



**Disclosures.** All authors: No reported disclosures.

### 753. Screening for Latent *Mycobacterium tuberculosis* Infection (LTBI): A Clinical Conundrum of Public Health Concern

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**Background.** Tumor necrosis factor (TNF)- $\alpha$  inhibitors increase the risk of reactivating LTBI, hence screening is crucial prior to starting therapy. There is a lack of evidence to support a preferred screening regimen in this population, and either tuberculin skin tests (TST) or interferon- $\gamma$  release assays (IGRAs) are acceptable. Although difficult to assess, the sensitivity of IGRAs and TST are similar (80–95%), while IGRAs are considered to be more specific.

**Methods.** A 48-year-old White female in rural Iowa with a 30-year history of Crohn's disease was evaluated for TNF inhibitor therapy. She had no known risk factors for LTBI and was screened using an IGRA which yielded an indeterminate result. A repeat IGRA and a two-step TST were both negative. Subsequently, adalimumab was initiated. Adalimumab was discontinued after 9 months due to progression of Crohn's, and the patient underwent bowel surgery at a California hospital. Her course was complicated by bilateral pleural effusions requiring thoracentesis twice.

**Results.** The patient presented 1 month later with upper lobe infiltrative changes and mediastinal adenopathy. A third IGRA was performed and was non-reactive. A bronchoscopy with biopsy was then performed. The next day her dyspnea, cough and fevers worsened. She was admitted to an Iowa hospital where she was immediately put in airborne precautions. Her bronchoalveolar lavage acid-fast bacilli (AFB) smear was 4+, and an induced sputum showed 3+ AFB. Standard TB treatment was initiated. At least 59 patients (17 immunocompromised) and five employees in a private office and 13 employees at the Iowa hospital were exposed, in addition to an unknown number in California.

**Conclusion.** Although rare, there appears to be a risk for patients on TNF inhibitors who have multiple negative screening tests to become infected with TB. It is unclear whether this represents reactivation of undetected LTBI or new infection, although new TB cases are less likely in rural Iowa where the incidence is 1.53 per 100,000. Patients should be counseled to report any pulmonary symptoms to providers. As demonstrated by this case, airborne precautions should be implemented as soon as possible if clinical suspicion of TB is high despite negative screening tests to reduce exposure to others.

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### 754. Prevalence of Latent Tuberculosis Infection Among Healthcare Workers at a Tertiary Care University Hospital

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**Background.** We investigated the prevalence of latent tuberculosis infection (LTBI) among healthcare workers (HCWs) and analyzed its risk factors in a tertiary care university hospital in South Korea in a population with intermediate tuberculosis (TB) burden.

**Methods.** A standard questionnaire regarding the baseline demographics and risk factors for LTBI was given to each participant. QuantiFERON-TB GOLD In-Tube (QFT-GIT) assay and chest radiography were performed to investigate the rate of LTBI.

**Results.** A total of 1,429 participants, 213 (14.9%) doctors and 988 (69.1%) nurses and 228 (16.0%) others were enrolled. The mean age of the subjects was 33.0 years old, and 1,175 (82.2%) were female. Of the participants, 94.5% had received BCG vaccine. QFT-GIT assays were positive for 156 subjects (10.9%). Of the 213 doctors, 28 (13.1%) were positive by QFT-GIT, and among the 988 nurses, 94 (9.5%) had positive QFT-GIT results. Experience of working in hospital was significantly associated with positive LTBI test results by QFT-GIT assay. Gender and duration of employment as an HCW were significantly associated with having a positive QFT-GIT result in univariate analyses. In multivariate analyses, duration of employment as an HCW (>15 years) (odds ratio, 1.98; 95% confidence interval, 1.14–3.43) was independently associated with increased risk of a positive QFT-GIT result.

**Conclusion.** A high prevalence of LTBI was found among our HCWs. Considering the association between the experience of working in hospital and high risk of LTBI. The risk for tuberculosis infection among HCWs was higher than general population, which suggests that stricter preventive strategies against nosocomial tuberculosis infection should be implemented.

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### 755. Clinical Adherence to Latent Tuberculosis Screening Recommendations in Adults with Inflammatory Bowel Disease (IBD) Prior to Biologic Therapy

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**Background.** Biological agents have become increasingly common in the treatment of immune-mediated illnesses. Their use, however, is associated with an increased risk of progression from latent to active tuberculosis (TB) infection. The American Thoracic Society (ATS) recommends both a tuberculin skin test (TST) and an interferon gamma release assay (IGRA) be conducted to screen for latent TB prior to initiation of biologic therapy. We examined the adherence to these recommendations for adults with inflammatory bowel disease (IBD) in the Calgary region of Alberta.

**Methods.** In this retrospective cross-sectional study, we used the Alberta Health Services' Sunrise Clinical Manager and Netcare databases to identify IBD patients initiated on biologic therapy (age >18 years) in Calgary, Alberta between 2008 and 2018. Socio-demographic and clinical characteristics of patients were described. Linear and logistic regression models were constructed to identify factors associated with screening. All analyses were conducted using Stata 15.0 (University of London, UK).

**Results.** There was a total of 247 identified cases (48.18% female). Of these 96 were Ulcerative Colitis and 151 Crohn's Disease. The mean age was 39.5 (14.8 SD). There was a total of 210 (85%) who had documented screening with the TST and nine (3.4%) with the IGRA. In a multivariable analysis, factors associated with latent TB screening were age and outpatient setting at the time of screen. Six patients (2.43%) had positive screens and four of those six were treated for latent TB infection.

**Conclusion.** TST remains the predominant screening method for latent TB infection although the ATS recommends both IGRA and TST prior to biologic therapy. Screening varied with age and higher rates were noted in those evaluated as outpatients compared with inpatients. Further work is needed to evaluate the barriers to screening and to improve access to latent TB screening particularly in the inpatient setting.

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### 756. Targeting the Birth-Cohort of the Pre-antibiotic Era: A Proposal to Screen for Tuberculosis in Seniors in Arkansas

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**Background.** Approximately 13 million (4.7%) people in the United States have latent TB infection (LTBI). Persons born prior to 1951 have disproportionately higher LTBI prevalence, and frequently experience delays in TB diagnosis and TB deaths. Nevertheless, this birth-cohort was overlooked in the 2016 US Preventive Service Task Force (USPSTF) recommendation for LTBI screening. The aims of this project are to (1) determine the LTBI prevalence in this birth-cohort, (2) assess TB complications prevented by LTBI screening in this birth-cohort, and (3) raise TB awareness among providers and the community.

**Methods.** We propose to: (1) Develop educational pamphlets for the physicians and community. (2) Screen 10,000 members of the target birth-cohort during their routine clinical visits for 1 year, using T-SPOT.TB. County health officers, the partners of Arkansas Department of Health, will enroll physicians in their jurisdictions to participate in TB screening. LTBI prevalence in the birth cohort will be determined, and TB complications will be compared among cohort TB cases that were screened to those not previously screened. (3) Incorporate LTBI and birth-cohort status in patient medical forms.

**Results.** In our preliminary study, for the period 2009–2014, 142 of 326 TB cases (43.6% of all US-born TB cases) were reported from the target birth-cohort; 72.6% of the cases had unique genotype strains.

**Conclusion.** If the LTBI prevalence in this birth cohort exceeds 8–10%, we recommend a nation-wide screening program for this birth-cohort. Even without treatment, we believe that screening and noting diagnosis of LTBI in the patient record will impact delayed diagnosis and mortality.

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#### 757. Community Prevalence of Bacteriologically Confirmed Pulmonary Tuberculosis: A 7-Year Retrospective Study

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**Background.** It is estimated that about 40% of the Indian population is infected with *Mycobacterium tuberculosis* (TB), the vast majority of whom have latent TB. However, asymptomatic pulmonary carriage of the TB bacteria contributes to sustenance of the disease in the community and subsequent transmission. The present study was carried out to see the prevalence of culture positive pulmonary tuberculosis in apparently asymptomatic individuals from the community.

**Methods.** The study population consisted of individuals wishing to migrate to the USA/UK/Canada/Australia and submitting for the mandatory health check prior to obtaining the Visa. Chest X-ray was the initial screening test for diagnosis of tuberculosis. Individuals with any X-ray abnormalities were directed to submit three sputum samples for microscopy and culture which was done on automated culture systems (BacTALERT and MGIT). First-line drug susceptibility (INH, Rifampicin, Pyrazinamide, Ethambutol, Streptomycin) testing data were retrieved wherever available. Data were obtained for a period of 7 years from August 2010 to July 2017.

**Results.** A total of 140,499 individuals presented for the health check. Of these, 1,002 (0.7%) were further investigated using sputum microscopy and culture based on chest X-ray findings. Of these, 42 (0.4%) individuals were sputum culture positive for *Mycobacterium tuberculosis*. Except two, none had any respiratory complaints. Eleven (27.5%) of them were smear positive for acid fast bacilli. Most of the patients (30%) belonged to the age group of 18–25 years. Eighty-four percent had no prior history of tuberculosis or treatment for TB. Fifty-nine percent isolates were sensitive to all first-line drugs (Isoniazid, rifampicin, pyrazinamide, ethambutol and streptomycin). Twenty-seven percent were resistant to pyrazinamide alone. Fourteen percent were resistant to more than one first-line drug. There were no cases of multidrug resistance.

**Conclusion.** This is a unique large-scale study which assesses prevalence of culture positive pulmonary tuberculosis in the urban Indian community. It stresses the need for more stringent public health measures to curb transmission of the disease in such a high endemic region such as India.

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#### 758. Tuberculosis Recurrence in New York City: A Retrospective Study

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**Background.** Tuberculosis (TB) recurrence has been difficult to determine due to diverse definitions. Without knowledge of recurrence rates or associated

risk factors, patients with highest likelihood of recurrence may not be identified, contributing to continued morbidity and disease transmission. We aimed to determine the recurrence rate for TB cases, associated clinical findings and patient characteristics.

**Methods.** We conducted a retrospective study evaluating 7,755 New York City TB cases from 2005 to 2014 for recurrence after appropriate treatment completion through 2017. Demographic, clinical, drug susceptibility testing (DST), and genotype data were collected during routine care. Adjusted odds ratios (aOR) were calculated to estimate associated risk factors for recurrence.

**Results.** A total of 73 cases were identified with  $\geq$  one recurrence, a rate of 0.9%. Median time to recurrence after treatment was 516 days (IQR 165–1,256). In univariate analysis, pulmonary or combination of pulmonary and extrapulmonary disease, human immunodeficiency virus (HIV) infection, culture positive disease, alcohol abuse, intravenous drug use, and homelessness in the 12 months prior to diagnosis were associated with recurrence ( $P < 0.05$ ). In adjusted analysis, HIV infection (aOR 2.04 95% CI 1.13–3.67), pulmonary disease (aOR 9.03 95% CI 2.19–37.12), and having both pulmonary and extrapulmonary disease (aOR 17.19 95% CI 4.0–74.0) were independently associated with recurrence. Of 67 cases with positive culture and DST, 10 had additional drug resistance and 14 had new disease sites. Among 36 cases with complete genotyping information, data suggested relapse in 27 (75%) cases and re-infection in two (5.5%). Re-infection could not be ruled out in seven (19%) cases.

**Conclusion.** The recurrence rate for this period was lower than expected compared with other studies. HIV infection continues to be associated with recurrence despite availability of effective antiviral medication. Those with pulmonary or disseminated TB were more likely to have recurrence compared with only extrapulmonary TB. A notable number of recurrent cases demonstrated new drug resistance or disease manifestations, which should be considered in later treatment regimens and follow-up evaluation.

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#### 759. Molecular Characterization and Epidemiology of Multidrug-Resistant *Mycobacterium tuberculosis* (MDR-TB) and Identification of Possible Cases of Local Transmission of MDR-TB in Kuwait

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**Background.** Increasing incidence of multidrug-resistant tuberculosis (MDR-TB) is hampering efforts to control TB. Kuwait is a low (25/100,000) TB incidence country and ~1% of *Mycobacterium tuberculosis* strains are resistant to rifampin, RIF and isoniazid, INH (MDR-TB). Analysis of resistance conferring mutations in seven genes was combined with spoligotyping for detecting local transmission of MDR-TB in Kuwait.

**Methods.** MDR-TB strains ( $n = 131$ ) from 88 TB patients and 50 susceptible strains were used. Susceptibility testing was done by MGIT 960 system, gMTBDRplus assay and PCR-sequencing of three regions of *rpoB*, *katG* codon 315 (*katG315*) + *inhA* regulatory region, *embB* (*embB306/embB406/embB497* regions), *rpsL* + *rrs*-500–900 regions and *pncA* for RIF, INH, ethambutol (EMB), streptomycin (SM) and pyrazinamide (PZA), respectively. Sequencing data were used to construct phylogenetic tree by MEGA7 software. Spoligotypes were identified by SITVIT2 and phylogenetic tree was made by MIRU-VNTRplus software.

**Results.** Mutations were detected in most isolates in *rpoB*, *katG+inhA*, *embB*, *rpsL+rrs* and *pncA* which confer resistance to RIF, INH, EMB, SM and PZA, respectively. Phylogenetic analysis of multi-locus concatenated sequences showed unique patterns for 51 patient's isolates while 37 patient's isolates grouped in 14 clusters. Spoligotyping identified 35 patterns (19 unique patterns and 69 patient's isolates in 16 patterns) including 11 orphan patterns. Sixteen isolates yielded six clusters (each containing two to five isolates) by both fingerprinting methods.

**Conclusion.** Our study provides the first insight into molecular epidemiology of MDR-TB in Kuwait and identified six potential cases of local transmission of MDR-TB involving two to five subjects (including five Kuwaiti patients) which had escaped detection by routine surveillance studies. Prospective detection of resistance conferring mutations thus identifies possible cases of local transmission of MDR-TB in low TB incidence countries.

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