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Title: A prospective longitudinal study evaluating a T-cell-based assay for latent tuberculosis infection in healthcare workers in a general hospital in Beijing

Lifan 11782 Zhang lifan.zhang1982@gmail.com^{1,2}, Yao 11783 Zhang zhangyao1@gmail.com¹, Guohua 11784 Deng dengghua@hotmail.com MD¹, Manish 11785 Pareek manish.pareek07@imperial.ac.uk³, Ajit 11786 Lalvani a.lalvani@imperial.ac.uk MD³ and Xiaoqing 11787 Liu liuxq_pumch@yahoo.com.cn MD^{1,2}.¹ Department of Infectious Diseases, Peking Union Medical College Hospital, Chinese Academy of Medical Sciences & Peking Union Medical College, Beijing, China ;² Clinical Epidemiology Unit, Chinese Academy of Medical Sciences & Peking Union Medical College, Beijing, China and ³ Tuberculosis Research Unit, Department of Respiratory Medicine, National Heart and Lung Institute, Imperial College London, London, United Kingdom .

Body: Background: To compare the performance of the T-SPOT.TB and tuberculin skin test(TST) for latent tuberculosis infection(LTBI), evaluate diagnostic concordance and risk factors for LTBI, and observe the progression to active TB disease among health care workers(HCWs) in a general hospital in Beijing. Methods: The prospective cohort study enrolled HCWs in a tertiary general hospital in Beijing, China, to evaluate LTBI with T-SPOT.TB and TST. The subjects were evaluated every 12 months during the 60-month follow-up. Results: Of 101 participating HCWs, 96 and 101 had valid TST and IGRA results respectively. Twenty-nine(28.7%, 95%CI 19.9%-37.5%) were defined as positive by T-SPOT.TB and 53(55.2%, 95% CI 45.2%-64.9%) by TST(using a ≥ 10 mm cut-off). Agreement between the two tests was poor(57.3%, $\kappa=0.18$, 95%CI 0.01-0.52). In multivariate analysis, direct exposure to sputum-smear positive TB patients was a significant risk factor for a positive T-SPOT.TB(OR 5.76, 95% CI 1.38-24.00). Pooled frequency of antigen-specific IFN- γ secreting T cells for subjects who reported direct contact with sputum-smear positive TB patients was significantly higher than that for participants without direct contact ($p=0.045$). One of 20 subjects with positive result of T-SPOT.TB and TST developed culture-confirmed pulmonary TB at 24 months follow-up. Conclusion: HCWs have a moderately high prevalence of LTBI in Beijing. In this BCG-vaccinated population, T-SPOT.TB is a more accurate, targeted method of diagnosing LTBI than TST. The predictive values of T-SPOT.TB and TST for progression to active TB are comparable and limited.