

Correlation Of Hypertension And Estimated Glomerular Filtration Rate In Type-2 Diabetes Patients

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Abstract

Type 2 Diabetes Mellitus (T2DM) causes impairment in various organ systems including renal issues. It can cause impaired renal function which has a higher mortality risk and often progress to end-stage renal disease. The short article study aims to determine the correlation of kidney disease and investigate the relationship between various factors and impaired renal function in a population of patients with T2DM. Impaired glomerular filtration rate (GFR) was defined as <60 mL/min per 1.73 m².

Keywords: Hypertension, high blood pressure, Diabetes, high blood glucose, Glomerular Filtration Rate, GFR, Albuminuria

Diabetes mellitus is a group of metabolic diseases characterized by hyperglycemia resulting from defects in insulin secretion, insulin action, or both (1). Diabetes is associated with many complications that are classified as "microvascular disease" (due to damage to small blood vessels) and "macrovascular disease" (due to damage to the arteries). Retinopathy, nephropathy, and neuropathy are included in microvascular complications (2).

Diabetes and hypertension generally coexist and are the major causes of the above-mentioned complications.

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Studies in experimental animals indicate that dilation of the afferent (precapillary) glomerular arteriole has an important role in increasing intraglomerular pressure and the glomerular filtration rate that may contribute to renal insult in diabetic nephropathy(3) molecular studies have identified several mechanisms that may be involved in the process of renal and retinal damage associated with hypertension and hyperglycemia. Most of these studies were based on an in vitro model of mechanical stimuli, such as stretch, mimicking the effect of increased pressure in glomerular and retinal cells in vivo (4).

Diabetic nephropathy has been categorized into stages based on the values of urinary albumin excretion (UAE): microalbuminuria and macroalbuminuria (5). Albuminuria and eGFR are the preliminary predictors of end-stage renal disease. 20-30 % of patients with type 2 diabetes and normoalbuminuria (NA) progressed to microalbuminuria or proteinuria after 6 to 9 years of follow-up (6). The Castle Monferrato study revealed that macroalbuminuria was the main predictor of mortality, independently of both estimated GFR and cardiovascular risk factors, whereas estimated GFR provided no further information for all-cause mortality and cardiovascular mortality in normoalbuminuric patients (7).

The basis of prevention and treatment of diabetic nephropathy includes the management of hypertension, hyperglycemia, smoking, and dyslipidemia (5). High doses of thiamine and its derivate benfotiamine have been shown to retard the development of microalbuminuria in experimental diabetic nephropathy, probably due to decreased activation of protein kinase C, decreased protein glycation, and oxidative stress(8) Very few studies have been conducted in humans. Sulodexide, a glycosaminoglycan, significantly reduced albuminuria in micro- or macroalbuminuric type 1 and type 2 diabetic patients (9). Apart from this diet and multifactorial interventions have been seen to reduce the disease progression rate.

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