

tick bites and health problems over the preceding five years. Blood samples were tested for *B burgdorferi* antibody by indirect ELISA at the microbiology department, Charing Cross Hospital, London. 32 of the 33 workers were men and the age range was 22-63. Of the 33 Nature Conservancy workers 27 recorded tick bites, while all 10 Red Deer Commission workers had been frequently bitten, several over 18-28 years. Symptoms previously described in Lyme disease were reported by 28 workers (65%), the most common being joint pains (21) and rashes (5). 7 (16%) sera were antibody positive, 5 being "weak positive" (20-30 ELISA units<sup>3</sup>). No rashes were recalled in any of the seropositive cases (table)—indeed serological results, symptoms recalled, tick bites, and length of exposure did not seem to be related.

It seems that a significant proportion of workers in occupations carrying a risk of tick bite transmission of Lyme disease in Scotland have antibodies to *B burgdorferi* but the relation between serology and clinical Lyme disease is unclear. Baseline studies and more detailed epidemiological surveys in high-risk groups are needed to establish an accurate picture, a task that would be enhanced by the more uniform and consistent reporting of cases. Making Lyme disease a non-statutory reportable infection in Scotland is a step in the right direction.<sup>4</sup>

Clinical Department of Infectious Diseases,  
Ruchill Hospital,  
Glasgow G20 9NB

Raigmore Hospital, Inverness

Communicable Diseases (Scotland) Unit,  
Ruchill Hospital

N. HAMLET

D. NATHWANI

D. O. HO-YEN

E. WALKER

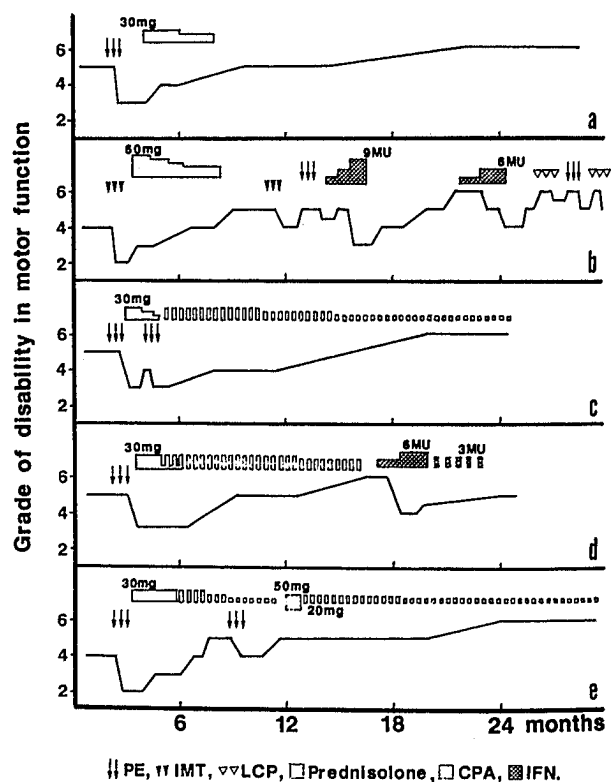
1. Hamlet N, Nathwani D. A report of the Scottish workshop on Lyme disease. *Commun Dis (Scotland) Unit Wkly Rep* 1989; 2: 7-8.
2. Nathwani D, Hamlet N, Irwin G, Walker E. A survey of 32 Scottish cases of Lyme disease. *Commun Dis (Scotland) Unit Wkly Rep* 1989; 2: 8-12.
3. Cutler SJ, Wright DJM. Comparison of immunofluorescence and enzyme-linked immunosorbent assay for the diagnosis of Lyme disease. *J Clin Pathol* (in press).
4. Forbes GI. Reportable infections. *Commun Dis (Scotland) Unit Wkly Rep* 1988; 51/52: 6-7.

### LONG-TERM FOLLOW-UP OF IMMUNOMODULATION IN TREATMENT OF HTLV-I-ASSOCIATED MYELOPATHY

SIR,—Last year<sup>1</sup> we reported that plasmapheresis was useful, at least temporarily, in 11 of 18 patients with HTLV-I-associated myelopathy (HAM). During the 1.8-2.5 years after plasmapheresis, 15 of these 18 patients have been treated with other immunomodulatory methods. We report here the long-term follow-up of these patients.

All patients except 1 who had tuberculosis were treated with prednisolone at an initial dose of 30-60 mg daily or on alternate days. Prednisolone was continued for at least 4 weeks at the initial dose and then tapered off. 8 patients had another series of plasmaphereses (four to six sessions, with AP-O5H plasma separator or IM-T 350 immunoabsorbent column).<sup>2</sup> 4 received oral cyclophosphamide 50 mg daily. 2 were treated with a daily intramuscular injection of interferon-alpha (IFN- $\alpha$ ) for 4 weeks. We used human lymphoblastoid interferon (Sumitomo Pharma, Osaka). The dose was increased stepwise from  $10^6$  to  $9 \times 10^6$  units per day. Patient 2 had six sessions of lymphocytapheresis (Asahi Medical, Tokyo). Clinical assessment was by disability grade (0-10)<sup>3</sup> and the mean follow-up period from initial diagnosis has been 26 months (range 22-32).

Patients 1-5, who had improved on plasmapheresis by two grades or more tended to respond to other immunomodulating therapies in the same way (figure). 2 patients treated with IFN- $\alpha$  improved in motor function by two grades. In these patients spontaneous proliferation of peripheral blood lymphocytes, which increase in patients with HAM,<sup>2</sup> decreased from 18 731 (3202) to 635 (116) counts per min and from 35 716 (3690) to 10 086 (2037) counts per min, respectively. Even in the 5 responsive patients, however, 4 progressed and the other returned to the pre-treatment level by the end of follow-up. The other 10 patients responded less to these treatments than they had to the initial plasmapheresis. Prednisolone was useful to prevent symptoms from recurring. However, more than 30 mg per day was necessary in all 14 patients.



Clinical courses of 5 patients (a-e) who responded to plasmapheresis.

PE = plasma exchange, IMT = plasmapheresis (IM-T350 column), LCP = lymphocytapheresis, CPA = cyclophosphamide. Motor function is graded 0 (no disability) to 10 (unable to change position).

Cyclophosphamide was beneficial in 1 of the 4 patients but not in the others. Lymphocytapheresis also seemed to be effective, though this was a short-term observation in only 1 patient.

Each immunomodulatory therapy resulted in some short-term improvement. In the long-term follow-up, however, no-one improved and 6 were one grade worse off by the end of the study. No severe adverse effect or leukaemic change (adult T-cell leukaemia) occurred after treatment.

First Department of Internal Medicine,  
Nagasaki University,  
School of Medicine,  
Nagasaki 852, Japan;  
and School of Allied Medical Sciences,  
Nagasaki University

HIDENORI MATSUO  
TATSUFUMI NAKAMURA  
KOHJI SHIBAYAMA  
KUNIHICO NAGASATO  
MITSUHIRO TSUJIHATA  
SHIGENOBU NAGATAKI

1. Matsuo H, Nakamura T, Tsujihata M, et al. Plasmapheresis in treatment of human T-lymphotropic virus type-I associated myelopathy. *Lancet* 1988; ii: 1109-13.
2. Itoyama Y, Minato S, Kira J, et al. Spontaneous proliferation of peripheral blood lymphocytes increased in patients with HTLV-I-associated myelopathy. *Neurology* 1988; 38: 1302-07.

### DIETARY FAT GUIDELINES FOR MEN AND WOMEN

SIR,—Dr Crouse (Feb 11, p 318) argues that the association between low-density lipoprotein (LDL) cholesterol and cardiovascular risk is more evident and consistent in men than in women. Furthermore decreasing fat intake was suggested to lower HDL-cholesterol (a risk factor for both sexes)—to a greater extent in women than in men. He therefore questioned the applicability of dietary guidelines to women. We have found that, relative to a diet high in monounsaturates, a carbohydrate-rich diet lowered HDL-cholesterol more in men (25%) than in women (13%) ( $p < 0.005$ ).<sup>1</sup> The increase in serum triglycerides on the cholesterol-rich diet was also more pronounced for men (40%) than for women (14%) ( $p < 0.1$ ). The effects observed were opposite to those suggested by

Crouse: risk factors for coronary heart disease on the carbohydrate-rich diet were affected more favourably in women than in men. Our study does indicate that diet may cause different changes in lipoproteins in men and in women. We therefore feel that dietary trials should include both men and women so as to yield dietary guidelines which are valid for both sexes.

Department of Human Nutrition,  
Wageningen Agricultural University,  
6700 EV Wageningen, Netherlands

RONALD P. MENSINK  
MARTIJN B. KATAN

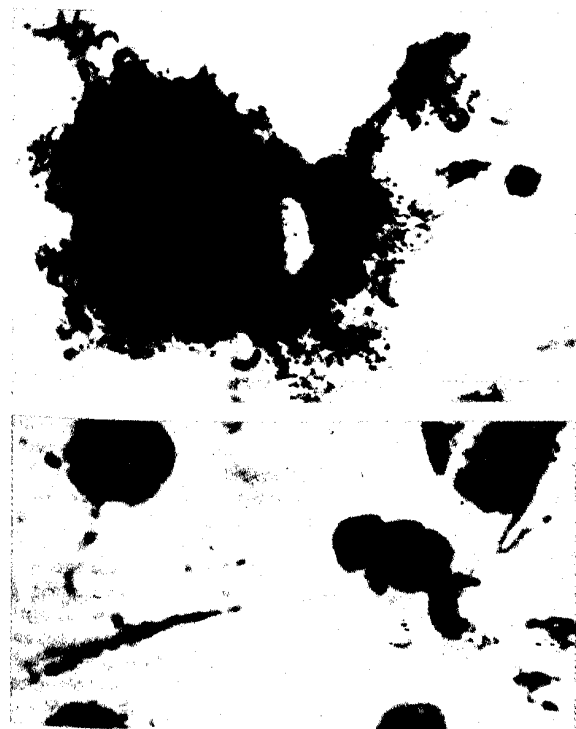
1. Mensink RP, Katan MB. Effect of monounsaturated fatty acids versus complex carbohydrates on high-density lipoproteins in healthy men and women. *Lancet* 1987; i: 122-25.

### SARCOSPORIDIOSIS REVEALED IN SPUTUM

SIR,—In August, 1988, a 31-year-old man, a plumber, born in France and living in a small town north of Paris, had a severe fever with profuse sweating, chest pain, and shortness of breath. He coughed up abundant mucopurulent sputum which, in a Ziehl-Neelsen smear, was found to contain many bright-red banana-shaped protozoons (8–10  $\mu\text{m}$ ). A cluster, 60–100  $\mu\text{m}$  in size and consisting of a hundred parasites, was observed (figure). The likely diagnosis was infection with schizonts or trophozoites of *Sarcocystis* sp. The patient refused a chest X-ray and was treated with isosamycin for 5 days.

3 weeks later the infection had gone and the sputum was negative for *Sarcocystis*, but positive for *Candida albicans*. These yeasts were also present in the faeces, with cysts of *Giardia intestinalis*. Haematological indices were normal (erythrocytes  $4.8 \times 10^6/\mu\text{l}$ , leucocytes  $9000/\mu\text{l}$  [65.5% neutrophils, 1% basophils, 0.5% eosinophils, 27% lymphocytes, 6% monocytes], platelets  $258\,000/\mu\text{l}$ ) and the 1 h sedimentation rate was 3 mm.

Serodiagnostic tests for toxoplasmosis showed IgG 75 IU/ml and no IgM (Remington and ISAGA tests) and antibody and/or antigen tests were negative for *Aspergillus fumigatus*, *A. flavus*, *C. albicans*, *Cryptococcus neoformans*, and HIV.



Trophozoites of *Sarcocystis*.

Upper: cluster (see text).

Lower: single trophozoite at higher magnification.

*Sarcocystis* are coccidia with a carnivore as final host (in the intestine of which are the sexual forms) and a herbivorous or omnivorous animal as intermediate host. The intermediate host is infected with asexual forms, which are endothelial, and then muscular forms.<sup>1,2</sup> Man is usually a final host (sarcocystosis) but is rarely an intermediate host (sarcosporidiosis).<sup>3-5</sup>

The finding of schizogonic forms of *Sarcocystis* sp in the sputum is, to our knowledge, unprecedented. The parasites may be explained by the rupture of an endothelial or muscular pseudocyst in the airways or lungs. The incident may have been caused, or facilitated, by a bacteriological or viral acute upper-respiratory-tract infection or a lung infection.

Parasitology Laboratory,  
Hôpital Tenon,  
75020 Paris, France

Laboratoire Haddad et Morana,  
Livry-Gargan

Parasitology,  
Hôpital Bichat-Claude Bernard, Paris

Nanteuil le Haudouin

Parasitology Laboratory,  
Hôpital Tenon, Paris

F. LANCASTRE

A. DELALANDE

A.-M. DELUOL

C. MATRAT

E. GEORGES

P. ROUX

1. Tadros W, Laarman JJ. Current concepts on the biology, evolution and taxonomy of tissue cyst-forming Eimeriid coccidia. *Adv Parasitol* 1982; 20: 294-468.
2. Euzéby J. Les parasitoses humaines d'origine animale. Paris: Flammarion Médecine Sciences, 1984.
3. Jeffrey HC. Sarcosporidiosis in man. *Trans R Soc Trop Med Hyg* 1974; 68: 17-29.
4. Beaver PC, Cadgil RK, Morera P. *Sarcocystis* in man: a review and report of five cases. *Am J Trop Med Hyg* 1979; 28: 819-44.
5. Greve E. Sarcosporidiosis—an overlooked zoonosis: man as intermediate and final host. *Dan Med Bull* 1985; 32: 228-30.

### PLASMA D-DIMER AND PULMONARY EMBOLISM

SIR,—Bounameaux et al<sup>1</sup> have suggested that the plasma concentration of D-dimer might be of diagnostic value in suspected pulmonary embolism. However, when perfusion scans were inconclusive, a normal value of D-dimer (< 500 ng/ml) could not be related to the absence of pulmonary thromboembolism. Moreover, because phlebography was not done thromboembolic disease could not be ruled out in 7 patients with high D-dimer levels.

Using the same ELISA method (Stago, Asnières) we have prospectively assayed plasma D-dimer in 29 patients in whom embolism was sought by pulmonary angiography.

At day 0 (date of diagnosis), all the patients had high levels of D-dimer ranging from 910 to 26 000 ng/ml; there was no significant relation between the D-dimer level and the degree of obstruction (Miller's index). In sharp contrast the D-dimer level was 194 ng/ml in 1 patient in whom pulmonary embolism was excluded after blind examination of the angiogram; this value fell into the normal range defined by the results of 20 healthy volunteers of 130 (65) ng/ml; mean (SD).

During heparin therapy there were no recurrences of pulmonary embolism or extension of deep venous thrombosis, D-dimer levels fell from day 1 to day 8 (table). However, 2 of the 29 patients exhibited a secondary moderate increase (less 1800 ng/ml), coincident in both cases with a voluminous haematoma. In 1 patient who relapsed more than a month after the initial pulmonary embolism despite well-adjusted oral anticoagulant therapy, the D-dimer level was 15 000 ng/ml.

Our study, with angiographic evidence, supports the suggestion of Bounameaux et al that the D-dimer level might be of diagnostic

PROGRESS OF D-DIMER LEVELS

Day	Plasma D-dimer (ng/ml)
0	2800 (910-26 000)
2	1700 (500-7200)
8	1000 (255-4960)
Normal (n=20)	140 (55-305)

Results given as median, with range in parentheses.