Human immunodeficiency virus testing in patients with newly-diagnosed tuberculosis in Singapore

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ABSTRACT

Introduction: Infection with human immunodeficiency virus (HIV) is the most well-known risk factor for the development of tuberculosis (TB). The joint statement by the American Thoracic Society, Centers for Disease Control and Prevention, and Infectious Diseases Society of America recommends that all patients with TB undergo testing for HIV infection after counselling. We looked at physician compliance with this recommendation in Singapore.

Methods: A retrospective review of the case records of all patients diagnosed with microbiologically-proven TB between September 2005 and December 2006 (inclusive) at the Singapore General Hospital was conducted.

Results: Between September 2005 and December 2006, 493 patients were diagnosed with tuberculosis at our institution. HIV testing was performed in 184 patients (37.3 percent), of whom 15 (8.2 percent) was seropositive. Univariate analysis showed that an age equal to or younger than 60 years, male gender, non-pulmonary tuberculosis, inpatient location at diagnosis, and having an infectious diseases physician as the attending doctor were all significantly associated with HIV testing (p-value is less than 0.05).

Conclusion: Compliance with HIV testing in all newly-diagnosed tuberculosis patients is poor, with less than 40 percent of patients being tested at our institution. We need to address the factors associated with failure to test, and reinforce to our physicians the importance of HIV testing in these patients.

Keywords: acquired immunodeficiency syndrome, human immunodeficiency virus, pulmonary tuberculosis, tuberculosis

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INTRODUCTION

Human immunodeficiency virus (HIV) infection is the most important risk factor for developing tuberculosis (TB).[1] The joint statement by the American Thoracic Society, Centers for Disease Control and Prevention, and Infectious Diseases Society of America recommends that all patients with TB undergo testing for HIV co-infection.[2] We looked at HIV testing in patients with newly-diagnosed TB at our institution in Singapore, and attempted to identify patient demographical and clinical variables associated with a failure to test for HIV.

METHODS

Case records of all patients with microbiologically-proven TB between September 2005 and December 2006 (inclusive) at the Singapore General Hospital were retrospectively reviewed. HIV testing done in our laboratory, using ELISA, and the likelihood of HIV testing were correlated with demographical and clinical variables. Statistical analysis was performed using the Statistical Package for Social Sciences version 10.0 (SPSS Inc, Chicago, IL, USA). Chi-square test at two-sided significance was used for univariate analysis, and forward stepwise binary logistic regression was used for multivariate analysis. Statistical significance was taken at $p \leq 0.05$. Study approval was obtained from the Singapore General Hospital Institutional Review Board.

RESULTS

Over this time period, 496 patients were diagnosed with TB. Three patients whose HIV positivity was already known were excluded. The mean age of the remaining 493 patients was 54.7 ± 19.2 years, of whom 336 (68.2%) were male, 380 (77.1%) had pulmonary TB, 340 (69%) were diagnosed as outpatients and 343 (69.6%) were cared for by respiratory physicians, while the rest were cared for by infectious diseases (ID) physicians. HIV testing was performed in 184 (37.3%) patients, of whom 15 (8.2%) were seropositive. Univariate analysis showed that age ≤ 60 years, male gender, non-pulmonary TB, inpatient location at diagnosis and having an ID physician as the attending doctor were all significantly associated with

Table I. The relationship of demographical and clinical variables with HIV testing.

Variable [reference category]	Adjusted odds ratio (95% confidence interval)	p-value
Age (years) [> 60]		
≤ 60	2.906 (1.889–4.471)	0.000
Gender [male]		
Female	0.471 (0.299–0.743)	0.001
Location [inpatient]		
Outpatient	0.308 (0.198–0.477)	0.000
Attending physician [respiratory]		
Infectious diseases	2.180 (1.395–3.406)	0.001

Table II. Frequency of HIV seropositivity among patients with newly-diagnosed TB.

Variable	No. of patients (n = 493)		No. of patients tested (n = 184)	
	No.	HIV positive (%)	No.	HIV positive (%)
Age (years)				
≤ 60	290	5.2	131	11.5
> 60	203	0	53	0
Gender				
Male	336	3.9	138	9.4
Female	157	1.3	46	4.3
Location				
Outpatient	340	0.6	96	2.1
Inpatient	153	8.5	88	14.8
Attending physician				
Respiratory	343	0.3	106	0.9
Infectious diseases	150	9.3	78	17.9

HIV testing ($p < 0.05$). Multivariate analysis showed that all the above factors except non-pulmonary TB were independently associated with HIV testing (Table I). Table II shows the HIV seropositivity rates according to those variables found to be independently associated with the likelihood of HIV testing. HIV seropositivity rates for the whole sample of patients with newly-diagnosed TB represent minimal estimates, as patients not tested were assumed to be seronegative. At the least, 15 (3.0%) of the total sample was HIV-antibody positive. Among those who were actually tested, 15/184 (8.2%) had HIV co-infection.

DISCUSSION

Previous reports from the United States have shown poor compliance with recommendations for HIV testing in all patients with TB – only 35% of patients were tested in the late 1980s,[3] increasing to 63% in 1993.[4] In comparison, 46% of patients underwent testing in Canada between 1992 and 1995,[5] while 41% of patients in Saudi Arabia underwent testing between 1995 and 2000.[6] In 2002, data from the United Kingdom reported that 56% of patients at a TB clinic were offered HIV testing.[7] Despite a re-emphasis in the 2003 guidelines,[2] we found compliance with HIV testing at our institution in Singapore to be poor, with less than 40% of all newly-diagnosed patients with TB being tested. In our study, a failure to test for HIV was independently associated with an age greater than 60 years, female gender, outpatient location at diagnosis and having a respiratory physician as the attending doctor. If we assume that all patients who did not undergo HIV testing were seronegative, then 3% of all our patients with newly-diagnosed TB were seropositive for HIV. Among those patients tested for HIV, 8.2% were seropositive.

One reason for a failure to test for HIV could be that physicians do not initiate HIV testing in patients whom they perceive to be at a low risk for HIV infection. However, we know from a previous study that direct questioning does not identify all the risk factors of HIV.[8] At the minimum, 1.3% of females, a group perceived to be at "low risk" in our study, were found to be seropositive for HIV. This is still higher than the 0.15% HIV seroprevalence rate at which a previous cost-benefit analysis suggests to be cost-effective for screening for HIV infection.[9] Interestingly, respiratory physicians at our institution who see twice the number of newly-diagnosed TB patients compared to their ID physician colleagues were less likely to test their patients for HIV.

It could be postulated that respiratory physicians perceive their patients to be at a lower risk for HIV infection and hence assume that testing is less warranted. Even then, only 78/150 (52%) patients managed by ID physicians had HIV testing performed, implying that neither subspecialty is meeting the expectations set out by the guidelines.

Strikingly, our data shows that the outpatient setting was independently associated with a failure to test for HIV, an observation similar to that previously reported.[7] The reasons for this are likely multifactorial, but one contributing factor could be because of time constraints in the outpatient clinic setting. Physicians may also find it awkward in this setting to offer testing for HIV, a condition that the public still perceives as taboo and associated with considerable social stigma. Our study was confined to data from a single institution in Singapore, and a limitation is that this cannot be extrapolated to the whole of Singapore. Furthermore, 140/493 (28.4%) of the patients were referred to the TB Control Unit (TBCU) of Singapore for follow-up after their diagnosis of TB was made. Of the patients who did not receive HIV testing, 79/309 (25.6%) were referred to the TBCU for continuation of management. We were unable to ascertain whether these patients were then subsequently offered HIV testing. Another major limitation is that we did not have data on which patients were offered HIV testing but refused, and whether HIV testing was offered universally or based on the risk profile. As such, we were unable to delineate which factors were major contributors to a failure to test for HIV.

Despite the recommendations for HIV testing in all patients with TB, this is not fully implemented at our institution in Singapore. TB is a common initial manifestation of HIV infection,[1] and testing provides an opportunity to diagnose and treat HIV infection early. Failure to perform HIV testing in patients perceived to be at low risk would result in missing a significant percentage of these patients. Our study highlights the deficiencies in our practice, and provides some insights into the patterns of HIV testing in our TB patients, upon which we hope to facilitate the development of strategies to ensure universal HIV testing among all TB patients. Any strategy to ensure universal HIV testing among all newly-diagnosed TB patients should be targeted at increasing awareness among all physicians diagnosing and managing TB regardless of their subspecialty and institution of practice. This would take us one step closer to implementing routine opt-out HIV screening for patients in all healthcare settings as recommended by the Centers for Disease Control and Prevention, thereby fostering earlier detection of HIV infection and linking these patients to clinical and prevention services.[10] In conclusion, compliance to recommendations for HIV testing in all newly-diagnosed TB patients is poor, with less than 40% of patients being tested at our institution. We need to address factors associated with failure to test, and reinforce to our physicians the importance of HIV testing in these patients.

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