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Elimination kinetics of Monocrotophos

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Abstract

Objective: To estimate the elimination half-life of Monocrotophos in humans after self-poisoning

Methods: A limited pharmacokinetic study was carried out on 5 male patients mean age of 35.8 years ±2.94 years, admitted with known monocrotophos poisoning to the medical ICU. A maximum of eight blood specimens were collected at 0, 1, 3, 5, 7, 10, 15 and 21 hours. Separate urine collections were scheduled via catheterization at 0-2, 2-4, 4-6, 6-8, 8-12 and 12-24 hours where zero hour is taken as time of admission. Plasma and urine monocrotophos was measured using reverse phase high performance liquid chromatography (HPLC) with UV detection. Elimination half-life was calculated for plasma with a 1 compartment model from the slope of the graphical plot of natural log of plasma concentration versus time. For urine a semi log plot of amount remaining to be excreted (ARE) versus time gives a straight line with a slope of –k.

Results: Plasma data was available in 5 patients and urine data alone in 3. Plasma concentrations fell from time 0 to around 10 hours after admission, then began to rise again in 3 of the patients. Plasma median elimination half-life (n=5) was 4.1 hours (range 1.7-6.9). From urine data (n=3) it was median 3.3 hours (1.9-5.0)

Conclusions: There is very little data available on monocrotophos elimination half-life in humans, and the median half-life of elimination of 3.7- 4.1 hrs is consistent with a compound which is rapidly cleared from the plasma. Monocrotophos has a log p <1.0 conforming its hydrophilic nature. Limitations of the study were that the amount of monocrotophos ingested and the time of ingestion cannot be known exactly. Complete urine collection over 4 half-lives was difficult to ensure. We have assumed that we can apply simple pharmacokinetics using a one compartment model. The rise in plasma monocrotophos after about 10 hours in 3 patients may be due to monocrotophos metabolites co-eluting with the parent compound. Alternatively it may be due to enterohepatic recirculation which has not been noted in animal studies(2). The cumulative excretion of monocrotophos in urine assumes the compound is excreted unchanged which again could not be verified.