



## Global Conference on Medical and Health Sciences

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### GLYCEMIC VARIABILITY AS A HIDDEN CARDIAC RISK FACTOR IN PATIENTS WITH TYPE 2 DIABETES MELLITUS: THE ROLE OF THE $\Delta$ INDICATOR

Najimutdinova D. K.<sup>1</sup>

Turaeva N. R.<sup>1</sup>

<sup>1</sup>Faculty of "Internal Diseases, Endocrinology",  
Tashkent State Medical University

#### Background

Type 2 diabetes mellitus (T2DM) is one of the leading causes of cardiovascular morbidity and mortality worldwide [1, 2]. Beyond glycated haemoglobin (HbA1c), **glycemic variability** — defined as fluctuations in blood glucose concentrations throughout the day and across days — is increasingly recognised as an important prognostic factor for cardiac complications [3]. Elevated glycemic variability has been associated with increased oxidative stress, autonomic nervous system imbalance, and prolongation of the QT interval, all of which raise the risk of arrhythmias [4, 5].

Direct monitoring of glycemic variability using continuous glucose monitoring (CGM) is not always feasible, particularly in small study populations. Therefore, the  **$\Delta$  indicator** — defined as the difference between the fasting blood glucose level and the estimated average glucose (eAG) derived from HbA1c — may serve as an indirect proxy for glycemic variability [6].

#### Aim

To assess glycemic variability in patients with T2DM using the  $\Delta$  indicator and to evaluate its potential role as a hidden cardiac risk factor.



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### Objectives

- Calculate the  $\Delta$  indicator for each patient using the formula:  
 $\Delta = \text{Fasting glucose} - \text{eAG}$ , where  $\text{eAG} = 1.59 \times \text{HbA1c} - 2.59$
- Evaluate individual differences in glycemic variability among T2DM patients.
- Analyse the potential impact of glycemic variability on cardiac risk based on published evidence concerning arrhythmias and glucose excursions.
- Draw conclusions regarding the applicability of the  $\Delta$  indicator as an indirect marker of hidden glycemic variability.

### Materials and Methods

The study included fasting blood glucose levels (mmol/L) and HbA1c values (%) from 20 patients with T2DM. For each patient, the  $\Delta$  value was calculated as the difference between the actual fasting glucose and the eAG estimated from HbA1c [6, 7].

### Results

Twenty observations from patients with T2DM were analysed. The mean fasting blood glucose was 12.8 mmol/L and the mean HbA1c was 10.2%, indicating poor glycaemic control across the study group. The calculated eAG averaged 13.6 mmol/L.

Analysis of the  $\Delta$  indicator revealed that 60% of observations ( $n = 12$ ) showed negative values, suggesting the possible presence of hidden glycemic variability, while 40% of cases ( $n = 8$ ) demonstrated positive  $\Delta$  values reflecting other discrepancies between actual and estimated glycaemia.



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### Conclusions

The findings demonstrate that in patients with T2DM, even with high HbA1c values, marked discrepancies exist between actual and estimated glycaemia, indicating the presence of glycemic variability [3, 8].

Thus, the  $\Delta$  indicator can help identify hidden glucose fluctuations and may be considered a straightforward supplementary tool for assessing potential cardiac risk in this patient population [4, 9].

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