

Original Report

HIV Infection and Susceptibility to Epidemic Bacterial Infections among Rwandan Refugees

Shlomo Maayan, MD;* Nila Marks;[†] Alexander Viterbro;[†] Yona Zeide;[†] Abraham Morag, MD;* Lucien Neil, MD;[‡] Nurit Strauss, MsC;* and Mervyn Shapiro, MD*

ABSTRACT

Objective: To study HIV prevalence and susceptibility to epidemic bacterial infections among Rwandan refugees treated at the Israeli military field hospital in Goma, Zaire, during a 2-week period of massive outbreaks of cholera, shigellosis, and meningitis in the summer of 1994.

Methods: Anonymous testing was performed on serum samples obtained for laboratory analysis from patients who had had an intravenous line inserted at the hospital's emergency facility. The prevalence of HIV was compared among patients who presented at the emergency facility because of watery or bloody diarrhea, pneumonia, meningitis, or trauma.

Results: Of the 1350 patients who were seen during the period, 127 were tested: 35 of 127 (27.5%) were HIV seropositive by enzyme-linked immunosorbent assay (ELISA) and Western blot. No statistical difference in the prevalence of HIV was found among the four categories.

Conclusion: A high prevalence of HIV infection was observed among Rwandan refugees treated for severe cholera, shigellosis, pneumonia, meningitis, or trauma in a field hospital in Goma, Zaire in the summer of 1994. This rate was similar to that reported among the healthy Rwandan population. Although based on only a small sample of the sick refugees in the camps, this study suggests that HIV infection did not cause increased susceptibility to the epidemic bacterial infections seen during the 1994 refugee crisis in Rwanda.

Key Words: AIDS, HIV, refugees, Rwanda

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The influx of over 800,000 Rwandan refugees into Goma in Eastern Zaire, in the wake of the civil strife inside Rwanda, resulted in massive outbreaks of cholera, dysentery, and meningitis in the refugee camps.^{1,2} As part of its humanitarian assistance to the refugees, the State of Israel commissioned an 80-bed multipurpose military hospital, which operated in Goma for a 6-week period between July and August 1994. The hospital was equipped with a surgical unit, field laboratories, x-ray unit, and a large emergency facility. Because the refugee population treated had arrived from an area hyperendemic for human immunodeficiency virus (HIV) infection, the authors investigated whether HIV infection had any influence on the clinical manifestations of the patients. The prevalence of HIV was compared among patients who were treated for watery or bloody diarrhea, meningitis, pneumonia, or trauma.

MATERIAL AND METHODS

The investigation was done during a 2-week period in July and August 1994, in the emergency facility of the hospital. During that period, the initial wave of cholera had subsided in the refugee camps, and a major outbreak of shigellosis and bacterial meningitis (meningococcus type A) had developed.² Patients were brought to the emergency tent from Kibumba, Muinga, Katindo, and Katale refugee camps and from camps inside Goma. Upon admission, patients were assigned to four disease categories according to the United Nations High Commission for Refugees guidelines.² These categories were based on the dominant clinical presentation: watery diarrhea, bloody diarrhea, pneumonia, meningitis, or trauma/other. All the patients that were seen for severe dehydration were assumed to have either cholera (if they had watery diarrhea) or shigellosis (if they had bloody diarrhea). All patients with clinical pneumonia underwent confirmatory chest x-ray. In addition, most had a sputum obtained for Gram's stain. Meningococcal meningitis was confirmed by Gram's stain of the cerebrospinal fluid (CSF) showing gram-negative diplococci or by direct aggluti-

*Hadassah University Hospital, Jerusalem; [†]Israel Defense Force; and [‡]Bioforce-Hospital Robert Pique, Bordeaux, France.

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Address correspondence to Dr. Shlomo Maayan, Director, The AIDS Clinic, Hadassah University Hospital, Jerusalem, Israel.

Table 1. Underlying Disease Category and HIV Status Observed among 127 Rwandan Refugees Treated at the Israeli Hospital in Goma, Zaire

Disease Category	Number of Patients	HIV Seropositive	HIV Seronegative	P Value
Bloody or watery diarrhea	59	17 (29%)	42 (71%)	NS
Meningitis	17	2 (12%)	15 (88%)	NS
Pneumonia	25	9 (36%)	16 (64%)	NS
Trauma/other	26	7 (27%)	19 (73%)	NS

nation method on CSF specimens (Sanofi Diagnostics, Institut Pasteur, Paris, France).

Testing for HIV was done anonymously on unselected, samples drawn daily from patients who had had an intravenous line inserted. Leftover serum specimens from routine laboratory tests (WBC counts and electrolytes) were used. Due to the severe clinical presentations and the anonymous unlinked nature of the study, verbal consent for HIV testing was not obtained.

RESULTS

Blood samples from 127 patients were tested (39 females, 88 males). The mean age of the patients was 26.4 yr \pm 1.5 yr. They comprised 9.4% of the total number of patients seen in the emergency facility of the hospital during that 2-week period. Of the 127 individuals, 59 (46%) had bloody or watery diarrhea as the main presenting symptom, 25 (20%) had clinical pneumonia, 17 (13%) had meningococcal meningitis, and 26 (20%) had trauma or nonepidemic infections (e.g., malaria). Of the 127, 35 (27.5%) were found to be infected by HIV-1, according to enzyme-linked immunosorbent assay (ELISA) and Western blot criteria; of the seropositive individuals 17 of 35 (48.5%) had diarrheal illness, 9 of 35 (26%) had clinical pneumonia, 2 of 35 (6%) had meningococcal meningitis, and 7 of 35 (20%) had trauma or nonepidemic infections. No statistical difference in prevalence of HIV was found among the four disease categories (Table 1).

Of the 127 patients, 85 (67%) were hospitalized for acute care. Of the hospitalized patients, 18 (21%) were HIV-1 seropositive. No statistical difference in the rate of hospitalization was observed comparing the HIV-1 seropositive group (18/35, 51%) to the seronegatives (51/92, 55%, $P = \text{NS}$). Of the patients who were hospitalized, three died: two had diarrheal syndrome, and one had meningitis; all three were HIV seronegative. Thus, the overall mortality rate was 0% among HIV infected individuals and 3% among HIV uninfected individuals.

DISCUSSION

Although biased by the small number of individuals tested, by the difficulty of access to the medical facility, and by the severity of the underlying infections (sicker patients died before reaching the emergency tent), the group of patients who underwent HIV testing was representative of the total of 1350 patients seen during the 2-week period. The sex distribution, the mean age of the patients tested, and the relative incidence of the four disease categories among those tested were similar to those parameters in the entire cohort.

The finding of the similarity of HIV prevalence in the four disease categories as seen in the emergency tent and the lack of excess HIV-1 seropositives among individuals admitted to the hospital suggests that HIV infection per se did not increase susceptibility to one epidemic infection over the other. Despite the severity of the underlying infections, the overall HIV rate in this group of patients (27.5%) was similar to that reported among the healthy urban Rwandan population both prior to,³⁻⁵ and following the refugee crisis.⁶

Data from studies conducted in nonepidemic settings in Africa suggest a high incidence of acute diarrheal diseases in HIV seropositive infants.⁷ Other studies in such settings point to an association between tuberculosis and HIV seropositive individuals.^{8,9} Infections due to bacterial pathogens, such as *Streptococcus pneumoniae* and *Salmonella typhi* also are found with high frequency among HIV seropositives in Africa.^{10,11} These infections usually occur episodically rather than epidemically. A single previous report failed to find an association between meningococcal disease and HIV infection in Nairobi.¹² The present findings, although based on somewhat limited diagnostic procedures, suggest that the natural history of the classic epidemics of cholera, shigellosis, and meningococcal meningitis, which occur as a result of crowding and malnutrition, may not be altered by the parallel epidemic of HIV-1.

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