Pengaruh fotokoagulasi laser dan bevacizumab intravitreal pada retinopati diabetes melitus tipe 2 : tinjauan penanda biologis stres oksidatif = Effect of laser photocoagulation and intravitreal bevacicuzumab in proliferative diabetic retinopathy review on biomarkers of oxidative stress

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Abstrak

ABSTRAK
Latar Belakang: Stres oksidatif merupakan salah satu faktor patogenesis terjadinya retinopati diabetik (RD). Fotokoagulasi laser dan anti-VEGF bermanfaat pada penanganan RD. Keberhasilan terapi dan prognosis dapat dilakukan melalui penilaian klinis dan penanda biologis stres oksidatif.

Tujuan: Penelitian ini bertujuan membandingkan pengaruh fotokoagulasi laser dan bevacizumab intravitreal (BIV) terhadap penanda biologis stres oksidatif, antara lain aktivitas ALDH plasma, kadar VEGF, MDA dan aktivitas SOD vitreus pada penyandang RD proliferatif.

Metode: Penelitian ini adalah penelitian prospektif dengan desain uji klinis acak tersamar tunggal. Sebanyak 72 mata dari 69 penyandang RD proliferatif di Rumah Sakit Cipto Mangunkusumo (RSCM) antara Februari 2011 ? Juni 2013 dirandomisasi menjadi 4 kelompok terdiri dari kelompok 1) kontrol yaitu kelompok langsung vitrektomi sesuai indikasi (n = 18), 2) kelompok yang mendapat fotokoagulasi laser pre-vitrektomi (n = 18), 3) kelompok yang mendapat BIV pre-vitrektomi(n = 18) dan 4) kelompok yang mendapat kombinasi BIV dan fotokoagulasi laser previtrektomi (n = 18).

Hasil: Hasil penelitian ini mendapatkan bahwa pada kelompok 1, 2, 3 dan 4 masingmasing rerata aktivitas ALDH plasma (IU/mg protein) (0,034+0,02; 0,027+0,02; 0,025+0,02; 0,031+0,1; p = 0,66), kadar MDA vitreus (nmol/mL) (1,661+1,21; 1,557+1,32; 1,717+1,54; 1,501+1,09; p = 0,96), dan aktivitas SOD (U/mL) (0,403+0,50; 0,210+0,18; 0,399+0,49; 0,273+0,32 p = 0,38) dan tidak terdapat perbedaan bermakna, sedangkan perbandingan rerata kadar VEGF vitreus (pg/mL) (0,356+0,60; 0,393+0,45; 0,150+0,24; 0,069+0,13; p = 0,05) menunjukkan perbedaan yang bermakna. Kadar VEGF kelompok kombinasi BIV dengan fotokoagulasi laser lima kali lebih rendah dibandingkan dengan kelompok kontrol.

Simpulan: Kombinasi BIV dan fotokoagulasi laser tidak berpengaruh terhadap aktivitas ALDH plasma dan SOD vitreus, namun berpengaruh terhadap kadar MDA dan VEGF vitreus penyandang RD proliferatif. Kombinasi BIV dengan fotokoagulasi laser perlu dilakukan pada RD proliferatif. Pengukuran ALDH plasma dapat digunakan sebagai faktor prognostik untuk perubahan CMT dan visus.
<hr><i>ABSTRACT
Background: Diabetic Retinopathy (DR) is retinal vascular complications in patients with diabetes mellitus (DM). Oxidative stress plays a major role in the pathogenesis of this disease. The current management of DR includes laser photocoagulation (LF) and administration of anti-VEGF, such as intravitreal bevacizumab

(IVB). Clinical parameters are usually applied in determining the outcomes of these methods of therapies. However, the measurement of biomarkers of oxidative stress can possibly be used to determine the prognosis.

Purpose: This study was aimed to compare the effect of LF, IVB and combined treatments on biomarkers of oxidative stress such as plasma ALDH and vitreal SOD activities, and vitreal VEGF and MDA level on proliferative DR patients. Methods: In this single blind randomized clinical trial, 72 eyes from 69 cases of proliferative DR in Cipto Mangunkusumo Hospital (RSCM) between February 2011 - June 2013 were randomized into 4 groups : 1) control group (n = 18), 2) LF previtrectomy group (n = 18), 3) IVB pre-vitrectomy group (n = 18) and 4) combined IVB and LF pre-vitrectomy group (n = 18). In all groups, the biomarkers of oxidative stress were measured as the primary outcome and visual acuity and CMT as secondary outcome.

Results: There were no statistically significant differences in the comparison of the average plasma ALDH activity (IU/mg protein) (0.034+0.02; 0.027+0.02; 0.025+0.02; 0.031+0.1; p = 0.66), vitreal MDA level (nmol/mL) (1.661+1.21; 1.557+1.32; 1.717+1.54; 1.501+1.09; p = 0.96) and SOD activity (U/mL) (0.403+0.50; 0.210+0.18; 0.399+0.49; 0.273+0.32 p = 0.38) among these four groups, respectively. However, the average of vitreal VEGF level (pg/mL) among these 4 group showed a statistically significant difference (0.356+0.60; 0.393+0.45; 0.150+0.24; 0.069+0.13; p = 0.05), with the level of vitreal VEGF in the combined group was 5 times lower than control.

Conclusion: Combined treatments of DR by IVB and LF does not have any effect on the activities of plasma ALDH and vitreal SOD. However, these combined treatments were correlated with lower vitreal MDA and VEGF level, higher SOD activity and lower VEGF level in proliferative DR. Combined treatments with IVB and LF are recommended for the management of proliferative DR patients. The measurement of plasma ALDH can be used as a prognostic factor for determining the visual acuity and CMT.</i>