

Acute pulmonary toxoplasmosis with alveolitis of T suppressor lymphocyte type

O MICHEL, R SERGYSELS

From the Clinic of Respiratory Diseases, Saint-Pierre University Hospital, Brussels, Belgium

There are few reports of pulmonary manifestations of systemic toxoplasmosis in previously healthy people.^{1,2} We present the case history of a patient with clinical evidence of toxoplasma pneumonitis from whom bronchoalveolar lavage material was obtained before and after successful treatment.

Case report

A 21 year old Portuguese man became ill in November 1984 with high fever, dry cough, shivers, myalgia, arthralgia, and exanthema. He had no previous relevant medical history. He smoked 50 cigarettes a day and was an assistant cook.

On physical examination the patient was febrile (39°C). Cervical lymphadenopathy, pharyngitis, bilateral crackles, hepatomegaly, and rash were present. The chest radiograph showed a bilateral interstitial infiltration. The relevant laboratory findings were: arterial blood gases—pH 7.45, Po₂ 6.9 kPa (52 mm Hg), PCO₂ 4.3 kPa (32 mm Hg); total leucocytes 7.4 × 10⁹/l (neutrophils 81%, lymphocytes 13%, atypical lymphocytes 4%, monocytes 1%, eosinophils 1%), platelets 70 × 10⁹/l; fibrinogenaemia 3.44 g/l; erythrocyte sedimentation rate 7 mm in one hour; glutamic oxaloacetic transaminase 63 IU/l (normal value <22 IU/l); glutamic pyruvate transaminase 35 IU/l (<20 IU/l); lactate dehydrogenase 1084 IU/l (<195 IU/l); creatinine phosphokinase 243 IU/l (<110 IU/l).

The delayed skin tests for tuberculin (5TU), streptokinase-streptodornase, and phytohaemagglutinin gave negative results. Respiratory function tests indicated a mild restrictive pattern, with vital capacity 3.82 l (76% of predictive value), total lung capacity 5.09 l (78% predicted), and impaired carbon monoxide gas transfer (TLCO

16.66 ml min⁻¹ mm Hg, 49% predicted). Blood and sputum cultures were negative. Routine fiberoptic bronchoscopy was of no diagnostic value. Bronchoalveolar lavage fluid (50 ml five times) contained an excess of lymphocytes (neutrophils 1%, lymphocytes 22%, macrophages 75%, epithelial cells 1.6%), some of which were seen to form rosettes around macrophages. The cell surface phenotype of blood and alveolar lymphocytes was determined (table) by a previously described technique.³

The patient was treated from admission with erythromycin 3 g/day. After 10 days the fever resolved and the chest radiograph and the arterial oxygen tension (Po₂) returned to normal. Erythromycin was discontinued and the patient remained afebrile. He was discharged on the 22nd day. At the time of discharge there was no serological evidence of legionnaires' disease or of mycoplasma or virus disease and serological tests for HTLV-3 also gave a negative result. Toxoplasma titres were, however, suggestive of an acute infection: from the first to the 10th day the Sabin Feldman titre increased from 1/1000 to 1/4000, the complement fixation titre from 0 to 1/64, and the immunofluorescence titre for IgM from 1/320 to 1/1280.

The patient was therefore treated with sulphadiazine and pyrimethamine. After three months' treatment the differential cell count of the lavage fluid had returned to normal (neutrophils 3%, lymphocytes 1%, macrophages 96%). The relative and absolute numbers of OKT3⁺ and OKT4⁺ lymphocytes in the peripheral blood had also returned to normal. The percentage of OKT8⁺ cells remained high, although the absolute number fell within the normal range. The serological test for toxoplasma showed a decrease in the complement fixation (1/32) and IgM immunofluorescence (1/40) titres.

Discussion

In our patient systemic infection with toxoplasma is suggested by the clinical picture,⁴ and by the investigations,

Address for reprint requests: Dr O Michel, Voies respiratoires, Hôpital Universitaire Saint-Pierre, 1000 Bruxelles, Belgium.

Accepted 17 February 1986

Lymphocyte surface phenotypes

Cell reactivity	7 normal controls (blood*)	Before treatment		After treatment (blood)
		Blood	Alveolar	
OKT3 relative (% lymphoid cells)	51-86	89	67	81
absolute (cells/ml)	296-3760	3973		2138
OKT4 relative (% lymphoid cells)	24-51	8	9	29
absolute (cells/ml)	160-1512	357		765
OKT8 relative (% lymphoid cells)	4-24	58	39	43
absolute (cells/ml)	180-1268	2589		1135
OKT4:OKT8 ratio	0.57-1.73	0.14	0.21	0.67

*Mean and 2 SD.

including the presence of atypical lymphocytes in the peripheral blood. The diagnosis was confirmed by finding a considerable rise in antibody titre in complement fixation, immunofluorescence, and Sabin-Feldman tests on paired sera.⁵ Pneumonitis was diagnosed from the clinical, radiological, and physiological features and bronchoalveolar lavage produced an abnormal number of lymphocytes.

In the few published reports pulmonary toxoplasmosis is always associated with systemic toxoplasmosis.^{1,2} It has been shown that infection with *Toxoplasma gondii* is followed by an increase in the peripheral blood of OKT8⁺ (suppressor) and OKT3⁺ (total T cells) lymphocytes.^{6,7} This was confirmed in our patient. Similar changes in T lymphocyte subclasses may also be observed in other intracellular infections—for example, Epstein-Barr virus⁸ and cytomegalovirus.⁶ Quinnan *et al*⁹ have shown that the OKT8 subclass may contain T lymphocytes that are cytotoxic for cells infected by cytomegalovirus. The increased numbers of OKT8⁺ lymphocytes observed in our patient could indicate a similar cytotoxic activity against cells infected by toxoplasma.

We have been able to show a similar increase in OKT3⁺ and OKT8⁺ cells in BAL and a decreased T4:T8 ratio which parallels the T4:T8 ratio in peripheral blood. In blastomycosis, another intracellular parasitic infection, T4:T8 ratios are also found to be reduced.¹⁰ Our observations have shown that in acute pulmonary toxoplasmosis, an increase in OKT8⁺ cells in peripheral blood with a decreased OKT4:OKT8 ratio cannot be explained by a redistribution of T4⁺ cells from the blood to the lung, as is suggested in sarcoidosis.¹¹ It remains to be seen whether or not the OKT8⁺ cells in the lung contain cytotoxic activity; if they

do, they could have a beneficial effect to the host by limiting the proliferation of the cells infected by toxoplasma.

References

- 1 Le Tan Vinh, Barbet JP, Mace B, Rousset S, Huault. La pneumonie toxoplasmique avec généralisation. *Sem Hôp Paris* 1980;**56**:744–50.
- 2 Ludlam GB, Beattie CP. Pulmonary toxoplasmosis? *Lancet* 1963;ii:1136–8.
- 3 Clumeck N, Sonnet J, Taelman H, *et al*. Acquired immunodeficiency syndrome in African patients. *N Engl J Med* 1984;**310**:492–7.
- 4 Theologides A, Kennedy BJ. Clinical manifestations of toxoplasmosis in the adults. *Arch Intern Med* 1966;**117**:536–40.
- 5 Remington JS. Toxoplasmosis in the adult. *Bull NY Acad Med* 1974;**50**:211–27.
- 6 De Waele M, Thielemans C, Van Camp B. Immunoregulatory T cells in mononucleosis and toxoplasmosis. *N Engl J Med* 1981;**305**:228.
- 7 Luft BJ, Kansas G, Engleman EG, Remington JS. Functional and quantitative alterations in T lymphocyte subpopulation in acute toxoplasmosis. *J Infect Dis* 1984;**150**:761–7.
- 8 De Waele M, Thielemans C, Van Camp B. Characterisation of immunoregulatory T cells in EBV-induced infectious mononucleosis by monoclonal antibodies. *N Engl J Med* 1981;**304**:460–2.
- 9 Quinnan GV, Manischewitz JE, Ennis FA. Cytotoxic T lymphocyte response to murine cytomegalovirus infection. *Nature* 1978;**273**:541–3.
- 10 Jacobs RF, Marmer DJ, Balk RA, Bradsher RW. Lymphocyte subpopulations of blood and alveolar lavage in blastomycosis. *Chest* 1985;**88**:579–5.
- 11 Martin II WJ, Williams DE, Dines DE, Sanderson DR. Interstitial lung disease. Assessment by bronchoalveolar lavage. *Mayo Clin Proc* 1983;**58**:751–3.