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# Human T-Cell Lymphotropic Virus Type 1 Infection and Tropical Spastic Paraparesis in Belgian Expatriates

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A case of HTLV-1 associated tropical spastic paraparesis is described in a Belgian nun who had been working as a midwife in Central Africa. Occupational exposure was the only risk factor identified. Among 2,482 Belgian expatriates in tropical countries, 92% of whom had resided in sub-Saharan Africa for an average of 15.5 years, only one Belgian-born man was found seropositive for HTLV-1. He was married to an African woman and living in Central Africa for 23 years. The risk of HTLV-1 infection is low in Belgian expatriates and on its own does not support generalised anti-HTLV screening in autochthonous Belgian blood donors.

**KEY WORDS:** HTLV, Belgium, Africa, HTLV-1 associated myelopathy, occupational transmission

## INTRODUCTION

Human T-cell lymphotropic virus type 1 (HTLV-1) causes adult T-cell leukaemia (ATL) and tropical spastic paraparesis, also called HTLV-1 associated myelopathy (TSP/HAM). The attack rate of ATL and TSP/HAM among the HTLV-1 infected is very low [Kondo et al., 1987; Goubau et al., 1990; Kaplan et al., 1990]. TSP/HAM has been described in Western Europe among immigrants from endemic countries, particularly from the Caribbean [Cruickshanck et al., 1989; Gessain et al., 1990].

In Belgium HTLV-1 infection has been observed mainly among immigrants from sub-Saharan Africa and exceptional cases of TSP/HAM are seen in this group [Taelman et al., 1989]. A large focus of HTLV-1 associated TSP/HAM has been identified in the Equateur province of Zaire [Kazadi-Kayembe et al., 1990; Goubau et al., 1990]. We now report a case of TSP/HAM and a survey of the prevalence of HTLV-1 infection among Belgian expatriates.

## SUBJECTS AND METHODS

A Belgian born missionary nun, working as a midwife in Zaire, was seen at the neurology department of the University hospitals in Leuven. A complete neurological examination was carried out and blood was drawn for HTLV-1 serology as described below.

Stored serum samples from 2,482 Belgians seen at the medical centre of the Ministry of Foreign Affairs and working in developing countries, and their adult family members who participated in an HIV seroprevalence study in 1986 and 1987 [Bonneux et al., 1988], were tested for HTLV-1 antibodies. Screening was carried out with a commercial ELISA using whole HTLV-1 virus lysate as the antigen (Ortho Diagnostics, Raritan, NJ). Repeatably reactive samples were confirmed with a second HTLV-1 ELISA (Abbot, North-Chicago), with immunofluorescence on MT-2 cells, a continuous HTLV-1 producing cell-line, and western blot (strips from Diagnostic Biotechnology, Singapore).

## RESULTS

### Case Report

A white Catholic nun aged 57 years when examined in 1989 had been complaining for 2 years of slowly progressive gait disturbance mostly affecting the left leg. Born and raised in Belgium, she has been working as a nurse and particularly as a midwife in Zaire since 1959. She has an unremarkable personal and familial medical history. She denies all sexual relations and blood transfusion, but omitted to wear gloves while caring for parturient patients, exposing herself abundantly to blood over many years. Clinical examination

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revealed a slight spastic paraparesis with hyperactive tendon reflexes in arms and legs and bilateral babinski signs. Sensation and coordination were normal. T2-weighted magnetic resonance imaging (MRI) scan images showed a few aspecific small hyperintensive brain spots in the periventricular white matter. No abnormal signal was detected in the cervical and thoracic spinal cord. A myelography was normal. Visual, brainstem, and somatosensory evoked potentials as well as an EMG and nerve conduction times were normal.

Serological tests showed previous exposure to hepatitis B (anti-HB surface and anti-HB core antibodies) and were negative for trypanosomiasis, toxoplasmosis, toxocariosis, cysticercosis, filariases and HIV. A high titre of antibodies to HTLV-1 was found in the serum (1/1,600 by immunofluorescence) with a complete pattern of bands in western blot. Electrophoresis of the cerebrospinal fluid showed no oligoclonal bands.

### Serological Survey of Belgian Expatriates

The mean age of the serosurvey population was 45 years (range 19–79 years) and the male-to-female ratio was 1.7. They had resided in tropical countries for a mean of 14.5 years, from less than 1 year to 41 years. About 12% had stayed in the tropics for less than 1 year. Ninety-two percent had been in sub-Saharan Africa for a mean of 15.5 years, and 70% of these were in Zaire.

Out of 2,482 sera 23 were repeatably reactive by the screening ELISA. Only 2 could be confirmed as positive for HTLV antibodies (distinction between HTLV-1 and HTLV-2 cannot be made unambiguously with standard serological assays). Both were positive by the second ELISA, by immunofluorescence, and by western blot, displaying a complete pattern of bands, including antibodies against GAG proteins (p19, p24, p53), the ENV protein gp46, and the possible TAX protein p36. Both were HIV negative. One HTLV positive serum was from a healthy 45 year old white Belgian born man married to an African woman and residing for the past 23 years in Zaire. His wife was not tested. The second seropositive serum came from a 38 year old healthy black woman of Belgian nationality through marriage but who herself was born in Africa of Central African descent. Her husband was seronegative. Thus only one Belgian born individual was seropositive in this large group of expatriates totaling 35,000 person years of exposure in sub-Saharan Africa.

The complete immunoblot patterns with strong p19 bands in both seropositives and also seen in the above patient suggest HTLV-1 rather than HTLV-2 infection [Wiktor et al., 1990]. This was confirmed with specific peptide testing provided through Dr. H. Lee (Abbott Laboratories, North Chicago) (in preparation). No HTLV-2 has been identified so far in Central Africa.

## DISCUSSION

A slowly progressive myelopathy without signs of spinal cord compression in a European patient always suggests the possibility of multiple sclerosis. However, age at onset, the absence of MS plaques on MRI, the normal evoked potentials, and the absence of oligoclonal bands in the cerebrospinal fluid make this diagnosis most unlikely in our patient. On the other hand the clinical picture is typical for TSP/HAM. This diagnosis was confirmed by the positive HTLV-1 serology.

The case of TSP/HAM which we present is the first in a European patient who contracted the infection during residence in an endemic country. The patient denies any sexual relations or transfusion, suggesting the possibility of occupational transmission during deliveries and patient care. This may therefore be the first bona fide case of occupational transmission of HTLV-1. The risk of occupational transmission of HTLV-1 to health care workers must be minimal as this virus is less transmissible than HIV. Although such cases must be exceptional, it is of interest that the first case of AIDS reported in a European health care worker in Africa, in a Danish female surgeon working in Zaire and who died in 1977, is also generally considered a bona fide case of occupational transmission [Bygbjerg, 1983; Shilts, 1987].

We found only one Belgian born seropositive man among 2,482 Belgians working abroad representing approximately 35,000 man-years in sub-Saharan Africa. Vranckx et al. [1990] found no HTLV-1 infection among 350 Belgian expatriates. Cases of proven HTLV-1 infection in white Belgians do not seem to have been reported previously.

HTLV-1 is clearly not an important problem among Belgians having lived or living abroad, even among those who resided for many years in Central Africa. Still TSP/HAM, even if rare, can occur in this group and clinicians should be aware of the possibility of HTLV-1 infection in a neurological patient who has lived in Africa.

In contrast to this very low HTLV-1 prevalence in Belgian expatriates (0.04%), an HIV prevalence of 1% has been found in a sample of the same population [Bonneux et al., 1988]. This difference may be explained by the different epidemiologies of the two viruses. Most HIV infected individuals in this population were men who contracted the infection through heterosexual contact [Bonneux et al., 1988]; sexual transmission of HTLV-1 is much less efficient and particularly so from woman to man [Kajiyama et al., 1986]. HIV and HTLV-1 also have different geographical distributions: a high prevalence of HTLV-1 is found in a number of dispersed, mostly rural areas, while HIV is much more widespread, with an urban predominance [Goubau et al., 1990; Delaporte et al., 1989]. The population of expatriates at risk is therefore probably much smaller for HTLV-1 than for HIV. In Zairian mothers, in sharp contrast to HIV, we have failed so far to find a significant increase in the seroprevalence of HTLV since 1970 (P. Goubau and J. Desmyter, in preparation).

HTLV-1 does not rank as an important public health problem in Belgium. Even among Africans residing in Belgium seroprevalence is low: 1 out of 212 students, 2 among 311 political refugees [Vranckx et al., 1990], and

2 in a group of 230 Ghanaians (P. Goubau and J. Desmyter, unpublished results). This study is relevant for the decision whether there should be unselected, generalised anti-HTLV screening of blood and plasma donations in Belgium (900,000 per year) at an estimated annual cost of nearly 200 million Belgian francs (approximately 5 million US dollars), and perhaps in other European countries. Considering the low prevalence even among exposed people, the present exclusion of donors from most endemic regions and of other HIV risks, and the infrequent pathogenicity of HTLV-1 (TSP/HAM is a rare event and ATL has never been described after blood transfusion), the risk of transfusion associated HTLV-1 infection and disease must be extremely low in Belgium. The minimal benefit of generalised screening may be outweighed by the technical and personal problems which will arise from the many false positives in massive screening. Systematic screening should not be needed for international exchange of plasma derived products, as only cell-bound virus has been transmissible. Countries not generalising anti-HTLV screening in blood donations should identify for selective screening risk groups that are not otherwise excluded from blood donations.

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