

Tesis

**KORELASI KADAR HEMOGLOBIN BEBAS DENGAN  
NITRIC OXIDE PLASMA PADA *PACKED RED CELL*  
SELAMA PENYIMPANAN DI BANK DARAH**



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# KORELASI KADAR HEMOGLOBIN BEBAS DENGAN *NITRIC OXIDE* PLASMA PADA *PACKED RED CELL* SELAMA PENYIMPANAN DI BANK DARAH

## ABSTRAK

**Latar Belakang:** Perubahan morfologi dan biokimia yang terjadi selama penyimpanan eritrosit, biasa dikenal dengan jejas penyimpanan, merusak integritas membran eritrosit, menyebabkan hemolisis yang menghasilkan hemoglobin bebas. *Nitric oxide* (NO) merupakan vasodilator yang berperan dalam regulasi aliran darah dan fungsi vaskular. Hemoglobin bebas yang dihasilkan selama penyimpanan darah diperkirakan berhubungan dengan peningkatan konsumsi NO sehingga menurunkan kadar NO plasma, yang secara signifikan akan menyebabkan gangguan respons dilatasi vaskular. Tujuan penelitian ini adalah untuk mengetahui korelasi kadar hemoglobin bebas dengan *nitric oxide* plasma selama waktu penyimpanan di bank darah.

**Metode:** Penelitian ini merupakan penelitian analitik dengan rancangan potong lintang terhadap 14 kantong darah PRC yang disimpan di Bank Darah RSUP Dr. M. Djamil Padang. Penelitian dilakukan bulan Mei 2016 sampai Agustus 2017. Pemeriksaan dilakukan selama 28 hari penyimpanan dengan interval 1 minggu. Kadar hemoglobin bebas diperiksa dengan metode sianmethemoglobin dan *nitric oxide* menggunakan kolorimetrik. Analisis statistik menggunakan uji Spearman dengan hasil dianggap bermakna jika  $p < 0,05$ .

**Hasil:** Donor terbanyak laki-laki (85,7%), dengan rentang usia donor 33(9) tahun. Terdapat perbedaan rerata kadar hemoglobin bebas dan NO plasma yang bermakna berdasarkan waktu penyimpanan ( $p < 0,05$ ). Kedua parameter mempunyai korelasi sedang yang bermakna secara statistik dengan arah korelasi negatif ( $r = -0,56$ ;  $p = 0,01$ ).

**Simpulan:** Kadar hemoglobin bebas berkorelasi negatif sedang dengan kadar NO plasma PRC selama penyimpanan.

**Kata kunci:** Hemoglobin bebas, hemolisis, *nitric oxide*, jejas penyimpanan

**CORRELATION OF FREE HEMOGLOBIN LEVEL AND  
PLASMA NITRIC OXIDE IN PACKED RED CELL  
DURING BLOOD BANK STORAGE PERIOD**

**ABSTRACT**

**Background:** Stored red blood cells undergo morphological and biochemical changes with increased storage time, commonly referred as the storage lesion, reduced integrity of erythrocyte membrane, causing hemolysis and increased free plasma hemoglobin (fHb) level. Nitric oxide (NO) was an endogenous vasodilator with major role in vascular and blood flow regulation. Accumulation fHb during instorage RBC hemolysis was thought to be correlated with elevated NO consuming caused low NO level that significantly impaired endothelial function. The aim of this study was to analyze the correlation of free Hb and plasma nitric oxide level during PRC storage period in blood bank.

**Method:** This was an analytic study with cross-sectional design to 14 unit PRC those were stored in Dr. M. Djamil Padang Hospital Blood Bank. The study was conducted from May 2016 to August 2017. The assay was performed for 28 days of storage with 1 week intervals. Free Hb and NO level were analysed by cyanmethemoglobin and colorimetry method respectively. Spearman test was used to assess correlation between free Hb level and nitric oxide plasma with  $p < 0.05$  means significant.

**Results:** Most donors were male (85.7%) with age range were 33(9) years. Free Hb and nitric oxide level were significantly differenced in each week storage periods ( $p < 0.05$ ). Two parameters was significantly have moderate negative correlation during storage periods ( $r = -0.56$ ;  $p = 0.01$ ).

**Conclusion:** Free Hb level has significantly negative correlation with plasma nitric oxide level during storage periods of PRC.

**Keywords:** Free Hb, hemolysis, nitric oxide, storage lesion



