Perbandingan aktifitas antioksidan superoxide dismutase eritrosit, kadar trace elements eritrosit dan indeks eritrosit pada kehamilan normal dan preeklamsia = Comparison between erythrocyte antioxidant superoxide dismutase activity, erythrocyte trace elements and erythrocyte index in normal pregnancy and preeclampsia

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Abstrak

Latar Belakang: Preeklamsia merupakan penyebab utama morbiditas dan mortalitas ibu dan bayi di seluruh dunia. Gejala preeklamsia disebabkan oleh disfungsi endotel maternal. Eritrosit maternal dapat berperan menyebabkan disfungsi endotel maternal melalui gangguan keseimbangan nitric oxide. Stres oksidatif dan trace elements pada eritrosit dicurigai berperan menyebabkan gangguan produksi nitric oxide. Stres oksidatif eritrosit juga dapat mempengaruhi morfologi eritrosit. Tujuan: Penelitian ini membandingkan aktifitas antioksidan superoxide dismutase eritrosit, kadar trace elements eritrosit dan indeks eritrosit pada kehamilan normal dan preeklamsia. Metode: Penelitian ini merupakan studi potong lintang dengan jumlah sampel 20 pasien preeklamsia dan 20 pasien hamil normal yang melakukan kunjungan pada RS Cipto Mangunkusumo, RSUD Kab. Tangerang dan RSUD Koja. Pemeriksaan antioksidan superoxide dismutase eritrosit dengan metode ELISA dan pemeriksaan trace elements eritrosit dengan metode ICP-MS. Data disajikan dalam tabel dan dianalisis dengan uji parametrik yakni uji-t tidak berpasangan bila sebaran normal atau uji Mann-Whitney U bila sebaran tidak normal. Penelitian ini sudah lolos kaji etik dan mendapatkan persetujuan pelaksanaan dari Komite Etik Penelitian Kesehatan FKUI-RSCM.
Hasil: Didapatkan kadar eritrosit preeklamsia dibandingkan kontrol adalah (4,39 ± 0,55 vs 3,84 ± 0,44 juta/ml) (p=0,001), MCV (83,01 ± 8,48 vs 88,53 ± 5,6 fL) (p=0,020), MCH (26,9 ± 3,6 vs 29,6 ± 5,7 pg) (p=0,009) dan MCHC (32,4 ± 1,7 vs 33,4 ± 1,03 %) (p=0,023). Tidak terdapat perbedaan bermakna RDW-CV eritrosit preeklamsia dibandingan kontrol 14,3 (12,5-23,7) vs 14,1 (12-16,2) (p=0,448). Kadar aktifitas SOD eritrosit kelompok preeklamsia dibandingkan kelompok kontrol adalah 35,74 ± 7,97 vs 28,9 ± 6,28 U/ml (p=0,005); Aktifitas SOD/Hb eritrosit kelompok preeklamsia dibandingkan kelompok kontrol adalah 310,8 ± 83,4 vs 257,88 ± 63,1 U/g Hb (p=0,029). Untuk trace elements preeklamsia dibandingkan kontrol adalah : Ferrum (67 (23-82) vs 75 (24-92)) fg/RBC (p=0,033); Cobalt (0,15 (0,05-0,61) vs 0,08(0,02-0,34)) ag/RBC (p=0,027); Selenium (18,5 ± 4,6 vs 21,7 ± 2,8) ag/RBC (p=0,014); Cadmium (0,10 (0,02-0,22) vs 0,33 (0,01-0.14)) (p=0,006) dan Timbal (9,37 ± 4,67 vs 5,6 ± 2,06) ag/RBC (p=0,003). Trace elements eritrosit mangan, nikel, cuprum, seng, arsenik, merkuri dan thalium tidak terdapat perbedaan antara kehamilan preeklamsia dan kontrol.
.....Background : Preeclampsia is a major cause of maternal and infant morbidity and mortality worldwide. Symptoms of preeclampsia are caused by maternal endothelial dysfunction. Maternal erythrocytes can play a role in causing maternal endothelial dysfunction through impaired nitric oxide balance. Oxidative stress and micro-minerals in erythrocytes are suspected to play a role in causing impaired nitric oxide production. Oxidative stress of erythrocytes can also affect the morphology of erythrocytes. Objective : This study compared the anti-oxidant activity of erythrocyte superoxide dismutase, erythrocyte micro mineral content and erythrocyte index in normal pregnancy and preeclampsia. Methods: This study is a cross-sectional study

with a sample of 20 patients with preeclampsia and 20 pregnant patients without preeclampsia who visited Cipto Mangunkusumo Hospital, Kab. Tangerang and hospitals. Koja. Examination of erythrocyte superoxide dismutase antioxidant by ELISA method and micro erythrocyte mineral examination by ICP-MS method. The data are presented in tables and analyzed by parametric test, unpaired t-test if the distribution is normal or the Mann-Whitney U test if the distribution is not normal. This research has passed the ethical review and received implementation approval from the Health Research Ethics Committee of the FKUI-RSCM.

Results: The preeclampsia erythrocyte levels compared to controls were (4.39 ± 0.55 vs 3.84 ± 0.44 million/ml) (p=0.001), MCV (83.01 ± 8.48 vs. 88.53 ± 5 .6 fL) (p=0.020), MCH (26.9 ± 3.6 vs 29.6 ± 5.7 pg) (p=0.009) and MCHC (32.4 ± 1.7 vs 33 ,4 ± 1.03%) (p=0.023). There was no significant difference in RDW-CV of preeclampsia erythrocytes compared to controls 14.3 (12.5-23.7) vs. 14.1 (12-16.2) (p=0.448). SOD activity levels of erythrocytes in the preeclampsia group compared to the control group were 35.74 ± 7.97 vs. 28.9 ± 6.28 U/ml (p=0.005);The erythrocyte SOD/Hb activity of the preeclampsia group compared to the control group was 310.8 ± 83.4 vs. 257.88 ± 63.1U/g Hb (p=0.029). For preeclampsia trace minerals compared to controls were: Ferrum (67 (23-82) vs 75 (24-92)) fg/RBC (p=0.033); Cobalt (0.15 (0.05-0.61) vs. 0.08(0.02-0.34)) ag/RBC (p=0.027); Selenium (18.5 ± 4.6 vs. 21.7 ± 2.8) ag/RBC (p=0.014); Cadmium (0.10 (0.02-0.22) vs. 0.33 (0.01-0.14)) (p=0.006) and Lead (9.37 ± 4.67 vs 5.6 ± 2.06) ag/RBC (p=0.003). The trace elements erythrocyte: manganese, nickel, cuprum, seng, arsenic, mercury and thallium showed no significant difference between the preeclampsia and control groups.