

# **CORRELATIONS BETWEEN TOTAL ANTIOXIDANT CAPACITY AND 8-HYDROXYDEOXYGUANOSINE WITH CAROTID-FEMORAL PULSE WAVE VELOCITY IN CHRONIC KIDNEY DISEASE**

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## **Abstract**

**Introduction.** *Chronic Kidney Disease (CKD) is often associated with an increased risk of cardiovascular disease. Cardiovascular disease in CKD can be affected by oxidative stress and inflammation. Oxidative stress can affect arterial stiffness, especially in patients with CKD, which will increase the risk of cardiovascular disease. This study aimed to explain the correlation between Total Antioxidant Capacity (TAC) and 8-Hydroxydeoxyguanosine (8-OHdG) with Carotid-Femoral Pulse Wave Velocity (cfPWV) in Patients with CKD.*

**Method.** *This was a correlational research with cross-sectional study design. The sample of this study was 43 CKD patients. TAC was measured from serum samples by colorimetric method, 8-OHdG was measured from urine by enzyme-linked immunoassay method, while Doppler ultrasound was performed to assess cfPWV.*

**Result.** *Significant correlations were found between age, e-GFR, HBA1C, serum creatinine, cystatin-C, and CKD stage with urinary 8-OHdG levels. Serum creatinine, cystatin-C, stage CKD, age, HDL, e-GFR, and HBA1C also had significant correlations with serum TAC levels. Other significant correlations between e-GFR, HBA1C, serum creatinine, cystatin-C, and CKD stage with cf-PWV were also obtained. A significant negative correlation was obtained between serum TAC and cf-PWV with moderate levels of correlation coefficient ( $r = -0.504$ ).*

**Conclusion.** *There was a negative correlation between Total Antioxidant Capacity and Carotid-Femoral Pulse Wave Velocity in patients with CKD. The lower the TAC level was, the higher the cfPWV was, which means that the degree of arterial stiffness had an inverse correlation with the TAC level. There was no significant correlation between 8-OHdG and cf-PWV in patients with CKD*

**Keywords:** *Chronic Kidney Disease, Total Antioxidant Capacity, 8-Hydroxydeoxyguanosine, Carotid-Femoral Pulse Wave Velocity.*

# KORELASI ANTARA *TOTAL ANTIOXIDANT CAPACITY* DAN *8-HYDROXYDEOXYGUANOSINE* DENGAN *CAROTID-FEMORAL PULSE WAVE VELOCITY* PADA PASIEN PENYAKIT GINJAL KRONIS

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## Ringkasan

Latar belakang. Penyakit Ginjal Kronis (PGK) sering dikaitkan dengan peningkatan risiko penyakit kardiovaskular. Selain faktor risiko tradisional, penyakit kardiovaskular pada PGK juga dapat disebabkan oleh faktor risiko nontradisional, yaitu stres oksidatif dan inflamasi. Stres oksidatif dapat mempengaruhi *arterial stiffness*, terutama pada pasien dengan PGK, sehingga dapat meningkatkan risiko penyakit kardiovaskular.

Tujuan. Untuk menjelaskan korelasi antara *Total Antioksidan Capacity* (TAC) dan *8-Hydroxydeoxyguanosine* (8-OHdG) dengan *Carotid-Femoral Pulse Wave Velocity* (cfPWV) pada pasien PGK.

Metode. Ini adalah penelitian korelasional dengan desain studi *cross-sectional*. Sampel penelitian ini adalah 43 pasien PGK di Rumah Sakit Universitas Airlangga, Surabaya, Indonesia pada bulan Desember 2019 - Maret 2020. TAC diukur dari sampel serum dengan metode Kolorimetri, 8-OHDG diukur dari urin dengan metode *enzyme-linked immunoassay*, sedangkan cfPWV diukur dengan menggunakan USG doppler. Pemeriksaan cfPWV menggunakan USG Doppler probe vaskular mesin Ekokardiografi GE Vivid 5 yang disinkronisasi dengan Elektrokardiografi.

Hasil. Didapatkan korelasi yang signifikan antara usia, e-GFR, HBA1C, kreatinin serum, cystatin-C, dan stadium PGK dengan kadar 8-OHdG urin. Kreatinin serum, cystatin-C, stadium PGK, usia, HDL, e-GFR, dan HBA1C juga memiliki korelasi signifikan dengan kadar TAC serum. Korelasi signifikan lainnya didapatkan antara e-GFR, HBA1C, kreatinin serum, cystatin-C, dan stadium PGK dengan cf-PWV. Korelasi negatif yang signifikan didapatkan antara serum TAC dan cf-PWV dengan tingkat koefisien korelasi sedang ( $r = -0,504$ ).

Kesimpulan. Didapatkan korelasi negatif antara *Total Antioksidan Capacity* dan *Carotid-Femoral Pulse Wave Velocity* pada pasien dengan PGK. Semakin rendah kadar TAC, semakin tinggi cfPWV, yang berarti derajat *arterial stiffness* semakin berat. Tidak ada korelasi yang signifikan antara 8-OHdG dan cf-PWV pada pasien CKD.

Kata kunci: Penyakit ginjal kronis, *Total Antioxidant Capacity*, *8-Hydroxydeoxyguanosine*, *Carotid-Femoral Pulse Wave Velocity*.