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Nephroprotective Effect of *Asparagus falcatus* Leaf Extract on Adriamycin Induced Nephrotoxicity in Wistar Rats: A Dose Response Study

Authors : A. M. S. S. Amarasiri, A. P. Attanayake, K. A. P. W. Jayatilaka, L. K. B. Mudduwa

Abstract : Adriamycin (ADR) is an effective anthracyclin antitumor drug, but its clinical use is limited due to renal toxicity. The leaves of *Asparagus falcatus* (Family: Liliaceae) have been used in the management of renal diseases since antiquity. In the present investigation, the aqueous leaf extract of *A. falcatus* was evaluated for acute nephroprotective activity in ADR induced nephrotoxic rats. Nephrotoxicity was induced in healthy male Wistar rats by intraperitoneal administration of ADR 20 mg/kg. The lyophilized powder of the aqueous refluxed (4h) leaf extract of *A. falcatus* was administered orally at three selected doses; 200, 400 and 600 mg/kg for three consecutive days. Fosinopril sodium (0.09 mg/kg) was used as the standard drug. Administration of the plant extract and the standard drug was commenced 24 hours after the induction of nephrotoxicity to rats. The nephroprotective effect was determined by selected biochemical parameters and by the assessment of histopathology on H and E stained kidney sections. The results were compared to a group of control rats with ADR induced nephrotoxicity. A group of rats administered with the equivalent volume of normal saline served as the healthy control. Administration of ADR 20 mg/kg produced a significant increase in the concentrations of serum creatinine (61%) and urine protein (73%) followed by a significant decrease in serum total protein (21%) and albumin (44%) of the plant extract treated animals compared to the healthy control group ($p < 0.05$). The aqueous extract of *Asparagus falcatus* at the three doses; 200, 400 and 600 mg/kg and the standard drug were found to decrease the elevation of concentrations of serum creatinine (33%, 51%, 54% and 42%) and urine protein (8%, 63%, 80% and 86%) respectively. The serum concentrations of total protein (12%, 17%, 29% and 12%) and albumin (3%, 17%, 17% and 16%) were significantly increased compared to the nephrotoxic control group respectively. Assessment of histopathology on H and E stained kidney sections demonstrated that ADR induced renal injury, as evidenced by loss of brush border, cytoplasmic vacuolization, pyknosis in renal tubular epithelial cells, haemorrhages, glomerular congestion and presence of hyaline casts. Treatment with the plant extract and the standard drug resulted in attenuation of the morphological destruction in rats. The results of the present study revealed that the aqueous leaf extract of *A. falcatus* possesses significant nephroprotective activity against adriamycin induced acute nephrotoxicity. The improved kidney functions were supported with the results of selected biochemical parameters and histological changes observed on H and E stained sections of the kidney tissues in Wistar rats.

Keywords : adriamycin induced nephrotoxicity, *asparagus falcatus*, biochemical assessment, histopathological assessment, nephroprotective activity

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