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ORIGINAL RESEARCH

1-hour glycemia predicts future dysglycemia in normoglycemic subjects

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1. ABSTRACT

The original study examined whether blood glucose values obtained during an oral glucose tolerance test (OGTT, a test in which glucose and sometimes insulin are measured after glucose intake) can predict the onset of glycemic regulation disorders in people initially classified as having normal glucose tolerance. In 1,356 subjects with at least one follow-up OGTT, 1-hour glycemia showed superior discriminatory capacity compared to fasting glycemia, 2-hour glycemia, and glycated hemoglobin in predicting future prediabetes or diabetes.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 1-hour value captures a phase in which the initial insulin response and tissue sensitivity to insulin are under particular stress. Independent cohorts confirm the association between elevated 1-hour glycemia and a higher future probability of diabetes; physiological studies also show lower insulin sensitivity and less effective beta-cell function. However, this prognostic and mechanistic evidence alone does not establish that the 1-hour value should replace all other diagnostic criteria.

ONLINE ARTICLE

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MISSION

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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, in people with normal glucose tolerance, fasting glycemia, or glycemia measured one hour or two hours after an OGTT, better predicted the subsequent onset of dysglycemia. The authors used the term dysglycemia to indicate the onset of prediabetes or diabetes according to World Health Organization criteria.The hypothesis was that one-hour glycemia might contain more prognostic information than conventional parameters. This question is relevant to this section of the book because it addresses the central point of the narrative: an early glycemic peak after a glucose load can reveal future metabolic risk even when the initial classification is normal.The study can compare how accurately different glycemic values distinguish, over time, between those who will and will not develop dysglycemia. However, it cannot prove that elevated one-hour glycemia causes diabetes, nor can it define on its own which threshold should be adopted in clinical practice.

3. MATERIALS AND METHODS OF THE ORIGINAL STUDY

An analysis of electronic health records was conducted on individuals who underwent an OGTT between 1991 and 2016 at a specialized diabetes center. A total of 1,356 subjects with normal glucose tolerance at their first examination and at least one subsequent follow-up OGTT were selected.The researchers compared fasting plasma glycemia, as well as glycemia at one hour and two hours, both individually and in combination. They also compared one-hour glycemia with glycated hemoglobin—an indicator of average glucose exposure over the preceding months—and with the combination of glycated hemoglobin and fasting glycemia.The primary outcome was the subsequent onset of prediabetes or diabetes. Predictive capacity was evaluated using the area under the ROC curve, or AUC: a higher value indicates a better ability to distinguish between people who will develop the outcome and those who will not. Detailed exclusion criteria, distribution by sex and age, glucose concentrations used as thresholds, and multivariate adjustment analyses are not reported in the available material, which contains only the abstract.

4. RESULTS

During a median follow-up of 3.5 years, 318 out of 1,356 participants, or 23.4%, developed prediabetes. During a median follow-up of 5.6 years, 134 participants, or 10%, developed diabetes. Median times indicate the midpoint of the observed time distribution and do not mean that every participant was followed for exactly that duration.For the prediction of prediabetes, one-hour glycemia achieved an AUC of 0.684, which was higher than that of fasting glycemia (0.560) and two-hour glycemia (0.644). For the prediction of diabetes, the AUC for one-hour glycemia was 0.716, compared to 0.593 for fasting glycemia and 0.618 for two-hour glycemia. In practical terms, the one-hour value better distinguished those who would develop future glycemic impairment.Adding fasting glycemia or two-hour glycemia to one-hour glycemia did not significantly improve the AUC compared to one-hour glycemia alone. Also for diabetes, one-hour glycemia predicted the outcome better than glycated hemoglobin and the combination of glycated hemoglobin and fasting glycemia. Confidence intervals, exact P-values, analyzed thresholds, and estimates adjusted for potential confounding factors are not reported in the available material.

5. INTERPRETATION

The main finding suggests that, after glucose intake, a measurement taken at one hour can capture differences in how the body rapidly handles a sugar load. This is consistent with the fact that, at that stage, an adequate early insulin secretion must work in tandem with a good response to insulin from the muscles, liver, and adipose tissue.The part of the book's narrative that is actually supported by the study is prognostic: among individuals who are initially normoglycemic, a more informative one-hour glycemia better identifies those who will later develop prediabetes or diabetes compared to the parameters compared. The study did not directly measure early insulin secretion, peripheral insulin sensitivity, or pancreatic beta-cell function. The link to these mechanisms is therefore pathophysiologically plausible, but requires additional specific evidence.

6. INDEPENDENT SUPPORTING EVIDENCE

Initial independent confirmation comes from the San Antonio Heart Study. In 1,611 individuals without baseline diabetes, followed for 7-8 years, one-hour glycemia during an OGTT helped identify subjects with normal glucose tolerance but at high future risk of diabetes. The model that included one-hour glycemia, fasting glycemia, and metabolic syndrome maintained its ability to stratify risk independently of two-hour glycemia. This directly confirms the prognostic shift in the narrative, although it does not prove that the one-hour value is the only necessary parameter [1].A second cohort, consisting of 5,703 Korean adults with normal glucose tolerance followed for 12 years, reinforced the generalizability of the association. 10.3% developed diabetes; the AUC for one-hour glycemia was 0.74, higher than that for fasting glycemia (0.61) and two-hour glycemia (0.63). After adjusting for the risk factors considered by the authors, a one-hour value equal to or greater than 8.0 mmol/L was associated with a 2.84-fold higher risk of diabetes and lower beta-cell function. This is longitudinal confirmation in humans, but it remains an observational association and not proof of causality [2].The pathophysiological link mentioned in the book is supported by a clinical-metabolic study of 305 non-diabetic offspring of people with type 2 diabetes. Among participants with normal glucose tolerance, those with one-hour glycemia equal to or greater than 155 mg/dL showed lower insulin sensitivity and reduced beta-cell function compared to subjects with a lower one-hour value. Beta cells are the pancreatic cells that produce insulin; a less effective response from them makes it more difficult to contain the rise in glycemia after a glucose load. This result supports the proposed mechanism, but it is cross-sectional: it describes differences present at the time of the examination and does not prove that such differences necessarily determine future diabetes [3].

7. CONFLICTING EVIDENCE

No directly conflicting evidence of sufficient relevance has been identified; this does not prove the absence of contrary results.The main caution concerns clinical interpretation: different studies have used different populations, follow-up durations, and one-hour glycemia thresholds. Furthermore, the fact that a parameter improves statistical prediction does not automatically equate to its adoption as a complete substitute for fasting glycemia, two-hour glycemia, or glycated hemoglobin. The comparability of the results is therefore good in terms of the direction of the association, but less defined regarding the choice of a single universal threshold value.

8. QUADRO COMPARATIVO E SINTESI DELLE EVIDENZE

The table distinguishes the study that is the subject of the review from the independent publications used to confirm the prognostic and pathophysiological passage in the book chapter.

Quadro comparativo

Reference	Study type	Population or model	Main result	Direction of evidence	Strength of evidence
Original study	Retrospective analysis of medical records with follow-up	1,356 subjects with normal glucose tolerance	One-hour glycemia had a higher AUC compared to fasting, two-hour, and HbA1c levels in predicting future dysglycemia.	direct confirmation	moderate
[1]	Prospective cohort	1,611 people without diabetes, including people with normal glucose tolerance	One-hour glycemia identified subjects at higher future risk of diabetes independently of two-hour glycemia.	direct confirmation	moderate
[2]	Community-based prospective cohort	5,703 Korean adults with normal glucose tolerance, 12-year follow-up	One-hour glycemia predicted diabetes better than fasting and two-hour values; elevated values were associated with higher risk.	direct confirmation	high
[3]	Cross-sectional clinical-metabolic study	305 non-diabetic offspring of people with type 2 diabetes	Elevated one-hour glycemia was associated with lower insulin sensitivity and reduced beta-cell function.	biologically consistent evidence	moderate

9. SINTESI EDITORIALE E CONCLUSIONI

CONCLUSIONS

The study analyzed shows that, in individuals initially considered normoglycemic, one-hour glycemia during an OGTT predicted the subsequent onset of prediabetes and diabetes better than the compared values. This finding is well supported by independent cohorts and appears consistent with early alterations in insulin sensitivity and beta-cell function.The pathophysiological narrative is therefore robustly confirmed, but with an important limitation: predictive capacity does not demonstrate causality and does not, by itself, equate to the definition of a substitute diagnostic criterion. Further prospective validation in different clinical settings is necessary to establish how to integrate the one-hour value into the individual assessment of metabolic risk.

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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