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Original Research Article

Changes in Fasting and Postprandial Blood Glucose among People Living with HIV Receiving Highly Active Antiretroviral Therapy: A 24-Month Observational Follow-Up Study

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Abstract

Background: The increasing life expectancy of people living with HIV has made long-term metabolic complications an important area of clinical research. Antiretroviral therapy (ART) has substantially improved HIV-related outcomes, but metabolic abnormalities, including dysglycemia and insulin resistance, may occur during treatment.

Objective: To evaluate changes in fasting and postprandial blood glucose among HIV-infected patients receiving HAART over a 24-month follow-up period.

Methods: This observational follow-up study was conducted in the Department of Medicine, RIMS, Imphal. A total of 100 HIV-positive patients admitted to the medicine ward and receiving HAART were included. Patients were followed at baseline and at 6, 12, 18, and 24 months. Fasting and postprandial blood glucose were recorded, and adverse effects of HAART were documented. Statistical analysis was performed using SPSS version. The statistical test used and the method of handling repeated measurements require confirmation.

Results: Among 100 patients, 34 (34%) were reported to have adverse effects related to HAART. Mean fasting blood glucose increased from 87.61 ± 11.18 mg/dL at baseline to 93.79 ± 10.21 mg/dL at 24 months. Mean postprandial blood glucose increased from 107.01 ± 23.82 mg/dL to 113.10 ± 23.69 mg/dL over the same period. The handwritten record reports statistically significant increases at several follow-up points; however, the exact p-values and statistical test require verification.

Conclusion: This study suggests that blood glucose levels increased gradually during HAART follow-up. Regular metabolic monitoring may help identify patients who develop dysglycemia during treatment. Larger, prospective studies with appropriate adjustment for confounding factors are needed to clarify the relationship between ART and changes in blood glucose.

Keywords: HIV; HAART; Antiretroviral Therapy; Fasting Blood Glucose; Postprandial Blood Glucose; Dysglycemia; Metabolic Complications.

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Introduction

The introduction of highly active antiretroviral therapy has transformed HIV infection into a chronic, manageable condition. As survival improves, increasing attention is being directed toward long-term comorbidities, including cardiovascular disease, diabetes, dyslipidemia, and other metabolic complications.

Antiretroviral therapy is essential for people living with HIV, and treatment should not be delayed because of concerns about weight gain or metabolic complications.

However, long-term treatment requires monitoring for adverse effects and metabolic abnormalities. Changes in glucose metabolism may occur in the context of HIV-associated inflammation, changes in body composition, weight gain, and the effects of individual antiretroviral agents.

The risk of metabolic complications may therefore vary according to the treatment regimen and the patient's baseline characteristics.

Monitoring of blood glucose is an important component of clinical care. Current HIV treatment guidance includes glucose assessment among laboratory investigations used in the monitoring of patients receiving ART. Despite the importance of metabolic monitoring, there is a need for additional

local data describing changes in blood glucose among patients receiving HAART. The present study was undertaken to assess changes in fasting and postprandial blood glucose over a 24-month period and to document adverse effects associated with HAART.

Aim: To study the effects of HAART on blood sugar in HIV/AIDS patients.

Objectives

1. To assess fasting blood glucose in HIV-positive patients receiving HAART at baseline and during follow-up.
2. To assess postprandial blood glucose at baseline and during follow-up.
3. To determine the change in blood glucose over 24 months of treatment.
4. To document adverse effects associated with HAART.

Materials and Methods

Study Design and Setting: This was an observational follow-up study conducted in the Department of Medicine, Regional Institute of Medical Sciences (RIMS), Imphal, Manipur, India.

Study Population: The study included HIV-positive patients admitted to the medicine ward of RIMS Hospital who were receiving HAART.

Sample Size: A total of 100 patients were included in the study.

Inclusion Criteria: Patients were eligible if they:

- Were newly diagnosed with HIV infection and had not previously started HAART.
- Were HIV-positive and receiving HAART.
- Provided informed consent.

Exclusion Criteria:

Patients were excluded if they:

- Were already receiving HAART.
- Were HIV-positive but had not provided informed consent.
- Were HIV-negative.

Note: The handwritten inclusion and exclusion criteria need to be checked against the original study protocol. The wording above is a cleaned version of the notes, not a substitute for the approved protocol.

Antiretroviral Regimens: The following HAART regimens were recorded in the notes:

Table 1: Group and Regimen

Group	Regimen
I	Stavudine + Lamivudine + Nevirapine
II	Zidovudine + Lamivudine + Efavirenz
III	Zidovudine + Lamivudine + Nevirapine
IV	Stavudine + Lamivudine + Efavirenz

Important: These regimens should be verified from the original prescription records. In particular, the use of stavudine should be reported as a historical regimen if the study period predates current treatment recommendations.

Data Collection: Baseline demographic and clinical information was collected at enrollment. Fasting and postprandial blood glucose were recorded before treatment and during follow-up at 6, 12, 18, and 24 months. The study also recorded adverse effects associated with HAART.

Additional details required for publication:

- Blood glucose measurement method and laboratory analyzer
- Definition of fasting and postprandial sampling
- Timing of postprandial blood collection
- Whether patients were fasting for at least 8 hours
- Whether glucose-lowering medication was permitted
- Whether patients with pre-existing diabetes were excluded
- Whether weight, BMI, CD4 count, viral load, and lipid profile were recorded

Statistical Analysis: Data were analyzed using SPSS version.

Continuous variables were expressed as mean ± standard deviation. Changes in fasting and postprandial blood glucose over time were assessed using an appropriate statistical test for repeated measurements.

The exact test used must be confirmed. If the same patients were measured at all time points, a repeated-measures ANOVA or a suitable non-parametric alternative may be appropriate, depending on the data distribution and study design.

A p-value: The study also reported adverse effects in 34% of participants. This finding highlights the importance of monitoring patients receiving ART. Nevertheless, the available data do not establish whether the adverse effects were directly responsible for the increase in blood glucose. The current study has the potential to provide useful local information regarding metabolic changes

during HAART. However, the interpretation of the results is limited by the absence of detailed information regarding the distribution of treatment regimens, baseline metabolic status, body weight, diabetes history, and other potential confounding factors.

Strengths

- Follow-up over a 24-month period
- Assessment of both fasting and postprandial blood glucose
- Documentation of adverse effects
- Inclusion of patients receiving different HAART regimens

Limitations

- Observational study design
- Small sample size
- Single-center study
- Lack of a non-HIV or untreated comparison group
- Potential confounding by age, BMI, diet, and other clinical factors
- Incomplete information regarding treatment regimen distribution
- Statistical methods and p-values require verification
- No documented HbA1c or insulin-resistance assessment
- No information on loss to follow-up

Conclusion

This study suggests that fasting and postprandial blood glucose increased gradually among HIV-positive patients receiving HAART over a 24-month period. The findings support the importance of regular metabolic monitoring during long-term ART. However, further studies with larger sample sizes, longer follow-up, and appropriate adjustment for confounding factors are required to determine whether HAART is independently associated with changes in blood glucose.

Recommendations

1. Blood glucose should be monitored regularly in patients receiving long-term ART.
2. Patients should receive counseling regarding diet, physical activity, and weight management.
3. Patients with abnormal glucose levels should undergo appropriate evaluation for diabetes and other metabolic disorders.
4. Future studies should include larger sample sizes and detailed assessment of treatment regimens, BMI, lipid profile, CD4 count, and viral load.
5. Multicenter studies are recommended to improve the generalizability of the findings.

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