PENGARUH VITAMIN D TERHADAP EKSPRESI mRNA CTGF DAN GAMBARAN HISTOPATOLOGIK SEL STELLATA HEPATIK AKTIF PADA HEPAR TIKUS MODEL DIABETES MELLITUS

INTISARI

Latar Belakang : Diabetes mellitus adalah penyakit yang dapat menyebabkan kerusakan pada hepar. Diabetes mellitus menyebabkan peningkatan *reactive oxygen species* (ROS) yang menyebabkan aktivasi sel stellata hepatik (HSC) dan berprogresi menjadi fibrosis. Vitamin D dapat digunakan sebagai proteksi pada kerusakan hepar akibat fibrosis. Akan tetapi, penelitian lebih lanjut mengenai efek vitamin D terhadap fibrosis hepar pada penyakit diabetes mellitus masih belum dikaji dengan dalam.
Tujuan : Penelitian ini bertujuan untuk mengkaji lebih dalam mengenai pengaruh vitamin D terhadap ekspresi mRNA *connective tissue growth factor* (CTGF) dan gambaran histopatologik HSC aktif pada hepar tikus model diabetes mellitus.
Metode : Penelitian ini adalah penelitian eksperimental dengan desain *post-test-only control group*. Subjek penelitian adalah tikus *Sprague dawley* jantan sebanyak 30 ekor yang dibagi menjadi 6 kelompok secara acak. Tikus model diabetes mellitus dibuat dengan induksi *streptozotocin* (STZ) 60 mg/kgBB dosis tunggal diinjeksikan secara intraperitoneal dan dibiarkan selama 30 hari (DM-1, n=5) dan 60 hari (DM-2, n=5). Intervensi vitamin D diberikan secara intraperitoneal setiap hari selama 30 hari pada tikus yang sudah diinduksi STZ selama 30 hari yang dibagi menjadi 3 kelompok dosis, yaitu kelompok VD-0,125 µg (n=5), kelompok VD-0,25 µg (n=5), dan kelompok VD-0,5 µg (n=5). Kelompok kontrol (n=5) hanya diberikan injeksi NaCl 0,9% dosis tunggal. Sebelum dilakukan terminasi, dilakukan pengambilan sampel darah melalui vena retro orbital. Setelah itu, tikus dilakukan terminasi dan diambil organ heparnya. Kemudian, dilakukan pemeriksaan ekspresi mRNA CTGF menggunakan RT-PCR dan melihat gambaran histopatologik sel stellata hepatik aktif menggunakan pemeriksaan imunohistokimia *glial fibrillary acidic protein* (GFAP).
Hasil : Ekspresi mRNA CTGF pada kelompok DM-2 lebih tinggi secara signifikan daripada kelompok kontrol. Ekspresi mRNA CTGF pada kelompok vitamin D lebih rendah secara signifikan daripada kelompok DM-2. Gambaran histopatologi HSC aktif lebih teramati pada kelompok DM daripada kontrol dan vitamin D.
Kesimpulan : Pemberian vitamin D memberikan efek antifibrosis hepar tikus model DM. Ketiga jenis dosis memberikan efek pada mRNA CTGF dan gambaran histopatologi HSC lebih rendah pada hepar tikus model diabetes mellitus.
Kata kunci : hepar, diabetes mellitus, fibrosis, CTGF, GFAP, sel stellata hepatik

EFFECT OF VITAMIN D ON CTGF mRNA EXPRESSION AND HISTOPATHOLOGIC IMAGES OF ACTIVE HEPATIC STELLATE CELLS IN THE LIVER OF RAT MODEL DIABETES MELLITUS

ABSTRACT

Background: *Diabetes mellitus is a disease that can cause damage to the liver. Diabetes mellitus causes an increase in reactive oxygen species (ROS) which causes activation of hepatic stellate cells (HSC) and progresses to fibrosis. Vitamin D can be used as protection against liver damage due to fibrosis. However, further research regarding the effect of vitamin D on liver fibrosis in diabetes mellitus has not yet been studied in depth.*
Objective: *This study aims to examine more deeply the effect of vitamin D on connective tissue growth factor (CTGF) mRNA expression and the histopathological features of active HSC in the liver of rats with diabetes mellitus.*
Methods: *This research was an experimental study with a post-test-only control group design. The research subjects were 30 male Sprague Dawley rats which were randomly divided into 6 groups. Diabetes mellitus model rats were created by inducing a single dose of streptozotocin (STZ) 60 mg/kgBW injected intraperitoneally and left for 30 days (DM-1, n=5) and 60 days (DM-2, n=5). Vitamin D intervention was given intraperitoneally every day for 30 days to rats that had been induced by STZ for 30 days which were divided into 3 dose groups, namely VD-0,125 µg group (n=5), VD-0,25 µg group (n=5), and the VD-0,5 µg group (n=5). The control group (n=5) was only given a single dose of 0,9% NaCl injection. Before termination, a blood sample is taken via the retro orbital vein. After that, the rats were terminated and their livers were removed. Then, CTGF mRNA expression was examined using RT-PCR and the histopathological feature of active hepatic stellate cells was examined using the glial fibrillary acidic protein (GFAP) immunohistochemical examination.*
Results: *CTGF mRNA expression in the DM-2 group was significantly higher than in the control group. CTGF mRNA expression in the vitamin D group was significantly lower than in the DM-2 group. Histopathological features of active HSC were more observed in DM group than in control and vitamin D group.*
Conclusion: *Vitamin D has an antifibrosis effect on the liver of the DM model. The three types of doses affected lower CTGF mRNA and HSC histopathology in the liver of the rat model of diabetes mellitus.*
Keywords: *liver, diabetes mellitus, fibrosis, CTGF, GFAP, hepatic stellate cells*