

Efek simvastatin terhadap kadar malondialdehid jantung dan serum tikus model penyakit ginjal kronis = Effects of simvastatin on cardiac and serum malondialdehyde levels in a rat model of chronic kidney disease

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Abstrak

Latar belakang: Riset Kesehatan Dasar 2018 menemukan bahwa 38/10.000 penduduk Indonesia berusia 15 tahun menderita penyakit ginjal kronis (PGK). Morbiditas dan mortalitas utama pada penderita PGK disebabkan karena sindrom kardiorrenal tipe 4. Toksin urea pada penderita PGK dapat menyebabkan inflamasi sistemis serta perburukkan stres oksidatif, mengakibatkan disfungsi endotel dan aterosklerosis yang bisa berujung pada penyakit kardiovaskuler. Sejumlah studi menemukan bahwa simvastatin memiliki efek antiinflamasi dan antioksidan yang ditunjukkan dengan penurunan malondialdehid (MDA), penanda tidak langsung inflamasi dan stres oksidatif.

Tujuan: Penelitian ini bertujuan untuk mengetahui efek pemberian simvastatin dan pengaruhnya terhadap stres oksidatif pada tikus model PGK melalui pengamatan kadar MDA di jantung dan serum.

Metode: Tikus Sprague-Dawley (n=12) dibagi secara acak menjadi 3 kelompok: kelompok sham (S), model PGK melalui metode 5/6 nefrektomi (N), dan model PGK dengan pemberian simvastatin 10 mg/kgBB selama 4 minggu (NS). Pengukuran kadar MDA jantung dan serum dilakukan melalui Thiobarbituric Acid Reactive Substance Assay. Data selanjutnya diolah melalui uji One-Way Anova.

Hasil: Ditemukan rerata kadar MDA jantung sebagai berikut: S=1,3708 nmol/mg protein; NS=1,2574 nmol/mg protein; dan N=0,4129 nmol/mg protein. Ditemukan rerata

kadar MDA serum sebagai berikut: NS=1,5924 nmol/ml; N=1,2667 nmol/ml; dan S=1,2171 nmol/ml. Temuan pada penelitian ini bertentangan dengan teori yang sudah ada. Meski demikian, perbedaan kadar MDA antarkelompok pada penelitian ini tidak bermakna secara statistik ($p>0,05$).

Simpulan: Tidak terdapat perbedaan kadar MDA yang bermakna secara statistik baik pada kelompok S, kelompok N, dan kelompok NS.

Introduction: Riset Kesehatan Dasar 2018 found that 38/10.000 Indonesian population aged 15 years were suffering from Chronic Kidney Disease (CKD). CKD patients' morbidity and mortality are majorly caused by type 4 cardiorenal syndrome. Urea toxin in CKD patients can cause systemic inflammation and oxidative stress, causing endothelial dysfunction and atherosclerosis that can lead to cardiovascular diseases. Several studies found that simvastatin had antiinflammatory and antioxidant effects, shown by the reduction of malondyaldehyde (MDA), an indirect inflammatory and oxidative stress marker.

Objective: This research aims to determine the effects of simvastatin administration on oxidative stress in CKD rat model by measuring cardiac and serum MDA levels.

Method: Sprague-Dawley rats (n=12) were randomly divided into 3 groups: sham (S), CKD model by 5/6 nephrectomy (N), and CKD model with 10 mg/kgBB simvastatin administration for 4 weeks (NS). Cardiac and serum MDA levels were measured using Thiobarbituric Acid Reactive Substance Assay. Data collected were analyzed using One-Way Anova test.

Results: The average cardiac MDA levels found were as followed: S=1.3708 nmol/mg protein; NS=1.2754 nmol/mg protein; and N=0.4129 nmol/mg protein. The average serum MDA levels found were as followed: NS=1.5924 nmol/ml; N=1.2667 nmol/ml; and S=1.2171 nmol/ml. These findings contradict existing theories. However, the differences among treatments and MDA levels are not statistically significant ($p>0.05$).

Conclusion: There isn't statistically significant difference among the MDA levels in the S, the N, and the NS group