

Pengaruh pemberian pentoksifilin terhadap perubahan faktor hemoreologi pada cedera reperfusi iskemik tungkai akut = Effect of pentoxifylline administration toward hemorheology changes in acute limb ischemic reperfusion injury

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Abstrak

Latar Belakang. Komplikasi tindakan revaskularisasi pasca suatu periode iskemik mulai menjadi perhatian kalangan medis sejak awal abad ke-20. iskemik tungkai akut merupakan masalah kegawatan kardiovaskular dan tindakan reperfusi terhadap jaringan yang iskemik ternyata sering memperburuk cedera jaringan yang ada, bahkan sampai dilakukan amputasi. Pada cedera reperfusi iskemik (R-I) terjadi perubahan sifat hemoreologi darah (hematokrit, viskositas, dan deformitas sel darah merah). Pentoksifilin (PTXF) mempunyai kemampuan memperbaiki cedera reperfusi dengan meningkatkan aliran darah perifer, memperbaiki deformitas sel darah merah, menurunkan viskositas darah, dan menekan agregasi platelet.

Tujuan Penelitian. Untuk mengetahui pengaruh pemberian PTXF terhadap faktor hemoreologi darah pada cedera R-I tungkai akut.

Metode. Penelitian dilakukan pada kelinci jantan ras New Zealand White Rabbit (NZW) yang berasal dari 1 galur sebanyak 10 ekor usia 5 bulan dengan berat badan rata-rata 2,5-3 kg. Kemudian hewan coba dibagi dalam 2 kelompok, yakni 5 ekor kelinci kelompok perlakuan diberi PTXF dengan dosis 40 mg/kgBB yang diikuti dosis rumatan 1 mg/kgBB/jam dan 5 ekor kelinci sebagai kontrol diberi cairan NaCl 0,9% dengan kecepatan yang sama seperti kelompok perlakuan. Dilakukan oklusi arteri iliaka komunis sinistra dan setelah 2,5 jam iskemik diambil darah untuk pemeriksaan hematokrit dan viskositas, setelah itu segera diberikan PTXF. Pada jam ke-3 dilakukan reperfusi (membuka oklusi) dan 2 jam setelah reperfusi diambil darah untuk pemeriksaan hematokrit dan viskositas. Data hasil pemeriksaan dianalisis dengan statistik program SPSS 13 dengan menggunakan uji parametrik General Linear Model (GLM) untuk pengukuran berulang.

Hasil. Nilai rerata hematokrit kelompok PTXF fase iskemik $37,06 \pm 3,88\%$ dan fase reperfusi $34,20 \pm 1,90\%$ dengan delta penurunan 2,86%. Nilai rerata hematokrit kelompok nonPTXF fase iskemik $35,88 \pm 5,31\%$ dan fase reperfusi $32,90 \pm 4,61\%$ dengan delta penurunan 2,98%. Antara pengukuran pertama dan kedua, baik kelompok PTXF dan nonPTXF tidak terdapat perbedaan bermakna ($p = 0,37$). Analisis statistik nilai rerata hematokrit antara kelompok PTXF dan nonPTXF tidak terdapat perbedaan bermakna ($p = 0,74$).

Nilai rerata viskositas kelompok PTXF fase iskemik $5,25 \pm 0,77$ cp dan fase reperfusi $4,69 \pm 0,70$ cp dengan delta penurunan 0,558 cp. Nilai rerata viskositas kelompok nonPTXF fase iskemik $4,54 \pm 0,48$ cp dan fase reperfusi $4,48 \pm 1,31$ cp dengan delta penurunan 0,066 cp. Antara pengukuran pertama dan kedua, baik kelompok PTXF dan nonPTXF tidak terdapat perbedaan bermakna secara statistik ($p = 0,26$ dan $p = 0,92$). Analisis statistik pada nilai rerata viskositas antara kelompok PTXF dan nonPTXF tidak terdapat perbedaan

bermakna ($p=0,53$).

Kesimpulan. Pemberian PTXF pada kelompok perlakuan memperlihatkan hasil tidak bermakna dalam menurunkan nilai hematokrit dan viskositas darah dibanding kelompok kontrol pada keadaan cedera R-I tungkai akut.

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Background: Complications of revascularization after an ischemic period has attract attention from clinicians since the beginning of 20th century. Acute limb ischemia is an emergency cardiovascular problem and revascularization procedures of ischemic tissue has been documented to worsen tissue damage to the extend of a need for limb amputation. In ischemic reperfusion injury, changes in blood hemorheology occurs (hematocrit, viscosity and erythrocyte deformities). Pentoxifylline (PTXF) has the ability to repair reperfusion injury by increasing peripheral blood flow, repairing erythrocyte deformities, decreasing blood viscosity dan suppressing platelet agregation.

Objectives: To investigate the effect of pentoxifylline administration toward hemorheology changes in acute limb ischemic reperfusion injury.

Methods: We studied 10 pure strain New Zealand White Rabbit (NZW) age 5 months with mean weight of 2.5-3 kg. The subjects were divided in two groups; 5 of the experimental rabbit were given PTXF 40 mg/kg body weight followed by a maintenance dose of 1 mg/kg body weight/hour, while subjects in the control group received a similar administration of NaCl 0.9%. We performed occlusion of the left common iliac artery and after an ischemic period of 2.5 hours blood samples were taken for hematocrit and viscosity measurement. PTXF were given soon afterward. On the third hour the artery occlusion were opened and after another two hours blood samples were again taken for hematocrit and viscosity measurement. Data analysis were performed by SPSS 13, using parametric test with general linear model (GLM) for repeated measurements.

Results: The mean hematocrit value for the PTXF group in the ischemic period were 37.0613.88%, and in the reperfusion period were 34.2011.90%, with a decrease of 2.86%. The mean hematocrit value for the control group in the ischemic and reperfusion period were 35.8815.31% and 32.90±4.61% , respectively, with a decrease of 2.98%. There were no significant difference between the first and second hematocrit measurements both in the experimental and control group ($p=0.19$ and $p=0.37$). Statistical analysis of mean hematocrit value between the two groups also showed no significant difference ($p=0.74$).

The mean viscosity value for the PTXF group in the ischemic period were 5.2510.77 cp and in the reperfusion period were 4.6910.70 cp with a difference of 0.558 cp. The mean viscosity value for the control group in the ischemic and reperfusion period were 4.54±0.8 cp and 4.4811.31 cp, respectively, with a decrease of 0.066 cp. There were no statistically significant difference between the first and second viscosity measurements both in the experimental and control group ($p=0.26$ and $p=0.92$). Statistical analysis of mean viscosity value between the two groups also showed no significant difference ($p=0.53$).

Conclusion: PTXF administration in the experimentally induced acute limb ischemic reperfusion injury in

rabbits have no benefits to decrease hematocrit and viscosity values compared to control group.