal > 500 cells/ml.

HIV AB/AG—human immunodeficiency virus antibody or antigen in blood.

The indication for antipneumocystis treatment in HIV infected patients has been the presence of *Pneumocystis carinii* in specimens obtained from the lungs where there is evidence of pneumonia.<sup>1</sup> This has been done on an empirical basis as the number of organisms necessary to cause symptoms is unknown. Our findings support the view that the detection of *Pneumocystis carinii* in lavage or brush biopsy material is likely to represent pneumocystis pneumonia and that this is an indication for treatment.

## References

- Mills J. *Pneumocystis carinii* and *Toxoplasma gondii* infections in patients with AIDS. *Rev Infect Dis* 1986;**8**:1001–11.
- Murray JF, Felton CP, Garay SM, *et al*. Pulmonary complications of the acquired immunodeficiency syndrome. *N Engl J Med* 1984;**310**:1682–8.
- Dee P, Winn W, McKee K. *Pneumocystis carinii* infection of the lung: radiologic and pathologic correlation. *AJR* 1979;**132**:741–6.
- Esterly JA. *Pneumocystis carinii* in lungs of adults at autopsy. *Am Rev Respir Dis* 1968;**97**:935–7.
- Perera DR, Western KA, Johnson HD, Johnson WW, Schultz MG, Akers PV. *Pneumocystis carinii* pneumonia in a hospital for children. *JAMA* 1970;**214**:1074–8.
- Settnes OP, Genner J. *Pneumocystis carinii* in human lungs at autopsy. *Scand J Infect Dis* 1986;**18**:489–96.
- Coleman DL, Luce JM, Wilber JC, *et al*. Antibody to the retrovirus associated with the acquired immunodeficiency syndrome (AIDS). *Arch Intern Med* 1986;**146**:713–5.
- Golden J., Hollander H, Stulberg M, Ganser G. Bronchoalveolar lavage as the exclusive diagnostic modality for *Pneumocystis carinii* pneumonia. *Chest* 1986;**90**:18–21.