

Risk of non-mycobacterial tuberculosis infection lurks beneath the water surface

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Abbreviations: TB, tuberculosis; BCG, bacillus calmette-guérin; IGRA, interferon gamma release assay; NTB, non-tb mycobacterial infections; MDR-TB, multi-drug resistance; NTM, non TB mycobacterial

Editorial

Death from tuberculosis (TB) comes second to HIV/AIDS worldwide.¹ The question is, despite advancements made in early detection and diagnostic tests by Interferon Gamma Release Assay (IGRA) assays, why do people still die of TB? Clearly, the only licensed Bacillus Calmette-Guérin (BCG) vaccine is not effective in preventing the disease. According to WHO, in 2014, 9.6 million people were TB positive and 1.5 million died of TB globally. Out of these, 80% of the cases were from developing countries such as India, Indonesia, Nigeria, China, Pakistan and South Africa. Factors that contribute to such high rates of death are HIV/AIDS, multi-drug resistance (MDR-TB) and Non-TB mycobacterial infections (NTB). Globally, TB remains the most common cause of death in HIV patients.

HIV virus and TB bacteria can co-work together causing functional changes in T-cells and macrophages.² Another risk factor for increased TB related deaths is the multi-drug resistance to TB infection. In 2014, 480,000 TB patients worldwide developed Multi drug resistant TB (MDR-TB), TB that does not respond to isoniazid and rifampicin.³ Often times, MDR-TB develops in patients due to use of poor quality medicines and premature treatment interruption. Length of treatment extending to years and the number of pills contribute to the non-conformity to treatment regimen in patients. Efforts made by TB alliance group have made possible a triple combination pill for TB called PaMZ (Pretomanid + Moxifloxacin + Pyrazinamide). PaMZ is under clinical trials which are expected to decrease the length and cost of TB treatment.⁴

TB cases in United States have decreased by 2.2% in 2014, however, the risk of non TB mycobacterial (NTM) infection is reported to be increasing annually.^{5,6} Non-Tuberculosis Mycobacterium (NTM) infections or MOTT (Mycobacterium other than tuberculosis) are caused by mycobacterial species other than *Mycobacterium tuberculosis*.⁷ NTM infections are infections very common in immunocompromised patients and US alone has 10 million immunocompromised patients that are HIV positive, transplant patients and patients on steroid medications.⁸ Unlike TB, Non-TB infection is transmitted through environmental exposure such as soil and water.⁹ It is predicted that patients may be at a greater risk of NTM infection than TB in United States with prevalence in elderly women.^{10,11}

Longer hot bath showers can increase the risk of Non-TB infection.⁷ Most prevalent Non-TB infectious microbes such as *M.*

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Avium complex, *M. Smegmatis* are known to form biofilms and to live in water pipelines for long years.^{12,13} Currently, there are 150 species of Mycobacterium discovered, it is critical to recognize that these bacteria may cause pulmonary disease in both immunocompetent and immunocompromised patients.¹⁴

A multipronged approach is often necessary to diagnose the mycobacterium agent, which include culture growth of NTM from one bronchoalveolar lavage, sputum samples, or culture from respiratory tissue demonstrating granulomatous histopathology.¹¹ The choice and extent of treatment depends on the mycobacterium species and often times may need surgery depending on the disease severity. At present, there are substantial gaps in regards to identification and treatment of the NTM disease; nevertheless, it is becoming increasingly evident that the incidence of NTM infections surpasses that of TB infections in developed countries.

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None.

Conflicts of Interest

None.

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