Diagnosis of Pneumocystis carinii pneumonia from non-invasive sampling of respiratory secretions

R A Hague, S E Burns, J Y Q Mok, P L Yap

Abstract
An infant infected with HIV presented with fever, tachypnoea, hypoxia, and radiological evidence of bilateral pneumonitis. Fluorescent antibody technique identified Pneumocystis carinii within 24 hours from secretions obtained by nasopharyngeal aspiration. This rapid, non-invasive method should be the first line investigation of suspected P carinii pneumonia in immunocompromised patients.

Pneumocystis carinii is an important pathogen in the immunocompromised child, and must be considered in the differential diagnosis of any such child presenting with respiratory symptoms. Characteristic radiological appearances are of diffuse reticulogranular infiltrates, particularly in the perihilar region, progressing to consolidation, but a normal chest radiograph is compatible with the diagnosis. Cytomegalovirus or mycobacteria infection may produce similar findings.

Definitive diagnosis has previously relied on the demonstration of silver staining cysts in material obtained from open lung biopsy or bronchoalveolar lavage, requiring an invasive procedure in an acutely ill child. Sputum induction in infants and small children is not a practicable technique, and serology is unhelpful. We report a case in whom the diagnosis was made from nasopharyngeal secretions using a fluorescent antibody technique.

Case report
A white infant girl whose HIV seropositive mother developed P carinii pneumonia at 35 weeks' gestation was delivered at term weighing 3050 g. There were no neonatal problems, and her initial progress was complicated only by persistent candidal infection of the oral cavity and napkin area.

At 4.5 months she presented with a two week history of mild upper respiratory symptoms, two days of fever, an unproductive cough, and increasing tachypnoea, sufficiently severe to impair feeding. Examination showed a pale, mildly cyanosed and lethargic, but responsive infant. She had a tachycardia of 160/minute and respiratory rate of 80/minute, with bilateral intercostal and subcostal indrawing and scattered crepitations on auscultation. Lymphadenopathy and hepatosplenomegaly were noted and there was candidal dermatitis of the napkin area.

A chest radiograph showed extensive bilateral pneumonitis (figure). She was hypoxic (oxygen saturation 60%), with a carbon dioxide tension (PCO₂) of 5.37 kPa and hydrogen ion concentration of 39.7 mmol/l. On admission the neutrophil count was 6200x10⁶/l, T4 lymphocyte count 1079x10⁶/l, and T4/T8 ratio 1.4. Serum IgG concentration was normal (4 g/l), and IgA and IgM raised (0.9 g/l and 2.1 g/l). HIV p24 antigen was positive (140 pg/ml). Secretions obtained by nasopharyngeal aspiration were sent for microbiological investigation.

Pending results the infant received oxygen supplementation and high dose cotrimoxazole and acyclovir intravenously. The identification of P carinii was confirmed the next day (see below). The infant's condition initially stabilised, but deteriorated 24 hours later. Despite giving hydrocortisone and intravenous immunoglobulin, she failed to maintain oxygen saturation of >80% even with fractional inspiratory oxygen of 100%, and developed carbon dioxide retention (PCO₂ 9.75 kPa) and respiratory acidosis (hydrogen ion concentration 73.7 mmol/l). Definite knowledge of the diagnosis, and its implications for the child's long term prognosis meant that the parents could be counselled appropriately. Their wish for her not to receive mechanical ventilation was respected, and she died on the fourth day of her admission. Postmortem examination confirmed the widespread alveolar exudate within the lungs in which round organisms were detected.

Chest radiograph showing bilateral interstitial pneumonitis.
Cystic fibrosis, Pseudomonas aeruginosa, and selective decontamination

A Mark Dalzell, Hendrik K F van Saene, David P Heaf

Abstract
We used an oral topical antibiotic preparation to try and prevent oropharyngeal carriage of Pseudomonas aeruginosa in patients with cystic fibrosis. Ten of 15 patients treated with a two week course of intravenous ceftazidime together with a 90 day course of an antibiotic containing gel continued to carry P aeruginosa in the oropharynx.

The technique of selective decontamination of the digestive system uses oral antibiotic combinations to prevent the overgrowth of certain groups of organism (typically Gram negative aerobes), and allows the more usual flora to maintain colonisation resistance.1 It has application particularly in the immunocompromised patient undergoing cytotoxic chemotherapy and in long term ventilated patients,2 where Gram
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