

INTISARI

Latar Belakang: Diabetes merupakan salah satu kontributor terbesar terhadap kasus penyakit ginjal kronis yang salah satunya ditandai oleh meningkatnya fibrosis interstitial. Efek proteksi vitamin D (calcitriol) terhadap fibrosis telah diketahui, namun dosis untuk pencegahan fibrosis pada model ginjal diabetes melitus masih perlu dikaji lebih lanjut.

Tujuan: Penelitian ini bertujuan untuk mengkaji efek proteksi vitamin D terhadap fibrosis interstitial pada model diabetes tipe 1.

Metode: Penelitian ini bersifat *quasi experimental*. Tikus (*Rattus norvegicus*) galur Sprague Dawley diinduksi dengan pemberian Streptozotocin (STZ) selama satu bulan sehingga didapatkan model diabetes melitus. Model diabetes melitus diberikan perlakuan berupa pemberian vitamin D (Calcitriol) dengan dosis berbeda (0 µg/kgBB; 0,125 µg/kgBB; 0,25 µg/kgBB; 0,5 µg/kgBB) dengan kontrol negatif berupa tikus tanpa pemberian STZ dan kontrol positif berupa tikus dengan pemberian STZ selama dua bulan.

Sampel histologi ginjal diwarnai dengan pewarnaan *sirius red* dan diukur fraksinya fibrosisnya melalui software ImageJ. mRNA Collagen-1 (COL-1) diamplifikasi dengan reverse transcriptase polymerase chain reaction (RT-PCR) dan diukur densitas band-nya dengan ImageJ. Data yang didapat kemudian diproses dengan software SPSS 23 untuk mendapatkan rerata dan standar deviasi dengan kriteria hasil dianggap signifikan secara statistik apabila nilai $p < 0,05$.

Hasil: Fraksi area fibrosis lebih rendah secara bermakna pada kelompok dosis vitamin D 0,25 µg/kgBB (VD0.25) dan 0,5 µg/kgBB (VD0.5) dibanding kelompok induksi diabetes 1 bulan (DM1) dan 2 bulan (DM2). VD0.5 tidak menunjukkan perbedaan signifikan dibanding kelompok kontrol. Ekspresi COL-1 lebih rendah secara signifikan pada kelompok VD0.5 dibanding DM2, sedangkan VD0.5 tidak menunjukkan perbedaan dibanding dengan kontrol.

Kesimpulan: Vitamin D memiliki efek proteksi terhadap fibrosis interstitial ginjal pada model tikus diabetes melitus tipe 1.

Kata kunci: Vitamin D, Ginjal, Fibrosis, Diabetes melitus tipe I, Collagen-1, *Sirius red*

ABSTRACT

Background: Diabetes is one of the biggest contributors to cases of chronic kidney disease, one of which is characterized by increased interstitial fibrosis. The protective effect of vitamin D (calcitriol) on fibrosis is well known, but the dose for preventing fibrosis in renal models of diabetes mellitus still needs to be studied further.

Purpose: This study aims to examine the protective effect of vitamin D on interstitial fibrosis in a type 1 diabetes model.

Method: This research is quasi-experimental. Sprague Dawley rats (*Rattus norvegicus*) were induced with Streptozotocin (STZ) for one month to obtain a diabetes mellitus model. The diabetes mellitus model was given treatment in the form of administration of vitamin D (Calcitriol) at different doses (0 µg/kgBW; 0.125 µg/kgBW; 0.25 µg/kgBW; 0.5 µg/kgBW) with negative controls in the form of rats without STZ administration and control positive in the form of mice with STZ administration for two months.

Kidney histology samples were stained with Sirius red staining and the fraction of fibrosis was measured using ImageJ software. Collagen-1 (COL-1) mRNA was amplified by reverse transcriptase polymerase chain reaction (RT-PCR) and the band density was measured by ImageJ. The data obtained was then processed with SPSS 23 software to obtain the mean and standard deviation with the outcome criteria considered statistically significant if the p value <0.05.

Results: The fibrous area fraction was significantly lower in the 0.25 µg/kgBB (VD0.25) and 0.5 µg/kgBB (VD0.5) vitamin D dose group compared to the 1 month (DM1) and 2 month (DM1) and 2 months diabetes induction groups (DM2). VD0.5 did not show a significant difference compared to the control group. COL-1 mRNA expression was significantly lower in the VD0.5 group compared to DM2, while VD0.5 showed no difference compared to the controls.

Conclusion: Vitamin D has a protective effect against renal interstitial fibrosis in a rat model of type 1 diabetes mellitus.

Keywords: Vitamin D, Kidney, Fibrosis, Diabetes mellitus type I, Collagen-1, Sirius red