

TB Risk Factors in HIV: Insights into TST Conversion

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DESCRIPTION

Tuberculosis (TB) remains a leading cause of morbidity and mortality among people living with HIV/AIDS. The intersection of TB and HIV creates a formidable public health challenge, as HIV-infected individuals are significantly more susceptible to TB due to their weakened immune systems. One important aspect of managing this dual epidemic is understanding the risk factors for Tuberculin Skin Test (TST) conversion among HIV-infected patients. TST conversion, which indicates a recent infection with *Mycobacterium tuberculosis*, is a critical marker for identifying individuals at high risk of developing active TB disease. The Tuberculin Skin Test (TST) involves injecting a small amount of Purified Protein Derivative (PPD) of *Mycobacterium tuberculosis* into the skin and measuring the immune response 48-72 hours later. TST conversion is defined as a change from a negative to a positive test result over time, suggesting new infection with TB. For HIV-infected patients, the criteria for a positive TST are generally more lenient (typically an induration of 5 mm or more) due to their compromised immune response.

Risk factors for TST conversion

The degree of immunosuppression is a significant risk factor. HIV-infected patients with lower CD4⁺ T-cell counts are at higher risk of TST conversion and subsequent TB infection. As the immune system weakens, the body becomes less capable of containing and fighting off *M. tuberculosis*. HIV-infected individuals living or working in close proximity to active TB cases are at heightened risk of TST conversion. This includes household contacts, healthcare workers, and individuals residing in congregate settings such as prisons or shelters, where TB transmission rates are higher. Living in regions with high TB prevalence significantly increases the risk of TST conversion. Environmental factors such as poor ventilation and crowded living conditions can facilitate the spread of *M. tuberculosis*, especially in areas where HIV is also prevalent. HIV-infected patients with a history of previous TB exposure or latent TB infection are at increased risk of TST conversion. Reactivation of latent TB infection is more likely in the presence of HIV due to

the compromised immune system. HIV-infected patients with a history of previous TB exposure or latent TB infection are at increased risk of TST conversion. Reactivation of latent TB infection is more likely in the presence of HIV due to the compromised immune system. While ART can significantly reduce the risk of TB by improving immune function, the timing and adherence to ART are important. Patients who have not yet initiated ART or have poor adherence to their ART regimen are at higher risk of TST conversion. Conversely, effective ART can reduce the risk by partially restoring immune function.

Implications for public health

Healthcare providers should prioritize TST screening for HIV-infected individuals who are at high risk of TB exposure, including those with low CD4⁺ counts, close contacts of TB patients, and individuals in high-prevalence regions. Regular monitoring and timely identification of TST conversion can facilitate early intervention. For those who test positive for TST conversion, preventive TB therapy (e.g., isoniazid preventive therapy) can significantly reduce the risk of progression to active TB. Integrating TB preventive therapy with ART programs can enhance outcomes for HIV-infected patients. Public health interventions aimed at improving living conditions, reducing overcrowding, and ensuring adequate ventilation can mitigate the risk of TB transmission in high-risk environments. Promoting better nutrition and addressing co-infections and comorbidities can further strengthen immune function and reduce susceptibility to TB.

CONCLUSION

The intersection of HIV and TB presents unique challenges for public health. Identifying and addressing the risk factors for TST conversion among HIV-infected patients is critical for preventing the development and spread of TB in this vulnerable population. Through targeted screening, preventive therapy, and comprehensive public health strategies, it is possible to mitigate the impact of these dual epidemics and improve outcomes for individuals living with HIV.

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