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Emblica officinalis Fruit Extract Ameliorates Cisplatin-Induced Nephrotoxicity in Experimental Rats

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Abstract : Cisplatin is the most common chemotherapeutic agent used in different solid tumors, but its main limiting factor is dose-dependent nephrotoxicity by generating reactive oxygen species, by stimulating inflammatory and apoptotic pathways. Additional adjuvant therapies to decrease the toxicity of this chemotherapeutic drug are essential. This study was designed to evaluate the protective role of Emblica officinalis Geartn (Indian gooseberry) against cisplatin induced nephrotoxicity. Emblica officinalis was orally administered to Wistar rats (n=6) for 10 days in 50, 100 and 200mg/kg body weight. On day 7, 8mg/kg of cisplatin was administered intra-peritoneally to rats in all groups. Serum creatinine, blood urea nitrogen and antioxidant levels were measured on day10. The renal damage was evaluated by histopathological and transmission electron microscopy. We found that 200mg/kg dose of Emblica officinalis significantly inhibited the elevation of biochemical parameters i.e. serum creatinine, blood urea nitrogen, oxidant stress marker (malondialdehyde) and increased the reduced levels of antioxidant marker (endogenous glutathione and superoxide dismutase). Cisplatin treated rats have shown acute tubular necrosis and infiltration of inflammatory cells in rat kidney which was reversed after treating the animals with Emblica officinalis in the treatment group. In ultrastructural changes cisplatin treated group showed the damaged mitochondria (M) with dissolved cristae and large number of lysosomes (L) and vacuole (V) formation in tubular epithelial cells. EOE administered group showed visible cristae formation and sign of autophagy vacuoles at a dose of 200mg/kg. Further in-silico studies revealed that ellagic acid is responsible for its nephroprotective effect. The above findings conclude that the Emblica officinalis may be used as an adjuvant therapy in cisplatin induced nephrotoxicity.

Keywords : antioxidant, cisplatin, Emblica officinalis, in silico, nephrotoxicity
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