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Perspective

Reducing Mortality in HIV and MDR-TB Co-infection through ART

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DESCRIPTION

The intersection of Tuberculosis (TB) and Human Immunodeficiency Virus (HIV) has posed a significant public health challenge globally, particularly in regions with high prevalence rates of both diseases. Tuberculosis is the leading cause of death among people living with HIV, and when Multidrug-Resistant Tuberculosis (MDR-TB) is involved, the risk of mortality becomes even more severe. MDR-TB, caused by strains of *Mycobacterium tuberculosis* resistant to at least isoniazid and rifampicin, complicates treatment and significantly increases the risk of death. Antiretroviral Therapy (ART), however, has proven to be a life-saving intervention for HIV-infected individuals, especially when combined with TB treatment. This article examines the impact of ART on mortality rates in adults with co-infection of MDR-TB and HIV. MDR-TB presents unique challenges for those living with HIV. People with HIV have weakened immune systems, making them more vulnerable to TB infection. For these individuals, MDR-TB is particularly dangerous because the standard TB treatments are ineffective. As a result, patients often endure longer, more toxic, and expensive treatment regimens with lower success rates. According to the World Health Organization (WHO), an estimated 450,000 people develop MDR-TB each year, and a significant proportion of these individuals are also living with HIV. The dual burden of these two infections is particularly heavy in Sub-Saharan Africa and parts of Asia, where HIV and MDR-TB are both prevalent. Without appropriate intervention, mortality rates in individuals with both conditions are alarmingly high.

Antiretroviral therapy and its role in reducing mortality

ART has revolutionized the management of HIV by reducing viral load, restoring immune function, and preventing opportunistic infections like TB. For HIV-positive individuals, the initiation of ART can significantly reduce the risk of developing active TB. When TB does develop, ART has been shown to improve overall treatment outcomes, including for patients with MDR-TB. Several studies have demonstrated that ART dramatically reduces mortality in patients co-infected with HIV and MDR-TB. The mechanism is relatively straightforward: ART restores immune function, enabling the body to better fight TB infections. Patients receiving ART are more likely to respond positively to MDR-TB treatment, experience fewer complications, and have a better quality of life. One of the key considerations in managing patients with HIV and MDR-TB co-infection is the timing of ART initiation. Early initiation of ART is important for reducing mortality. WHO guidelines recommend starting ART as soon as possible after the diagnosis of HIV in patients with TB, regardless of their CD4 count. This approach helps restore immune function more quickly and prevents the worsening of both diseases. However, there are challenges associated with the simultaneous treatment of MDR-TB and HIV. Drug-drug interactions, overlapping toxicities, and the increased pill burden can complicate treatment adherence and patient outcomes. Nonetheless, the benefits of starting ART early far outweigh these risks. Studies have shown that delayed ART initiation significantly increases mortality risk in patients with MDR-TB and HIV.

Impact of CD4 count on mortality

The CD4 count, a measure of immune system function, plays an essential role in predicting outcomes for people co-infected with HIV and MDR-TB. Patients with lower CD4 counts (particularly below 200 cells/mm^3) are at higher risk of mortality due to their severely weakened immune systems. ART helps improve CD4 counts, reducing this risk. Research indicates that patients with MDR-TB and low CD4 counts who are not on ART have extremely high mortality rates, often exceeding 50%. In contrast, those who begin ART promptly and achieve immune restoration experience significantly better outcomes, with substantially lower mortality rates. While ART has proven to be highly effective in reducing mortality, there are numerous barriers that prevent patients from receiving timely treatment. In many high-burden countries, limited access to healthcare services, insufficient diagnostic tools, and shortages of second-line TB drugs pose significant challenges. Additionally, stigma and discrimination

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surrounding both HIV and TB further complicate treatment access. Adherence to both ART and MDR-TB treatment regimens is another major hurdle. The long duration of MDR-TB treatment, combined with the side effects of both ART and TB medications, can lead to poor adherence and, ultimately, poorer outcomes. Patients must navigate complex treatment protocols, which often require substantial support from healthcare providers, families, and communities.

CONCLUSION

In adults with co-infection of multidrug-resistant tuberculosis and HIV, mortality rates are alarmingly high without proper intervention. ART has proven to be an essential tool in reducing mortality in this vulnerable population by restoring immune function and improving the body's ability to fight TB. Early initiation of ART, especially in patients with low CD4 counts, is essential for improving survival rates. However, numerous barriers to treatment, including drug interactions, side effects, and access to healthcare, must be addressed to ensure the effectiveness of ART and MDR-TB treatment in reducing mortality. Strengthening healthcare systems and increasing access to ART and MDR-TB treatment are vital steps toward controlling the dual epidemics of TB and HIV and reducing the number of preventable deaths worldwide.