

## MEDICAL INTELLIGENCE



### A CLUSTER OF HIV INFECTION AMONG HETEROSEXUAL PEOPLE WITHOUT APPARENT RISK FACTORS

NATHAN CLUMECK, M.D., HENRI Taelman, M.D.,  
 PHILIPPE HERMANS, M.D., PETER PIOT, M.D.,  
 MARTINE SCHOUMACHER, R.N.,  
 AND STÉPHANE DE WIT, M.D.

**B**ELGIUM is a point of transition between Africa and Europe with respect to patterns of transmission of the human immunodeficiency virus (HIV).<sup>1</sup> About 66 percent of all patients with the acquired immunodeficiency syndrome (AIDS) in Belgium have apparently been infected heterosexually, and heterosexual intercourse was identified as the mode of transmission of HIV in 46 percent of patients seen at the AIDS unit in Brussels.<sup>2</sup> In contrast with the United States, where the highest risk of transmission of HIV among heterosexuals is found in intravenous drug users, most of the heterosexual patients in Belgium are not intravenous drug users and have been infected in Central Africa or by people who have been sexually active in Africa.<sup>1,2</sup> Since 1985, all HIV-seropositive patients in Brussels and Antwerp who have been infected heterosexually have been offered participation in a pilot program of partner notification. In the program, the sexual partners of patients with HIV are notified of their risk, counseled about HIV prevention, and offered HIV testing.<sup>3</sup> We describe a cluster of 19 women so identified, all of whom had had sexual contact with the same man and 11 of whom had been infected by him.

#### METHODS

Brussels and Antwerp are the two cities in Belgium with the highest prevalence of HIV infection. Starting in 1985, participation in a pilot partner-notification project was offered to heterosexual patients in those cities. A trained team from our AIDS units took responsibility for notifying the sexual partners of persons with HIV infection of their risk, counseling them about HIV prevention, and offering them an HIV-antibody test.<sup>4</sup> Contacts were assured that information would remain confidential. The interview process included detailed questions about demographic characteristics, the type and frequency of sexual activities, the names and addresses of their sexual partners in Belgium during the preceding three years, any history of sexually transmitted disease, use of intravenous

drugs, and a history of travel and sexual activity abroad. The patients were then asked if they preferred to notify their sexual partners themselves or to leave this task to our team. In the latter case, the partners were contacted by telephone and then seen by the social worker outside the hospital. After the program and its goals were explained, counseling and HIV-antibody testing were offered. Persons seropositive for HIV antibodies were interviewed about additional sexual partners in the preceding three years and offered follow-up that included medical assessment and psychosocial support. When blood samples were repeatedly found to be seropositive on enzyme-linked immunosorbent assay (Wellcozyme, London, England), the results were confirmed by indirect immunofluorescence and Western blot techniques (Dupont, Geneva, Switzerland). A specimen was considered positive for HIV antibody if it reacted with the p24 and either the gp41 or gp120 bands on Western blotting.

#### RESULTS

The definition of this cluster began in 1985, when a Belgian woman in Antwerp was found to have AIDS-related complex. She named an African man (the index patient) as the only possible source of her infection. At about the same time, two other HIV-antibody-positive Belgian women and one African woman in Brussels also named the same person as the possible source of their infections. None of these four women were willing to notify the presumed index patient. When he was interviewed, the index patient could remember the names of 17 sexual partners in Belgium during the preceding three years, including 2 of the 4 women mentioned above. The index patient did not want to notify any of these 19 sexual partners. Figure 1 shows the HIV-antibody status and relationships of the 39 men and women in this cluster linked by heterosexual contact. All but 1 of the 15 women whose HIV serologic status was unknown agreed to undergo HIV-antibody testing. Seven of 14 women then tested were HIV-seropositive. Thus, overall, 11 of the 18 female sexual partners of the index patient who were tested were HIV-seropositive. Of these 11 women, 6 named a total of 8 male sexual partners, and 3 chose to notify their 5 partners directly. Four of 11 refused to give the names of their 8 sexual partners, and the remaining woman returned to Africa without identifying a partner. All eight men identified by the seropositive women agreed to be tested. One of them (12 percent) was HIV-seropositive, and he named two female sexual partners, who were both HIV-seronegative.

#### Index Patient

The index patient was a civil engineer from a Central African country who had come to Belgium in 1963 as a political refugee. He had been living in Brussels since 1963, but he traveled regularly and for long periods to Central Africa. He had never used intravenous drugs or received a transfusion. During a one-month stay in Central Africa in July 1980, he had sexual contact with several prostitutes. At the end of his travels, a transient febrile disease of undetermined cause developed. During the following five years, the patient was perfectly well, and he was unaware of his HIV infection until July 1985, when he was contacted by our team. A medical examination showed generalized

From the Division of Infectious Diseases, St. Pierre University Hospital, Brussels (N.C., P.H., M.S., S.D.W.), and the Department of Microbiology, Institute of Tropical Medicine, Antwerp (H.T., P.P.), both in Belgium. Address reprint requests to Dr. Clumeck at the Division of Infectious Diseases, St. Pierre University Hospital, Rue Haute, 322, B-1000 Brussels, Belgium.

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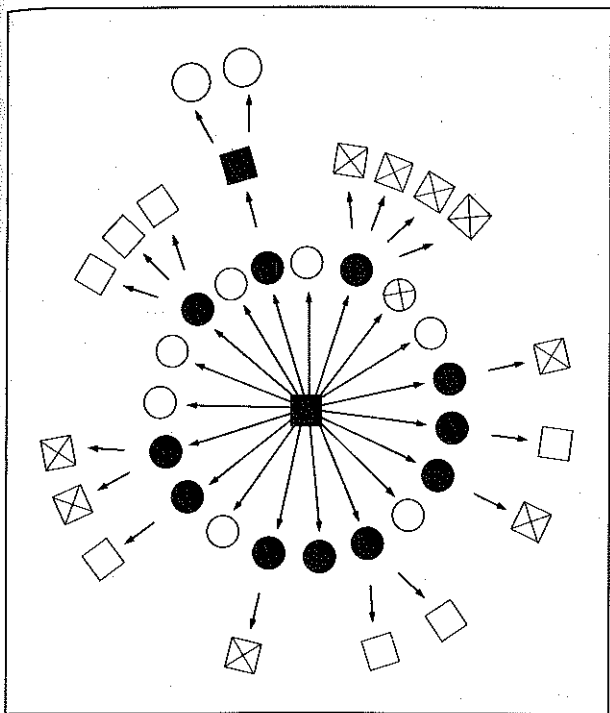


Figure 1. Results of the Partner-Notification Study of HIV Status, Beginning with the Sexual Partners of the Index Patient.

Open circles and squares denote seronegative women and men, respectively; solid circles and squares, seropositive women and men; and circles and squares containing an X, subjects not tested.

lymphadenopathy, with an absolute T4-cell count of 108 per cubic millimeter. He reported having multiple heterosexual contacts, with approximately 20 partners a year. He reported no contacts with Belgian prostitutes and that most of his sexual partners were white, middle-class women in Brussels. He had a history of recurrent genital herpes but did not recall any outbreak during the preceding two years or any other episode of sexually transmitted disease. He ceased all sexual activity after testing seropositive. In January 1986, idiopathic thrombocytopenic purpura was diagnosed, and in June 1986 HIV-related encephalopathy developed, and the patient died.

**Characteristics of the Sexual Partners**

Among the 19 women identified as sexual partners of the index patient, there were 12 Europeans (7 with infection) and 7 Africans (4 with infection among the 6 tested). Eight women were married, but three lived separately from their husbands at the time of their sexual contact with the index patient. The

mean age of the 19 women was 35 years (range, 24 to 42). Eleven (58 percent) were middle-to-high-level employees, six (32 percent) were university students, and two (11 percent) were not employed. None had ever used intravenous drugs, received a blood transfusion, or had sex in areas where HIV was common during the past three years. None were prostitutes. Their mean number of sexual partners during the three years before the interview was 2.5 (range, 1 to 4). Two women with HIV infection had had sexual contact with men who had traveled in sub-Saharan Africa, but they refused to give names. They were excluded from the calculation of the rate of transmission. Excluding them, 9 of 16 women tested were HIV-seropositive, for a rate of transmission of 56 percent.

The characteristics of the women who underwent HIV testing are shown in Table 1. Ten of the 13 single or separated women were infected with HIV, as compared with 1 of the 5 married women ( $P < 0.05$  by Fisher's exact test). We were unable to find any significant difference between the single or separated women and the married women when they were compared with respect to age, type of sexual activity, total number of unprotected sexual contacts (in which no condoms or other methods of preventing HIV transmission were used), period when the encounters occurred, or duration of relationship. Two HIV-positive women had had only a single sexual encounter with the index patient. Only one woman (who was HIV-seropositive) reported that she had engaged in anal sex. None had had sex during menstruation. Of the 11 infected women, 7 (64 percent) had had sex with the index patient during the three years before his death, as compared with 3 of the 7 uninfected women (43 percent) ( $P = 0.35$  by Fisher's exact test).

With respect to their clinical history, two seropositive women reported a history of genital herpes within

Table 1. Characteristics of the 18 Women Who Underwent HIV Testing, According to HIV Status.

CHARACTERISTIC	HIV STATUS		P VALUE*
	SEROPOSITIVE	SERONEGATIVE	
No. of women	11	7	—
Age (yr) — mean (range)	34 (26–40)	36 (27–42)	NS
Single or separated — no. (%)†	10 (91)	3 (43)	<0.05‡
<b>Unprotected sexual contact with the index patient</b>			
Type of sexual activity (no. of women)			
Vaginal	11	7	NS
Anal	1	0	NS
Total contacts — no. (%)			
1–5	6 (55)	6 (86)	NS
6–50	2 (18)	1 (14)	NS
>50	3 (27)	0 (0)	NS
Duration of relationship (days) — median (range)	3 (1–700)	2 (1–150)	NS
Women with contact in the 3 years before the patient's death — no. (%)	7 (64)	3 (43)	NS

\*NS denotes not significant.

†Includes three married women who were separated from their husbands at the time of their sexual contact with the index patient.

‡By Fisher's exact test, one-tailed test.

three months of their sexual contacts with the index patient; one of the women continued to have chronic mucocutaneous perineal herpes. Six of the seropositive women could remember having a mononucleosis-like syndrome during the weeks after their sexual encounters with the patient. At their initial presentation, two women had AIDS-related complex, six had generalized lymphadenopathy, two were asymptomatic, and one was not examined. As of early 1989, three women had AIDS, one had AIDS-related complex, and six had generalized lymphadenopathy. Two and a half years after the initial counseling and testing, 6 of the 11 HIV-seropositive women were still attending an HIV clinic. Five of them had engaged in monogamous relationships with partners who used condoms consistently, and one woman had been sexually abstinent for the entire period. All five male sex partners remained HIV-antibody-negative. One of the women, knowing her HIV status, decided to postpone pregnancy.

### DISCUSSION

We describe a cluster of 19 women without apparent risk factors for HIV infection who had sexual contact with the same HIV-infected heterosexual man in Belgium. Of the 18 women tested for HIV infection, 11 were found to be seropositive. The high rate of HIV transmission (56 percent) among the women tested may be an overestimation, because the index patient may have recalled his most recent partners preferentially or those with whom he had more frequent contact. However, other studies among heterosexual Africans, Europeans, and Haitians have yielded similar estimates of the transmission rate.<sup>5,6</sup>

Our index patient may be considered a "high disseminator," a type of patient already described among heterosexuals in California and Sweden.<sup>7,8</sup> The fact that in two instances HIV was transmitted during a single instance of vaginal intercourse and that there was a trend toward a higher rate of transmission during the last three years of his life suggest that the index patient was either highly infectious or infected with a virulent strain of HIV.<sup>5</sup> Another variable that enhances the likelihood of HIV transmission is the presence of genital herpes, which has been associated with the heterosexual acquisition of HIV among African patients.<sup>9</sup> Although the index patient did not report any episode of active genital herpes during the last three years of his life, genital herpes developed in two HIV-infected women after sexual contact with him, suggesting that he was able to transmit herpes simplex virus during this period even without active lesions. Our study also shows a lower rate of transmission (12 percent) from the infected women to their male partners, as has been found in other studies.<sup>6,10,11</sup> However, this lower rate may be due to the shorter duration of infection and the asymptomatic status of most of the women at the time of diagnosis of HIV infection, as well as to the ab-

sence of ulcerative genital lesions among these women and their partners.

Since the women had only a few sexual partners and some women were infected after a single encounter with the index patient, the results of our study suggest that heterosexuals may be at higher risk from ongoing contact with one partner who is at risk for HIV than from contact with multiple sexual partners.<sup>10</sup> Emphasizing only sexual relations with multiple partners as a risk factor for women may be irrelevant and even counterproductive, since it implies that the absence of multiple partners makes women "safe." As the epidemic progresses, the risk of HIV infection among heterosexuals in Western countries remains difficult to assess. Our study emphasizes that middle-class women who are not intravenous drug users, the sexual partners of such drug users, or the sexual partners of bisexual men can become infected by HIV. Women who do not consider themselves at risk because they do not engage in what they perceive as high-risk sexual practices may have a false sense of security. For this reason, a program of partner notification that is targeted to heterosexuals who have no apparent risk factors should be considered as an adjunct to other public health interventions designed to control this epidemic.

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