Hubungan Kadar Hemoglobin dengan Ekspresi HIF-1 pada Pasien Luka Kaki Diabetes dengan Anemia = Association of Hemoglobin Levels with HIF-1 Expression in Diabetic Foot Ulcer Patients with Anemia

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Abstrak

Latar Belakang: Indonesia menempati peringkat ke-7 di antara 10 negara dengan jumlah penderita DM terbanyak. Tingginya jumlah penderita DM meningkatkan jumlah komplikasi luka kaki diabetes. Anemia berhubungan dengan luka kaki diabetes, serta menjadi prediktor amputasi dan mortalitas. Pasien anemia tanpa DM mengalami peningkatan ekspresi HIF-1 akibat hipoksia. Akan tetapi, pada pasien luka kaki diabetes tanpa anemia justru memiliki kadar HIF-1 yang rendah. Keadaan hiperglikemia menyebabkan degradasi HIF-1. Penelitian ini bertujuan mengetahui hubungan kadar hemoglobin dengan ekspresi HIF-1 pada pasien luka kaki diabetes dengan anemia di RS Dr. Cipto Mangunkusumo.

Metode: Penelitian ini merupakan observasional analitik jenis potong lintang. Data diambil dari seluruh pasien terdiagnosis luka kaki diabetes dengan anemia di RSCM, meliputi kadar hemoglobin, gula darah sewaktu, HbA1c, dan kadar HIF-1 berdasarkan metode ELISA yang diperoleh dari jaringan hasil biopsi. Analisis statistik dilakukan menggunakan SPSS versi 20. Uji korelasi Spearman dilakuan untuk memperoleh nilai koefisien korelasi. Nilai p <0,05 bermakna signifikan.

Hasil: Terdapat 59 subjek luka kaki diabetes dengan anemia di RSCM. Laki-laki sebanyak 30 orang (50,8%) dan mayoritas subjek berusia 40—59 tahun yaitu sebanyak 37 orang (62,7%). Perempuan memiliki median GDS 227,0 mg/dL (IQR: 192) dan HbA1c 8,0 g/dL (IQR: 4,6), lebih besar dibandingkan laki-laki. Sebaliknya, laki-laki memiliki rerata Hb 9,9 g/dL (SB: 2,0) dan median HIF-1 19,1 pg/mg (IQR: 36,4), lebih besar dibandingkan perempuan. Hanya Hb dan HbA1c yang berhubungan dengan jenis kelamin secara signifikan (p <0,05). Uji korelasi Spearman diperoleh nilai korelasi r = 0,266 (IK95%: -0,14—0,58; p = 0,043).

Simpulan: Didapatkan korelasi positif lemah dan signifikan antara kadar hemoglobin dengan ekspresi HIF-1 pada pasien luka kaki diabetes dengan anemia di RSCM. Keadaan hiperglikemi dapat mendegradasi HIF-1 lebih kuat dibandingkan kemampuan anemia dalam memicu ekspresi HIF-1.
.....Background: Indonesia is ranked 7th out of 10 countries with the most diabetes mellitus patients. The high number of DM patients will increase complications of diabetic foot ulcers. Anemia is associated with diabetic foot ulcers as well as a predictor of amputation and mortality. Anemic patients without diabetes have increased HIF-1 expression due to hypoxia. Meanwhile, diabetic foot ulcer patients without anemia have low levels of HIF-1. Hyperglycemia causes degradation of HIF-1. This study aims to determine the association of hemoglobin levels and HIF-1 expression in diabetic foot ulcer patients with anemia at Dr. Cipto Mangunkusumo National Hospital.

Method: This is a cross-sectional study. Data were taken from all patients diagnosed with diabetic foot

ulcers with anemia at the RSCM, including hemoglobin (Hb) levels, blood glucose (BG), HbA1c, and HIF-1 levels based on the ELISA method obtained from tissue biopsies. Statistical analysis was done using SPSS version 20. Spearman correlation test was performed to obtain the coefficient of correlation. P-value <0.05 was significant.

Results: There were 59 subjects with diabetic foot ulcers with anemia in RSCM. It consisted of 30 male (50.8%) and most of subjects were 40-59 years old (37 subjects; 62.7%). Female subjects have a median BG 227.0 mg/dL (IQR: 192) and median HbA1c 8.0 g/dL (IQR: 4.6), it is higher than male. On the other hand, male subjects have a mean Hb 9.9 g/dL (SB: 2.0) and median HIF-1 19.1 pg/mg (IQR: 36.4), it is larger than female. Only Hb and HbA1c were significantly related to gender ($p < 0.05$). Spearman correlation test obtained a correlation value of $r = 0.266$ (95%CI: -0.14-0.58; $p = 0.043$).

Conclusion: We found a weak but significant positive correlation between hemoglobin levels and HIF-1 expression in diabetic foot wound patients with anemia in RSCM. Hyperglycemia can degrade HIF-1 more strongly than anemia's ability to initiate HIF-1 expression.