Pengaruh kadar gula darah terhadap vascular endothelial growth factor dan placental growth factor plasma dan vitreus pada tikus diabetik = Effect of blood glucose control towards plasma and vitreous levels of vascular endothelial growth factor and placental growth factor in diabetic rats

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Abstrak

Tujuan: Membandingkan kadar vascular endothelial growth factor VEGF dan placental growth factor PlGF plasma dan vitreus pada tikus diabetes dengan kontrol gula darah GD buruk, dengan perbaikan kontrol gula darah, dan tikus nondiabetes, dan melihat pengaruh perbaikan kontrol gula darah terhadap kadar VEGF dan PlGF.
Metode: Penelitian ini merupakan uji eksperimental pada hewan coba tikus strain Sprague Dawley. Sebanyak 18 ekor tikus disertakan dalam penelitian dan secara acak dibagi ke dalam kelompok perlakuan n=14 dan kontrol n=4 . Kelompok perlakuan diberikan injeksi Streptozotocin untuk menginduksi diabetes. Tikus dengan kadar GD 72 jam pasca induksi lebih dari 300 mg/dL didiagnosis diabetes. Kadar GD diperiksa secara berkala pada seluruh subyek. Setelah 4 mingu, kelompok perlakuan dibagi ke dalam kelompok I untuk terminasi dan kelompok II untuk perbaikan kontrol GD dengan injeksi insulin selama 4 minggu berikutnya, begitu pula dengan kelompok kontrol. Saat terminasi, sampel plasma darah dan vitreus diambil untuk analisis kadar VEGF dan PlGF melalui pemeriksaan enzyme-linked immunosorbent assay ELISA.
Hasil: Sebanyak 17 ekor tikus bertahan hidup hingga akhir penelitian dengan 1 ekor tikus mati dari kelompok perlakuan. Kadar GD kelompok perlakuan II menurun drastis dan mencapai normoglikemia. Pemeriksaan ELISA bulan pertama menunjukkan kadar VEGF vitreus kelompok perlakuan I cenderung lebih tinggi dibandingkan kontrol I, yakni 196,36 65,24 pg/dL dan 123,64 44,99 pg/dL p=0,20 . Pemeriksaan ELISA bulan kedua menunjukkan kadar PlGF vitreus kelompok perlakuan II lebih tinggi dibandingkan kontrol II, yakni 59,04 2,48 dan 51,93 3,15 p=0,01. Kadar VEGF vitreus dan plasma kelompok perlakuan I dan II tidak berbeda bermakna, sedangkan kadar PlGF vitreus dan plasma lebih tinggi pada bulan kedua.
Kesimpulan: Kadar VEGF dan PlGF vitreus mengalami peningkatan pada kelompok tikus diabetes dibandingkan nondiabetes, dan perbaikan kontrol gula darah selama 1 bulan belum dapat menurunkan kadar VEGF dan PlGF.
<hr><i>Aim: To compare plasma and vitreous level of vascular endothelial growth factor VEGF and placental growth factor PlGF in diabetic rats with poor blood glucose BG control, reconstitution of good BG control, and nondiabetic rats, and to investigate the effect of reconstitution of good BG control to VEGF and PlGF plasma and vitreous level.
Methods: This is an experimental study using Sprague Dawley rats. Eighteen rats were divided into intervention group n 14 and control group n 4. Intervention group were given Streptozotocin STZ injection to induce diabetes. Rats with BG level more than 300 mg dL at 72 hours after injection were considered diabetes and successful models. BG levels were monitored periodically in all subjects. After 4 weeks,

intervention group was randomly divided into group I for termination and group II for reconstitution of good BG control with insulin for following 4 weeks, and so was the control group. Plasma and vitreous samples were taken. VEGF and PlGF levels were detected with enzyme linked immunosorbent assay ELISA.
Results: Seventeen rats survived and one rat died in intervention group. BG level of intervention group II decreased dramatically to normoglycemia. ELISA at month 1 showed that VEGF vitreous level tend to be higher in intervention group I compared to control I, 196.36 65.24 pg dL and 123.64 44.99, respectively p 0.20. ELISA at month 2 showed that PlGF vitreous level of intervention group I were significantly higher compared to control I, 59.04 2.48 and 51.93 3.15, respectively p 0.01. Vitreous and plasma VEGF of intervention group I and II were not different, while vitreous and plasma PlGF were significantly higher in group II.
Conclusions: Vitreous levels of VEGF and PlGF were increased in diabetic rats compared to nondiabetic, and reconstitution of good BG control for 1 month were unable to reduce VEGF and PlGF levels.