

ABSTRACT

Background : Endothelial dysfunction is well-known as an early stage of atherosclerosis. Increased oxidative stress in hypercholesterolemia triggers endothelial dysfunction that is characterized by decreased biological availability of nitric oxide (NO). Experimental studies showed that chlorophyllin had an effective antioxidant activity.

Objectives : To determine the effect of chlorophyllin on nitric oxide (NO) and malondialdehyde (MDA) level of hypercholesterolemic rats.

Methods : Post test only randomized control group used twenty four male Sprague Dawley rats were randomly divided into four groups: without treatment (technical control/K1), hypercholesterolemic (negative control/K2), hypercholesterolemic with chlorophyllin at dose of 1,8 mg/200 g/d (P1) and hypercholesterolemic with chlorophyllin at dose of 3,34 mg/200g/d (P2). Chlorophyllin was dissolved in water and was given via nasogastric tube for 21 days after the rats got hypercholesterolemia. Total cholesterol level of blood was measured by CHOD-PAP method, level of NO plasma was measured by Griess reaction and level of MDA plasma was measured by TBARS method. Hypothesis test was analyzed by One Way Anova continued by Post hoc LSD test and Kruskall Wallis by significant level of 0,05.

Results : NO plasma level was the lowest in group P2 ($0.203 \pm 0.015 \mu\text{M}$) and the highest in the group K2 ($0,224 \pm 0,001 \mu\text{M}$), but no difference of NO plasma level among groups ($p = 0.118$). There were differences in MDA plasma level among the groups ($p = 0.001$). P1 and P2 groups had lower MDA plasma level than K2 ($2.40 \pm 0.11 \text{ nmol/ml}$), indicated by ($1.94 \pm 0.07 \text{ nmol/ml}$, $p=0.0001$) and ($1,37 \pm 0.13 \text{ nmol/ml}$, $p=0.0001$) respectively, but still higher than K1 ($0.94 \pm 0.05 \text{ nmol/ml}$, $p=0.0001$).

Conclusion : The treatment of chlorophyllin does not have an effect of NO plasma level, but gives an effect of lower MDA plasma level.

Keywords: chlorophyllin, nitric oxide, malondialdehyde, hypercholesterolemia

ABSTRAK

Latar Belakang: Disfungsi endotel dikenal sebagai tahap awal dari aterosklerosis. Peningkatan stres oksidatif pada hiperkolesterolemia memicu disfungsi endotel yang ditandai dengan penurunan ketersediaan biologis oksida nitrat (NO). Studi eksperimental menunjukkan bahwa klorofilin memiliki aktivitas antioksidan yang efektif.

Tujuan: Mengetahui pengaruh klorofilin pada oksida nitrat (NO) dan malondialdehid (MDA) tingkat tikus hiperkolesterolemia.

Metode: Penelitian eksperimen dengan rancangan post test only dilakukan terhadap 24 ekor tikus Sprague Dawley secara acak dibagi menjadi empat kelompok: tanpa pengobatan (kontrol teknis / K1), hiperkolesterolemia (kontrol negatif / K2), hiperkolesterolemia dengan klorofilin pada dosis 1,8 mg / 200 g / d (P1) dan hiperkolesterolemia dengan klorofilin pada dosis 3,34 mg / 200g / d (P2). Klorofilin dilarutkan dalam air dan diberi melalui pipa nasogastrik selama 21 hari setelah tikus mendapat hiperkolesterolemia. Kadar kolesterol total darah diukur dengan metode CHOD-PAP, tingkat NO plasma diukur dengan reaksi Griess dan tingkat MDA plasma diukur dengan metode TBARS. Uji hipotesis dianalisis dengan One Way Anova dilanjutkan dengan Post hoc LSD tes dan Kruskall Wallis pada tingkat signifikan 0,05.

Hasil: Kadar NO plasma yang terendah pada kelompok P2 ($0,203 + 0,015 \text{ M}$) dan tertinggi pada kelompok K2 ($0.224 \pm 0.001 \text{ M}$), tetapi tidak ada perbedaan tingkat NO plasma antar kelompok ($p = 0,118$). Ada perbedaan plasma MDA antar kelompok ($p = 0,001$). P1 dan P2 kelompok plasma MDA lebih rendah dibanding dengan K2 ($2,40 + 0,11 \text{ nmol / ml}$), ditandai dengan ($1,94 0,07 \text{ nmol / ml}$, $p = 0,0001$) dan ($1,37 0,13 \text{ nmol / ml}$, $p = 0,0001$). Kadar MDA kelompok K1 lebih tinggi ($0,94 + 0,05 \text{ nmol / ml}$, $p = 0,0001$).

Simpulan: pengobatan chlorophyllin tidak memiliki efek pada tingkat NO plasma, tetapi memberikan efek penurunan plasma MDA.

Kata kunci: klorofilin, oksida nitrat, malondialdehid, hiperkolesterolemia