

THE IMPORTANCE OF QUANTIFERON-TB GOLD TEST IN DIAGNOSING LATENT TUBERCULOSIS INFECTION

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Relevance

Latent tuberculosis infection remains one of the most persistent global public health threats. It is estimated by the World Health Organization (WHO) that approximately 25 percent of the world's population is infected with latent tuberculosis bacilli. Although individuals with latent tuberculosis do not show clinical symptoms and are not contagious, around 5 to 10 percent of them will eventually develop active tuberculosis disease during their lifetime, particularly when the immune system is weakened. Therefore, early detection and preventive treatment of latent tuberculosis infection are critical components in breaking the transmission cycle of tuberculosis. The QuantiFERON-TB Gold test has become an important diagnostic tool for identifying latent tuberculosis infection, particularly in settings where Bacille Calmette-Guérin (BCG) vaccination is common, which can reduce the specificity of the traditional Tuberculin Skin Test (TST). This interferon-gamma release assay provides greater accuracy, faster results, and fewer false positives caused by previous BCG vaccination or exposure to non-tuberculous mycobacteria.

Objective: The objective of this research is to examine the diagnostic significance and clinical utility of the QuantiFERON-TB Gold test in the detection of latent tuberculosis infection. The study aims to evaluate its diagnostic performance, compare it with traditional diagnostic methods such as the Tuberculin Skin Test, and assess its potential application in clinical and epidemiological settings.

Materials and Methods: This thesis is based on a comprehensive review of scientific literature, including research articles, clinical guidelines, and systematic reviews published in peer-reviewed journals. The analysis included studies involving immunocompromised patients, healthcare workers, children, and populations from high tuberculosis prevalence regions. Key performance indicators such as sensitivity, specificity, predictive values, and cost-effectiveness were evaluated. Clinical trial data from sources including the Centers for Disease Control and Prevention (CDC), the World Health Organization (WHO), and manufacturers' validation studies were reviewed.

Results: The review demonstrated that the QuantiFERON-TB Gold test consistently shows higher specificity than the Tuberculin Skin Test, particularly in individuals previously vaccinated with BCG. Its laboratory-based format eliminates reader bias and provides objective, quantitative results within 24 hours. The test requires only one patient visit, enhancing its feasibility for large-scale screening programs. Although slightly less sensitive in severely immunocompromised individuals, it remains more reliable than TST in detecting latent tuberculosis in these populations. Studies also indicate that the use of QuantiFERON-TB Gold test in contact investigations, healthcare worker screenings, and pre-immigration evaluations increases diagnostic efficiency and enables earlier initiation of preventive therapy.

Conclusion: The QuantiFERON-TB Gold test represents a significant advancement in the accurate diagnosis of latent tuberculosis infection. Its superior specificity, independence from prior BCG vaccination, and operational simplicity make it a valuable asset in global tuberculosis control efforts. Its use should be prioritized in high-risk and resource-limited settings where traditional methods have limitations. Further research and global health policy support are needed to improve accessibility, affordability, and integration of this test into national tuberculosis prevention strategies.

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