

Research Article

Association between Serum Bilirubin and Estimated Glomerular Filtration Rate among Diabetic Patients

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The subjects comprised 230 men aged 77 ± 10 (range: 50–100) years and 279 women aged 81 ± 10 (50–101) years that visited the medical department. We examined the relationship between increased serum bilirubin and renal function evaluated by estimated glomerular filtration rate (eGFR) using CKD-EPI equations modified by a Japanese coefficient. Compared with the fourth quartile in serum bilirubin (1.01–1.97 mg/dL), the nonadjusted, age and gender-adjusted, and multivariate-adjusted odds ratios {95% confidence interval (CI)} of eGFR <60 mL/min/1.73 m² for the first quartile in serum bilirubin (0.13–0.50 mg/dL) were 2.08 (1.25–3.44), 1.82 (1.07–3.09), and 1.53 (0.83–2.81), respectively. Moreover, compared with the fourth quartile, nonadjusted, age and gender-adjusted, and multivariate-adjusted odds ratios (95% CI) of eGFR <45 mL/min/1.73 m² for the first quartile were 3.50 (1.95–6.23), 3.12 (1.72–5.65), and 3.53 (1.71–7.26), respectively. The data were further stratified by gender, age, medication (antihypertensive, antidiabetic agents), and prevalence of cardiovascular disease (CVD). The standardized coefficients for eGFR were significant in all the subgroups other than the prevalence of CVD, and there were significant interactions between the two groups regarding CVD. Our data demonstrated an independent positive association between serum bilirubin and eGFR among diabetic patients.

1. Introduction

Serum bilirubin may protect against inflammation, cardiovascular disease (CVD), and all-cause mortality in adults [1, 2]. Moreover, current evidences demonstrate that mildly elevated serum bilirubin may confer potent antioxidant properties, as indicated by its ability to scavenge peroxy radicals and to inhibit oxidation of low-density lipoprotein (LDL) derived lipids [3, 4]. Lots of studies have shown a positive relationship between serum bilirubin and estimated glomerular filtration rate (eGFR) [5–9], showing that serum bilirubin has a potential renoprotective effect. We also demonstrated an independent positive association between serum bilirubin and eGFR in both genders among elderly persons [10]. Therefore, it is reasonable to speculate that serum bilirubin levels may be negatively correlated with diabetic nephropathy and renal function among diabetic patients.

Several cross-sectional studies have shown that low serum bilirubin levels were significantly associated with

decreased eGFR, and negatively associated with diabetic nephropathy in a hospital-based sample of diabetic patients [6, 7]. In a cohort of Japanese type 2 diabetic patients, Mashitani et al. [9, 11] demonstrated that serum bilirubin levels were prospectively associated with diabetic nephropathy progression, independent of possible confounders. In contrast, Targher et al. [12] found that serum bilirubin was negatively associated with eGFR, considering serum bilirubin as a renal risk factor. Thus, a relationship between serum bilirubin and renal function remains controversial.

We evaluated the relationship of serum bilirubin with confounding risk factors such as renal function, as well as hypertension, hyperglycemia, and lipids, using cross-sectional data from the Nomura study [10].

2. Methods

2.1. Subjects. Patients for this investigation were recruited among consecutive diabetic patients aged ≥ 50 years that