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## Body Mass Index Changes During Remission and Relapse in Leukemia Patients Living with HIV: A Review

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### Abstract

Leukemia patients living with HIV face a complex medical landscape characterized by the interplay of two major health conditions, each profoundly impacting immune function and overall health. Body Mass Index (BMI) emerges as a critical marker in this context, reflecting nutritional status, treatment response, and prognostic outcomes. This review explores the dynamic changes in BMI during remission and relapse phases among leukemia patients with HIV, aiming to elucidate underlying factors, clinical implications, and avenues for future research. Antiretroviral therapy (ART) and chemotherapy, cornerstones of HIV and leukemia management, respectively, exert intricate effects on BMI. While some ART regimens are associated with weight gain and metabolic alterations, chemotherapy often leads to weight loss due to treatment-related side effects. Moreover, the combined impact of ART and chemotherapy complicates BMI fluctuations, necessitating close monitoring and tailored interventions to optimize patient outcomes. Nutritional status emerges as a key determinant influencing BMI changes in leukemia patients with HIV. Malnutrition is prevalent in this population, exacerbated by treatment-related side effects and HIV-associated opportunistic infections. Nutritional interventions, including dietary modifications and supplementation, play a crucial role in supporting patients through treatment and recovery phases.

**Keywords:** *Body Mass Index, BMI, leukemia, HIV, remission, relapse, antiretroviral therapy, chemotherapy, nutrition, immune function, metabolic health*

### Introduction

Leukemia, a hematologic malignancy characterized by the uncontrolled proliferation of abnormal white blood cells, poses a significant health burden globally. Concurrently, Human Immunodeficiency Virus (HIV) infection remains a major public health challenge, leading to acquired immunodeficiency syndrome (AIDS) in advanced stages. The coexistence of leukemia

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and HIV in patients presents a unique clinical scenario, where the complex interactions between these two conditions profoundly influence disease progression, treatment outcomes, and overall patient well-being. Against this backdrop, Body Mass Index (BMI) emerges as a crucial parameter reflecting the nutritional status and metabolic health of individuals, with implications extending beyond mere body weight assessment.<sup>1-5</sup> The dynamic nature of BMI in leukemia patients living with HIV presents a multifaceted clinical challenge. BMI serves as a fundamental indicator of nutritional status, which is intricately linked to immune function and treatment outcomes in both leukemia and HIV. While leukemia and its treatment modalities can lead to fluctuations in BMI due to factors such as chemotherapy-induced nausea, vomiting, and appetite changes, HIV infection itself can impact metabolism, energy expenditure, and fat distribution. Therefore, understanding the patterns and determinants of BMI changes during different phases of leukemia (remission vs. relapse) becomes essential for optimizing patient care and improving prognostic outcomes.<sup>6-10</sup> Antiretroviral therapy (ART), a cornerstone of HIV management, further complicates the relationship between BMI and leukemia in HIV-infected patients. While ART can improve immune function and reduce the risk of opportunistic infections, certain drug regimens are associated with metabolic disturbances, insulin resistance, and lipodystrophy, which can affect BMI. Additionally, chemotherapy, the primary treatment modality for leukemia, can lead to alterations in BMI through its effects on appetite, nutrient absorption, and energy metabolism. The combined impact of ART and chemotherapy on BMI underscores the need for a comprehensive understanding of these interactions to optimize treatment strategies and mitigate adverse effects.<sup>11-15</sup>

Nutritional status emerges as a critical determinant influencing BMI dynamics in leukemia patients living with HIV. Malnutrition, common in this patient population due to factors such as treatment-related side effects, HIV-associated wasting syndrome, and metabolic complications, can exacerbate the clinical course of both leukemia and HIV. Moreover, malnutrition compromises immune function, impairs wound healing, and increases susceptibility to infections, further complicating treatment outcomes. Therefore, tailored nutritional interventions, including dietary counseling, oral supplements, and enteral or parenteral nutrition support, play a pivotal role in addressing malnutrition and optimizing BMI in these patients.<sup>16-20</sup> Beyond its role as a surrogate marker of nutritional status, BMI holds prognostic significance in leukemia patients living with HIV. Studies have shown associations between BMI and treatment outcomes, disease progression, and overall survival in various cancer types, including leukemia. Obesity, characterized by elevated BMI, has been linked to increased cancer incidence, treatment-related toxicities, and inferior survival outcomes. Conversely, underweight status, indicative of malnutrition, is associated with treatment intolerance, compromised immune function, and higher mortality rates. Therefore, BMI assessment serves as a valuable tool for risk stratification and treatment planning in leukemia patients with HIV, aiding clinicians in making informed decisions tailored to individual patient needs.<sup>21-25</sup>

### **BMI Changes During Remission and Relapse in Leukemia Patients with HIV**

Body Mass Index (BMI) serves as a critical parameter in evaluating the nutritional status and metabolic health of individuals, particularly those with complex medical conditions such as

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leukemia and HIV. In the context of leukemia patients living with HIV, BMI undergoes dynamic changes during different phases of the disease, including remission and relapse. During remission phases, characterized by the absence of detectable leukemia cells in peripheral blood and bone marrow, BMI trends may vary among patients. Some individuals may experience weight gain and improvement in nutritional status as a result of treatment response and recovery from treatment-related side effects. However, other patients may struggle with persistent malnutrition and metabolic complications, stemming from the cumulative effects of chemotherapy, HIV-related immunosuppression, and opportunistic infections. The heterogeneity in BMI changes during remission underscores the importance of individualized nutritional assessment and intervention to support patients through the recovery phase.<sup>26-30</sup>

Conversely, BMI dynamics during relapse, marked by the recurrence of leukemia cells and disease progression, often reflect a reversal of the trends observed during remission. Patients may experience weight loss, cachexia, and worsening nutritional status as a consequence of disease activity, treatment resistance, and increased metabolic demands associated with cancer progression. In the context of HIV infection, relapse may further exacerbate metabolic dysregulation and immune dysfunction, leading to accelerated weight loss and compromised nutritional status. Thus, monitoring BMI during relapse is essential for identifying patients at risk of nutritional deterioration and implementing timely interventions to mitigate adverse outcomes. Antiretroviral therapy (ART) and chemotherapy play pivotal roles in shaping BMI changes during remission and relapse in leukemia patients with HIV. While ART aims to suppress HIV replication and restore immune function, certain drug regimens may contribute to metabolic disturbances and alterations in body composition. Similarly, chemotherapy, while targeting leukemia cells, can induce treatment-related side effects such as nausea, vomiting, and mucositis, impacting food intake, nutrient absorption, and energy metabolism. The combined effects of ART and chemotherapy on BMI underscore the importance of close monitoring and interdisciplinary management to address nutritional needs and optimize treatment outcomes. Nutritional interventions emerge as key strategies for managing BMI changes during remission and relapse in leukemia patients with HIV. Dietary counseling, oral supplements, and enteral or parenteral nutrition support can help mitigate malnutrition, support immune function, and enhance treatment tolerance. Additionally, physical activity and exercise programs tailored to individual patient capabilities can aid in preserving lean body mass, improving functional status, and promoting overall well-being. By integrating nutritional support into comprehensive care plans, healthcare providers can optimize BMI and enhance the quality of life for leukemia patients living with HIV during both remission and relapse phases.<sup>31-40</sup>

### **Clinical Implications**

The impact of antiretroviral therapy (ART) on Body Mass Index (BMI) dynamics in leukemia patients living with HIV carries significant clinical implications that warrant careful consideration in treatment planning and patient management. Firstly, healthcare providers must recognize the potential metabolic effects of ART on BMI and monitor patients closely for signs of metabolic disturbances, such as changes in body fat distribution, insulin resistance, and dyslipidemia. Regular assessment of BMI, along with metabolic parameters such as fasting glucose, lipid profile,

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and waist circumference, can help identify patients at risk of metabolic complications and inform targeted interventions to mitigate these risks. Secondly, optimizing adherence to ART is paramount for maintaining viral suppression and reducing the risk of HIV-related complications. Poor adherence to ART can compromise treatment outcomes, increase the risk of opportunistic infections, and impact nutritional status and BMI. Therefore, healthcare providers should prioritize patient education, counseling, and support to promote adherence to ART regimens, particularly during periods of leukemia treatment where adherence may be challenging.<sup>41-50</sup> Furthermore, the integration of ART with leukemia treatment requires careful consideration of potential drug interactions and overlapping toxicities. Certain antiretroviral drugs may interact with chemotherapy agents, affecting treatment efficacy and toxicity profiles. Additionally, chemotherapy-induced side effects, such as nausea, vomiting, and mucositis, can impact food intake, nutrient absorption, and BMI. Therefore, interdisciplinary collaboration between HIV specialists and oncologists is essential to develop individualized treatment plans that optimize therapeutic outcomes while minimizing adverse effects on BMI and nutritional status. Moreover, nutritional support plays a crucial role in managing BMI changes and improving outcomes in leukemia patients with HIV. Dietary counseling, oral supplements, and enteral or parenteral nutrition support should be integrated into comprehensive care plans to address malnutrition, support immune function, and enhance treatment tolerance. Additionally, physical activity and exercise programs tailored to individual patient capabilities can help preserve lean body mass, improve functional status, and promote overall well-being.<sup>51-61</sup>

## Conclusion

The relationship between antiretroviral therapy (ART) and Body Mass Index (BMI) dynamics in leukemia patients living with HIV underscores the complexity of managing these dual conditions. ART plays a crucial role in suppressing viral replication, restoring immune function, and improving overall health outcomes in HIV-infected individuals. However, its impact on BMI can be multifaceted, influencing metabolic health, immune function, and treatment outcomes. Healthcare providers must recognize the clinical implications of ART on BMI dynamics and incorporate this knowledge into comprehensive care plans for leukemia patients with HIV. Close monitoring of BMI, metabolic parameters, and adherence to ART is essential for optimizing treatment outcomes and mitigating potential adverse effects. Interdisciplinary collaboration between HIV specialists and oncologists is paramount to develop individualized treatment strategies that address the unique needs of this patient population. Furthermore, nutritional support plays a critical role in managing BMI changes and improving outcomes in leukemia patients with HIV. Dietary counseling, oral supplements, and physical activity programs should be integrated into care plans to address malnutrition, support immune function, and enhance treatment tolerance.

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