Increased Spot Urine Albumin-to-Creatinine Ratio and Stroke Incidence: A Systematic Review and Meta-analysis

Ruolan Huang, Xiaowu Chen and **Xu Cao**

Department of Neurology, Shenzhen University General Hospital; Clinical Research Center for Neurological Diseases, Shenzhen University, Shenzhen, Guangdong, P.R.China

Background: Stroke is the second leading cause of death and the primary cause of chronic neurological disability worldwide, and a high prevalence has been reported in China in the past ten years. Similarly, chronic kidney disease (CKD) is a considerable public health challenge worldwide. Growing evidence indicates that the presence of protein in the urine, which represents an early sign of kidney disease, may be related to the risk of stroke. There are different data regarding whether proteinuria, which is often measured via the urine albumin-to-creatinine ratio (UACR), could be a risk factor for stroke and its subtypes. Renal insufficiency could be one considerable risk for worse clinical outcome of cerebral vascular disease. High albumin urea, better interpreted by UACR, predict higher risk of renal insufficiency, latent glomerular damage and systemic change of small arteries. Further studies are needed.

Objective: This study aimed to clarify the association between an increased spot urine albumin-to-creatinine ratio (UACR) and the risk of stroke.

Methods: We performed a systematic review and meta-analysis of cohort studies, case-control studies, and ancillary data randomized controlled trials (RCTs), which were treated as cohorts in this study, and estimated the association between albuminuria, as measured with the UACR, and the risk of stroke. We performed a comprehensive search of PubMed, Embase, and the Cochrane Library and conducted a systematic review and cumulative meta-analysis of cohort studies with a cross-sectional with prospective design in which stroke incidence was reported and the baseline UACR was measured. Ancillary data from RCTs were also included as part of the cohort study. We studied the characteristics of the participants, quality scores and risk ratios (RR, with confidence intervals, CI) of stroke associated with normal and high UACRs, and we synthesized the data via a meta-analysis.

Results: Twelve eligible studies including a total of 32,888 participants and 3,944 cases of stroke were identified. A high UACR (>30 mg/mmol) increased the risk of stroke by 1.67 times (RR: 1.67, 95% CI: 1.49-1.86, P<0.001 I2=26%). The results were not different between Asian and non-Asian patients (RR: 1.64, 95% CI: 1.41-1.91, P<0.001, I2=23% compared with RR: 1.67, 95% CI: 1.50-1.85, P<0. 00, I2=39%) or between subgroups classified by old age (RR: 1.61, 95% CI: 1.39-1.88, P<0.001, I2=34% compared with RR: 1.68, 95% CI: 1.52-1.87, P<0.001, I2=13%). A sensitivity analysis did not significantly change the results.

Conclusion: The incidence of stroke increased significantly in the high UACR group compared with the normal UACR group. The UACR could be a clinical addition for the early indication of high-risk stroke patients.

Biography: Ruolan Huang graduated from Tongji Medical College of Huazhong University of Science and Technology in 2007 as a medical doctor and was a clinical research scholar of Harvard Medical College from 2016 to 2017. She is now Director of Shenzhen Neuroelectrophysiology Association, member of Shenzhen First Sleep Medicine Professional Committee and Shenzhen Psychiatric Professional Committee member of Shenzhen Integrative Chinese and Western Medicine Critical Care Committee. She has been engaged in clinical and research work of cerebrovascular diseases and critical neurological diseases for 10 years. In recent years, she has devoted to the study of interdisciplinary issues between sleep medicine and cerebrovascular diseases. One project of Guangdong Science and Technology Plan and one project of National Natural Science Foundation had been completed, over 10 papers were published by the first author.