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Characteristics of sputum smear-positive tuberculosis patients with and without HIV infection in a hospital in Zimbabwe

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Characteristics of sputum smear-positive tuberculosis patients with and without HIV infection in a hospital in Zimbabwe. O.D. Schoch, H.L. Rieder. ©ERS Journals Ltd 1996.

ABSTRACT: Human immunodeficiency virus (HIV) infection has a large impact on tuberculosis in Africa. In this study, the prevalence of HIV infection in a population of hospitalized tuberculosis patients in Zimbabwe was determined and demographic characteristics, clinical signs and symptoms, as well as radiographic appearance were compared in tuberculosis patients with and without HIV infection.

During a 5 month observation period, information on tuberculosis patients referred to Driefontein Tuberculosis Sanatorium, Mvuma, Zimbabwe was collected, computerized and analysed with commercially available software.

Of 467 patients admitted, 255 were sputum smear positive for acid-fast bacilli. Of 196 patients with complete information, 127 (65%) were HIV-seropositive. When compared to the 69 HIV-seronegative patients, HIV-infected patients were not different in age, gender, the period of delay between the onset of symptoms and diagnosis, radiographic appearance, history of previous antituberculosis treatment and symptoms and signs reported, with the exception of herpes zoster and other sexually-transmitted disease.

The prevalence of HIV infection in our population of tuberculosis patients was large. However, since demographic and clinical characteristics are remarkably similar in tuberculosis patients with and without HIV infection, case-finding activities need not be altered in the wake of the HIV epidemic.

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Tuberculosis is a major health problem in sub-Saharan Africa. With the epidemic of human immunodeficiency virus (HIV) spreading unabated, tuberculosis notifications and notification rates are increasing at an alarming speed in various parts of the continent [1–3]. Approximately half of the 6.5 million persons estimated to have been HIV-infected in 1992 in Africa were thought to be co-infected with *Mycobacterium tuberculosis* [1]. The risk of progression to clinically active tuberculosis among such dually infected persons appears to be as large as 5–8% annually [2].

In Zimbabwe, tuberculosis notification rates decreased from 113 per 100,000 population in 1960 to 53 per 100,000 population in 1985. Subsequently, notifications have rapidly increased and reached 121 per 100,000 population in 1991. It has been estimated that the prevalence of HIV infection in the general population was 5–8% in 1992, and 40–60% among tuberculosis patients in 1990 [4, 5].

Given the apparent large impact of HIV on tuberculosis, we decided to study the prevalence of HIV infection in our population of hospitalized tuberculosis patients and to compare demographic characteristics and prevailing clinical signs and symptoms between HIV-seropositive and HIV-seronegative patients.

Material and methods

Case-finding in Zimbabwe is passive according to international recommendations [6, 7]. The national treatment policy recommends directly observed therapy during a 2 month intensive phase, followed by self-administered treatment during the continuation phase [8]. The intensive phase is usually given during in-patient treatment, to ensure adherence of the patients and providers and is free of charge to patients.

Driefontein Tuberculosis Sanatorium [9] is a referral centre for the Midlands and Masvingo provinces and offers its services to various diagnostic centres with insufficient beds for tuberculosis treatment.

During a 5 month study period from April to September 1992, demographic, clinical and bacteriological information was systematically collected on all tuberculosis

patients admitted. Information on age and gender, clinical signs and symptoms of tuberculosis, results from three microscopic sputum examinations, and radiological findings on chest radiographs was routinely recorded. Combined patient's and doctor's delay was defined as the interval (in days) between the reported date of onset of symptoms and the date of laboratory diagnosis of sputum smear-positive tuberculosis. Each patient had pre-counselling for HIV testing, and a blood sample in those consenting was sent to the Provincial Health Laboratory in Gweru for two serological enzyme-linked immunosorbent assay (ELISA) tests (Anti-HIV-1/HIV-2 EIA®, Roche; and HIV-Mixed®, Vironostica). Patients were followed clinically and with laboratory parameters at the end of the intensive phase of treatment.

The data were computerized and analysed with commercially available software [10–12]. Continuous variables were categorized and, where appropriate, category cut-off points were determined from the quartiles of their distribution.

Only patients with sputum smear-positive tuberculosis were eligible for the study. The main outcome of interest was HIV serostatus, and univariate analyses were performed on all variables of interest stratified by outcome. A logistic model was used in a multivariate regression to adjust for potential confounders.

Results

A total of 467 patients aged 15 yrs and older were admitted during the 5 month observation period. Of these, 255 had at least one sputum smear positive for acid-fast bacilli. Of these eligible patients, 59 had to be excluded, eight because there was no HIV test result available and 51 because they had otherwise incomplete information. Thus, 196 cases were retained for analysis. Excluded patients with information on demographic characteristics did not differ significantly by age and gender from patients included in the study.

The prevalence of HIV infection in these patients was large, with 65% (127) seropositive (table 1). There was no important difference in the prevalence of HIV infection by age or gender. HIV-seropositive patients did not report a period of delay between the onset of symptoms and diagnosis that was different from patients without HIV infection. Importantly, there was also no difference between HIV-seropositive and HIV-seronegative patients with regard to a history of previous antituberculosis treatment. Although HIV-seropositive patients tended somewhat more commonly to have a pleural effusion, this difference was not significant. Concomitant extrapulmonary tuberculosis was frequent in both HIV-seronegative and HIV-seropositive patients (13 of 69 and

Table 1. – Characteristics of sputum smear-positive tuberculosis patients on admission by HIV status, Driefontein Tuberculosis Sanatorium, Zimbabwe, 1992: crude and adjusted (by logistic regression) analysis

Characteristic	HIV-positive n	HIV-positive %	HIV-negative n	Total n	Crude OR	AOR	95% CI	p-value
Patients	127	65	69	196	–	–	–	
Age group yrs								
15–24	23	61	15	38	1*	1*	–	–
25–34	47	73	17	64	1.8	1.9	0.8–4.6	0.15
35–44	34	77	10	44	2.2	2.3	0.9–6.1	0.11
≥45	23	46	27	50	0.6	0.6	0.2–1.4	0.23
Sex								
Male	88	65	47	135	1*	1*	–	–
Female	39	64	22	61	0.9	0.9	0.4–1.7	0.69
Delay days								
0–36	33	66	17	50	1*	1*	–	–
37–65	32	64	18	50	0.7	0.6	0.2–1.5	0.28
66–129	30	64	17	47	0.9	0.9	0.4–2.2	0.77
≥130	32	65	17	49	0.8	0.7	0.3–1.9	0.57
Previous TX								
Yes	8	53	7	15	1*	1*	–	–
No or unknown	119	66	62	181	1.7	1.4	0.4–4.5	0.58
Chest radiograph								
Cavitary, no effusion	67	63	40	107	1*	1*	–	–
Cavitary and effusion	9	82	2	11	2.7	0.7	0.2–3.2	0.67
Effusion, not cavitary	7	70	3	10	1.4	2.1	0.3–18.2	0.49
Other	44	65	24	68	1.1	0.8	0.2–3.4	0.72

HIV: human immunodeficiency virus; 95% CI: 95% confidence interval; OR: odds ratio; AOR: adjusted (for other variables) odds ratio; TX: treatment. *: defined as unity.

Table 2. – Clinical signs and symptoms of sputum smear-positive tuberculosis patients on admission by HIV status, Driefontein Tuberculosis Sanaterium, Zimbabwe, 1992: crude and adjusted (by logistic regression) analysis

Characteristic	HIV-positive n	%	HIV-negative n	Total n	Crude OR	AOR	95% CI	p-value
Patients	127	65	69	196	–	–		
Sexually transmitted diseases								
Yes	33	85	6	39	3.7	3.4	1.3–8.9	0.01
No	94	60	63	157	1*	1*	–	–
Diarrhoea								
Yes	27	71	11	38	1.4	1.7	0.7–3.9	0.25
No	100	63	58	158	1*	1*	–	–
Night sweats								
Yes	94	67	47	141	1.3	1.6	0.8–3.4	0.19
No	33	60	22	55	1*	1*	–	–
Cough								
Yes	120	64	68	188	0.3	0.3	0.0–2.7	0.27
No	7	88	1	8	1*	1*	–	–
Herpes zoster								
Yes	9	100	0	9	NA	NA	–	–
No	118	63	69	187	–	–	–	–
Weight loss								
Yes	112	64	63	175	0.7	0.6	0.2–1.7	0.34
No	15	71	6	21	1*	1*	–	–
Haemoptysis								
Yes	22	69	10	32	1.1	1.2	0.5–2.9	0.77
No	105	64	59	164	1*	1*	–	

NA: not available. For further abbreviations see legend to table 1.

27 of 127, respectively), but this difference was not significant. The most frequent extrapulmonary manifestations were pleural, miliary, and peripheral lymphatic tuberculosis.

With respect to clinical signs and symptoms at the time of presentation, HIV-seropositive and HIV-seronegative patients were again remarkably similar (table 2). As might be expected, a prominent difference was the significantly more frequent history of sexually-transmitted diseases and herpes zoster among HIV-seropositive compared to HIV-seronegative patients. Clinical signs or symptoms commonly associated with either disease (tuberculosis or HIV disease), such as cough, night sweats and weight loss, were similarly frequent between HIV-seropositive and HIV-seronegative patients.

Three parameters were re-evaluated after completion of the intensive phase, *i.e.* the change in haemoglobin, the change in the erythrocyte sedimentation rate, and the change in weight. The only difference observed was that HIV-seropositive patients tended to retain an elevated erythrocyte sedimentation rate somewhat longer. However, there was no consistent trend through the quartile categories of change.

Discussion

The prevalence of HIV infection in this population of tuberculosis patients was large. Almost two thirds of all smear-positive patients were found to be HIV-seropositive. This compares to the previously reported HIV seroprevalence for tuberculosis patients in Kenya in 1988/1989 of 25% [13], and 60% in Zambia in 1990 for all tuberculosis patients or 49% in confirmed tuberculosis patients [14]. A possible explanation for the high HIV seroprevalence in Zimbabwe is the relatively well-controlled tuberculosis situation in that country before the onset of the HIV epidemic [4].

In the analysis of potential risk factors for HIV infection among the sputum smear-positive tuberculosis patients, it was not possible to identify independent predictors, with the exception of those otherwise known to be strongly associated with HIV infection (herpes zoster and a history of other sexually-transmitted disease). This is not particularly surprising, because tuberculosis is often an early manifestation of HIV infection [15]. The accompanying symptoms are, thus, expected to be similar in patients with and without HIV infection. Patients with infectious tuberculosis present themselves with a similar frequency of commonly recognized symptoms of tuberculosis whether they are HIV-infected or not.

The delay was used as an estimate for the time of sputum positivity before the onset of effective chemotherapy, an important factor in tuberculosis control, determining the number of transmissions of an index case [l6]. The delay was very similar in both groups, with a median of about 2 months between the onset of symptoms and diagnosis.

Although this study was conducted in a single (albeit large) hospital in Zimbabwe and the results are, therefore, not necessarily applicable to other settings, certain general conclusions might nevertheless be drawn. It has been emphasized that the objectives of tuberculosis control in the setting of a high prevalence of HIV infection must remain the same [1, 7]. This study would tend also to confirm the contention that case finding activities need not be altered in the wake of the HIV epidemic. A high index of suspicion is needed among health-care workers who see patients presenting themselves with prolonged relevant symptoms referable to the respiratory tract or indications of systemic disease lasting for weeks [16]. Excess transmission of tubercle bacilli in the community, caused by the increased number of HIV-associated tuberculosis cases in heavily affected countries, will be contained only to the extent that patients with infectious tuberculosis are swiftly identified and properly treated and cured. Whilst preventive therapy for dually infected persons remains a cornerstone of tuberculosis control in industrialized countries [17, 18], experiences in Africa have so far not shown it to be an efficient intervention, due to logistic and other difficulties [19]. Thus, identification and curative treatment of sputum smear-positive tuberculosis patients is still the most cost-effective intervention, irrespective of the HIV serostatus of the patient [20, 21].

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