



QuantiFERON®-TB Gold Results in Foreign-born Persons Applying for Permanent Residency



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Abstract

Previously, the tuberculin skin test (TST) was the only test for diagnosing latent tuberculosis infection (LTBI). However, QuantiFERON®-TB Gold, a new test that measures the release of interferon-gamma in whole blood in response to stimulation by *Mycobacterium tuberculosis*-specific antigens, was approved by the FDA in 2005. It detects previous exposure to *M. tuberculosis* without cross-reaction to BCG antigens. We retrospectively reviewed records for individuals seen at the Combined Health District (CHD) of Montgomery County, Ohio. Records for individuals applying for permanent residency were reviewed for age, sex, region of birth, and years of residence in the USA. Between June 2006 and November 2006, 49 individuals had QuantiFERON testing. Individuals were between the age of 6 and 74 (mean = 35.2) years old and lived in the US for 1 to 36 years (mean = 6.1) years. Forty-two subjects (79.2%) had a negative test result, 5 (9.4%) were positive, and 2 (3.8%) were indeterminate. Individuals with positive results were from 3 countries (Uzbekistan, India, and Philippines); CXR was normal on each. Between January 2002 and December 2003, 293 immigrants had TST. Individuals age were 4 - 77 (mean = 31.0) years old, and lived in the US for 1 to 24 years (mean = 3.9). One hundred and sixty (54.6%) were reactive (TST >10 mm). The nearly six-fold difference in a positive rate between the two tests (54.6% vs. 9.4%) could be explained by the fact that QuantiFERON-TB Gold is more specific. However, prospective studies using both methods simultaneously in the same subjects would be required to confirm this finding. We conclude that the increased specificity of QuantiFERON-TB Gold test compared to TST is a significant advantage for diagnosing LTBI in foreign-born persons.

Introduction

- Institute of Medicine recommendations for the elimination of TB include mandatory screening for latent TB (through tuberculin skin testing) for all individuals applying for permanent residency
- Tuberculin skin tests (TST) are not ideal since there can be issues with administering and interpreting the test
- Difficulty evaluating TST in patients who have received BCG vaccination
- For all of these reasons, there is interest in pursuing alternative tests for LTBI→ A whole blood interferon (IFN)-gamma assay
- Principle of the assay: T cells of individuals previously sensitized with tuberculous antigens will produce interferon-gamma when they reencounter mycobacterial antigen → high level of interferon-gamma production is presumed to be indicative of TB infection

Methods

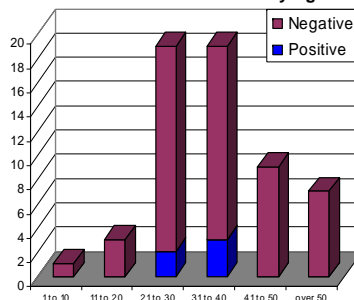
- Retrospective chart review of individuals applying for permanent residency seen at the CHD MC
- Between June 2006 and November 2006**
Data collected:
 - Age
 - Sex
 - Years in US
 - Country of birth
 - QuantiFERON result
 - CXR result
 49 individuals had QuantiFERON testing
- Between January 2002 and December 2003**
 - 293 immigrants had TST

Results

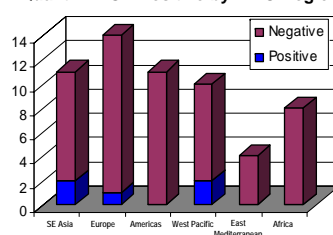
QuantiFERON group:

- 49 individuals had QuantiFERON testing
- Individuals were between the age of 6 and 74 (mean = 35.2) years old and lived in the US for 1 to 36 years (mean = 6.1) years
- 42 subjects (85.7%) had a negative test result, 5 (10.2%) were positive, and 2 (4.1%) were indeterminate
- Individuals with positive results were from 3 countries (Uzbekistan, India, and Philippines)
- CXR was normal on each

QuantiFERON Positive by Age



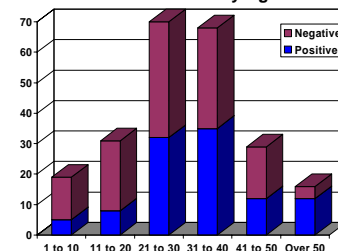
QuantiFERON Positive by WHO Region



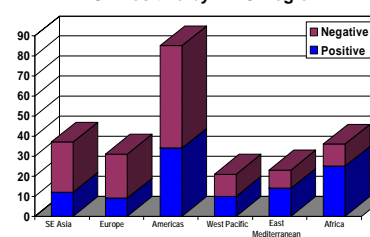
TST group:

- 293 individuals were seen for screening and/or treatment of latent TB
- Individuals were between the age of 4 to 77 (mean = 31.0) years old and lived in the US for 0-24 (mean = 3.9) years
- 160 individuals (54.6%) were reactive (TST >10 mm)
- Over 50% of the individuals with latent TB came from eight countries (Mexico, India, Rwanda, Vietnam, Ecuador, Russia, Nigeria, Senegal)

TST Positive by Age



TST Positive by WHO Region



Conclusions

- Individuals with latent TB came mostly from the Americas or Africa (52%)
- The nearly six-fold difference in a positive rate between the two tests (54.6% vs. 9.4%) could be explained by the fact that QuantiFERON-TB Gold is more specific in individuals with previous BCG vaccination
- QuantiFERON-TB Gold could be a better indicator of the risk of *M. tuberculosis* infection than the TST in a BCG-vaccinated population
- An increased specificity of QuantiFERON-TB Gold test compared to TST would be a significant advantage for diagnosing LTBI in foreign-born persons
- Prospective studies using both methods simultaneously in the same subjects would be required to confirm this finding

References

- Pai, M, Riley, LW, Colford, JM Jr. Interferon-gamma assays in the immunodiagnosis of tuberculosis: a systematic review. *Lancet Infect Dis* 2004; 4:761.
- Mazurek, GH, LoBue, PA, Daley, CL, et al. Comparison of a whole-blood interferon gamma assay with tuberculin skin testing for detecting latent *Mycobacterium tuberculosis* infection. *JAMA* 2001; 286:1740.
- Binkin NJ, Zuber PLF, Wells CD, et al. Overseas screening for tuberculosis in immigrants and refugees to the United States: current status. *Clin Infect Dis* 1998;23:1226-31.
- Kang, YA, Lee, HW, Yoon, HI, et al. Discrepancy between the tuberculin skin test and the whole-blood interferon gamma assay for the diagnosis of latent tuberculosis infection in an intermediate tuberculosis-burden country. *JAMA* 2005; 293:2756.
- Pai, M, Gokhale, K, Joshi, R, et al. *Mycobacterium tuberculosis* infection in health care workers in rural India: comparison of a whole-blood interferon gamma assay with tuberculin skin testing. *JAMA* 2005; 293:2746.
- Mazurek, GH, Jereb, J, Lobue, P, et al. Guidelines for using the QuantiFERON-TB Gold test for detecting *Mycobacterium tuberculosis* infection, United States. *MMWR* Recomm Rep 2005; 54:49.