Trinidad in 1965, though the malarial vector, the anopheles mosquito, has apparently remained or returned. I did not think, therefore, that malaria could be a valid differential diagnosis.

Malaria acquired at an airport² was unlikely as the patient had been ill for four weeks before departure and had not left his home in central Trinidad during that time; there had been no stopovers during his flight to London. His visit seven months previously to other Caribbean islands free of malaria was unlikely to have resulted in his acquiring vivax infection, though a six or seven month hypnozoite (exoerythrocytic prepatent) stage could not be ruled out completely. He did not have a history of blood transfusion.

One possible explanation for his infection is that *P. vivax* had been imported from South America. Trinidad is only seven miles from the coast of South America, and South American fishing boats sometimes dock in Port of Spain. Infected anopheles mosquitoes could have been conveyed the short distance over the sea; this hypothesis is similar to that put forward to explain acquired malaria in Europe.² Alternatively, a visiting boatman may have had malaria, and subsequent blood meals taken by uninfected but "receptive" mosquitoes indigenous to Trinidad would have provided the means of importation of vivax malaria.

This case indicates that in an area receptive for malaria where eradication has been achieved the disease may still recur. It further indicates that malaria should be among the differential diagnoses of fever imported to the United Kingdom by travellers from countries free of the disease that are close to, but topographically isolated from, countries in which malaria is endemic.

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1 World Health Organisation. Malaria risk in international travel. *Weekly Epidemiological Record* 1984;59:221-8.

2 Holvoet G, Michielsens P, Vandepitte J. Airport malaria in Belgium. *Lancet* 1982;ii:881-2.

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Absence of seroconversion for HTLV-III in haemophiliacs intensively treated with heat treated factor VIII concentrate

Haemophiliacs are at increased risk of the acquired immune deficiency syndrome (AIDS). The probable causative factor, human T lymphotropic virus type III (HTLV-III), is believed to be transmitted via the clotting factor preparations used by these patients; in particular, commercial factor VIII concentrates made from large plasma pools and obtained from the United States carry a high risk of transmission of HTLV-III.¹ Because retroviruses seem to be sensitive to heat inactivation² heat treated factor VIII concentrates are supposed to reduce the risk of transmission.³

Patients, methods, and results

We studied the rate of seroconversion for HTLV-III in 18 patients with severe haemophilia A (mean age 28, range 15-43). This group comprised all our haemophiliacs who had been given exclusively commercial factor VIII concentrates for home treatment since 1978. Before June 1983 they had received non-heat treated concentrates from the USA (Hemofil, Hyland; Factorate, Armour) for 10-63 months (mean 46 months) at a mean monthly dose of 4073 IU (range 1508-9329 IU). From June 1983 all patients were treated exclusively with a heat treated concentrate from the USA (Hemofil T, Hyland) at a mean monthly dose of 4202 IU (range 469-9030 IU).

Blood was sampled four months before and just before the first infusion of heat treated concentrate and four, 10, 22, and 28 months afterwards. All samples were tested for HTLV-III antibodies with an enzyme linked immunosorbent assay (Vironostika, Organon). Samples that were positive on assay, as well as the first serum sample from each patient, were subjected to immunoblot analysis. The assay and immunoblot analysis were performed by the Academic Medical Centre (Amsterdam, The Netherlands). Immunoblot analysis was also performed by the Centers for Disease Control (Atlanta, USA) on all samples collected from June 1983 to April 1985. No discrepancies were found between the results at the two centres. The table summarises clinical details and serological results.

Before the introduction of heat treated concentrate HTLV-III antibodies were found in only one patient. Afterwards none of the patients seroconverted. All

Characteristics of haemophiliacs treated with heat treated factor VIII concentrate (from June 1983), and rate of seroconversion for HTLV-III

Case No	Dose of factor VIII (IU/month) 1983-5	Presence of HTLV-III antibodies					
		Feb 1983	June 1983	Sept 1983	April 1984	April 1985	Sept 1985
1	3819	-	-	-	-	-	-
2	9030	-	-	-	-	-	-
3	3492	-	-	-	-	-	-
4	1463	-	-	-	-	-	-
5	6370	-	-	-	-	-	-
6	5748	-	-	-	-	-	-
7	2337	-	-	-	-	-	-
8	1981	-	-	-	-	-	-
9	1892	-	-	-	-	-	-
10	469	-	-	-	-	-	-
11	5217	-	-	-	-	-	-
12	7260	-	+	+	+	+	+
13	4510	-	-	-	-	-	-
14	5765	-	-	-	-	-	-
15	2910	-	-	-	-	-	-
16	5749	-	-	-	-	-	-
17	3076	-	-	-	-	-	-
18	4517	-	-	-	-	-	-

patients remained free of AIDS or the AIDS related complex. They had no known risk factors for AIDS apart from the treatment with factor VIII concentrates.

Comment

The prevalence of HTLV-III antibodies in our patients was remarkably low (5.5%), although they were treated from 1978 to 1983 with high doses of commercial non-heat treated concentrates. Considerably higher prevalences have been reported in comparable groups of haemophiliacs, ranging from 72-94% in the USA to 53-66% in Europe,^{1,4,5} and have been related to use of commercial factor VIII concentrates.¹ This difference cannot be attributed either to selection of patients or to methodological errors in the tests for HTLV-III antibodies. Thus our patients probably received fewer batches of concentrates contaminated with HTLV-III. The batches of concentrates that were used until June 1983 seem to have been manufactured about two years before their administration. The prevalence of HTLV-III antibodies in haemophiliacs treated with commercial concentrates from the USA was still low in 1981, and a progressive increase in incidence occurred thereafter.^{4,5} Thus delayed exposure to contaminated batches of non-heat treated concentrate in our patients is possible.

Although from 1983 to 1985 seroconversion for HTLV-III occurred in 27% of Dutch haemophiliacs who were treated with a local non-heat treated concentrate (C Breederveld *et al*, unpublished findings), none of our patients seroconverted. This absence of seroconversion is probably associated with the introduction of heat treated concentrate, although donor selection may also have contributed. Our results agree with those in previously untreated haemophiliacs.³ The mean total dose of heat treated concentrate administered in our group, however, was about 12 times higher than in that study.

We conclude that the heat treated factor VIII concentrate that our patients received carries a low or even no risk of transmission of HTLV-III. Longer follow up is needed to establish whether this product protects haemophiliacs against AIDS.

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2 McDougal JS, Martin LS, Cort SP, Mozen M, Heldebrandt CM, Evatt BL. Thermal inactivation of the acquired immunodeficiency syndrome virus, human T lymphotropic virus III/lymphadenopathy-associated virus, with special reference to antihemophilic factor. *J Clin Invest* 1985;76:875-7.

3 Rouzioux C, Chamaret S, Montagnier L, *et al*. Absence of antibodies to AIDS virus in haemophiliacs treated with heat-treated factor VIII concentrate. *Lancet* 1985;ii:271-2.

4 Anonymous. Blood transfusion, haemophilia, and AIDS [Editorial]. *Lancet* 1984;ii:1433-5.

5 Ball SE, Hows JM, Worsley AM, *et al*. Seroconversion of human T cell lymphotropic virus III (HTLV-III) in patients with haemophilia: a longitudinal study. *Br Med J* 1985;290:1705-6.

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