Prevalence of human immunodeficiency virus infection among tuberculosis suspect patients in Accra, Ghana.

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Summary

Background: **Acquired immunodeficiency syndrome is a major public health concern worldwide, particularly in Ghana, where recent reports indicate an increase of the disease. A close association between infection with human immunodeficiency virus (HIV) and tuberculosis (TB) is well known. A previous study showed a 16.8% seroprevalence of HIV in TB patients on admission at the chest clinic of the Korle-Bu teaching hospital. However this was in severely ill patients on admission and there was a likely selection bias. This study was therefore designed to determine the prevalence of HIV infection among patients suspected of TB attending the laboratory of the chest clinic of the Korle-Bu Teaching hospital, Accra, Ghana.**

Methods: **Pulmonary TB was diagnosed using clinical, sputum smear microscopy and chest x-ray features. HIV was determined using particle agglutination test (HIV-1 and HIV-2) and synthetic peptide-based immunoassay (Peptilav I and II ELISA).**

Results: **Of the 277 subjects examined, 108 (39%) were diagnosed as TB. The seroprevalence of HIV was 46.2% in all TB suspect patients. It was 47.2% and 45.6% in those with and without tuberculosis, respectively. in both groups, the peak age distribution of subjects positive for HIV antibodies was from 20 to 59 years.**

Conclusion: **The results show a great increase in HIV seroprevalence in TB patients in Korle-Bu. The high HIV seroprevalence suggests that subjects suspected of TB should be tested for HIV as well.**

Key-words: ***Human immunodeficiency virus, Tuberculosis, Antibodies, Sputum smear microscopy, Ghana.***

Résumé

Introduction: Syndrôme immunodéficitaire acqui est une chose qui intéressent le publique dans le monde entier, au Ghana en paticulier ou des rapports récents indiquent une augmentation de la maladie. Une association nettement liée entre l'infection et virus immunodéficitaire human (VIH) et tuberculose (TB) est bien connue. Une étude précédente avait indiqué un 16,8% séroprévalence du VIH chez des patients atteints du TB au cours d'admission au service de la poitrine du centre hospitalier universitaire du Korle-Bu. Toutefois, c'était chez des patients gravement malade au cours d'admission et c'est probable qu'il y a du parti pris pendant la sélection. Donc, cette étude est pour but de décider la fréquence de l'infection de VIH parmi les patients atteints d'un cas présumé de TB qui fréquentent le laboratoire du service de la poitrine du centre hospitalier universitaire du Korle-Bu, Accra, Ghana.

Méthodes: TB pulmonaire était diagnostiqué à travers l'utilisation clinique de la microscopie du frotte crachat, et les traits du rayon x de la poitrine. Le VIH a été décidé à travers l'utilisation d'hémagglutination (VIH-1 et VIH-2) immunoassay synthétique basé sur le peptide (PeptiLav I et II ELISA).

Résultats: Parmi les 277 sujets étudies 108 soit 39% étaient diagnostiqués comme TB. La séroprévalence de VIH était 46,2% chez tous les patients avec un cas présume de TB. C'était 47,2% et 45,6% chez ceux avec et sans tuberculose respectivement. Dans les deux groupes, l'âge maximum de la distribution des sujets positifs pour l'anticorps de VIH était de 20 au 59 ans.

Conclusion: Les résultats ont été interpretés comme montrant une augmentation principale dans la séroprévalence de VIH chez des patients atteints de la TB à Korle-Bu. La séroprévalence de VIH bien élevée évoque que des sujets avec un cas présumé de la TB devront également subir le test du dépistage de l'infection du VIH.

Introduction

The enormous burden of human immunodeficiency virus (HIV) infection in sub-Saharan Africa is well documented, and is estimated that about 70% of the world's HIV infected people (25.3 million) live in this religion [1]. HIV infection in Ghana was first reported in 1986 [2] and since then there has been a continuous rise in its prevalence to the present estimated 3-4% rate [3]. The reported cases now total 600,000 at the end of 2000[3]. Numerous studies have shown a complex association between HIV and tuberculosis (TB)[4]. According to WHO estimation at the end of 2000 about 12 million people have dual infection with tubercle baccilli and HIV in the world and 68% of them live in Africa [5,6]. HIV infection is the highest risk factor identified which augments the reactivation of latent infection with tubercle bacilli to active TB [5]. Thus, the HIV epidemic is fuelling a TB epidemic and in many African coutries the annual TB notification rates have risen up to 4-fold [7]. On the other hand, TB is the leading cause of morbidity and mortality in people infected with

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HIV[5] and TB has an adverse effect on HIV progression[8]. The relationship between TB and HIV infection has been documented for many countries in Africa, including Cote D'Ivoire[9], Zaire[10] Kenya[11] and Zambia[12]. However, this has only been studied in patients on ward admission in Ghana and there was the likelihood of selection bias for a higher HIV seroprevalence[13]. In order to reduce this selection bias the present study was conducted to determine the seroprevalence of HIV infection among TB suspect patients attending as outpatients at the laboratory of the chest clinic of the Korle-Bu Teaching Hospital, Accra, Ghana.

Materials and methods

Study population

The study was carried out between the months of April and August 2001 in all patients suspected of having pulmonary tuberculosis (PTB) attending the laboratory of the Chest Clinic of the Korle-Bu Teaching Hospital, Accra, Ghana for sputum smear microscopy (SSM) in the diagnosis of PTB. Korle-Bu Teaching hospital is the largest hospital in Ghana (1,500 beds and cots), and serves the city of Accra (population of 4 million), the surrounding urban population and the southern part of Ghana. The chest clinic is a national reference TB diagnosing centre.Patients attend the laboratory for SSM because of clinical or radiological suspicion of PTB, which needed to be confirmed by SSM. The Ethical and protocol Review Committee of the University of Ghana Medical School approved the protocol for this study. Written and informed consent was obtained from patients who also agreed to provide blood samples for screening for HIV antibodies. Patients were clinically examined, including history and chest x-rays,after which pre-and post-test counselling was provided for each subject.

Sample collection and analysis

Three samples of sputum were obtained from each patient; the first on first presentation to the laboratory; the second the next morning; the third on the patients' arrival at the laboratory on the second day. The sputum specimens were processed in the chest clinic according to established procedure using the Ziehl-Neelsen (ZN) method[14]. SSM was considered positive(SSM^+), in accordance with World Health Organisation[15] and National Tuberculosis Programme[16] criteria, when AFB was seen in at least two out of the three specimens. If AFB were seen in only one sputum specimen then three further sputa were examined and the test was considered positive when AFB were seen in at least one of these last specimens else the test was considered negative (SSM^-). Patients were diagnosed as having PTB if they were SSM^+ or had chest x-ray changes suggestive of TB irrespective of sputum smear status. They were not considered to have tuberculosis if SSM was negative and the chest x-ray was also not suggestive. Blood samples (about 15ml) were collected from all patients into 5ml plain test tubes. serum was seperated and kept at -20° C until analysed for HIV antibodies using the particle agglutination test (Serodia HIV-1 and HIV-2; Fujirebio Inc., Tokyo,Japan) and confirmed with the synthetic peptide based immunoassay (PeptiLav I and II) both obtained from Sanofi Diagnostic Pasteur, Marnes-la-Coquette, France.

Statistical analysis

Statistical analysis of the data was performed by EPI Info 2000 and SPSS version 10. Chi-square test was used to determine differences between the means. P values <0.05 were considered significant.

Results

A total of 277 subjects were recruited in the study. They were made up of 183 (66.1%) males and 94 (33.9%) females, with no significant differences in their mean ages of 38.5±20.7 and 36.2± 13.2 years, respectively. Tuberculosis was diagnosed by clinical examination, SSM and chest x-ray in 108 (39.0%); 71 (65.7%) were male and 37(34.3%) were female.

Table 1 shows that the HIV seroprevalence of all TB suspect patients was 46.2%. The HIV seroprevalence was

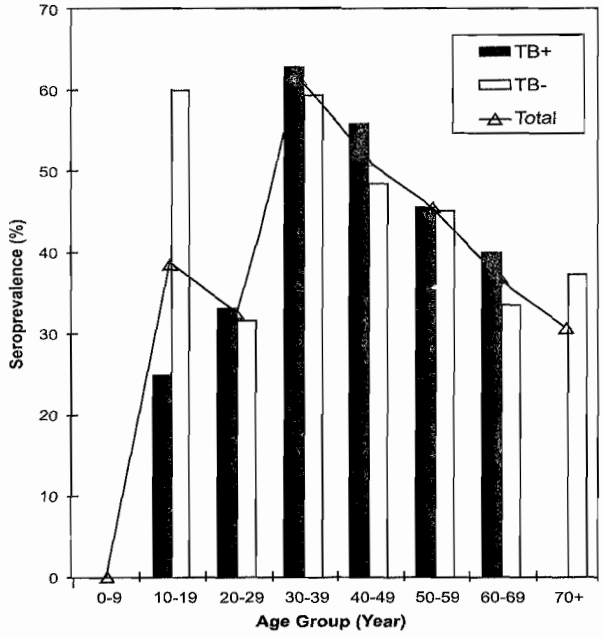

Fig. 1 ***Shows the age distribution and HIV status. The peak HIV seroprevalence was in the 30-39 age group.***

Table 1 The seroprevalence of HIV in patients with (TB+) and without (TB-) tuberculosis by sex

	TB+		TB-		Total	
	N	HIV+ (%)	N	HIV+ (%)	N	HIV+ (%)
Female	37	18(48.6)	57	29(50.9)	94	47(50.0)
Male	71	33(46.5)	112	48(42.9)	183	81(44.3)
Total	108	51(47.2)	169	77(45.6)	277	128(46.2)

47.2% and 45.6%, respectively, in those with and without TB. The seroprevalence was 44.3% in males and 50% in females; there was no significant differences ($p=0.5, X^2$ test) between the groups.

Discussion

This study aimed at determining the prevalence of HIV infection among TB suspect patientts seen at the chest clinic of the Korle-Bu Teaching Hospital, Accra, Ghana. The main finding in this study is surprisingly the high seroprevalence rate (46.2%) of HIV infection among all TB suspect patients.Significantly there was no difference between those who had PTB and those who did not. These result would indicate that HIV seroprevalence is high in all patients suspected of PTB whether they had or not. That there is a higher seroprevalence of HIV among PTB suspect patients is not surprising in itself because of the well known association between TB, other causes of chronic cough and/or abnormalities on chest x-ray, and HIV. What this study has shown is the degree of the association in Korle-Bu. Nearly half of patients suspected to have PTB were found to be HIV positive. We take this to mean that all patients with chronic cough or other features that make one suspect PTB, for example,weight loss, chest pain, night sweats, etc., should be counselled and tested for HIV in addition to the examination of sputum for TB or other infections. Indeed, because of the intricate link between HIV and TB both tests should be equally mandatory. The seroprevalence found in this study was much higher than that found in the same institution in patients with PTB on admission in 1996-97[13]. In that study the HIV seroprevalence was 16.8% (male:16.3% and female: 17.2%) and was significantly ($p<0.001$) higher in new (24.4%) than in old (9.7%) cases of PTB. In that study it was pointed out that admitted patient were generally more ill, not only from TB and other diseases, but also from the HIV infection and were therefore more likely to have a higher HIV seroprevalence than PTB patients seen at the outpatients' department. This is supported by a similar study in Kinshasa, Zaire (now the Democratic Republic of Congo)[8], which find HIV seroprevalence to be 36% in patients on admission and 17% in those seen at the out patients. On the surface, the result of the study seemed to be at variance with the previous one as it was expected to yield a lower seroprevalence. However, the HIV seroprevalence has been increasing alarmingly in Ghana as else where. In pregnant women, in urban areas in Ghana, the seroprevalence rose from 2.2% in 1996 to 3.8% in 2000[17]. It also increased in STI clinic patients in Accra from 2% 1988 to 9% in 1991, 27% in 1998 and 39% in 1999[17].The result of this study are therefore in keeping with the significant rise in the HIVseroprevalence in Ghana. They further document a significant rise in HIV seroprevalence in PTB patients at Korle-Bu during the five-year period from 1996 to 2001. The present rates found in this study are much higher than those for blood donors in Accra and the estimate for the whole of Ghana [3,18]. They are also higher than those observed in similar studies conducted in Kinshasa, DRC[8] and Lagos, Nigeria[19] but comparable to the rate (46.3%) observed in the United States of America[20]. The results under score the urgent need to screen suspected TB patients for HIV infection. In conclusion, our result show a great increase in HIV seroprevalence in TB patients in Ghana and suggest that patients suspected of having PTB should be tested for HIV antibodies, as nearly half of the subjects suspected of TB were HIV positive. This will help in the control of the dual HIV -TB infection.

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