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APPLICATION OF ANTIRETROVIRAL THERAPY IN HIV-INFECTED PATIENTS WITH DIABETES MELLITUS

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Relevance: The coexistence of HIV infection and diabetes mellitus (DM) is becoming increasingly common due to the prolonged lifespan of HIV-infected individuals as a result of improved antiretroviral therapies (ART). This coexistence presents complex clinical challenges because both conditions individually contribute significantly to morbidity and mortality worldwide. Managing these comorbidities effectively is crucial, as diabetes complicates HIV treatment by increasing the risk of cardiovascular diseases, renal failure, neuropathy, and opportunistic infections. Additionally, certain antiretroviral drugs exacerbate insulin resistance, glucose intolerance, and dyslipidemia, thereby elevating the risk of developing diabetes or worsening existing diabetic conditions. Addressing these intersecting conditions requires integrated clinical strategies to optimize treatment outcomes, enhance patient quality of life, and reduce healthcare system burdens.

Keywords:HIV, Diabetes Mellitus, Antiretroviral Therapy, Comorbidity, Metabolic Disorders, Epidemiology.

Introduction

Human Immunodeficiency Virus (HIV) remains a significant global public health issue, while diabetes mellitus (DM) is rapidly increasing worldwide. The intersection of these two conditions poses unique clinical challenges (Noubissi et al., 2020). ART has significantly improved survival rates for HIV-infected individuals but is associated with metabolic side effects, including increased risk for insulin resistance and diabetes (Paengsai et al., 2021). Thus, understanding the application and optimization of ART in diabetic patients living with HIV is essential for improving clinical outcomes and quality of life.

Diabetes prevalence among HIV-infected patients is notably higher than in the general population, attributed to both HIV infection itself and the metabolic side effects of ART. Persistent inflammation caused by HIV and ART-related insulin resistance contributes to the pathogenesis of diabetes in these patients (Brown et al., 2017). Addressing this complex interaction requires careful selection and monitoring of ART regimens.

Materials and Methods

This review integrates data from clinical trials, cohort studies, and systematic reviews published from 2015 to 2025. Databases such as PubMed, Web of Science, and clinical trial registries were utilized to identify relevant literature concerning HIV-infected individuals with diabetes mellitus receiving ART. The study evaluated the metabolic impacts of various ART regimens, glycemic control, drug interactions, and overall patient outcomes. Additional analysis involved reviewing guidelines from the World Health Organization (WHO) and the American Diabetes Association (ADA) for managing these comorbid conditions.

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Results

Studies indicate that HIV-infected patients on ART have an increased incidence of diabetes mellitus compared to the general population, primarily due to ART-associated insulin resistance (Dimala et al., 2016). Protease inhibitors (PIs) and certain nucleoside reverse transcriptase inhibitors (NRTIs) like stavudine and zidovudine have been particularly associated with heightened metabolic risks (Dimala et al., 2016).

Conversely, integrase strand transfer inhibitors (INSTIs) such as dolutegravir show a more favorable metabolic profile, demonstrating lower risk of diabetes-related complications (Hill et al., 2020). A meta-analysis revealed improved glycemic control and reduced metabolic syndrome incidence in patients switched to INSTI-based regimens compared to PIs (Paengsai et al., 2021).

Furthermore, diabetic patients on ART require frequent monitoring of glucose levels and metabolic parameters due to potential drug interactions, notably between ART medications and antidiabetic agents like metformin (Glesby et al., 2019). Clinical data suggest the importance of personalized ART regimens based on individual metabolic profiles and comorbid conditions to optimize clinical outcomes.

Additionally, cohort studies indicate increased cardiovascular risks in HIV-infected patients with diabetes, necessitating integrated management of cardiovascular and metabolic risk factors. Clinical trials also highlight the importance of lifestyle interventions alongside pharmacological management to achieve optimal outcomes in this patient group (Friis-Møller et al., 2018).

Discussion

The management of HIV-infected individuals with concurrent diabetes mellitus requires an integrated therapeutic approach. While ART significantly improves HIV-related outcomes, its association with metabolic dysregulation necessitates careful regimen selection and monitoring (Noubissi et al., 2020).

INSTIs appear to offer distinct advantages over older ART drugs regarding metabolic outcomes and are increasingly recommended for patients at risk of metabolic disorders (Hill et al., 2020). Nonetheless, consistent monitoring for adverse metabolic effects remains crucial due to potential inter-individual variability in drug metabolism and response.

Interprofessional collaboration among endocrinologists, infectious disease specialists, and primary care providers is essential in managing these patients, emphasizing comprehensive care that includes lifestyle modifications, dietary interventions, and tailored pharmacological strategies.

Challenges remain in the widespread implementation of these integrated approaches due to resource limitations, especially in low- and middle-income countries. Lack of standardized guidelines across regions further complicates clinical decision-making processes, highlighting the need for unified international recommendations and resource mobilization (Maggi et al., 2020).

Conclusion and Recommendations

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Optimal ART management in HIV-infected patients with diabetes mellitus involves selecting regimens with minimal metabolic risks, primarily utilizing INSTIs. Regular metabolic screening, personalized medicine approaches, and enhanced interdisciplinary collaboration are critical for improving patient outcomes.

Recommendations include:

1. Preferentially prescribing ART regimens with lower metabolic risks, particularly INSTIs.
2. Routine and comprehensive metabolic monitoring for early identification of complications.
3. Strengthening interdisciplinary care teams for effective comorbidity management.
4. Implementing patient education on lifestyle and dietary adjustments to support pharmacological treatment.
5. Development and adoption of international standardized guidelines for managing HIV and diabetes comorbidities.
6. Improving healthcare infrastructure and resources in low-income regions to enhance the quality of care.

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