

INPLASY PROTOCOL

To cite: Liu et al. Meta-analysis of the correlation between serum uric acid level and type 2 diabetic retinopathy. Inplasy protocol 202070111. doi: 10.37766/inplasy2020.7.0111

Received: 25 July 2020

Published: 25 July 2020

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Support: None.

Review Stage at time of this submission: Formal screening of search results against eligibility criteria.

Conflicts of interest:
None.

Meta-analysis of the correlation between serum uric acid level and type 2 diabetic retinopathy

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Review question / Objective: Studies indicate that serum uric acid is associated with microvascular disease and macrovascular disease in men with type 2 diabetes.

Condition being studied: Type 2 diabetes is caused by the fact that insulin cannot be secreted by the body's pancreatic β cells, is secreted too little, or cannot be used, resulting in increased blood glucose concentration. Nowadays, increasing incidence of diabetes in the whole world and high blood sugar that has not been controlled for a long time may cause damage to various systems of the human body, such as Diabetes related complications such as diabetic nephropathy (DN), diabetic foot disease, cardiovascular disease, peripheral neuropathy (DPN) and diabetic eye disease. Diabetes retinopathy (DR) is one of the most common and serious complications of diabetes, which may cause vision loss for people of all ages. And research found that the prevalence of DR can range from 20% to 80% [1]. According to the assessment value of the International Association for the Prevention of Blindness (IAPB) 145 million people had DR of varying severity in 2015, and more than 45 million people have reached threatened vision. it is fortunate that DR can be prevented if intervened in time, therefore, it is worth to find causes of DR in diabetics and find early preventive measures.

INPLASY registration number: This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 25 July 2020 and was last updated on 25 July 2020 (registration number INPLASY202070111).

INTRODUCTION

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secreted by the body's pancreatic β cells, is secreted too little, or cannot be used, resulting in increased blood glucose concentration. Nowadays, increasing incidence of diabetes in the whole world and high blood sugar that has not been controlled for a long time may cause damage to various systems of the human body, such as Diabetes related complications such as diabetic nephropathy (DN), diabetic foot disease, cardiovascular disease, peripheral neuropathy (DPN) and diabetic eye disease. Diabetes retinopathy (DR) is one of the most common and serious complications of diabetes, which may cause vision loss for people of all ages. And research found that the prevalence of DR can range from 20% to 80% [1]. According to the assessment value of the International Association for the Prevention of Blindness (IAPB) 145 million people had DR of varying severity in 2015, and more than 45 million people have reached threatened vision. it is fortunate that DR can be prevented if intervened in time, therefore, it is worth to find causes of DR in diabetics and find early preventive measures.

METHODS

Participant or population: Type 2 diabetes patients with or without retinopathy (DR).The diagnostic criteria for diabetes and diabetic retinopathy in the selected literature should meet international standards recognized standards and providing serum uric acid levels.

Intervention: Not applicable.

Comparator: Not applicable.

Study designs to be included: Case-control study or Cross-Section studies with available data to assess the associations between uric acid level and type 2 diabetic retinopathy.

Eligibility criteria: Studies were included if they met the following criteria: (1) The study population is diagnosed with type 2 diabetes; (2) The study type in the literature should be a case-control study experiment;

The case group is type 2 diabetes patients with retinopathy (DR), and the control group is type 2 diabetes patients without retinopathy (NDR); (3) The diagnostic criteria for diabetes and diabetic retinopathy in the selected literature should meet international standards recognized standards; (4) providing serum uric acid levels; (5) The weighted mean difference (WMD) and 95% confidence interval should be directly or indirectly provided by literature or the literature can provided the original data which can be converted into the weighted mean difference (WMD) and 95% confidence interval.

Information sources: PubMed, Web of Science, and Embase were systematically searched for studies investigating the correlation between the level of serum uric acid and the increased risk of DR, with no restrictions on language, place of publication or date of publication. The time limit of the database is from January 1,1990 to May 1,2020. The systematic literature search was conducted in PubMed, Web of Science, and Embase from January 1,1990 to May 1,2020 for meta-analyses of observational studies investigating the association between serum uric acid and DR, using a predefined search strategy. We did not apply any restrictions or filters. We also screened the reference lists of relevant reviews and meta-analyses.

Main outcome(s): The uric acid level in diabetic patients with retinopathy is higher than that in diabetic patients without retinopathy.

Quality assessment / Risk of bias analysis: Data was extracted by one author (MN) and doublechecked by a second author (AB). For each published meta-analysis, we extracted the following data: first author's name, year of study, the total sample size, the place of study, publication, serum uric levels (means and standard deviation), sample size, gender, age in patients with and without DR. For each primary study included in the published meta-analysis, we extracted the first author's name, year of publication, number of total cases, number of participants, and the 9-stars Newcastle-

Ottawa Scale(NOS).was used for quality evaluation. Studies with more than 7 stars were considered as low risk of bias. If the judgment result is in dispute, a third reviewer is introduced and resolved through discussion.

Strategy of data synthesis: Meta-analysis was performed by R language.The weighted mean difference of random effects (WMD) and 95%-CI for the association between serum uric acid level and type 2 diabetic retinopathy In each meta-analysis, we evaluated heterogeneity by using the I-squared (I²) statistic. The I² value ranges from 0% to 100% and represents the percentage of the total variation across studies that can be explained by heterogeneity, there was no statistical heterogeneity when I² ≤50%. However, I² is dependent on the study size (it increases with increasing study size). Therefore, we also calculated τ², which is independent of study size and describes variability between studies, in relation to the risk estimates. Finally, we calculated 95% prediction intervals, which also account for heterogeneity and show the range in which the underlying true effect size of future studies will lie with 95% certainty. Publication bias and small study effects were assessed by graphical and statistical tests, namely the funnel plot and Egger's tes.

Subgroup analysis: Not applicable.

Sensibility analysis: Leave-one-out Sensitivity analysis is mainly used to test the robustness of the results, and can examine the impact of a single article on the overall risk estimate by deleting the literature one by one.

Country(ies) involved: No restriction.

Keywords: Diabetes, diabetic retinopathy (DR), uric acid, Meta-analysis.

Contributions of each author:

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