Oral Abstracts

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A PILOT STUDY TO EVALUATE THE USE OF THE TRIPLE CHOLINESTERASE TEST IN ORGANOPHOSPHORUS POISONING

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Objectives: The triple cholinesterase test consisting of Plasma Butyrylcholinesterase (BChE), RBC Acetylcholinesterase (RBC-AChE) and Reactivation potential of RBC-AChE by obidoxime helps to determine the reactivation potential for guiding oxime therapy. This study was conducted to : (1) Validate the test and determine if reactivation of AChE by oximes is possible in OP poisoned patients, (2) Determine clinical characteristics of patients who are likely to benefit from oximes, and (3) Determine the duration for which oximes can be given for Organophosphorus (OP) poisoning.

Methods: This prospective observational study was conducted at Christian Medical College between April and August 2015. It included 30 patients presenting with OP poisoning <30 hours after consumption. The Triple cholinesterase test was done from admission to day 5 according to standard operating protocol of *Thiermann* et al [*Hum ExpToxicol. 1997 Aug;16(8):473–80].*AChE values were expressed as a percentage of normal. Significant reactivation was defined as AChE levels more than 30% of normal based on the study correlating RBC-AChE with neuromuscular transmission [*ChemBiol Interact. 2005 Dec 15;157–158:345–7*].

Results: 26 of the 30 patients had identified OP compounds (40% dimethyl and 33% diethyl). Sustained inhibition of RBC-AChE was associated with more severe poisoning, intermediate syndrome, requirement for mechanical ventilation and later time to presentation. 13(60%) out of the 22 patients with inhibited admission RBC-AChE levels showed significant in-vitro obidoxime reactivation. This 'Reactivation' group had shorter time to presentation of 6.04(±3.96) hours compared to 10.94(±8.06) hours for the 'No reactivation' group (p=0.007). The 'Reactivation' group consisted predominantly of diethyl compounds (46.1%) compared to the 'No reactivation' group which predominantly consisted of dimethyl compounds (55.5%) and no diethyl compounds. Day 1 and 2 post-reactivation levels were 101% and 95% respectively in the diethyl group compared to 65% and 69% in the dimethyl group (p=0.16). In patients with significant reactivation, obidoxime reactivated the enzyme to >30% for a mean duration of 2.35(± 1.7) days.

Conclusion: Our study showed that reactivation of AChE is possible by oximes in-vitro. The characteristics of OP poisoning patients who demonstrate in-vitro oxime reactivation of AChE are those who present within 6 hours and those with Diethyl OP compound poisoning. The average duration of reactivation was 2.4 days. This study paves the way for a future controlled clinical trial to test the efficacy of selective administration of oximes based on the triple cholinesterase test.