

RENAL TOXICITY DUE TO ACUTE ORGANOPHOSPHATE POISONING

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Organophosphate (OP) compounds are the most widely used insecticides and OP self-poisoning is a major public health problem in developing countries, including Sri Lanka. A few studies and case reports have reported that acute intoxication from OP compounds can be associated with acute tubular necrosis. The aim of this study was to detect the renal damage by OP (Chlorpyrifos, Dimethoate, Quinalphos and Temephos) using standard biomarker criteria for acute kidney injury and new urinary biomarkers.

This was a prospective cohort study which enrolled 20 symptomatic OP poisoned patients recruited from Peradeniya, Anuradhapura, Matara and Galle hospitals. Serum and urine samples were collected on admission, and 8, 16 and 24 hours post ingestion, and daily thereafter until discharge. Serum and urine creatinine were measured using a semi-automated biochemistry analyzer. Enzyme linked immunosorbent assay (ELISA) techniques were used to quantify the urinary biomarkers, kidney injury molecule (KIM), clusterin, and neutrophil gelatinase-associated lipocalin (NGAL)). Acute kidney injury (AKI) was defined using Acute Kidney Injury Network (AKIN) criteria for increase in creatinine. KIM, clusterin and NGAL ELISA were performed on serial urine samples obtained from OP poisoned patients with AKIN-I and without AKI. Receiver-operator characteristic (ROC) curves were drawn at 0 – 16 hours and 16 – 24 hours time intervals for the analysis of obtained data sets.

4/20 OP poisoned patients developed AKIN stage 1 acute kidney injury. The following area under curve (AUC) values were obtained from the analysis: 0–16 hours serum creatinine – 0.662, NGAL – 0.809, clusterin – 0.667 and KIM – 0.667 and for the 16 – 24 hours serum creatinine – 0.625, NGAL – 0.750, clusterin – 0.619 and KIM – 0.583. These results indicate that obtained AUC values were less specific and sensitive for the detection of acute kidney injury and obtained values were not significant (P >0.05).

The normalized urinary biomarker values were within normal range for most patients. Kidney injury from acute OP poisoning was generally mild and not associated with a rise in markers of direct nephrotoxicity.

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