

Human immunodeficiency virus and tuberculosis co-infection in Saudi Arabia

A.A. Alrajhi,¹ A. Nematallah,¹ S. Abdulwahab¹ and Z. Bukhary¹

فيروس العوز المناعي البشري والعدوى المشتركة بالسل في المملكة العربية السعودية
عبد الرحمن الراجحي، أنوف نعمة الله، شهاب عبد الوهاب، زكية بخاري

الخلاصة: تحدد دراستنا معدل تحري المرضي بالسل المصحوب بعدوى فيروس الإيدز كما تحدد معدل المرضي الإيجابي المصل لفيروس الإيدز بين المصابين بالسل. وقد قمنا بمراجعة استعمارية للبطاقات الطبية لـ 437 مريضاً سبق أن شخصت لديهم إصابات بالسل في الفترة بين 1995 و 2000 في الرياض في المملكة العربية السعودية. وقد أجريت تحريات على 178 من أولئك المرضي (يشكلون 41% من المجموع). وقد وجد لدى اثنين (1.1%) منهم إيجابية فيروس العوز المناعي البشري. وقبل البدء بالتحري كان أربعة من المرضي معروفين بإيجابية لفيروس العوز المناعي البشري. وقد شمل التحري أعداداً من الذكور (45%) أكبر من عدد الإناث (36%). وقد كان جميع الإيجابيين لفيروس العوز المناعي البشري من الذكور، ولم يتأثر التحري بأصل المرضي، وسوابق إصابتهم بالسل أو معالجتهم منه، ولا بنمط إصابتهم بالسل ولا بالمقاومة للأدوية المضادة للسل في الخط الأول. إن تحري فيروس العوز المناعي البشري لدى المصابين بالسل يبقى دون ما هو مطلوب. وقد كانت الإيجابية المصلية لفيروس العوز المناعي البشري ضئيلة بين من خضعوا للتحري عنه.

ABSTRACT Our study determined the rate of screening tuberculosis patients for HIV co-infection and the HIV seroprevalence among them. We retrospectively reviewed medical charts of 437 patients diagnosed with tuberculosis from 1995–2000 in Riyadh, Saudi Arabia. Screening was done for 178 (41%) patients: 2 (1.1%) of these were found to be HIV positive. Prior to screening, 4 patients were already known to be HIV positive. Males were screened more often than females (45% and 36% respectively). All HIV positive patients were males. Screening was not affected by origin of the patient, history of prior tuberculosis or treatment, type of tuberculosis involvement or resistance to first line anti-tuberculosis agents. In Saudi Arabia, screening for HIV in tuberculosis patients remains underutilized. Among screened patients, seropositivity was low.

Le virus de l'immunodéficience humaine et la co-infection par la tuberculose en Arabie saoudite
RESUME Notre étude a permis d'établir le pourcentage de patients tuberculeux chez lesquels une recherche d'une co-infection par le VIH a été effectuée et de déterminer la séroprévalence du VIH chez ces patients. Nous avons procédé à un examen rétrospectif des fiches médicales de 437 patients pour lesquels un diagnostic de tuberculose avait été posé de 1995 à 2000 à Riyad (Arabie saoudite). La recherche a été effectuée pour 178 patients (41 %) : on a trouvé que deux de ces patients (1,1 %) étaient séropositifs. Quatre patients étaient déjà connus auparavant comme étant séropositifs. Cette recherche était réalisée plus souvent chez les hommes que chez les femmes (45 % et 36 % respectivement). Tous les patients séropositifs étaient des hommes. La démarche de recherche n'était pas déterminée par l'origine du patient, des antécédents de tuberculose ou un traitement antérieur, le type d'atteinte tuberculeuse ou la résistance aux antituberculeux de première intention. En Arabie saoudite, la recherche d'une infection par le VIH chez les patients tuberculeux demeure peu pratiquée. Parmi les patients chez lesquels cette recherche avait été effectuée, la séropositivité était faible.

¹Section of Infectious Diseases, Department of Medicine, King Faisal Specialist Hospital and Research Centre, Riyadh, Saudi Arabia.

Introduction

Human immunodeficiency virus-1 (HIV-1) has evolved as one of the most important risk factors for *Mycobacterium tuberculosis* active infection. The acquired immune deficiency syndrome (AIDS) makes tuberculosis (TB) reactivation more likely and primary tuberculosis disease easier to establish. The interaction between *M. tuberculosis* and HIV-1 has played an important role in the resurgence of TB in many parts of the world. It also has significantly increased mortality from TB and increased rates of drug-resistant *M. tuberculosis* [1,2]. The impact of HIV-1 and *M. tuberculosis* is more devastating in developing countries where TB remains endemic and resources are scarce.

Offering appropriate counselling and HIV antibody testing for all patients with TB was recommended by the American Thoracic Society and the Centers for Disease Control and Prevention (CDC) in 1992 [3]. Screening for HIV has even been advised for contacts of patients with TB [3]. In Europe, screening for HIV is coordinated and undertaken by the Centre for Prevention of AIDS and Infectious Diseases for all blood donors, TB patients, prisoners, occupational groups including health-care workers, patients with risk factors and drug users [4]. The degree to which the recommendation to screen for HIV among TB patients is adhered to is not known nor is the seroprevalence rate of HIV among patients with TB in Saudi Arabia, where *M. tuberculosis* is endemic. Data about HIV and TB from the whole region of Eastern Mediterranean Region are very scarce.

We undertook this study to evaluate the rate of screening patients with active TB for HIV-1 infection and to determine the seroprevalence of HIV among patients with TB in Saudi Arabia.

Methods

All patients diagnosed with TB at King Faisal Specialist Hospital and Research Centre between 1995 and 2000 were included in our retrospective study. King Faisal Specialist Hospital and Research Centre in Riyadh, Saudi Arabia, is a 700-bed tertiary care centre receiving referrals from all over the country. It is the major facility for the management of HIV-infection and AIDS cases, with a population of more than 400 patients. Between 60 and 80 new cases of TB are diagnosed and treated annually in this hospital.

For the purpose of this study, a case of TB was defined as any patient who was confirmed by laboratory work-up to have *M. tuberculosis* active infection or suspected clinically to have TB and for whom anti-tuberculosis therapy had been started. Screening for HIV infection was defined as any request for HIV-1 antibody assay after TB was diagnosed. Patients who were known to have HIV infection were excluded. Medical records were abstracted for demographic information, risk factors for HIV infection, whether HIV screening was performed for the patient and the screening results. HIV screening was done using AxSYM HIV 1/2 gO MEIA (Abbott Laboratories, Abbott Park, Illinois, United States of America). Positive sera were confirmed using Western Blot or CHIRON RIBA HIV-1/HIV-2 SIA (Chiron Corp., Emeryville, California, USA).

Epi-Info version 6.04 was used for data collection. Statistical analysis was performed using *Statistica* version 5.0 (StatSoft, Tulsa, Oklahoma, USA). Student *t*-test was used to calculate continuous variables and chi-squared or Fisher exact test was used for proportions. All reported *P*-values were 2-tailed and a value of less than 0.05 was considered significant.

Results

At King Faisal Specialist Hospital and Research Centre, Riyadh, 437 patients were diagnosed with TB between 1995–2000. Pulmonary TB was diagnosed in 135 patients (31%), extrapulmonary TB in 254 patients (58%) and both in 48 patients (11%). There were 222 male patients and 215 female patients.

Of all 437 patients, only 178 had been screened (41%) (Table 1). Males had been screened more often than females (45% and 36% respectively, $P = 0.06$). Of the 178 patients who were screened, 2 (1.1%) who presented with TB and who had not known their HIV status were identified as HIV positive. One had extrapulmonary (brain) TB and the other had pulmonary TB. Furthermore, 4 other patients were known to be HIV positive when they developed TB. Therefore, the overall prevalence of HIV among the 178 TB patients who were screened was 3.3%. All HIV positive patients were males.

The percentages of TB patients who were screened for HIV infection did not improve during the 6-year period of the study. Screening was not affected by origin of the patient, history of prior TB or treatment, type of TB involvement, presence of cavitory lung lesion or resistance to first line anti-tuberculosis agents.

Table 1 Tuberculosis cases and screening status for HIV among male and female patients

Patients	Males No. (%)	Females No. (%)	Total No. (%)
Total	222	215	437
Screened for HIV	100 (45)	78 (36)	178 (41)
HIV positive	2 (2)	0	2 (1.1)

Discussion

The impact of HIV infection on TB was noted early in the HIV epidemic. As it is one of the major risk factors for activating latent TB, screening patients with TB for HIV was recommended [3].

Our study points to two main issues in HIV–*M. tuberculosis* co-infection. First, a large number of patients with TB were not screened for HIV-1. This is not unique to our patient population. Second, among our patients with TB, HIV-1 is not common.

Several reasons may explain this. In Saudi Arabia, a large portion of the population has evidence of previous *M. tuberculosis* infection by positive Mantoux test, reaching up to 61% in some areas among people not inoculated with bacille Calmette-Guérin (BCG) vaccine [5]. On the other hand, serosurveys for HIV in Saudi Arabia are limited. Among blood donors, only 1 of 19 775 donors (0.005%) was confirmed positive for HIV [6]. By the year 2000, there were 1100 patients with AIDS reported in Saudi Arabia (population 16 million). In the present study, we demonstrated that in an academic and tertiary care centre, only 41% of TB patients were screened for HIV, even though the test was part of the TB control programme and reporting procedures for TB [7]. This rate apparently did not improve over 6 years. In the USA, only 52.5% of reported TB cases had information on their HIV status in 1997, but this increased to 57.8% in 2001 among those aged 25–44 years [8,9]. Our findings point to a lack of awareness on the part of providers caring for TB patients that HIV-1 and *M. tuberculosis* are important co-pathogens.

Seroprevalence of HIV among TB patients varies widely by geographic area. In New York and Los Angeles, 23% and 18% of TB patients were HIV positive [10,11].

In London, 4.6%, 11.4% and 24.8 % of TB patients have been reported to be HIV positive [12–14]. In developing countries, seroprevalence of HIV among TB patients can be even higher, for instance, 46% in Abidjan, Ivory Coast, and 56% and 73% respectively among Zambian children and adults [15–17]. Data from the Middle East and North Africa are not available. In one study from Iraq from 1996–1998, of 430 patients with TB none were positive for HIV [18]. Our study indicated relatively low rates of undiagnosed HIV infection among TB patients in Saudi Arabia. However, these data represented cases from only one centre and countrywide rates were not

known. The overall prevalence of HIV among our TB patients, most of whom were Saudi nationals, was 3.3%. We believe that our rates were low because of the generally low rates of HIV in this population [6].

In conclusion, it is apparent that screening for HIV in TB patients has not been adopted routinely in many parts of the world. Health care providers need to be better informed of the role of HIV-1 in activating latent TB infection and the need for screening for HIV-1 in patients with TB. Low rates of seroprevalence should not be a reason not to screen all patients with TB for HIV co-infection.

References

1. Seng R et al. Community study of the relative impact of HIV-1 and HIV-2 on intrathoracic tuberculosis. *AIDS*, 2002, 16(7):1059–66.
2. MacArthur A et al. Characteristics of drug resistance and HIV among tuberculosis patients in Mozambique. *International journal of tuberculosis and lung disease*, 2001, 5(10):894–902.
3. Control of tuberculosis in the United States. American Thoracic Society. *American review of respiratory disease*, 1992, 146(6):1623–33.
4. Kazionny B et al. Implications of the growing HIV-1 epidemic for tuberculosis control in Russia. *Lancet*, 2001, 358 (9292):1513–4.
5. Abdullah AK et al. Tuberculosis epidemiology survey: Mantoux test results from Central Region of Saudi Arabia. *Saudi medical journal*, 1991, 12:107–10.
6. Bernvil SS et al. HIV antibody screening in a Saudi Arabian blood donor population: 5 years experience. *Vox sanguinis*, 1991, 61(1):71–3.
7. Jefri MH, Qahtani NH. *Manual of the National Tuberculosis Control Programme*. Riyadh, Ministry of Health, 1999.
8. *Reported tuberculosis in the United States, 1997*. Atlanta, Georgia, Centers for Disease Control and Prevention, 1998.
9. *Reported tuberculosis in the United States, 2001*. Atlanta, Georgia, Centers for Disease Control and Prevention, 2002.
10. Greenberg BL et al. HIV-1 seroprevalence in chest clinic and hospital tuberculosis patients in New York City, 1989–1991. *AIDS*, 1994, 8(7):957–62.
11. Asch SM et al. Testing for human immunodeficiency virus infection among tuberculosis patients in Los Angeles. *American journal of respiratory and critical care medicine*, 1997, 155(1):378–81.
12. Kumar D et al. Tuberculosis in England and Wales in 1993: results of a national survey. Public Health Laboratory Service/British Thoracic Society/Depart-

- ment of Health Collaborative Group. *Thorax*, 1997, 52(12):1060-7.
13. Bowen EF et al. HIV seroprevalence by anonymous testing in patients with *Mycobacterium tuberculosis* and in tuberculosis contacts. *Lancet*, 2000, 356 (9240):1488-9.
 14. Marshall BG et al. HIV and tuberculosis co-infection in an inner London hospital—a prospective anonymized seroprevalence study. *Journal of infection*, 1999, 38(3):162-6.
 15. Domoua K et al. The new face of tuberculosis in the context of the tuberculosis-HIV association in Abidjan, Ivory Coast. *Tubercle and lung disease*, 1995, 76(6): 505-9.
 16. Luo C et al. Human immunodeficiency virus type-1 infection in Zambian children with tuberculosis: changing seroprevalence and evaluation of a thioacetazone-free regimen. *Tubercle and lung disease*, 1994, 75(2):110-5.
 17. Elliott AM et al. The impact of human immunodeficiency virus on presentation and diagnosis of tuberculosis in a cohort study in Zambia. *Journal of tropical medicine and hygiene*, 1993, 96(1):1-11.
 18. Abdul-Abbas AJ, al-Delami AM, Yousif TK. HIV infection in patients with tuberculosis in Baghdad (1996-98). *Eastern Mediterranean health journal*, 2000, 6(5-6):1103-6.

Living in a world with HIV and AIDS

The booklet *Living in a world with HIV and AIDS: Information for employees of the UN system and their families* has been designed to provide UN employees and their families with important information about HIV and AIDS and to increase awareness of the resources and services available. The document is currently available in English, French, Spanish, Russian, Chinese, Portuguese and Arabic versions will be available soon. The booklet emphasizes the rights and responsibilities of all UN employees as individual staff members.

Information is organized under the following chapters: Be Aware: Know the facts about HIV/AIDS; Protect Yourself: Making healthy decisions; Live: Live positively with HIV/AIDS; Let Live: Contributing to a safe, fair and compassionate workplace. The booklet is available free on line at: <http://www.unaids.org/NetTools/Misc/DocInfo.aspx?href=http%3A%2F%2Fgva%2Ddoc%2Dowl%2FWEBcontent%2FDocuments%2Fpub%2FPublications%2FIRC%2Dpub06%2FJC975%2DLiving%20InWorldAIDS%5Fen%26%2346%3Bpdf>