THE PREVALENCE OF MICROVASCULAR COMPLICATIONS IN PATIENTS WITH TYPE 2 DIABETES MELLITUS IN CHINA: A SYSTEMATIC REVIEW AND META-ANALYSIS

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Objective

 To estimate the overall prevalence of microvascular complications of type 2 diabetes in mainland China, and to identify any associated risk factors

Background

- The International Diabetes Federation reported that Chinese adult diabetes patients (20-79 years old) have reached 116 million in 2019, making China the largest diabetic population in the world[1]
- · Diabetic microvascular complications mainly include diabetic retinopathy (DR), diabetic nephropathy (DN) and diabetic foot (DF) caused by diabetic neuropathy, resulting in a high rate of fatality and disability in patients with T2DM
- A comprehensive understanding of the prevalence of diabetes complications is imperative to reducing the diabetes disease burden and to ensuring a rational allocation of public health resources

Methodology

- Search strategy: A systematic literature search was conducted to investigate the prevalence of DR, DN and DF in Chinese patients with T2DM for the past 5 years (January 2014-August 2019), including Chinese National Knowledge Infrastructure (CNKI), Wanfang, PubMed and the Cochrane Library.
- Inclusion criteria: People aged over 18 years old and lived in mainland China and the prevalence of microvascular complications of T2DM was reported.
- Complication definition: DR is defined as damages to retinal due to diabetes^[2]: DN is defined as the presence of proteinuria or estimated glomerular filtration rate (eGFR) < 60ml/ (min 1.73m2)(3); and DF is defined as diabetic patients accompanied with neuropathy and with lower limb infections, ulcers, or deep tissue damages due to peripheral vascular lesions^[4].
- Data extraction and statistical analysis: Complication prevalence, age, male%, HbA1c, BMI, duration of diabetes, and region (Northeast /North China /East China /South China /Central China /Northwest /Southwest) were extracted. A metaanalysis was conducted using R3.4.3 following normal transformations given the skewed raw data. Due to high heterogeneity, a random effect model was selected. A meta-regression analysis was performed to investigate risk factors.

Results

- A total of 2,682 articles were retrieved with 171 included in the meta-analysis. Of which, 86 studies in DR, 61 in DN and 24 in DF, involving 807,313 T2DM patients.
- Results of the meta-analyses demonstrated that the prevalence of diabetic retinopathy was 26.19% [95% CI: 23.02%-29.50%], diabetic nephropathy 27.09% [95% CI: 23.55%-30.79%], and diabetic foot 7.41% [95% CI: 5.48%-10.03%], respectively (Figure 1).
- Results of the meta-regression analyses showed that the duration of diabetes was a risk factor for the prevalence of DR, DN and DF. The prevalence of all three complications demonstrated an upward trend with the increase of the duration of diabetes (p<0.05) (Figure 2).

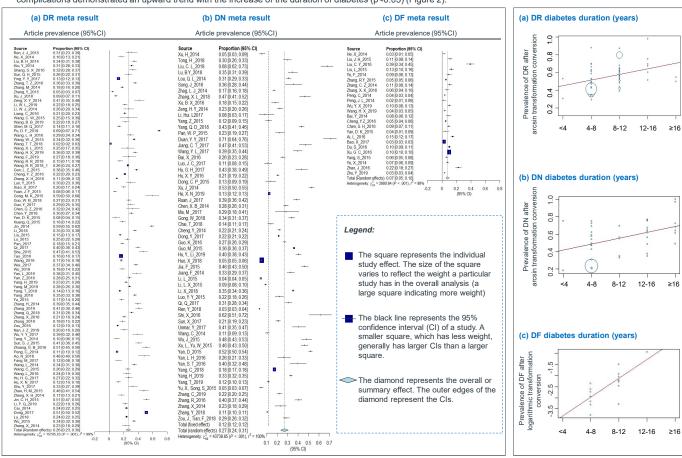


Figure 1 Meta-analysis Forest Plots

Figure 2 Meta-regression Analysis Bubble Charts

Discussion & Conclusion

Conclusion

The prevalences of DR, DN and DF in patients with T2DM are high in mainland China, leading to heavy disease burdens. Duration of diabetes is positively associated with diabetic microvascular complications. Anti-diabetic drugs with novel mechanisms are expected to be developed to restore glucose homeostasis so as to prevent and delay the onset of diabetic microvascular complications.

- The pathogenesis of diabetic microvascular complications has not yet been fully understood. Active control of blood glucose fluctuation, blood pressure and lipids is the basis for preventing and delaying the development of diabetic microvascular
- Although there are many different classes of anti-diabetic medications available, there is still a lack of clinical evidence on the improvement of glycemic fluctuation.
- Drugs with novel mechanisms should be developed, such as glucokinase activators, which can restore the normal physiological regulation of glucose, maintain glucose homeostasis, target the underlying causes of diabetes, and thus to reduce and delay the onset and development of diabetic complications effectively.

References
1. IDF Diabetes Atlas, 9th edn. 2020-03-30. http://www.diabetesatlas.org. 2. OPHTHALMOLOGY GROUP OF THE CHINESE MEDICAL ASSOCIATION OF OPHTHALMOLOGY. Guidelines for the clinical diagnosis and treatment of diabetic retinopathy in Chinase Journal of Ophthalmology. 2014,50(11):851-865. 3' MICROVASCULAR COMPLICATIONS GROUP OF DIABETES SOCIETY OF CHINESE MEDICAL ASSOCIATION. Chinese clinical guidelines for prevention and treatment of diabetic kidney disease, Chinese Journal of Diabetes,2019,11(1):15-28.
4. DIABETES SOCIETY OF CHINESE MEDICAL ASSOCIATION. Chinese guidelines for the prevention and treatment of diabetic kidney disease, Chinese Journal of Diabetes,2019,11(2):92-108.