Salmonella Bacteremia in African Patients with Human Immunodeficiency Virus Infection

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During a two-year period, 26 Central African patients with AIDS or AIDS-related complex were seen in two Belgian hospitals and five of these patients presented with non-typhoid *Salmonella* bacteremia. Three additional patients were observed in a Rwandese hospital. These eight African patients were compared with 16 non-AIDS patients with non-typhoid *Salmonella* bacteremias. The patients with AIDS or AIDS-related complex did not have gastroenteritis, but they did have a high recurrence rate and high prevalence of *Salmonella typhimurium*. Long-term antibiotic prophylaxis seems warranted for such patients despite the high frequency of side effects from antibiotics.

Non-typhoid *Salmonella* bacteremia accounts for 5–10% of *Salmonella* infections. Transient bacteremia associated with gastroenteritis can occasionally occur in non-immunocompromised patients. However, in most instances *Salmonella* septicemia occurs in patients with underlying disease such as sickle cell anemia, alcoholism, lymphoma, Hodgkin's disease, metastatic carcinoma, sarcoidosis and systemic lupus erythematosus. Characteristically, these patients rarely have gastrointestinal symptoms (1). Recently, increasing evidence was found that *Salmonella* infections also occur in patients with AIDS, and a prevalence rate of 2–6% has been cited (2–5). We report on eight African patients with human immunodeficiency virus (HIV) infection and non-typhoid *Salmonella* bacteremia observed during a two-year period.

Materials and Methods. Between January 1982 and December 1983, 22 patients with AIDS or AIDS-related complex (ARC) (defined as generalized lymphadenopathy associated with weight loss, chronic fever and chronic diarrhoea) were admitted to St. Pierre University Hospital, Brussels, Belgium. Nineteen (86%) patients came from Central Africa; three of these presented with non-typhoid *Salmonella* bacteremia. During the same period, five cases of non-typhoid *Salmonella* bacteremia occurring in Central African patients with AIDS or ARC were also observed in the Institute of Tropical Medicine, Antwerp, Belgium (two cases) and the Centre Hospitalier de Kigali, Rwanda (three cases). The charts of 16 non-HIV infected patients with non-typhoid *Salmonella* bacteremia seen at St. Pierre University Hospital during the study period were reviewed for comparison. Stool and blood cultures were taken in all patients when clinically indicated.

Results and Discussion. The eight African patients with AIDS or ARC and non-typhoid *Salmonella* bacteremia (Group I) (three in Brussels, two in Antwerp and three in Kigali) were five men and three women, their mean age was 30 years (range: 16–42 years), all were black, and five originated from Zaire and three from Rwanda. The five patients seen in Belgium had lived there for more than one year, suggesting they had been infected by *Salmonella* in Europe. Clinical characteristics, microbiological findings, treatment and evolution are summarized in Table 1. None of the patients had gastroenteritis or other focal manifestations due to non-typhoid *Salmonella*. Their clinical evolution was good, with apyrexia occurring after 24–72h of treatment with ampicillin or sulfamethoxazole + trimethoprim. Recurrence of bacteremia with *Salmonella* in the same group was bacteriologically confirmed in four of eight patients (patient one, two, four and five). Patient five had four episodes of *Salmonella* D bacteremia during the same year.

During the study period, 19 African patients with AIDS or ARC were seen in St. Pierre University Hospital, Brussels and seven in Antwerp. No data were available from Kigali. The overall prevalence of *Salmonella* infection among African patients with AIDS or ARC seen in Belgium was thus five of 26 or 19%. Sixteen patients (Group II) without HIV infection and with non-typhoid *Salmonella* bacteremia were seen in St. Pierre University Hospital, Brussels. In contrast to the HIV-infected patients, all patients were of Caucasian (n = 11) or Mediterranean (n = 5) origin. Age distribution was bimodal. The first subgroup (Group II A) included eight young patients (mean age: 26 years, range: 21 to 31 years). No underlying diseases were found and stool cultures were positive in only two of the eight patients. A seasonal prevalence was noted, with all episodes but one occurring between June and September. Mean age of the other subgroup (Group II B) of eight patients was 79 years (range: 48 to 83 years). Diagnosis of a possible immunosuppressive underlying disease was made in four patients (two severe diabetes, one decompensated cirrhosis, one generalized cancer). Associated gastro-

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Table 1: Clinical and microbiological findings in African patients infected with human immunodeficiency virus.

Patient no.	Clinical status	Blood isolate	Stool isolate	Treatment	Daily dose	Outcome
1	AIDS	*Salmonella typhimurium*	none	ampicillin	12g	relapse after 3 weeks
2	ARC	*Salmonella dublinii*	none	ampicillin	12g	relapse after 1 month
3	AIDS	*Salmonella typhimurium*	*Salmonella typhimurium*	trimethoprim-sulfamethoxazole	64mg/320mg	cure
4	AIDS	*Salmonella typhimurium*	none	ampicillin	8g	relapse after 1 week
5	ARC	*Salmonella* group D	*Salmonella* group D	ampicillin	8g	relapse 4 times during 1 year
6	AIDS	*Salmonella typhimurium*	none	trimethoprim-sulfamethoxazole	64mg/320mg	improvement, no follow-up available
7	AIDS	*Salmonella typhimurium*	none	trimethoprim-sulfamethoxazole	64mg/320mg	improvement, no follow-up available
8	AIDS	*Salmonella typhimurium*	none	trimethoprim-sulfamethoxazole	64mg/320mg	improvement, no follow-up available

enteritis was found in four patients in whom the same non-typhoid *Salmonella* was isolated in blood and stool. Serotypes isolated in blood cultures included five group A, one group B, and two group D in patients of subgroup IIA; two group B (one *typhimurium*), two group C and four group D were isolated in patients of subgroup IIB. All patients were cured by antibiotic therapy with ampicillin, chloramphenicol or sulfamethoxazole + trimethoprim and no relapse was observed.

Salmonella is an intracellular pathogen whose eradication involves natural killer cells and antibody-induced cellular cytotoxicity. The importance of cell-mediated immunity and the protective effect of gamma interferon against *Salmonella* infection has been shown in an animal model (6, 7). Most of the immunologic abnormalities found in the acquired immunodeficiency syndrome affect the cellular immunity, and impaired production of gamma interferon has been shown in patients with AIDS (8). It is thus not surprising that *Salmonella* bacteremia, now described as one of the infectious complications in HIV-infected patients, has a rising incidence (2, 3, 5).

Salmonella bacteremia has been described in patients with AIDS who were homosexual or bisexual. The incidence of *Salmonella* bacteremia among AIDS patients in the United States has been estimated at 2–6% (2–5). Although our studies involved a small number of patients, they indicate a higher incidence (19%) of *Salmonella* bacteremia among African AIDS or ARC patients treated in Belgium. This could be an overestimation due to the selection and the small number of patients. However, a higher prevalence of other infections such as cryptococcosis and toxoplasmosis have characteristically been reported among AIDS patients from developing countries (9).

Six of our eight patients with AIDS or ARC were infected with *Salmonella typhimurium* which is also the main serotype isolated in homosexuals, intravenous drug users and Haitians with AIDS (2, 4). In Central Africa, *Salmonella typhimurium* has been shown to account for less than 5% of all isolates and for approximately 10% of all blood isolates in patients with *Salmonella* bacteremia (10), suggesting that the high prevalence of *Salmonella typhimurium* bacteremia among our patients could be due to the underlying immunosuppression rather than to increased exposure. As far as the clinical pattern is concerned, the comparison with non-HIV infected patients showed that AIDS patients usually lack gastroenteritis and have a high frequency of relapse, suggesting that life-long antimicrobial prophylaxis could be indicated.

The choice of the antibiotic must, however, take into account the resistance pattern of *Salmonella* spp. and the relative high susceptibility of AIDS patients to adverse drug reactions. Studies on resistance patterns performed in Rwanda have shown that 91% of *Salmonella* strains were sensitive to trimethoprim-sulfamethoxazole but only 55% to ampicillin (11). The potential occurrence of candidal infections as a side effect of the chronic administration of ampicillin should be considered. Adverse drug reaction to trimethoprim-sulfamethoxazole occurs with high frequency among AIDS homosexual patients, but not among Africans (12, 13). Alterna-

tive regimens might be possible using recent commercial drugs. Indeed, quinolones and in particular ciprofloxacin have shown good antibacterial activity against *Salmonella* both in mice or non-immunocompromised patients with typhoid fever and in patients with *Salmonella typhimurium* carriage or *Salmonella typhimurium* septicemia and acute lymphoblastic leukaemia or AIDS (14). Further studies are needed to evaluate efficacy and toleration of long-term prophylaxis with quinolones in patients with AIDS or ARC and *Salmonella* infections.

AIDS or ARC patients from developing countries, particularly from Central Africa, appear to be at high risk for recurrent non-typhoid *Salmonella* bacteremia, probably more than Western homosexual males or intravenous drug users. In these countries, occurrence of such bacteremia should be considered an indication of possible immunodeficiency due to HIV infection.

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Improved Isolation of Mycobacteria Other than *Mycobacterium tuberculosis* on Isoniazid-Containing Löwenstein-Jensen Medium

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The benefit of including isoniazid-containing Löwenstein-Jensen medium for primary isolation of mycobacteria was evaluated in 3,726 clinical specimens. This media increased the primary isolation of mycobacteria other than *Mycobacterium tuberculosis* by 9.2 %, facilitated macroscopical reading and aided presumptive identification of the isolated mycobacteria.

The role of mycobacteria other than *Mycobacterium tuberculosis* (i.e. atypical mycobacteria) in the production of pulmonary and other disease has become more apparent during the last decades as the incidence of tuberculosis has declined (1). The emergence of the acquired immunodeficiency syndrome has also revealed an increased incidence of infections with atypical mycobacteria (2–4).

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