

INPLASY PROTOCOL

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None declared.

Relationship between glycemic variability and arrhythmias: protocol for a systematic review and meta-analysis

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Review question / Objective: The purpose of this manuscript is to propose a scheme of systematic evaluation and meta-analysis. The purpose is to evaluate the relationship between blood glucose variability and arrhythmia in patients with T2DM and provide more advanced evidence for clinical practice.

Condition being studied: Diabetes has been identified as one of the leading risk factors for cardiovascular disease. Previous clinical research has concentrated on the effect of chronic persistent hyperglycemia on the risk of coronary heart disease in T2DM patients: chronic hyperglycemia causes excessive glycosylation and increased oxidative stress in tissues, resulting in microvascular and macrovascular problems in diabetes. Existing research has shown that glycaemic fluctuations have a higher effect on vascular endothelium than chronic continuous hyperglycemia. Acute and persistent oscillations in blood glucose levels have been demonstrated in recent research to worsen oxidative stress in T2DM patients, resulting in cell dysfunction and tissue damage, myocardial ischemia, and structural alterations. Abnormal glucose fluctuation is also considered as an independent risk factor for poor prognosis in patients with cardiovascular disease. It has important clinical significance in predicting mortality in diabetic patients.

INPLASY registration number: This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 26 April 2023 and was last updated on 26 April 2023 (registration number INPLASY202340095).

INTRODUCTION

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analysis. The purpose is to evaluate the relationship between blood glucose variability and arrhythmia in patients with T2DM and provide more advanced evidence for clinical practice.

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METHODS

Participant or population: Participants with T2DM who have been clinically diagnosed with chronic cardiovascular disease, such as stroke, peripheral artery disease, and so on, will be included in the study. In addition, no restrictions are placed on ethnicity, gender, age, or source. Studies will be excluded when: (1) That includes patients taking antiarrhythmic drugs, such as propafenone, amiodarone, etc, that may affect the observed results; (2) they include pregnant; (3) they include patients with thyroid disease (hyperthyroidism or hypothyroidism).

Intervention: Blood glucose variability.

Comparator: Arrhythmia.

Study designs to be included: Studies will be excluded when: (1) That includes patients taking antiarrhythmic drugs, such as propafenone, amiodarone, etc, that may affect the observed results; (2) they include pregnant; (3) they include patients

with thyroid disease (hyperthyroidism or hypothyroidism).

Eligibility criteria: Study outcomes will be obtained from the literature by searching for studies that measure abnormal glycemic variability (the parameters including standard deviation of blood glucose (SDBG), largest amplitude of glycemic excursions (LAGE), mean amplitude of glycemic excursions (MAGE), absolute means of daily differences (MODD), time in range (TIR), time below range (TBR), time above range (TAR), coefficient of variation (CV) were tested for glycemic variability evaluation.) on arrhythmias (atrial fibrillation (AF), embolic stroke, atrial flutter (AFL), AF/AFL, ventricular tachycardia (VT), and cardiac arrest) in patients with T2DM. Studies that meet the following requirements will be included into this systematic review: (1) patients with type 2 diabetes; (2) Any non-fatal arrhythmia observed; (3) studies that monitored glycemic variability with continuous glucose monitoring (CGM). Studies will be excluded when: (1) That includes patients taking antiarrhythmic drugs, such as propafenone, amiodarone, etc, that may affect the observed results; (2) they include pregnant; (3) they include patients with thyroid disease (hyperthyroidism or hypothyroidism).

Information sources: Database such as PubMed, EMBASE, The Cochrane Library, China Biology Medicine disc, and the Wanfang database online will be included to search.

Main outcome(s): Arrhythmias.

Quality assessment / Risk of bias analysis: Funnel plots and STATA 13.0 will be used to assess publication bias of included articles. In studies with at least ten trials, funnel plots are used for publication bias assessment, whereas in studies with fewer than ten trials, STATA 13.0 is used for publication bias assessment.

Strategy of data synthesis: Review Manager will be used to analyze and

synthesize data. Test Q will examine the degree of variation between studies, and I² will explain it: The fixed-effects model will be utilized if the heterogeneity between studies is minimal (I²0.1); otherwise, the random-effects model will be employed, and subgroup analysis or meta regression analysis will be performed to investigate the reason of the heterogeneity.

Subgroup analysis: Heterogeneous results will be analyzed. There will be many meta-regressions depending on study and sample characteristics, such as the type of arrhythmia, MAGE tertiles (MAGE1 (1.24-4.37 mmol/l), MAGE2 (4.38-6.36 mmol/l), and MAGE3 (6.37-13.66 mmol/l), middle-aged and elderly T2DM patients.

Sensitivity analysis: In order to determine the robustness of conclusions, the sensitivity analysis will be conducted. We will exclude high deviation risk studies, missing data studies and outliers, and re analyze whether the conclusions have changed, so as to check the robustness of the conclusions of the systematic review.

Country(ies) involved: China.

Keywords: protocol; systematic review; type 2 diabetes mellitus; arrhythmia; Blood glucose fluctuation.

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