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Neichitti Kashayam (*Vernonia cinerea* aqueous extract) protects nephrons against cisplatin induced damage: A pilot study in African green monkey kidney (Vero) cells and mice

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Background: Traditional Siddha medicine suggests using *Vernonia cinerea* (VC) to alleviate toxic effects caused by metallic drugs. This study aimed to evaluate the protective effect of VC against cisplatin induced nephrotoxicity.

Methods: Ethanolic and aqueous extract of *Vernonia cinerea* were prepared using soxhale apparatus. *In vitro* cytoprotective activity of extracts at 10, 100 and 1000 µg/100 µL doses, against cisplatin was evaluated in African green monkey kidney (Vero) cells by sulphorhodime-B assay. Acute toxicity study in mice was carried out by following the OECD-423 guideline. For nephroprotective screening, a total of 12 male albino mice were divided into four groups (n=3). Group-1 served as normal kidney control. Nephrotoxicity was induced in groups 2-4 by administering a single dose of cisplatin (5.5 mg/kg, i.p.) on day 4. Group-2 served as cisplatin induced nephrotoxicity control. Group-3 and 4 received 200 mg/kg dose of aqueous and ethanolic extract respectively from day 1 (3 days prior to cisplatin) until day 15 (11 days after cisplatin). On day 16, the kidneys were collected for haematoxylin & eosin staining. The histology slides were observed under microscope and qualitatively compared between different groups.

Results: There was a dose dependent protection of Vero cells against cisplatin by aqueous extract treatment compared to ethanolic extract. In acute toxicity study, the extracts were nontoxic up to 2000 mg/kg. The body weight gain in normal mice was +3.67 g, whereas the weight gain was only +1 g (27.25%) due to cisplatin treatment. Histology of cisplatin treated animals showed mild acute renal tubular necrosis characterized by early changes in proximal convoluted tubules with loss of epithelial cells and luminal cast. Ethanol extract potentiated cisplatin toxicity evidenced by death of two animals on second day, weight reduction in third animal by -1 g (-27.25%) and no reversal of cisplatin induced acute renal tubular necrosis. The aqueous extract treatment significantly alleviated cisplatin toxicity by gaining (p=0.024) body weight of 2 g (55.5%) with mild reversal of cisplatin induced acute renal tubular necrosis characterized by regeneration of tubular lining in renal parenchyma.

Conclusion: *Vernonia cinerea* aqueous extract showed protection against cisplatin induced nephrotoxicity. Further studies on phytochemical isolation, optimal dosage and evaluating protective mechanism are ongoing in our lab.

Biography

Arul Amuthan is the first Ethnopharmacologist with blend educational background of Traditional Siddha Medicine (MD) and Medical Pharmacology (MSc). Currently, he is pursuing his PhD at Manipal University, India in the area of drug discovery from natural products. He is the Chairman of Scientific Committee of 'Indian Siddha Medical Graduates Association' and serving as Associate Editor of 'International Journal of Pharmacology and Clinical Sciences'. He is the active Reviewer in many peer reviewed journals. He is a dynamic Researcher in the area of ethnopharmacology, Siddha medicine, drug discovery, Yoga, Naturopathy, Varma therapy (Siddha vital point manipulation) and Integartived Medicine.

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