

Biochemical Correlations of Acute Chlorpyrifos Poisoning.

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Introduction: We previously observed that intermediate syndrome (IMS) is a spectrum disorder¹ with diagnostic features on repetitive nerve stimulation (RNS). **Objective:** The objective was to determine whether there is a correlation between IMS and admission red blood cell acetylcholinesterase level (RBC- AChE), butyrylcholinesterase level (BChE) and serum organophosphate (OP) level in patients with acute chlorpyrifos poisoning. **Method:** A prospective case series of 59 consenting symptomatic patients with acute chlorpyrifos poisoning were assessed. Repeated neurological examinations and RNS studies were done. RBC- AChE, BChE and OP levels were assessed on admission in 36, 59 and 59 patients respectively. The Mann Whitney U test was used to compare the differences. **Results:** Thirty of 59 patients developed electrophysiological abnormalities associated with muscle weakness indicating intermediate spectrum disorder. From the 30 intermediate spectrum patients (Group I) admission RBC- AChE, BChE and serum OP levels were assessed in 19, 30 and 30 patients respectively. From the 29 non- intermediate spectrum patients (Group II) admission RBC-AChE, BChE and serum OP levels were assessed in 17, 29 and 29 respectively (Table 1 and Figure 1). There was no significant difference in RBC- AChE level between Group I and Group II ($p=0.2885$). There was a significant difference in admission BChE level between the 2 groups ($p=0.0196$). Admission serum chlorpyrifos concentration was also significantly different between the 2 groups ($p=0.0059$). **Conclusion:** The amount of OP absorbed and the extent of BChE inhibition on admission seems to have an influence on the development intermediate spectrum disorder. Admission RBC-AChE does not show a significant difference between the two groups. Use of pralidoxime prior to RBC-AChE measurement might reduce the association as pralidoxime does not readily reactivate BChE at the normal therapeutic concentrations but it reactivates RBC-AChE. Serial RNS studies currently remain the best way of identifying patients at high risk of IMS. **Reference:** 1. Jayawardane P, Dawson A, Senanayake, N, Weerasinghe, V. Serial neurophysiological studies in 70 patients with organophosphate poisoning: early prediction of intermediate syndrome. *Clinical Toxicology* 2006; 44(5): 729.

Table 1: Summary statistics for RBC-AChE, BChE and serum chlorpyrifos levels in 2 groups of patients

RBC-AchE (mU/ μ mol Hb(Fe))	Median	Inter-quartile range
Group I (n=19)	167	67-307
Group II (n=17)	191	76-396.5
BChE(mU/ml)		

Group I (n=30)	121	99-307
Group II (n=29)	189	121-2034