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ORIGINAL RESEARCH

Fasting glycemia trajectories and risk of atherosclerosis: a longitudinal cohort study with threshold analysis in Chongqing, China - Evidence review

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ONLINE ARTICLE

ARTICLE INFORMATION

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1. ABSTRACT

The analyzed study evaluated whether the trend of fasting glycemia over three years was associated with a lipid indicator of atherosclerotic risk in 2,583 adults in Chongqing, China. Individuals with a glycemic trajectory in the prediabetes range showed a higher prevalence and incidence of the risk indicator, as well as a lower probability of improvement. The analysis also estimated an increased risk starting at approximately 5.10 mmol/L, with more marked associations in women and individuals under 45 years of age.In section 2.4 of “The Choice to Live in Health or Illness” by Dr. A. Colonnese and R. Panzironi, the publication contributes to the narrative that vascular risk can increase progressively before reaching the diagnostic thresholds for prediabetes. Independent studies link dysglycemia or prediabetes to signs of subclinical atherosclerosis and an increased cardiovascular risk; however, they do not confirm a single threshold applicable to all populations, nor do they demonstrate that 5.10 mmol/L represents a universal clinical boundary.

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 fasting glycemia, observed repeatedly over time rather than on a single occasion, was associated with the risk of atherosclerosis in adults undergoing health check-ups in Chongqing. The authors hypothesized that persistently higher glycemia, even within the prediabetes range, was accompanied by a lipid profile more favorable to the development of atherosclerosis.The relevance to the book's section primarily concerns the observation that the association with atherosclerotic risk appeared at glycemia values below the conventional threshold for impaired fasting glucose and was more pronounced in women and younger individuals. The study describes observational associations and cannot establish that a glycemia value in itself causes arterial lesions, nor can it demonstrate that the same threshold is valid outside the examined population.

3. MATERIALS AND METHODS OF THE ORIGINAL STUDY

This is a retrospective cohort study based on data from annual check-ups conducted between 2017 and 2019 at a health management center affiliated with JinShan Hospital in Chongqing. Initially, 2,914 participants were recruited. After excluding incomplete or physiologically implausible data, 2,610 individuals were included in the cross-sectional analysis and 2,583 in the longitudinal analysis.Fasting venous glycemia was measured after at least eight hours without food intake. Data on age, sex, body mass index, waist circumference, blood pressure, and blood parameters were also collected, including triglycerides and HDL cholesterol, commonly referred to as "good cholesterol." The primary outcome was not the presence of plaques documented by ultrasound or tomography, but the atherogenic index of plasma, or AIP, calculated from the ratio of triglycerides to HDL. An AIP of 0.1 or higher was used as a surrogate indicator of atherosclerotic risk.The authors identified three glycemia trajectories using a statistical model for groups with similar trends: normal glycemic regulation, prediabetes, and diabetes. They then used logistic regressions, adjusted for several potential confounding factors, and restricted cubic spline curves to explore whether the relationship between glycemia and risk was linear or changed at specific values.

4. RESULTS

In the longitudinal analysis, 1,634 participants, equal to 63.26%, belonged to the normal glycemic regulation trajectory; 841, equal to 32.56%, to the prediabetes trajectory; and 108, equal to 4.18%, to the diabetes trajectory. Individuals in the groups with higher glycemia were more often men, older, and more frequently presented with hypertension and dyslipidemia.Compared to the group with normal glycemic regulation, the prediabetes trajectory was associated with a higher prevalence of the atherosclerotic risk indicator: odds ratio, or OR, 2.02; 95% confidence interval from 1.63 to 2.51. In practical terms, after statistical adjustments, the odds of having an elevated AIP were approximately doubled. The same trajectory was associated with a higher incidence of the indicator during follow-up; 95% confidence interval 1.15–2.39, and a lower probability of returning below the AIP threshold; 95% confidence interval 0.39–0.79.The diabetes trajectory was associated with a higher prevalence of elevated AIP; 95% confidence interval 1.01–2.47. For the incidence and recovery of the indicator, however, the adjusted estimates were not statistically conclusive: for incidence, the OR was 1.77, but the confidence interval from 0.83 to 3.78 included the value of no association.Dose-response curves showed a non-linear relationship. In the studied sample, the risk of elevated AIP increased significantly between 5.10 and 5.90 mmol/L of fasting glycemia. In subgroup analyses, the association with the prevalence of elevated AIP was stronger in women (1.80 compared to 1.40 in men) and in people under 45 years of age (1.60 compared to 1.32 in people aged 45 or older). These data concern a lipid risk indicator and do not directly document new heart attacks, strokes, or clinically diagnosed arterial plaques.

5. INTERPRETATION

The general implication is that fasting glycemia does not appear to act like a switch that suddenly changes state at 100 mg/dL. In this cohort, higher and persistent values were associated with a more atherogenic triglyceride and HDL profile even before the conventional diagnosis of prediabetes.The pathway documented by the publication subject to this evidence review is therefore: progressively higher

fasting glycemia over time greater probability of elevated AIP higher estimated atherosclerotic risk. The observation of stronger associations in women and younger individuals suggests heterogeneity between subgroups, but it does not prove that vascular damage necessarily begins earlier in every woman or every young person.The most significant limitation is that AIP does not directly measure arterial thickening, plaques, or cardiovascular events. Furthermore, the study is single-center, lasts three years, and cannot rule out the potential role of unmeasured factors, such as diet, physical activity, medications, socioeconomic conditions, or insulin resistance. The 5.10 mmol/L threshold should therefore be interpreted as an exploratory estimate specific to this cohort, not as a new diagnostic criterion.

6. INDEPENDENT SUPPORTING EVIDENCE

Initial findings come from a Brazilian longitudinal study of 1,536 adults who were initially diabetes-free. After 10–12 years, fasting glycemia between 110 and 125 mg/dL was associated with increased carotid intima-media thickness, an ultrasound marker of subclinical atherosclerosis. The association was modest, but it uses a direct vascular measurement rather than a lipid indicator. The study therefore supports the premise that elevated glycemia below the diabetes threshold can be accompanied by early vascular signs, although it did not evaluate the 5.10 mmol/L threshold [1].A large meta-analysis of 129 studies, involving over ten million participants, found that prediabetes in the general population was associated with an increased risk of composite cardiovascular disease, coronary heart disease, and stroke. For composite cardiovascular disease, the relative risk was 1.15, with a 95% confidence interval of 1.11 to 1.18. This evidence confirms the general direction of the book's narrative: glycemic alteration before overt diabetes is associated with a higher vascular risk. However, it does not identify an individual glycemic threshold nor does it demonstrate causality [2].A further cross-sectional study of 2,959 Chinese women measured carotid intima-media thickness using Doppler ultrasound. As fasting glycemia increased, carotid mean thickness also increased, even within the range up to 7 mmol/L; in premenopausal women, both mean and maximum thickness increased. This result is biologically consistent with the hypothesis that relatively small differences in glycemia can be accompanied by arterial changes. However, the study did not compare men and women and observed a greater association in postmenopausal women, rather than in younger ones [3].

7. CONFLICTING EVIDENCE

A large collaboration of 102 prospective studies has downsized the idea of a strong and continuous relationship between fasting glycemia below the diabetic threshold and clinical vascular disease. In people without diabetes, compared to values between 3.90 and 5.59 mmol/L, coronary risk was only modestly higher with glycemia between 5.60 and 6.99 mmol/L; above 5.60 mmol/L, each 1 mmol/L increase was associated with a hazard ratio of 1.12, with a 95% confidence interval from 1.08 to 1.15. The associations did not vary substantially by sex or age group [4].This evidence does not deny that higher glycemia may be associated with vascular risk, but it indicates that the magnitude of the association with clinical events is generally modest below the diabetes threshold and does not confirm a universal threshold of 5.10 mmol/L, nor a systematically higher risk in women or young people. The differences may depend on the outcome studied: AIP and carotid thickness are intermediate indicators, while heart attack and stroke are clinical events influenced by many other factors.

8. QUADRO COMPARATIVO E SINTESI DELLE EVIDENZE

The table distinguishes the original study, based on a lipid risk indicator, from independent evidence on subclinical atherosclerosis and cardiovascular outcomes.

Quadro comparativo

Reference	Study type	Population or model	Main result	Direction of evidence	Strength of evidence
Original study	Longitudinal retrospective cohort	2,583 adults undergoing health check-ups in Chongqing, China	Prediabetes trajectory was associated with higher prevalence and incidence of elevated AIP; the exploratory threshold was 5.10 mmol/L.	direct confirmation	moderate
[1]	Longitudinal observational	1,536 Brazilian adults initially without diabetes	Glycemia of 110-125 mg/dL associated with greater carotid intima-media thickness after 10-12 years.	indirect confirmation	moderate
[2]	Meta-analysis	129 studies; 10,069,955 participants	Prediabetes was associated with an increased composite cardiovascular risk, RR 1.15.	indirect confirmation	high
[3]	Cross-sectional observational	2,959 Chinese women	As glycemia increased, carotid thickness increased, even below 7 mmol/L.	biologically consistent evidence	low
[4]	Collaborative meta-analysis of prospective cohorts	102 prospective studies without initial vascular disease	Below diabetes levels, the association between glycemia and coronary risk was modest and without relevant differences by sex or age.	discordant evidence	high

9. SINTESI EDITORIALE E CONCLUSIONI

CONCLUSIONS

The study analyzed suggests that, in the population examined in Chongqing, fasting glycemia persistently in the prediabetes range is associated with a higher atherosclerotic risk estimated through the AIP. Independent literature quite robustly confirms that prediabetes and dysglycemia are associated with cardiovascular risk and early vascular signs. However, external validation is needed to consider 5.10 mmol/L a useful threshold outside that cohort and to define reliable differences related to sex and age.

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.

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