Sylvia LaCourse, MD, 1 | University of Washington, Seattle, Washington; 2 | Kenya National Hospital, Nairobi, Central, Kenya; 3 | Department of Obstetrics and Gynecology, Kenya National Hospital, Nairobi, Kenya.

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**Background.** Pregnancy and HIV-associated immunologic changes may affect latent TB infection (LTI) interferon-gamma release assay (IGRA) QuantIFERON TB Gold Plus (QFT-Plus) diagnostic performance.

**Methods.** In this ongoing study, HIV-infected and -uninfected women 20–34 weeks gestation without TB in the past year are enrolled from antenatal clinics in western Kenya and tested with QFT-Plus. Mean quantitative IGRA-γ responses to mitogen, and *M. tuberculosis* antigens (TB1 [primarily CD4+] and TB2 [addition of CD8+] response) were compared using two-sample t-tests. Proportions for categorical variables were compared using univariate logistic regression.

**Results.** Among 306 women (HIV+ = 127 [41.5%], HIV− = 179 [58.5%]) enrolled between January 2018 and March 2019, median maternal and gestational age were 25 years (IQR: 21–28) and 28 weeks (IQR: 24–32), respectively. Among HIV-infected women at enrollment, 99.2% were on ART, median CD4 count was 440 cells/mm3 (IQR: 355–703), 37.5% were virally suppressed, and 60.6% reported having received isoniazid preventive therapy (IPT). Overall, 55 (31.1%) women were QFT-Plus positive (HIV+ = 38 [29.9%], HIV− = 17 [31.8%], OR = 0.90, 95% CI 0.54–1.48, P = 0.671; 190 (62.1%) were negative (HIV+ = 81 [63.8%], HIV− = 109 [60.9%], and 21 had indeterminate results (HIV+ = 8 [6.3%], HIV− = 13 [7.3%], OR 0.83, 95% CI 0.33–2.09, P = 0.690). Mean response to mitogen was similar between HIV-infected and -uninfected women (6.0 vs. 6.1 IU/mL, P = 0.663). Among QFT-Plus positive women, HIV+ women had significantly lower TB1 responses than HIV− women (HIV+ = 2.7 vs. 4.2 IU/mL, P = 0.035). Mean TB2 responses had a similar pattern, but did not reach statistical significance (HIV+ = 3.1 vs. 4.3 IU/mL, P = 0.107). Both TB1 and TB2 were positive for 82 women (86.3%), 4 women were only TB1 positive (4.2%), and 8 women were only TB2 positive (8.4%).

**Conclusion.** Among pregnant women, HIV infection was not associated with increased prevalence of QFT+ responses. However, among QFT-positive women, TB1 responses were lower in HIV-positive women with a similar trend observed for TB2 responses. These findings suggest that HIV-associated immunologic changes may influence QFT test performance.

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1345. Randomized Control Trial to Evaluate the Clinical and Cytokine Response Profile to Oral Thalidomide in Leprosy Patients with Erythema Nodosum Leprosum

Ajay Chopra, MD MBBS 1; Debdeep Mitra, MD DNB 2; Base Hospital, Delhi Cantt, New Delhi, India; 3 Assistant Professor, Delhi, India.

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**Background.** Leprosy is a chronic granulomatous disease caused by *Mycobacterium leprae*. Erythema Nodosum Leprosum is an acute inflammatory Type III hypersensitivity response during the chronic course of the disease process. This immune response manifests clinically as painful red nodules and systemic symptoms similar to sepsis with neutrophilic leukocytosis. Capsule Thalidomide is the drug of choice for treating this condition.

**Methods.** A randomized control study to study the immunological markers involved in the pathogenesis of erythema nodosum lepromatous and its successful suppression by Thalidomide should provide newer insight into the pathogenesis of the disease process, provide better diagnostic and therapeutic options and better markers to predict prognosis. Based on the previous studies our aim was to find a correlation between tumor necrosis factor-a, interferon-gamma, and Cd-64 expression on circulating neutrophils during Type II lepra reaction and the successful response to capsule Thalidomide. Venous blood samples were collected from all the samples and after 7 days post thalidomide therapy, only in the treated population. All the patients with type II lepra reaction responded to Capsule Thalidomide clinically and all the skin lesions resolved in 7–14 days. Blood samples and skin biopsy was subjected to histology, immunofluorescence assay, histochemical staining, quantitative RT-PCR (reverse transcriptase-polymerase chain reaction) and flow cytometry.

**Results.** Study found out that Interferon Tand Tumor necrosis factor-A are sensitive markers in diagnosing erythema nodosum lepromatous and Cd-64 expression on activated circulating neutrophils during Type II lepra reaction and the successful response to capsule Thalidomide. Venous blood samples were collected from all the samples and after 7 days post thalidomide therapy, only in the treated population. All the patients with type II lepra reaction responded to Capsule Thalidomide clinically and all the skin lesions resolved in 7–14 days. Blood samples and skin biopsy was subjected to histology, immunofluorescence assay, histochemical staining, quantitative RT-PCR (reverse transcriptase-polymerase chain reaction) and flow cytometry.

**Conclusion.** Cd-64 expression on circulating neutrophils is a potential early biophysical marker for diagnosing erythema nodosum leepromatous and can be used as a tool to assess thalidomide response. Interferon Tand Tumor necrosis factor-A are sensitive markers to screen for lepra reactions and this study showed no significant correlation with Thalidomide therapy.

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1346. Ruling out TB in New York City: Are Two NAATs (Nucleic Acid Amplification Testing) Enough?

William G. Greendyte, MD 1; Janett Pike, RN, MPA, CIC 2; Lilibeth V. Andranca, RN, MA, PNP, CIC 3; Krystal Balzer, RN, MSN, CIC 4; Thelesha Gray, RN, MPH, CCRN 1; Patrice M. Russell, RN, MSN, CIC 1; Manu Sharma, RN, MS, DNP 1; Ari Steinberg, RN, CCRN 3; Susan Whittier, PhD 1; E. Yoko Furuya, MD, MS 5; Columbia University Irving Medical Center, New York, New York; 6 New York Presbyterian Hospital, New York, New York; 7 Columbia University Medical Center, New York, New York

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**Background.** Prompt diagnosis of pulmonary Mycobacterium tuberculosis (TB) infection can prevent nosocomial exposure. However, sputum smears are insensitive, and turnaround time for cultures can take weeks. Rapid diagnostics, such as nucleic acid amplification testing (NAAT), on respiratory specimens of patients suspected to have TB can improve diagnostic accuracy. Current practice at our institution is to obtain ≥ 2 NAATs in high-risk patients prior to discontinuing airborne isolation, but some studies have suggested that 2 negative NAATs may be sufficient. We conducted a retrospective study of patients at our institution diagnosed with TB.

**Methods.** The study was conducted at an academic adult hospital, an academic pediatric hospital, and a community hospital in New York City. Line lists of positive cultures for TB and positive NAATs from 2014 to mid-2018 were obtained from microbiology. Chart review was performed. Patient demographics, comorbidities, and radiographic findings were collected. Concordance between culture results and NAATs was evaluated. Incidence of inpatient TB exposure was noted.

**Results.** 82 cases of TB were found in the study period (see Figure 1). 45 cases were new inpatient diagnoses of pulmonary TB. The most common presenting symptoms were cough (69%), weight loss (49%), and fever (42%, see Table 1). 38/45 (84%) of patients were originally from a country other than the United States. 43/45 (96%) of patients had abnormal lung imaging. Cavitary disease was seen in 29% other upper lobe disease was seen in 42%. Among smear-negative pulmonary TB cases, NAAT was positive in 11/16 (69%) of patients. Within this subgroup, the sensitivity of one NAAT was 41% when compared with culture. In smear-negative, NAAT-positive patients, NAATs were fully concordant with cultures in 4/11 patients (36%, see Table 2). The median number of positive NAATs was 1; the median number of positive cultures was 2. Five patients with pulmonary TB had negative NAATs altogether (median = 3); 2/5 resulted in TB exposure investigations after airborne precautions were discontinued following NAAT results. Overall 13/15 (88%) of new inpatient diagnoses resulted in an exposure investigation.

**Conclusion.** Obtaining ≥ 3 NAATs in patients suspected of pulmonary TB improved diagnostic accuracy compared with obtaining 2 or fewer.

**Table 1. Symptoms and comorbidities at the time of diagnosis in patients with pulmonary TB from 2014-2018.**

| Symptom                  | %  |
|--------------------------|----|
| Fever                    | 19/45 (42.2%) |
| Night sweats             | 9/45 (20.0%)  |
| Weight Loss              | 22/45 (48.9%) |
| Cough                    | 31/45 (68.9%) |
| Hemoptysis               | 6/45 (13.3%)  |

| Comorbidity              | %  |
|--------------------------|----|
| HIV                      | 1/45 (2.2%)  |
| Malignancy               | 2/45 (4.4%)  |
| Solid organ transplant    | 2/45 (4.4%)  |
| Other immunosuppressive disease | 2/45 (4.4%) |
| Asthma or COPD            | 5/45 (11.1%)  |
| Chronic Lung disease      | 6/45 (13.3%) |
| Chronic Liver disease     | 5/45 (11.1%)  |
| Chronic kidney disease or ESRD | 4/45 (8.9%)  |

**Figure 1.** Flowchart of TB cultures from 2014-2018.
1347. Tuberculosis Caused by Mycobacterium bovis in Children: A Retrospective Review of Cases From 2010 to 2019 in a Pediatric Tertiary-care Center in Mexico

Napoleon Gonzalez Saldana, MD; Mercedes Macías Parra, MD; Eliano Ariza de la Garza, MD; Saiyid Fereirs, MD; Manuel Eugenio Narro Flores, MD; Oscar Tamez Rivera, MD; Instituto Nacional de Pediatría, Mexico City, Distrito Federal, Mexico

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Background. Tuberculosis (Tb) is a leading cause of death worldwide. The most common cause of Tb is due to M. tuberculosis, however, M. bovis is considered a public health issue and an often-undetected cause of Tb. Information regarding Tb by M. bovis in children is scarce.

Methods. Retrospective analysis of culture-proven cases of Tb by M. bovis from 2010 to 2019 in a pediatric tertiary-care center in Mexico. Clinical and paraclinical characteristics were compared.

Results. We included 22 cases of Tb by M. bovis in children younger than 18 years of age. 64 percent were men, mean age was 3.8 years. All subjects had a positive history of BCG immunization. Eight subjects (36.4%) consumed unpasteurized dairy products, 13 (5.6%) referred contact with Tb-infected people, and none had contact with cattle. Twelve patients (54.5%) had an immunodeficiency (ID). The most common ID was defects in the IL-12/IFN-γ axis (36.3%), followed by severe-combined ID (9%). All of the subjects presented any form of extrapulmonary Tb, and 8 (36.4%) had disseminated Tb. The common extrapulmonary presentations were lymph-nodule (40.9%), abdominal (18.2%), and skeletal Tb (13.6%). Fever was present in 21.3% of the cases, weight-loss in 12%, and diarrhoea in 9.3%. Hepatomegaly was present in 83% of patients with abdominal Tb (P = 0.001). We found a negative association between lymph-node enlargement and skeletal Tb by M. bovis (P = 0.01). Fifteen cases (68.2%) were identified as M. bovis BCG strain. Infection by BCG strain was associated with a shorter time of presentation (< 4 months) (P = 0.005). Polypud resistance (resistance to ≥ 2 drugs, excluding those classified as MDR) was observed in five strains (22.7%). We detected 3 RIF-resistant strains (18%), 2 INH-resistant strains (9.1%), and 1 EMB-resistant strain (4.5%). No MDR strains were detected. We report an 86% cure rate, and 5% mortality. Nine (40.9%) patients are still in treatment.

Conclusion. We report 22 cases of culture-proven cases of Tb by M. bovis, from 2010 to 2019 in a pediatric tertiary-care center in Mexico. Disseminated presentation was common, as well as extrapulmonary involvement. Infection by M. bovis BCG strain was associated with a shorter time of presentation. Further studies are required in order to expand our knowledge on M. bovis infection in children.

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1348. Mycobacterium Chimaera Infection Following Cardiac Surgery: A Review of a Large Cohort of Cases in the United States

Jam N. Kim, MD; Jessica R. Costales, DO, MBS; Bobecic Mithatdidi, MD; Gary Blaestone, DO; Jim H. Nomura, MD; Kaiser Permanente Los Angeles Medical Center, Los Angeles, California; Southern California Permanente Medical Group, Baldwin Park, Baldwin Park, California

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Background. Mycobacterium chimaera (MC) is a nontuberculous mycobacterium associated with infections originating from heater-cooler devices following cardiac surgery globally from 2012 to 2016. Twenty-eight cases occurred within our health system in Southern California, the largest number of cases in the United States to date. We aim to summarize the clinical features, diagnosis, treatments, and outcomes of these cases.

Methods. We reviewed the electronic health records of 28 patients with identified MC infection who had index coronary artery bypass (CABG) and/or valve replacement surgery between 2014 and 2016. All diagnoses were confirmed by cultures speciated to Mc by 16S partial DNA sequencing or Karius testing, except for one case. Patients were grouped by clinical presentation of disseminated disease (n = 18) or localized disease (n = 10). Treatment delay was calculated from the time of initial presentation to the start date of antibiotics and evaluation for surgical intervention.

Results. All patients who underwent CABG alone (n = 5) developed localized sternal wound infections, whereas patients who had valve replacement surgery (n = 23) developed either localized or disseminated disease. Disseminated disease carried a mortality rate of 40% in those with surgical source control vs. 72% in patients who were not surgical candidates (OR 6.6, 95% CI 0.85–55). The mortality rate of patients with localized sternal wound infections was 11% after incision/drainage and sternal wire removal (n = 9). Delay of antimicrobial treatment greater than 6 months in all 28 patients was associated with a mortality rate of 54% compared with 35% in patients who started treatment within 6 months (OR 2.2, 95% CI 0.47–10.35). Overall mortality rate of patients with MC infection was 42%.

Conclusion. Disseminated MC infection should be considered early in at-risk patients presenting with constitutional symptoms. In this review of 28 confirmed and 1 probable case of MC infection, disseminated infection only occurred in patients who underwent valve surgery while localized disease occurred in patients who underwent CABG. Surgical source control with early initiation of antimicrobial therapy is associated with improved outcomes. Optimal duration of antimicrobial treatment is still unknown.

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1349. Risk Factors for Extrapulmonary Tuberculosis in Greece, a Low Tuberculosis Burden Country

Constantine Vassalos, PhD; Dimitrios Papaventos, PhD; Ioannis Koutelekos, PhD; Marina Panagi, Bachelor; Evangelos Vogiatzakis, PhD; Evdokia Vassalou, PhD; Simona Karabela, PhD; Greek Health System, Athens, Attiki, Greece; National Reference Center for Mycobacteria (Athens Chest Disease Hospital), Athens, Attiki, Greece; Faculty of Nursing, University of West Attica, Athens, Attiki, Greece

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Background. Although the most common site of tuberculosis (TB) is the lungs, spreading may occur to any part of the body, resulting in extrapulmonary tuberculosis (EPTB). We conducted a study to describe the clinical and epidemiological features of EPTB in Greece, a low TB burden country (>50 TB cases/million), in which immigrants from high TB burden countries make up >7% of the population.

Methods. We retrieved data for adults presenting with signs/symptoms consistent with EPTB from 2014 to 2015 registries of the Athens Chest Disease Hospital. EPTB was clinically, histologically or microbiologically diagnosed. We recorded age, gender, immigrant, or native status, site of disease, history of diabetes, smoking, and immunological status. Proportion ratios (PR) and 95% confidence interval (CI) were calculated to estimate risk factors for developing EPTB.

Results. We identified 277 (153 males) adult patients, 254 (91.7%) natives, and 23 (8.3%) immigrants, with signs/symptoms consistent with EPTB. Of 118/277 (42.6%) EPTB cases, 67 (57.6%) were males. No association with gender, diabetes, or smoking was shown between EPTB cases and non-cases. Immigrants were twice as likely to develop EPTB as natives (PR = 1.86 95% CI: 1.38–2.51 P < 0.001). Immigrants from high TB burden countries were 2 times as likely to develop nodal, pericardial, or pleural TB as the native population (Tables 1 and 2). Native patients > 60 years of age presenting with lymph node enlargement or with a pleural effusion were 3 times as likely to have TB than those aged ≤60 years (Table 2). In contrast, all immigrants with lymph node enlargement were EPTB cases (Table 1) and were <45 years old. Impaired immunological status increased the risk of developing EPTB by 62% in the native population (PR = 1.62 95% CI: 1.20–2.33 P < 0.001).

Conclusion. In a low TB burden country, EPTB is associated with older age and weak immune system due to possible extrapulmonary dissemination of latent TB. Considered to be at high-risk for developing EPTB, immigrants from high TB burden countries with signs and/or symptoms consistent with EPTB, albeit not transmitting the disease, need to be priority-wise tested for TB in order to be adequately treated.

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1350. Clofazimine as an Oral Companion Drug for Treatment of Mycobacterium avium complex Infections

Joy Yong, BSc (Pharmacy) (Hons), BCPs;