Functional and Structural Study on the Effect of Curcumin on Folic Acid-Induced Acute Kidney Injury in Albino Rats

Ghada S Mahmoud, Ayman S. Amer, Dalia G. Mostafa

Abstract:

Objective. Systemic administration of folic acid (FA) in rats was used for studying the pathogenesis associated with acute renal damage. However, the mechanism by which FA induces renal damage remains poorly understood. Up to our knowledge, no effective preventive or therapeutic drugs have been developed to protect against acute kidney injury. Curcumin (CUR) is commonly used worldwide as a spice and has been demonstrated to possess various biological activities. The present study was planned to investigate the effect of folic acid administration on renal function, inflammatory cytokines and associated histological changes in renal tissue. In addition, we examined the possible protective effect of curcumin on a rat model of folic acid (FA)-induced acute kidney injury (AKI). Methods. Rats were divided into 3 groups; (FA) folic acid treated group rats were exposed to FA (250 mg/kg) i.p. injection as a single dose. (FA+CUR) folic acid plus curcumin treatment group rats were given curcumin (200 mg/kg) administered by gavage daily for 11 days prior to folic acid (250 mg/kg) i.p injection and the last dose of curcumin was given one day after folic acid injection. Control group are given distilled water by gavage daily for 12 days and saline i.p. as a single dose on the 11th day. Animals were scarified one day following i.p. injection in all groups. Deterioration of kidney function was detected by blood urea and creatinine levels. Inflammatory response was monitored with blood levels of interleukin-6 (IL-6), interleukin-10 (IL-10), and tumor necrosis factor (TNF-α). Results. We found that FA treatment significantly raised blood urea, creatinine, IL-6, IL-10, TNF-α levels and caused marked structural changes of the kidney. CUR treatment for 12 days significantly reduced blood urea, IL-6, IL-10, TNF-α, and protected partially against renal structural damage. Conclusion. These findings suggest that curcumin is a promising protective agent against AKI induced by FA.

Keywords:

Acute kidney injury, Curcumin, Folic acid, Interleukin-6, Interleukin-10, Tumour necrosis factor-alpha.

Published In: