1375. Laboratory Abnormalities Among Patients with Pulmonary Mycobacterium avium Complex Infections

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Session: 153. Mycobacteria
Friday, October 4, 2019: 12:15 PM

Background. Limited data are available regarding laboratory abnormalities in patients with pulmonary Mycobacterium avium complex (MAC) disease.

Methods. We included patients without cystic fibrosis who had pulmonary MAC and met ATS/IDSA disease criteria from the Northwest NTM Biobank with a complete blood count (CBC) 6 months prior and up to 30 days after study enrollment. The biobank is a cohort of patients with Nontuberculous mycobacterium (NTM) infections identified through statewide laboratory surveillance and OHSU regional referral NTM clinic; a complete clinical history is collected by chart review at enrollment. We evaluated the proportion of pulmonary MAC patients with abnormal laboratory tests. We examined differences using a chi-square test between patients who were antimycobacterial treatment naive, on therapy at enrollment or previously treated, in addition to cavitary and non-cavitary disease and those who also had previous sputum isolation of additional organisms (co-isolation).

Results. 147 patients had CBCs available; 112 (76.2%) were female with a median age of 69 years (22–88 years). 64 (43.5%) were antimycobacterial treatment naive, 65 (44.2%) were on therapy at enrollment and 18 (12.2%) were previously treated. Lymphocyte count was below normal in 105 (73.4%) patients; 70 (49.3%) had lymphocyte counts below 1500 cells/mL and 27 (18.9%) were lymphopenic. Elevated monocyte percent was seen in 54 (37.2%) patients. Lymphopenia was more common in those on therapy, P = 0.01. There were no predominant laboratory abnormalities in 108 patients with metabolic panels. 34 patients had a c-reactive protein (CRP) collected, which was elevated, after age and gender correction, in 31 patients (91.2%). There was no significant difference between treatment groups. Eleven patients had cavitary disease with no differences in laboratory values compared with those with non-cavitary disease. Patients with co-isolation were more likely to be anemic (P = 0.03), have thrombocytopenia (P = 0.02) and were less likely to have a monocytosis (P = 0.03).

Conclusion. A large proportion of patients with pulmonary MAC disease have low lymphocyte counts, elevated monocyte percent and CRP. Further evaluation of the meaning of these abnormalities as well as changes during therapy is needed.

Table 1: Characteristics and Comorbidities in Northwest NTM Biobank, Pulmonary MAC subset (N=147)

| NTM Disease Category | Total N (%) | Currently Treated N (%) | Previously Treated N (%) | Treatment Failure N (%) |
|----------------------|-------------|--------------------------|--------------------------|------------------------|
| Female               | 112 (76.2)  | 47 (73.3)                | 65 (86.9)                | 49 (76.4)              |
| White                | 131 (89.1)  | 58 (89.2)                | 73 (100)                 | 98 (88.7)              |
| Median Age (range)   | 69 (20-88)  | 69 (20-88)               | 70 (52-84)               | 68 (25-84)             |
| Median Days since Disease Diagnosis (range)* | 239 (22-610) | 220 (27-590) | 301 (16-617) | 339 (22-367) |
| COPD/lymphopenia     | 43 (29.5)   | 19 (29.2)                | 24 (32.4)                | 50 (31.5)              |
| Bronchectasis        | 113 (78.3)  | 51 (78.3)                | 62 (86.0)                | 48 (72.3)              |
| Chronic interstitial lung disease | 8 (5.4) | 5 (7.7) | 3 (4.1) | 2 (1.3) |
| Prior Tuberculosis   | 10 (6.8)    | 5 (7.7)                  | 0 (0.0)                  | 5 (7.6)                |
| Lung cancer          | 10 (6.8)    | 4 (6.1)                  | 6 (8.6)                  | 5 (7.6)                |
| Non-cancer           | 36 (24.5)   | 15 (23.1)                | 21 (29.0)                | 31 (20.4)              |
| Immunosuppressive treatment | 20 (13.4) | 12 (18.6) | 8 (11.4) | 7 (10.8) |
| Prior Transplant      | 4 (2.7)     | 1 (1.5)                  | 3 (4.1)                  | 2 (1.3)                |
| Autoimmune disease   | 23 (15.4)   | 9 (13.0)                 | 14 (19.3)                | 10 (13.9)              |
| Renal disease        | 11 (7.5)    | 4 (6.1)                  | 7 (9.9)                  | 6 (9.4)                |
| Gastroesophageal reflux disease | 50 (41.5) | 21 (32.3) | 29 (41.5) | 27 (42.1) |
| Diabetes             | 14 (9.5)    | 3 (4.6)                  | 11 (15.4)                | 10 (14.9)              |
| Congestive heart failure | 8 (5.4) | 3 (4.4) | 5 (7.0) | 5 (7.6) |
| Anemia               | 39 (26.2)   | 17 (26.2)                | 22 (31.9)                | 39 (30.1)              |
| Lymphocytic count & DLD in cells/mL | 70 (49.3) | 29 (45.3) | 41 (57.1) | 31 (35.7) |
| Lymphocytic count > 1.200 cells/mL | 70 (49.3) | 29 (45.3) | 41 (57.1) | 31 (35.7) |
| Bacteremia            | 22 (15.8)   | 6 (9.4)                  | 16 (22.4)                | 16 (22.4)              |
| Elevated Monocyte Percent | 54 (37.2) | 22 (35.0) | 32 (45.0) | 22 (32.0) |
| Hypergammaglobulinemia* | 17 (11.6) | 6 (9.2) | 11 (15.1) | 9 (14.1) |

*P<0.05 for the separate test
+ ATS/IDSA NTM disease criteria
* Diagnosis of nontuberculous disease, positive, smear positive or acid-fast bacilli or positive culture or growth in culture for Mycobacterium avium complex
** Any low antibody levels for any class or IgG or IgM or two or more subclass levels (IgG, IgA, IgM, IgG, IgA).

Table 2: Additional organisms isolated from pulmonary cultures in 68 (46.9%) patients with co-isolation

| Bacteria | Count (%) |
|----------|-----------|
| Staphylococcus aureus (MSSA, MRSA) | 14 (9.5) |
| Pseudomonas | 18 (12.2) |
| Streptococci | 6 (4.3) |
| Nocardia | 4 (2.7) |
| Aspergillus | 29 (19.7) |
| Penicillium | 31 (7.5) |
| Other | 30 (20.4) |

Disclosures. All authors: No reported disclosures.
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Table 1: Characteristics of 71 children with pre-immigration diagnosis of latent tuberculosis infection (LTBI), separated by post-immigration TB impression

| Post-immigration Evaluation Impression | LTBI (n=13) | No. TB (n=58) |
|--------------------------------------|-------------|---------------|
| Mean years of age, (range)           | 10.8 (3-14) | 8.7 (1-15)    |
| Mean mm induration by TST, (range)   | 12mm (10-21)| 12mm (10-30)  |
| QFT positive, n (%)                  | 9 (69%)     | 0 (0%)        |
| Documented BCG vaccine (confirmed), n (%) | 7 (54%) | 46 (79%) |
| Place of birth, n (%)                |             |               |
| - Asia                                | 10 (77%)    | 54 (93%)      |
| - Africa                              | 2 (15%)     | 0 (0%)        |
| - Latin America                       | 1 (8%)      | 0 (0%)        |
| - Eastern Europe                      | 0 (0%)      | 4 (7%)        |
| Close contact with infectious TB, n (%) | 4 (31%) | 0 (0%)        |

*Note: Providers waited until 2 years of age to obtain Quantiferon
Abbreviations: LTBI: latent tuberculosis infection; TST: tuberculin skin test; QFT: Quantiferon; BCG: Bacillus Calmette-Guérin

Disclosures. All authors: No reported disclosures.

1377. Use of Interferon-Gamma Release Assays (IGRAs) Reduced Late Tuberculosis Infection (LTBI) Diagnosis in Refugee and Immigrant Children

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Session: 153. Mycobacteria
Friday, October 4, 2019: 12:15 PM

Background. For foreign-born children from countries with high tuberculosis (TB) burden, positive tuberculin skin test (TST) results, associated with Bacillus Calmette-Guérin (BCG) vaccination, paradoxically increase the risk for overdiagnosis and overtreatment of latent TB infection (LTBI) during immigration. The higher specificity of interferon-gamma release assays, such as QuantiFERON-TB (QFT), may help distinguish LTBI from positive TSTs due to BCG or non-TB Mycobacteria. However, data on QFT usage in pediatric populations, particularly refugee and immigrant children, are sparse. Our objective was to assess the impact of QFT on LTBI diagnosis and treatment in the vulnerable child refugee and immigrant population.

Methods. We initiated a retrospective study of children (<15 years) seen in Santa Clara County Refugee/Immigrant Clinic for post-immigration TB re-evaluation in 2017. We collected information from the Electronic Disease Notification system and post-immigration clinic records, including laboratory studies, imaging, and clinical impression. The primary outcome was post-immigration LTBI diagnosis in patients with positive pre-immigration TB screening. Patients with prior active TB or LTBI treatment were excluded.

Results. A total of 218 physicians responded to the survey; of whom, 137 identified themselves as primary care physicians (i.e., pediatrics (62%), internal medicine (30%), or family medicine (8%)). About half of them were FMGs and 40% identified themselves as SA. Three out of four of these physicians (n=101) indicated they routinely screen their patients for LTBI. Bivariate analyses were used for bivariate analyses to look for factors associated with LTBI screening and treatment.

Conclusion. There is variability in LTBI screening, treatment, and follow-up among our physician sample. Physicians have not yet adopted newer treatment regimens suggesting the need for an educational intervention.

Disclosures. All authors: No reported disclosures.

1378. Clinical Characteristics of Tuberculosis Among Patients With an Endemic Country

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Session: 153. Mycobacteria
Friday, October 4, 2019: 12:15 PM

Background. Tuberculosis (TB) is an infection caused by reactivation of Mycobacterium tuberculosis. Decreasing host immune system plays an important role in pathophysiology especially in patients with human immunodeficiency virus (HIV) infection and transplant recipients. Exposure to immunosuppressants agents among patients with solid and hematologic malignancy is likely to increase risk of TB. However, characteristics of TB in this population remain scarce.

Methods. A single-center, retrospective descriptive study was conducted at King Chulalongkorn Memorial Hospital. Adult patients who developed TB between January 2008 and October 2018 after diagnosis of solid or hematologic malignancy were identified using ICD-10 code. Baseline, clinical characteristics, and treatment outcomes were collected.

Results. A total of 114 patients developed TB after diagnosis of malignancy including, 67 (58.8%) with solid tumor and 47 (41.2%) with hematologic malignancy. Lung cancer was the most common solid malignancy with TB (17.9%) followed by head and neck carcinoma (14.9%) and colorectal cancer (13.4%). For hematologic malignancies, non-Hodgkin’s lymphoma was the most common malignancy (53.2%) followed by leukaemia (29.8%) and multiple myeloma (14.9%). Among patients who received immunosuppressive treatment, the mean onset of TB was 4.97 months (range 0.25 to 57 months) and 2.55 months (range 0.1 to 18 months) after treatment of solid and hematologic malignancies. Pulmonary and pleural involvement remained the most common site of infection in both groups. Mortality was highest among patients with hematologic malignancies (40.4%) while mortality in solid malignancies was 11.9%.

Conclusion. TB in patients with solid and hematologic malignancies contained substantial morbidity and mortality. Immunosuppressants agents and chemotherapy may play an important role especially in the endemic area.

Disclosures. All authors: No reported disclosures.