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ORIGINAL RESEARCH

1-hour post-load glucose level is more effective than HbA1c for screening dysglycemia - Evidence review

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ONLINE ARTICLE

ARTICLE INFORMATION

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1. ABSTRACT

The analyzed study compared plasma glucose measured one hour after an oral glucose load with glycated hemoglobin (HbA1c, an indicator of average glucose exposure over the previous months) to identify impaired glycemic regulation in 212 people at high metabolic risk. Among the participants, 70 people, equal to 33%, had prediabetes according to the oral glucose tolerance test criteria. In the available material, which is limited to the abstract and interrupted in the results section, the one-hour glucose level is more closely associated with the two-hour glucose level, insulin sensitivity, and pancreatic beta-cell function compared to HbA1c.The research contributes to the passage from "The Choice to Live in Health or Illness" by Dr. A. Colonnese and R. Panzironi, according to which the one-hour glycemic value can describe initial metabolic alterations better than HbA1c. Independent longitudinal studies and a meta-analysis support that the one-hour glucose level can identify a future risk of dysglycemia and diabetes earlier than other parameters. However, the evidence does not prove that every elevated one-hour value equates to a clinical diagnosis, nor that HbA1c necessarily represents a more advanced stage in every person.

MISSION

LIFE Science Hub – Journal of Science was founded with the aim of making scientific knowledge accessible without giving up methodological rigour, quality of sources and authoritativeness of content. The journal promotes the dissemination of knowledge in the health, nutrition, medical and longevity sciences, building a bridge between the world of research and society.

Through articles, reviews, in-depth analyses and expert contributions, the Journal champions evidence-based medicine and science, fostering a correct interpretation of scientific data and countering misinformation. Every piece of content is developed with the aim of translating the complexity of research into understandable, useful and applicable information, while keeping intact the principles of accuracy, transparency and scientific independence.

Free from political, industrial and commercial influence, the journal stands as an authoritative and independent editorial space, dedicated to promoting scientific culture, professional development and the growth of health awareness among the public.

2. ANALYZED STUDY

The research question was whether plasma glycemia one hour after glucose intake during an oral glucose tolerance test (OGTT, a test that measures how the body handles a standard dose of glucose) identified dysglycemia better than HbA1c. The hypothesis was that a one-hour glycemia level of 155 mg/dL or higher might be more closely related to alterations in the insulin response than HbA1c.The relevance to the section "The Choice to Live in Health or Illness" by Dr. A. Colonnese and R. Panzironi is precise: the study directly compares the two markers and evaluates the relationship of one-hour glycemia with insulin sensitivity and beta-cell function. It can therefore support the part of the narrative concerning the greater ability of one-hour glycemia to reflect early pathophysiological alterations. However, it cannot, on its own, demonstrate the individual temporal sequence that leads to type 2 diabetes, nor establish that HbA1c always indicates a later stage of dysglycemia.

3. MATERIALS AND METHODS OF THE ORIGINAL STUDY

The study was a diagnostic accuracy analysis conducted in a real-world clinical care setting. It included 212 people considered to be at high metabolic risk. The available material does not report age, sex, detailed inclusion and exclusion criteria, study location, enrollment period, or the complete clinical characteristics of the participants.The researchers compared the HbA1c criteria proposed by the American Diabetes Association, ranging from 5.7% to 6.4%, and those of the International Expert Committee, ranging from 6.0% to 6.4%, with the OGTT criteria. They also evaluated the one-hour glycemia threshold of 155 mg/dL or higher, i.e., 8.6 mmol/L. Prediabetes was defined according to the American Diabetes Association's OGTT criteria.The relationships between HbA1c, one-hour glycemia, fasting glycemia, two-hour glycemia, and indices of insulin sensitivity and beta-cell function were examined using Spearman's correlation. Concordance between diagnostic tests was assessed using Cohen's kappa coefficient, which measures how much two classifications agree beyond what is expected by chance. Discriminant accuracy was predicted using the ROC curve, a procedure that evaluates how well a test correctly separates people with and without a condition. The available material does not report the full details of the formulas used to estimate insulin sensitivity and beta-cell function.

4. RESULTS

Out of 212 high-risk individuals, 70, or 33%, were identified as having prediabetes according to OGTT criteria. In practical terms, approximately one in three people already had impaired glucose regulation according to the gold-standard test used in the study.One-hour glycemia showed a stronger association than HbA1c with two-hour glycemia, the insulin sensitivity index, and pancreatic beta-cell function. Beta cells are the cells in the pancreas that produce insulin; a less effective response from them, combined with reduced tissue sensitivity to insulin, promotes an increase in glycemia after a meal or a glucose load.The available abstract ends immediately after indicating that these associations were statistically significant. Correlation coefficients, full P-values, confidence intervals, sensitivity, specificity, kappa concordance, and areas under the ROC curve are not reported in the available material. It is therefore not possible to faithfully describe the full numerical results or quantify the difference in accuracy between one-hour glycemia and HbA1c beyond what is qualitatively stated in the abstract.

5. INTERPRETATION

The biological significance of this result is that blood glucose measured at one hour may better capture an inefficient metabolic response immediately following a glucose load. When insulin is secreted less rapidly or acts less effectively in the tissues, glucose tends to remain higher in the blood during the first part of the OGTT.The analyzed study links one-hour blood glucose to indices of insulin sensitivity and beta-cell function more closely than HbA1c. HbA1c, on the other hand, summarizes average glucose exposure over time and may not distinguish variations in the immediate response to a glucose load with the same precision. This is the scientific correspondence with the section from “The Choice to Live in Health or Illness” by Dr. A. Colonnese and R. Panzironi.However, it is necessary to distinguish between observation and interpretation. The available

data show associations between markers; they do not prove that reduced beta-cell function directly causes a high one-hour value in every participant. Furthermore, the diagnostic design does not allow us to establish whether HbA1c always reflects a more advanced and stable phase of dysglycemia: this is a plausible pathophysiological interpretation that requires longitudinal studies.

6. INDEPENDENT CONFIRMING EVIDENCE

A meta-analysis of 15 studies, including 35,551 participants from various ethnic groups and 2,705 new cases of diabetes identified via OGTT, evaluated the ability of one-hour glycemia to identify diabetes as defined by two-hour glycemia. The 209 mg/dL threshold showed 92% sensitivity and 91% specificity; the area under the curve was 0.939. This evidence confirms that the one-hour value contains relevant diagnostic information, but it primarily concerns the recognition of diabetes relative to the two-hour criterion and does not directly compare one-hour glycemia with HbA1c for beta-cell function. Furthermore, the positive predictive value was 45%, indicating that an elevated result requires diagnostic confirmation and clinical context [1].A retrospective longitudinal study of 1,356 people initially with normal glucose tolerance evaluated which component of the OGTT best predicted future dysglycemia. During a median follow-up of 3.5 years, 318 participants (23.4%) developed prediabetes; during a median follow-up of 5.6 years, 134 (10%) developed diabetes. One-hour glycemia had superior discriminative ability compared to fasting and two-hour glycemia for both prediabetes and diabetes, and it predicted diabetes better than HbA1c, even when HbA1c was combined with fasting glycemia. This more directly confirms the idea that one-hour glycemia can intercept metabolic risk before conventional markers. The limitation is that these are clinical data collected in the past at a single center and that greater predictive capacity alone does not prove a causal mechanism [2].An independent longitudinal analysis of 201 Southwestern Native Americans, followed for 6–10 years and subjected to at least three OGTTs, examined the timing of increases in one-hour and two-hour values. Among 43 people who developed prediabetes according to both criteria, 32 (74%) reached the 155 mg/dL one-hour threshold before the 140 mg/dL two-hour threshold. Among 33 people who developed diabetes, 25 (75%) reached 209 mg/dL at one hour before the 200 mg/dL diagnostic threshold at two hours. This result reinforces the temporal interpretation of the book's narrative, while remaining limited to a specific population and lacking direct comparison with HbA1c [3].Mechanistic and prognostic evidence, however, does not imply that a single threshold can be transferred without modification to every population. In a study of 1,454 adolescents with obesity, a one-hour glycemia of 132.5 mg/dL identified impaired glucose tolerance with 80.8% sensitivity and 74.3% specificity in the development sample, while the test was performed with a glucose dose adapted to body weight. Young people with elevated one-hour glycemia had lower insulin sensitivity and lower early insulin secretion compared to peers with lower values. This study supports the biological consistency of the marker but also shows that age, obesity, and test protocol can modify the most informative threshold [4].

7. CONFLICTING EVIDENCE

No directly conflicting evidence of sufficient relevance has been identified; this does not prove the absence of contrary results. The main point of concern regards the universal transferability of the 155 mg/dL threshold. In the pediatric study included in the evidence, a lower threshold of 132.5 mg/dL identified impaired glucose tolerance in adolescents with obesity who underwent a weight-adjusted glucose load protocol [4].This difference does not contradict the biological value of one-hour glycemia, but it limits the notion that a single cutoff has identical accuracy across adults, adolescents, people with obesity, and different ethnic groups. Furthermore, the meta-analysis on diabetes diagnosis indicated that the positive predictive value of the 209 mg/dL threshold was 45%; this means that, even with good sensitivity and specificity, a portion of those who test positive do not meet the diabetes criterion used as a reference [1].

8. QUADRO COMPARATIVO E SINTESI DELLE EVIDENZE

The table distinguishes the study under review from the independent publications used to confirm or define the narrative of the paragraph.

Quadro comparativo

Reference	Study type	Population or model	Main result	Direction of evidence	Strength of evidence
Original study	Diagnostic accuracy study	212 adults at high metabolic risk	One-hour glycemia was more closely associated with two-hour glycemia, insulin sensitivity, and beta-cell function compared to HbA1c.	direct confirmation	moderate
[1]	Meta-analysis of diagnostic accuracy	15 studies; 35,551 adults; 2,705 new cases of diabetes	The 209 mg/dL one-hour threshold showed 92% sensitivity and 91% specificity for diabetes defined by two-hour glycemia.	indirect confirmation	high
[2]	Retrospective longitudinal observational	1,356 initially normoglycemic adults	One-hour glycemia predicted prediabetes and diabetes better than fasting glycemia, two-hour glycemia, and HbA1c.	direct confirmation	moderate
[3]	Longitudinal observational	201 Southwestern Native Americans followed for 6-10 years	In 74% of prediabetes cases and 75% of diabetes cases, the one-hour threshold was reached before the two-hour threshold.	indirect confirmation	moderate
[4]	Observational study with development and validation cohort	1,454 adolescents with obesity	A 132.5 mg/dL one-hour threshold identified impaired glucose tolerance and a profile of lower insulin sensitivity.	discordant evidence	moderate

9. SINTESI EDITORIALE E CONCLUSIONI

CONCLUSIONS

The study analyzed pertinently supports the idea that one-hour glycemia during an OGTT is more closely associated with indicators of insulin response and pancreatic beta-cell function than HbA1c. Independent evidence makes its ability to identify early metabolic risk and predict future dysglycemia in certain populations quite well-supported.It remains necessary to distinguish between an early risk marker and a definitive diagnosis. The most appropriate threshold may depend on the population, age, risk level, and test protocol. The assertion that HbA1c reflects a more advanced stage of dysglycemia is biologically plausible and moderately supported, but requires further prospective comparative validation.

Aggiornato al 17/11/2026. Questo contenuto riflette una sintesi divulgativa delle evidenze scientifiche al momento della pubblicazione e non sostituisce il parere medico.

10. TRANSPARENCY AND SCIENTIFIC RESPONSIBILITY

Artificial Intelligence was used solely as a tool for editorial and documentary support. All content, interpretations, bibliographic citations and conclusions have been verified, reviewed and approved by the author, who assumes full scientific responsibility for them.

The manuscript was also subjected to independent peer review prior to publication.

To ensure the greatest transparency, the complete history of the article, including the dates of submission, revision, acceptance and publication, as well as information on the peer review process, is available on the dedicated Article History page.

11. RIFERIMENTI BIBLIOGRAFICI

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Diabetes Care
DOI: https://doi.org/10.2337/dc20-1688

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