

## Diabetes Mellitus, hypertension and nephropathy – A vicious triangle

**Ferruh Artunc**<sup>1-3</sup>



**Professor of Internal Medicine, Nephrology, Department of Internal Medicine, Division of Endocrinology, Diabetology, Vascular Disease, Nephrology and Clinical Chemistry, University Hospital Tübingen, Institute of Diabetes Research and Metabolic Diseases (IDM) of the Helmholtz Center Munich at the University Tübingen, German Center for Diabetes Research (DZD) at the University Tübingen, Germany**

<sup>1</sup> **Department of Internal Medicine, Division of Endocrinology, Diabetology, Vascular Disease, Nephrology and Clinical Chemistry, University Hospital Tübingen, Germany**

<sup>2</sup> **Institute of Diabetes Research and Metabolic Diseases (IDM) of the Helmholtz Center Munich at the University Tübingen, Germany**

<sup>3</sup> **German Center for Diabetes Research (DZD) at the University Tübingen, Germany**

Diabetes mellitus is associated with hypertension and nephropathy which have a great clinical impact on the course of the disease and its outcome. Hypertension and nephropathy reflect profound macro- and microangiopathic alterations and damage of a diabetic patient which the potential to aggravate each other in a reciprocal manner. In this constellation diabetes, hypertension and nephropathy manifest as a vicious triangle that is associated with increased morbidity and mortality, mainly due to increased cardiovascular events and deaths. In addition to adequate treatment of hyperglycemia, blood pressure control and nephroprotection by the use lowering of intraglomerular pressure are of paramount importance. Proteinuria can be regarded as a strong biomarker that predicts both morbidity and mortality in diabetic patients with hypertension and nephropathy. Recent studies suggest that excretion of active serine proteases in proteinuria causes renal sodium retention leading to salt-sensitive hypertension. Lowering of proteinuria by the use of renin-angiotensin-system blockers has been shown to improve clinical outcomes in these patients. Currently, SGLT2 inhibitors while reducing proteinuria emerge as a protective drug class in diabetes that both prevent cardiovascular events and progression of diabetic nephropathy.