Figure 2. Mycobacteria IHC and AFB staining in lung and skin tissues

M. tuberculosis granulomatous pneumonia

M. leprae granulomatous dermatitis

Conclusion. FFPE tissue analysis by multigene targeted PCR assays expands the opportunities for rapid identification of Mycobacterium species, allows differentiation of MTBC from NTM, and helps to detect co-infections. Using multigene targeted PCRs in combination with histopathology and IHC improve the accuracy of diagnosis, particularly in the setting of immunosuppression and environmental pathogens.

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2110. Interferon-γ Release Assay Performance in Pediatric Tuberculosis Disease in California

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Background. Interferon Gamma Release Assays (IGRAs) and Tuberculin Skin Tests (TSTs) are important adjunctive pediatric TB diagnostics. This study analyzes the use and performance of IGRAs in children diagnosed with active TB disease in a high-resource, low-incidence setting.

Methods. We retrospectively reviewed cases of children reported with TB to the California Department of Public Health (CDPH) Tuberculosis Registry during 2010–2015. Our cohort included 778 children, after excluding 68 without an IGRA or TST reported. We analyzed case characteristics associated with test selection and performance, and measured IGRA test sensitivity in children with laboratory confirmed TB disease.

Results. Of the 778 cases of pediatric TB reported, 360 were laboratory confirmed. Children tested with IGRAs were more likely foreign-born, aged ≥5 years, to have extrapulmonary disease only, and be confirmed, than those tested with TST. Children aged ≥2 years with confirmed disease were less likely to have a positive IGRA [PRR 0.72 (95% CI 0.55, 0.93)] than children <2 years. Indeterminate IGRAs were associated with age <1 year [PRR 9.23, 95% CI 2.87, 29.8] and central nervous system (CNS) disease [PRR 2.69, 95% CI 1.06, 6.86] on multivariate analysis suggesting an association with severe disease. IGRA and TST sensitivity were similar in children <5 years with confirmed disease and test concordance was high in this age group, but sensitivity was <87% for both tests among children aged ≥2 years. IGRA was more sensitive than TST among children aged 5–18 years (96%, 95% CI 88%-99% vs. 83%, 95% CI 72–91%, P = 0.012).

Conclusion. Children presenting with TB symptoms and disseminated disease were more likely to be tested by IGRA than TST. In children <5 years, IGRA sensitivity is similar to TST, but sensitivity of both tests are reduced in children <2 years. Indeterminate results are higher, particularly in <1 year-olds and in CNS disease. In children aged ≥5 years with laboratory confirmed TB, IGRA has greater sensitivity than TST among children aged 5–18 years (96%, 95% CI 88%-99% vs. 83%, 95% CI 72–91%). Children <1 year were more likely to be tested by IGRA than TST. In children <5 years, IGRA sensitive than TST among children aged 5–18 years (96%, 95% CI 88%-99% vs. 83%, 95% CI 72–91%)

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2112. Seasonal Interferon Gamma Response to Interferon Gamma Release Assay in Quantified Mycobacterium Tuberculosis (Mtb) Infected Children

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Background. The QuantiFERON Gold-in-tube (QFT) test is an Interferon Gamma Release Assay (IGRA) used to indirectly diagnose tuberculosis infection (TB). The QFT measures Interferon gamma (INF-γ) released in response to specific Mycobacterium tuberculosis (MtB) antigens. The main objective of this analysis is to determine whether there is a seasonal variation of the INF-γ level released in QFT in healthy children.

Methods. Data of the QFT assays conducted in health care workers (HCW) at Houston Methodist Hospital (HHH; Houston, TX) between August 2008 and April 2017 were analyzed and stratified by the season when the blood samples were drawn. A linear regression analysis was performed, and the statistical significance was evaluated using ANOVA. The INF-γ level was measured by enzyme-linked immunosorbent assay (ELISA).

Results. Data from 10,089 QFT assays were included in the analysis. The tested HCW were primarily between the ages of 18 to 49 years (76.5%), female (65.9%), and non-Hispanic (77.0%). A significantly higher level of INF-γ was found in the mitogen-stimulated blood (Phytohemagglutinin) in the summer (June – August) (estimate: 0.19 IU/mL; P < 0.001) compared with the other seasons, and a significantly lower level of INF-γ was found in the fall (September – November) (estimate: -0.27 IU/mL; P < 0.001) compared with the other seasons. The INF-γ level was significantly lower in the unstimulated blood (estimate: -0.02 IU/mL; P = 0.038) but not in the antigen stimulated blood samples drawn in the winter (December–February) compared with those drawn in other seasons.

Conclusion. We observed a seasonal variation of the INF-γ level measured in unstimulated and antigen-stimulated blood samples drawn for the QFT assays, in which seasonal factors such as airborne antigens like pollen may play a role. Clinicians should take into account the possible seasonal variation when interpreting positive QFT results, especially those on the borderline of the assay’s diagnostic cutoffs. Re-testing or implementing additional diagnostic tools should be considered if necessary. Further research would be needed to identify the specific seasonal factors that may influence the QFT results.

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2113. Safety & Benefits of Directly Observed Therapy with Rifapentine and Isoniazid for Latent Tuberculosis Infection – Less is More?

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Background. Rapid and accurate diagnosis of tuberculosis (TB) is important for appropriate treatment initiation and control of disease transmission. Xpert TB/RIF has been widely used for rapid diagnosis especially in sputum AFB smear-negative pulmonary TB. However, about one-third of patients with pauci-bacillary pulmonary TB still reveal negative Xpert TB/RIF results from sputum specimens. Theoretically, bronchoalveolar lavage (BAL) fluid can provide more sensitive specimens for positive M. tuberculosis by culture or PCR assays. Patients those with caseating granuloma in biopsy tissue and shows a good response to anti-tuberculous therapy were classified as having probable TB.

Results. A total of 113 patients were included in the analysis. Of these 113 patients, 30 (27%) were classified as confirmed TB, 7 (6%) as probable TB, and 76 (67%) as not TB. Of these 37 patients with confirmed or probable TB, 8 (22%) had military TB and 12 (32%) were immunocompromised. Only 15 (50%) of the 30 confirmed TB patients revealed positive Xpert TB/RIF results from BAL fluid. Overall sensitivity, specificity, positive predicted value, and negative predicted value for Xpert TB/RIF from BAL fluid for the diagnosis of TB were 41% (95% CI, 31%-41%), 100% (95% CI, 95%-100%), 100% (95% CI 77%-100%), and 78% (95% CI 74%-77%), respectively.

Conclusion. Xpert TB/RIF from BAL fluid appears to be suboptimal to rule out pulmonary TB. The development of more sensitive and rapid test for pauci-bacillary pulmonary TB is needed.

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