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Potential nephroprotective effects of L-carnitine against drug-induced nephropathy: A review of literature

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Drug-induced nephrotoxicity (DIN) has been reported with a great number of medications. The significance of DIN lies in its contribution to approximately 20% of the hospital admissions. Various therapeutic agents such as L-carnitine have been proposed to reduce DIN. Antioxidant, anti-inflammatory and anti-apoptotic effects of L-carnitine make it a candidate for nephro-protection against DIN. These benefits of L-carnitine necessitated the current review. The present review covered all clinical and animal research published on the concept of nephroprotective effects of L-carnitine against DIN. L-carnitine was significantly effective in amelioration of DIN in *in vitro* and animal studies, especially against cisplatin-induced renal damage. Inhibition of reactive oxygen species generation, lipid peroxidation, apoptosis, matrix remodeling, anti-inflammatory properties, and improvement in carnitine deficiency has been suggested as probable nephroprotective mechanisms of L-carnitine. In spite of the evidence support the nephroprotective effect of L-carnitine, the main problems in this area are the inadequacy of reliable studies in humans and difficulty of translating the experimental results into clinical practice. Use of L-carnitine as a prophylactic nephroprotective agent for nephrotoxic therapies is rarely possible except for contrast-induced nephrotoxicity. Research on these nephroprotective effects in human population seems essential before generalization the results to human subjects. The possible impact of L-carnitine on the therapeutic efficacy of nephrotoxic agents such as calcineurin inhibitors and aminoglycosides remain as a question for further studies. Development of validated early biomarkers to detect DIN may provide the opportunity to use prophylactic nephroprotective agents at the golden time.

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