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Association between immunological status and TB disease development in HIV-infected individuals with LTBI

NS Wong[1], K Chan[2], WK Chan[2], A Lin[2], CC Leung[3] and SS Lee[1]

[1]Chinese University of Hong Kong, Stanley Ho Centre for Emerging Infectious Diseases, Hong Kong, Hong Kong, China [2]Hong Kong Special Administrative Region Government, Special Preventive Programme, Department of Health, Hong Kong, Hong Kong, China [3]Hong Kong Tuberculosis, Chest and Heart Diseases Association, Hong Kong, Hong Kong, China

Purpose: Limited research has addressed factors associated with TB disease development in HIV-infected patients with latent tuberculosis infection (LTBI). This study aims to examine the association between immunological status and TB disease development in HIV-infected individuals who have ever tested tuberculin skin test (TST) positive during HIV care.

Method: Retrospective anonymous baseline, clinical and LTBI testing records of HIV-infected individuals were collected from a major HIV specialist clinic in Hong Kong. Patients who were diagnosed with HIV between 2002 and 2013 and had tested TST positive, but without any history of active TB at or before HIV diagnosis, were included in the analysis. The main outcome variable was TB disease development, after exclusion of TB cases whose interval between positive TST and TB diagnosis was <1 year. Univariable and multivariable cox regression models adjusted by history of LTBI treatment were performed.

Results: A total of 508 subjects met the inclusion criteria, of whom 87% were male, 93% had initiated ART, 40% were positive at the first LTBI test, and 86% had received LTBI treatment. TB incidence from the last negative TST time point was 4.68 per 1000 person-years (95% C.I.=2.72–7.55). Adjusted by history of LTBI treatment, local residency (aHR=0.18, 95% C.I.=0.06–0.60), ART (aHR=0.18, 95% C.I.=0.05–0.65), and number of negative TSTs before positive results (aHR=0.36, 95% C.I.=0.15–0.85) were negative predictors of TB disease development, while positive result at the first TST was a positive predictor (aHR=5.73, 95% C.I.=1.61–20.43). Immunologically, CD4 count (aHR=0.997, 95% C.I.=0.99–0.9999) and CD4/CD8 ratio (aHR=0.08, 95% C.I.=0.01–0.93) at the time of positive TST result, CD4 ≤200/lL (aHR=2.84, 95% C.I.=1.003– 8.02), concurrent CD4 ≤200/lL and CD4/CD8 ratio≤0.5 (aHR=3.11, 95% C.I.=1.10–8.73) after the last negative TST were significantly associated with TB disease development.

Conclusion: Poorer immunological status markers from positive TST results could be used as a surrogate for predicting TB disease in HIV-infected patients.