

INTISARI

PENGARUH VITAMIN D TERHADAP VASCULAR REMODELING SERTA EKSPRESI ENDOTHELIN-1 (ET-1) DAN ENDOTHELIAL NITRIC OXIDE SYNTHASE (eNOS) PADA MENCIT YANG DIINDUKSI CEDERA ISKEMIA/REPERFUSI (I/R)

Latar Belakang: Penyakit ginjal akut masih menjadi masalah besar di beberapa negara. Cedera iskemia/reperfusi (I/R) diketahui menjadi penyebab tersering dari penyakit ginjal akut. Disfungsi endotel yang ditandai dengan *vascular remodeling* dan ketidakseimbangan Endothelin-1 (ET-1) dan *endothelial Nitric Oxide Synthase* (eNOS), menjadi salah satu akibat dari cedera I/R di ginjal. Vitamin D diketahui mempunyai peran protektif terhadap cedera I/R ginjal.

Tujuan: Penelitian ini bertujuan untuk mengetahui pengaruh vitamin D terhadap *vascular remodeling*, ekspresi ET-1 dan eNOS pada mencit dengan cedera I/R ginjal.

Metode: Lima belas ekor mencit jantan berlatar belakang Swiss dengan usia 3-4 bulan dibagi dalam tiga kelompok yaitu mencit dengan hanya dilakukan Sham Operation (SO, n=5), mencit dengan cedera I/R selama 7 hari (IR7, n=5), dan mencit dengan cedera I/R yang diberi vitamin D selama 7 hari (IR7D, n=5). Cedera I/R didapatkan dengan *clamping* pedikulus renalis mencit selama 30 menit dilanjutkan reperfusi. Pewarnaan *sirius red* digunakan untuk melihat *vascular remodeling* yang diukur menggunakan *software* ImageJ, sedangkan ekspresi ET-1 dan eNOS diperoleh dari RT-PCR yang dianalisis menggunakan *software* ImageJ. Data diuji statistiknya dengan *one-way ANOVA* atau *Kruskal-Wallis H* pada SPSS versi 16.0.

Hasil Penelitian: Pemberian vitamin D setelah cedera I/R meningkatkan ketebalan dinding dan area lumen arteri intrarenal serta ekspresi ET-1 ($p < 0,05$). Ekspresi eNOS meningkat secara klinis namun tidak secara statistik ($p > 0,05$).

Kesimpulan: Peningkatan ketebalan dinding dan area lumen arteri intrarenal, ekspresi ET-1 dan eNOS kemungkinan besar disebabkan karena pemberian vitamin D setelah cedera I/R ginjal.

Kata kunci: vitamin D, cedera iskemia/reperfusi, ET-1, eNOS, *vascular remodeling*, penyakit ginjal akut

ABSTRACT

THE ROLE OF VITAMIN D IN VASCULAR REMODELING,
EXPRESSION OF ENDOTHELIN-1 (ET-1) AND ENDOTHELIAL
NITRIC OXIDE SYNTHASE (eNOS) IN MICE INDUCED BY
ISCHEMIA/REPERFUSION INJURY (IRI)

Background: Acute kidney injury (AKI) has been being a big problem in many country around the world. Ischemia/reperfusion injury (IRI) is believed to be the most common cause of AKI. Endothelial dysfunction including vascular remodeling and imbalance of Endothelin-1 (ET-1) and *endothelial Nitric Oxide Synthase* (eNOS) becomes one of many consequences of IRI in kidney. Vitamin D is known as having protective effect for IRI in kidney.

Objective: To identify the role of vitamin D in vascular remodeling, ET-1 and eNOS expressions as the result of kidney ischemia/reperfusion injury in mice.

Method: Fiveteen male Swiss background mice (3-4 months old) were divided into 3 groups which were Sham Operation (SO, n=5), 7-days IRI (n=5), and 7-days IRI with vitamin D injection (n=5). Ischemia/reperfusion injury was obtained by clamping of bilateral renal pedicle for 30 minutes and continued by reperfusion. Vascular remodeling was seen by renal sirius red staining, whereas ET-1 and eNOS expressions were done by RT-PCR. They were then measured using ImageJ software. Stastical analysis were done using one-way ANOVA or Kruskal-Wallis H in SPSS version 16.0.

Results: Seven days injection of vitamin D after IRI increased the intrarenal artery wall thickness and lumen area, as well as the expression of ET-1 ($p < 0,05$). eNOS expression clinically increased but statistically not significant ($p > 0,05$).

Conclusion: Enhancement of intrarenal artery wall thickness and lumen area, ET-1 and eNOS expressions may become the effect of vitamin D administration.

Key words: vitamin D, ischemia/reperfusion injury, endothelin-1, eNOS, vascular remodeling, acute kidney injury