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**PENGARUH PEMBERIAN VITAMIN D TERHADAP DERAJAT CEDERA TUBULUS GINJAL DAN SUPEROXIDE DISMUTASE (SOD)
PADA GINJAL TIKUS JANTAN (Rattus norvegicus) MODEL DIABETES MELITUS TIPE 1**
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INTISARI

Latar Belakang: Diabetes Melitus Tipe 1 dapat menyebabkan terjadinya kerusakan organ ginjal yang ditandai dengan cedera tubulus dan penurunan ekspresi *superoxide dismutase* (SOD). Vitamin D telah diketahui mempunyai efek renoprotektif dengan mengurangi dampak buruk diabetes melitus tipe 1.
Tujuan: Mengkaji pengaruh pemberian tiga dosis vitamin D terhadap derajat cedera tubulus ginjal dan ekspresi mRNA *superoxide dismutase* (SOD) pada ginjal tikus jantan *Rattus norvergicus* model diabetes melitus tipe 1.
Metode: Model Diabetes Melitus Tipe 1 pada tikus jantan *Rattus norvegicus* galur *Sparague dawley* dibuat dengan menginduksi *streptozotocin* (STZ). Selanjutnya tikus diberi vitamin D untuk mengetahui seberapa besar pengaruhnya terhadap derajat cedera tubulus ginjal dan *superoxide dismutase* (SOD). Tikus dibagi menjadi enam kelompok, yaitu kelompok kontrol (K), kelompok diabetes melitus tipe 1 dipelihara 1 bulan (DM1), kelompok diabetes melitus tipe 1 dipelihara 2 bulan (DM2), kelompok vitamin D dosis 0,125 µg/kgBB (VD0.125), kelompok vitamin D dosis 0,25 µg/kgBB (VD0.25), dan kelompok vitamin D dosis 0,5 µg/kgBB (VD0.5). Cedera tubulus ginjal dinilai dengan pewarnaan PAS menggunakan derajat cedera tubulus. Sedangkan ekspresi mRNA *superoxide dismutase* (SOD) akan dinilai menggunakan *Reverse Transcriptase-Polymerase Chain Reaction* (RT-PCR). Selanjutnya, data yang diperoleh dari penelitian tersebut dianalisis dengan menggunakan *software* SPSS.
Hasil: Derajat cedera tubulus kelompok DM1 dan DM2 lebih tinggi dibandingkan kontrol ($p<0,05$) dan kelompok VD0.125, VD0.25, VD0.5 lebih rendah dibandingkan DM1 dan DM2 ($p<0.05$). Ekspresi mRNA SOD2 kelompok DM1 dan DM2 lebih rendah dibandingkan kontrol ($p<0,05$) dan kelompok VD0.125, VD0.25, VD0.5 lebih tinggi dibandingkan DM1 dan DM2 ($p<0.05$).
Kesimpulan: Kelompok tikus diabetes melitus tipe 1 yang diberi vitamin D dosis 0,125 µg/kgBB, 0,25 µg/kgBB, dan 0,5 µg/kgBB memiliki derajat cedera tubulus ginjal yang lebih rendah dan ekspresi mRNA SOD2 yang lebih tinggi.
Kata Kunci: Diabetes Melitus tipe 1, cedera tubulus ginjal, *superoxide dismutase* (SOD), Vitamin D (kalsitriol).

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ABSTRACT

Background: Type 1 Diabetes Mellitus (T1DM) can cause kidney damage which is characterized by tubular injury and decreased expression of superoxide dismutase (SOD). Vitamin D has been known to have a renoprotective effect by reducing the adverse effects of type 1 diabetes mellitus.
Objective: To examine the effect of three doses of vitamin D on the degree of renal tubular injury and the expression of mRNA superoxide dismutase (SOD) in the kidneys of Rattus norvergicus male rats with type 1 diabetes mellitus model.
Methods: Model of Type 1 Diabetes Mellitus in male rats Rattus norvegicus Sparague Dawley strain was prepared by inducing streptozotocin (STZ). Furthermore, the rats were given vitamin D to find out how much influence it had on the degree of kidney tubular injury and superoxide dismutase (SOD). Mice were divided into six groups, namely the control group (K), the type 1 diabetes mellitus group maintained for 1 month (DM1), the type 1 diabetes mellitus group maintained for 2 months (DM2), the vitamin D group at a dose of 0,125 µg/kgBW (VD0.125), the vitamin D group at a dose of 0,25 µg/kgBB (VD0.25), and the vitamin D group dose was 0,5 µg/kgBB (VD0.5). Renal tubular injury was assessed by PAS staining using the degree of tubular injury. Meanwhile, the expression of mRNA superoxide dismutase (SOD) will be assessed using Reverse Transcriptase-Polymerase Chain Reaction (RT-PCR). Furthermore, the data obtained from the study were analyzed using SPSS software.
Results: The degree of tubular injury in the DM1 and DM2 groups was higher than the control group ($p<0.05$) and the VD0.125, VD0.25, VD0.5 groups were lower than the DM1 and DM2 groups ($p<0.05$). The expression of SOD2 mRNA in the DM1 and DM2 groups was lower than the control group ($p<0.05$) and the VD0.125, VD0.25, VD0.5 groups were higher than the DM1 and DM2 groups ($p<0.05$).
Conclusion: The group of type 1 diabetes mellitus mice that were given vitamin D doses of 0.125 µg/kgBW, 0.25 µg/kgBW, and 0.5 µg/kgBW had a lower degree of renal tubular injury and higher expression of SOD2 mRNA.
Keywords: Diabetes Mellitus type 1, renal tubular injury, superoxide dismutase (SOD), Vitamin D (calcitriol).