# Degradasi Glikokaliks Urin pada Pasien Diabetes Melitus Tipe 2 dengan Penyakit Ginjal Diabetes Tahap Awal yang Dinilai Berdasarkan Laju Filtrasi Glomerulus = Urinary Glycocalyx Degradation in Type 2 Diabetes Mellitus Patients with Early Stage of Diabetic Kidney Disease Assessed by the Glomerular Filtration Rate

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Abstrak

Glikokaliks endotel pada glomerulus membantu mempertahankan homeostasis vaskular. Perubahan hemodinamik ginjal yang disebabkan oleh hiperglikemia kronis meningkatkan tekanan hidrolik glomerulus yang berkontribusi terhadap peluruhan glikokaliks. Faktor ini berkontribusi terhadap inisiasi penyakit ginjal kronis. Penelitian ini bertujuan untuk mengetahui asosiasi antara degradasi glikokaliks urin dan penyakit ginjal diabetes yang dinilai dengan estimasi laju filtrasi glomerulus (eLFG) pada pasien diabetes melitus tipe 2. Penelitian dilakukan dengan desain potong lintang dan teknik pengambilan sampel consecutive di Puskesmas Kecamatan Pasar Minggu. Sampel darah dan urin partisipan dikumpulkan untuk pengukuran eLFG, HbA1c, perbandingan albumin-kreatinin urin, dan degradasi glikokaliks. Degradasi glikokaliks urin diukur menggunakan 1,9- dimetilmetilen biru (GAG-DMMB). Total 75 partisipan dibagi menjadi dua kelompok menurut eLFG,  90 ml/min per 1,73 m2 (n = 33) (kelompok G1) dan 60-89 ml/min per 1,73 m2 (n = 42) (kelompok G2). Tidak ada perbedaan bermakna secara statistik (p<0,05) pada karakteristik dasar dan klinis kedua kelompok kecuali usia (p<0,001) dan HbA1c (p=0,039). Lebih lanjut, degradasi glikokaliks urin (mg/g kreatinin) lebih rendah pada kelompok G1 (median (min-max): 1,50 (0,00-16,59)) dibandingkan dengan kelompok G2 (2,04 (0,00-17,00)), namun tidak bermakna secara statistik. Tidak terdapat korelasi antara eLFG dengan degradasi glikokaliks urin (r=-0,11; p=0.33). Peningkatan degradasi glikokaliks urin tidak berhubungan terhadap tahap awal penyakit ginjal diabetes.

.....Endothelial glycocalyx in the glomeruli helps maintain vascular homeostasis. Renal hemodynamic alterations caused by chronic hyperglycemia increase glomerular hydraulic pressure that contributes to the shedding of glycocalyx. This factor predisposes to the initiation of chronic kidney disease. This study aimed to investigate the association between endothelial glycocalyx breakdown and diabetic kidney disease assessed by the estimated glomerular filtration rate (eGFR) among type 2 diabetes mellitus patients. This cross-sectional study used consecutive sampling method and was conducted in Pasar Minggu Primary Health Center. Participants' blood and urine samples were collected for measurement of eGFR, HbA1c, urine albumin-to-creatinine ratio (UACR), and glycocalyx degradation. Urinary glycocalyx breakdown was measured in the form of glycosaminoglycan and was assayed with 1,9-dimethylmethylene blue (GAG-DMMB). A total of 75 participants were divided into two groups according to the eGFR,  90 ml/minute per 1.73 m2 (n = 33) (G1 group) and 60-89 ml/minute per 1.73 m2 (n = 42) (G2 group). There were no statistically significant differences (p<0.05) in baseline and clinical characteristics among groups except for age (p<0.001) and HbA1c level (p=0.039). Furthermore, there was a decrease in urinary glycocalyx degradation product (mg/g creatinine) in G1 group (median (min-max): 1.50 (0.00-16.59)) compared to G2 group (2.04 (0.00-17.00)) with no statistically significant difference. There was no correlation between eGFR and urinary glycocalyx degradation product (r=-0,11; p=0.33). Increased urinary glycocalyx

degradation was not associated with early phase of diabetic kidney disease.