OPEN ACCESS Freely available online

Mycobacterial Diseases

ISSN: 2161-1068

Commentary

Early Tuberculosis Detection through Immune Complexes

Lui Maria*

Department of Radiology, Ramón y Cajal University Hospital, Madrid, Spain

DESCRIPTION

Pulmonary Tuberculosis (TB), caused by *Mycobacterium tuberculosis*, remains a significant global health issue. Despite advances in medical science, TB continues to cause millions of new infections and deaths annually. Early and precise diagnosis is important for effective treatment and control. One emerging area of TB research is the study of Circulating Immune Complexes (CICs), which are formed when antibodies bind to antigens. These complexes could potentially serve as valuable diagnostic markers. CICs are a component of the immune system's response to infections. In the case of TB, mycobacterial antigens trigger the production of antibodies, which then bind to these antigens to form CICs. Typically, these complexes are cleared from the bloodstream by the body's mononuclear phagocyte system. However, in TB, continuous exposure to mycobacterial antigens can lead to the persistent presence of CICs in the bloodstream.

Methods for detecting CICs

Enzyme-Linked Immunosorbent Assay (ELISA): This widely used method detects and quantifies CICs with high sensitivity and specificity. ELISA can identify even low levels of CICs in the blood.

Radioimmunoassay: This technique uses radioactively labelled antibodies to detect CICs. Although highly sensitive, it requires specialized equipment and the handling of radioactive materials.

Precipitation and agglutination tests: These simpler methods involve the precipitation or agglutination of CICs in the presence of specific reagents. Although less sensitive than ELISA and radioimmunoassay, they can be useful in resource-limited settings.

Complement fixation test: This test measures the ability of CICs to activate the complement system, providing an indirect indication of their presence.

Diagnostic significance of CICs in pulmonary TB

CICs can be detected early in TB infection, often before symptoms appear. This makes them valuable as early biomarkers, potentially allowing for timely intervention. The levels of CICs in the blood correlate with TB activity and severity. Higher CIC levels often indicate more extensive disease and higher bacterial loads, helping to assess prognosis and monitor treatment response. Differentiating between latent TB infection and active pulmonary TB is important for appropriate treatment. Generally, CIC levels are higher in active TB, providing a potential marker to distinguish between these states. Monitoring CIC levels over time can help assess treatment effectiveness. A decrease in CIC levels typically indicates a successful response to therapy, while persistently high levels may suggest treatment failure or relapse.

Challenges and future directions

Beyond anti-tuberculosis drugs, e-beam treatment has wide applications in the production of various medical preparations. E-beam irradiation can be used to inactivate viruses and bacteria, facilitating the production of vaccines that retain immunogenic properties without causing disease. The technology is effective in sterilizing medical devices, including syringes, surgical instruments, and implants, ensuring they are free from pathogens. E-beam treatment can modify polymers used in medical devices and drug delivery systems, enhancing their properties such as biocompatibility and mechanical strength.

CONCLUSION

Circulating immune complexes offer a promising avenue for improving the diagnosis and management of pulmonary tuberculosis. By providing early detection, aiding in the differentiation between latent and active TB, and monitoring treatment response, CICs can significantly improve patient outcomes. Continued research and development in this area are essential to fully realize the potential of CICs in the fight against TB.

Correspondence to: Lui Maria, Department of Radiology, Ramón y Cajal University Hospital, Madrid, Spain, Email: maria.li26@acu.in

Received: 03-Apr-2024, Manuscript No. MDTL-24-32622; **Editor assigned:** 05-Apr-2024, PreQC No. MDTL-24-32622 (PQ); **Reviewed:** 19-Apr-2024, QC No. MDTL-24-32622; **Revised:** 26-Apr-2024, Manuscript No. MDTL-24-32622 (R); **Published:** 03-May-2024, DOI: 10.35248/2161-1068.24.14.455.

Citation: Maria L (2024) Early TB Detection through Immune Complexes. Mycobact Dis. 14:455.