Efek pemberian kurkumin dan nanokurkumin pada tikus dengan nefrotoksisitas yang diinduksi cisplatin melalui jalur ERKe1/2 = The effects of nanocurcumin and curcumin on cisplatin induced nephrotoxicity through ERK1/2 pathway in rat

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Abstrak

Nefrotoksisitas merupakan efek samping utama yang membatasi penggunaan cisplatin sebagai obat anti-tumor. Kurkumin memeliki beberapa aktivitas farmakologis salah satunya, yaitu sebagai nefroprotektor. Akan tetapi kurkumin kurang larut di dalam air, sehingga digunakan nanokurkumin yang lebih mudah larut/terdispersi dalam air. Tujuan penelitian ini adalah untuk mengetahui efek kurkumin dan nanokurkumin terhadap nefrotoksisitas tikus yang diinduksi cisplatin melalui jalur ERK1/2. Perlakuan hewan coba dilakukan selama 10 hari, menggunakan tikus Sprague Dawley yang dibagi menjadi 5 kelompok, n=6, yaitu kelompok normal, cisplatin CIS, Cisplatin kurkumin 100 mg/kgBB/hari p.o Cis Kurku100, Cisplatin nanokurkumin 50 mg/kgBB/hari p.o Cis Nanokur50, Cisplatin nanokurkumin 100 mg/kgBB/hari p.o Cis Nanokur100 . Pada hari ke-7 dilakukan injeksi cisplatin 7 mg/kgBB, i.p dan 72 jam setelah injeksi cisplatin dilakukan pengambilan darah dan organ ginjal. Cisplatin dosis tunggal pada kelompok CIS menyebabkan peningkatan kadar BUN dan kreatinin dalam plasma, kadar MDA, peningkatan rasio ekspresi BCL-2/Bax, serta peningkatan rasio ekspresi protein p-ERK/ERK secara signifikan, dibandingkan kelompok normal. Pemberian kurkumin 100 mg/kgBB dan nanokurkumin 100 mg/kgBB berperan sebagai antioksidan untuk mencegah progresifitas nefrotoksisitas akibat cisplatin, dilihat melalui terjadinya penurunan kadar BUN dan kreatinin dalam plasma, penurunan kadar MDA, dan peningkatan rasio ekspresi gen BCL-2/Bax secara signifikan dibandingkan kelompok CIS, serta penurunan rasio ekspresi protein p-ERK/ERK secara signifikan dibandingkan kelompok CIS. Cisplatin dosis tunggal 7 mg/kgBB dapat menyebabkan nefrotoksisitas pada tikus yang menyerupai AKI Acute Kidney Injury pada manusia. Kurkumin 100 mg/kgBB cenderung memiliki efek nefroprotektor yang lebih baik dalam mencegah progresifitas nefrotoksisitas akibat cisplatin melalui jalur stress oksidatif dan apoptosis.

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Nephrotoxicity is the major limitation for the clinical use of cisplatin as an antitumor. Curcumin has some pharmacological activity, one of them as nephroprotector. However, curcumin less soluble in water, so it is used nanocurcumin which is readily dispersed in aqueous media. The purpose of this study is to investigate the effects of curcumin and nanocurcumin against ciplatin induced nephrotoxicity in rats through ERK1 2 pathway. This study conducted for 10 days treatment, five groups n 6 of male Sprague Dawley rats were examined normal, cisplatin CIS 7 mg kgBW, Cis curcumin Cis Curcu100 100 mg kg BW day, Cisplatin nanocurcumin 50 mg kg BW day Cis Nanocur50, and Cisplatin nanocurcumin 100mg kg BW day Cis Nanocur100 . After 72 h following injection cisplatin, specimens were collected. This study resulted a single dose of cisplatin in CIS group caused a significant increased in plasma BUN, plasma creatinine, MDA levels, decreased ratio expression of BCL 2 Bax gene, and increased ratio of p ERK ERK as compared to normal group. Pre treatment with curcumin 100 mg kgBW and nanocurcumin 50 and 100 mg kgBW acts as an antioxidant to prevent progression of nephrotoxicity cisplatin, were reduced plasma BUN levels, plasma

creatinine levels, MDA levels in kidney, increased GSH level in kidney, increased ratio expression of BCL 2 Bax gene in kidney, and decreased ratio of p ERK ERK protein in kidney compared with cisplatin induced nephrotoxicity rats without treatment. Cisplatin with single dose 7 mg kgBW is able to induced nephrotoxicity in rats that mimicked acute kidney injury in human. Curcumin 100 mg kgBW tend to have a better nephroprotector effect in preventing the progression of cisplatin induced nephrotoxicity through oxidative stress pathways and apoptosis.