

PENGARUH PEMBERIAN VITAMIN D ORAL TERHADAP EKSPRESI *TUMOR*

***NECROSIS FACTOR- α* PADA *TRABECULAR MESHWORK* TIKUS MODEL**

GLAUKOMA

TESIS

Diajukan sebagai salah satu syarat untuk mendapatkan gelar

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**PENGARUH PEMBERIAN VITAMIN D ORAL TERHADAP EKSPRESI *TUMOR*
NECROSIS FACTOR- α PADA *TRABECULAR MESHWORK* TIKUS MODEL
GLAUKOMA**

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Abstrak

Pendahuluan : Peningkatan tekanan intra okuler merupakan faktor resiko perkembangan dan progresifitas glaukoma yang dapat menginduksi proses inflamasi di *trabecular meshwork* melalui produksi sitokin pro-inflamasi seperti TNF- α . Inflamasi dapat menyebabkan stres mekanik dan perubahan matriks ekstraseluler di *trabecular meshwork*, sehingga terjadi hipertonisitas dan resistensi aliran keluar akuos humor. Vitamin D dapat memodulasi produksi sitokin dengan menekan ekspresi sel TH1 dan menginduksi ekspresi sel TH2.

Tujuan : Untuk mengetahui pengaruh pemberian Vitamin D oral terhadap ekspresi TNF- α pada *trabecular meshwork* tikus model glaukoma.

Metode : Penelitian ini merupakan penelitian eksperimental dengan rancangan *post test-only with control group*. 30 tikus model glaukoma dibagi dalam 3 kelompok, kelompok 1 dan 2 tanpa pemberian vitamin D oral dan pemeriksaan ekspresi TNF- α di *trabecular meshwork* dilakukan masing-masing pada hari ke 3 dan ke 14. Kelompok 3 diberikan vitamin D oral hingga hari ke 14 dengan dosis 1200IU/kgBB/hari. Pengukuran ekspresi TNF- α dilakukan dengan mengukur persentase proporsi area yang terwarnai coklat melalui pewarnaan imunohistokimia. Perbedaan antara ketiga kelompok dianalisis secara statistik dengan uji *one way ANOVA*. Perbedaan yang signifikan jika nilai $p < 0,05$.

Hasil : Rerata ekspresi TNF- α di *trabecular meshwork* tikus model glaukoma pada kelompok 1, 2, dan 3 berturut-turut adalah $22,2 \pm 2,51$ %, $39,1 \pm 3,98$ %, $34,2 \pm 3,19$ %. Secara statistik terdapat perbedaan yang signifikan antara ketiga kelompok ($p < 0,001$). Uji *post hoc Bonferroni* menunjukkan terdapat perbedaan rerata yang signifikan antar kelompok 1 dan 2 ($p < 0,001$), kelompok 1 dan 3 ($p < 0,001$), serta kelompok 2 dan 3 ($p = 0,007$).

Kesimpulan : Vitamin D oral dapat menurunkan ekspresi TNF- α pada *trabecular meshwork* tikus model glaukoma dan menekan proses inflamasi yang terjadi akibat peningkatan tekanan intra okuler.

Kata kunci : Vitamin D, TNF- α , *trabecular meshwork*, glaukoma

THE EFFECT OF ORAL VITAMIN D ADMINISTRATION ON THE EXPRESSION OF TUMOR NECROSIS FACTOR- α IN THE TRABECULAR MESHWORK OF GLAUCOMA MODEL RATS

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Abstract

Introduction : Elevated intraocular pressure is a risk factor for the development and progression of glaucoma that can induce inflammation in the trabecular meshwork through the production of pro-inflammatory cytokines such as TNF- α . Inflammation can cause mechanical stress and changes in the extracellular matrix in the trabecular meshwork, resulting in hypertonicity and resistance to aqueous humor outflow. Vitamin D can modulate cytokine production by suppressing TH1 cell expression and inducing TH2 cell expression.

Objective : To determine the effect of oral Vitamin D on TNF- α expression in the trabecular meshwork of glaucoma model rats.

Methods : This study is an experimental study with a post-test-only design with a control group. 30 glaucoma model rats were divided into 3 groups, group 1 and 2 without oral vitamin D administration and examination of TNF- α expression in the trabecular meshwork was performed on day 3 and 14, respectively. Group 3 was given oral vitamin D until day 14 with a dose of 1200 IU/kg body weight/day. Measurement of TNF- α expression was carried out by measuring the percentage of the proportion of brown stained areas through immunohistochemical staining. The differences between the three groups were statistically analyzed by one way ANOVA test. The difference is significant if the p value <0.05.

Results : The mean expression of TNF- α in the trabecular meshwork of glaucoma model rats in group 1, 2, and 3 was $22,2 \pm 2,51\%$, $39,1 \pm 3,98\%$, $34,2 \pm 3,19 \%$ respectively. Statistically there was a significant difference between the three groups ($p < 0.001$). Bonferroni's post hoc test showed that there were significant mean differences between groups 1 and 2 ($p < 0.001$), groups 1 and 3 ($p < 0.001$), and groups 2 and 3 ($p = 0.007$).

Conclusion: Oral vitamin D can reduce the expression of TNF- α in the trabecular meshwork of glaucoma model rats and suppress the inflammatory process that occurs due to increased intraocular pressure.

Key words : Vitamin D, TNF-, trabecular meshwork, glaucoma