



The triglyceride-glucose index and its usefulness in clinical practice as a cardiovascular risk assessment tool

El índice de triglicéridos y glucosa y su utilidad en la práctica clínica como herramienta de evaluación del riesgo cardiovascular

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Abbreviations:

T2DM = Type 2 Diabetes Mellitus

TyG = Triglyceride-Glucose

Cardiovascular diseases are the leading cause of morbidity and mortality worldwide, making the early identification of associated risk factors crucial.¹ Insulin resistance is recognized as a pathophysiological precursor to the development of Type 2 Diabetes Mellitus (T2DM), hypertension, and its complications: ischemic heart disease, stroke, and kidney failure.

In patients without a clinical diagnosis of T2DM, insulin resistance can be subclinical for years, progressively contributing to vascular damage. This process is associated with abnormal glucose and lipid metabolism that alters vascular wall structure and remodeling, endothelial function and nitric oxide synthesis (the main vasodilator), activation of the sympathetic nervous system, and renal sodium and water handling.

Several approaches exist for assessing insulin resistance. The euglycemic clamp is the gold standard for this assessment; however, its implementation is complex and impractical on a large scale. Indirect alternatives have also been proposed, such as the Homeostasis Assessment Model for Insulin Resistance (HOMA-IR) and the Quantitative Insulin Sensitivity Check Index

(QUICKI);² however, these approaches remain limited by their high cost and limited availability in our context.

An alternative readily available to most healthcare systems is the Triglyceride-Glucose (TyG) index, considered an indirect marker of insulin resistance. Its availability in routine clinical practice, based on standard clinical determinations, facilitates its application.

The TyG index is calculated using the following formula:

$$\text{TyG} = \text{Ln}[\text{TG}(\text{mg/dL}) \times \text{fasting glucose}(\text{mg/dL})]/2$$

Current evidence suggests that elevated TyG index values are associated with a high risk of major adverse cardiovascular events, supporting its potential use as a cardiovascular risk marker.^{3,4} Also observational studies link the TyG index to the development of hypertension and cerebrovascular events in middle-aged and older adults, reflecting early cardiometabolic alterations that precede the development of cardiovascular complications.^{4,5}

Recently, Lanfranco D'Elia et al.⁶ reported that elevated TyG values (greater than 4.91) exhibit high predictive capacity for the development of hypertension.

The prognostic value of the TyG index, including its association with all-cause mortality, even after adjusting for traditional risk factors, reinforces its potential as a marker to identify

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individuals at greater long-term clinical vulnerability.⁷

The TyG index is not intended to replace more complex methods, but it can assist in assessing metabolic risk through a simple, reproducible, and low-cost formula. This is relevant because in primary care, most patients present without overt cardiovascular disease but with multiple risk factors. Identifying metabolic dysfunction using readily available parameters will enable earlier risk stratification, timely preventive interventions, and closer clinical follow-up. Its routine use is increasingly important for early detection of cardiovascular risk and enables comprehensive assessment in routine clinical practice.^{6,7}

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