

Utilizing biomarkers of infection to monitor response to treatment of tuberculosis in children and adolescents

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With an estimated 1 million cases related to almost 140,000 deaths in 2014, pediatric tuberculosis (TB) remains a global public health challenge. Proper treatment of TB is critical to improving outcomes and reducing transmission of the disease. Currently, the standard procedure to assess response to treatment of TB in adults depends on direct bacteriological examination and/or sputum culture after initiation of treatment. In children and adolescents, this method is often ineffective because many of these patients present paucibacillary TB, which rarely produces positive microbiological tests. The aim of this study is to use biomarkers of TB infection to evaluate the response to treatment of HIV-infected and uninfected pediatric patients. The study cohort includes children and adolescents (≤ 19 years old) diagnosed with pulmonary or extrapulmonary TB at 7 health units and hospitals in the Rio de Janeiro metropolitan area since September 2014. Asymptomatic children and adolescents (≤ 19 years old) with no household TB contact are invited to participate as healthy controls. Clinical and laboratory follow-up is carried out for six months after admission to the study (0, 1, 2 and 6 months), or until completion of treatment course if more than 6 months is required. Enzyme-linked immunosorbent assay (ELISA) is used to measure the level of antibodies against *Mycobacterium tuberculosis* cell-wall lipids (cardiolipin, sulfatide and mycolic acid) and protein (Mce1a) in patient serum. Preliminary analysis of 22 subjects showed that, on average, all five antibody levels decreased by 30% or more after anti-TB treatment. In healthy controls, anti- sulfatide, mycolic acid, and Mce1a antibodies decreased by less than 7% over the same time period, whereas anti-cardiolipin also showed a 30% decrease in these subjects. These results indicate that the level of reduction in our biomarkers of interest may serve as a way to track successful treatment of TB in pediatric patients.

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