Controversies in Insecticide Poisoning

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ABSTRACT

Organophosphorus (OP) insecticide poisoning is a major poisoning in Thailand and developing countries. It causes high morbidity and mortality rate among the insecticide poisoning. Although it is an old insecticide, mechanisms of poisoning and appropriate management still remain unclear. Some points of these controversies are raised for discussion.

It has been observed that the clinical manifestation and severity of OP poisoning vary from cases to cases. Is it explained simply by the dose of exposure? In fact, OP is a group of chemicals whose chemical structures are mainly derivatives of phosphoric acid or thiophosphoric acid and will be called “oxon” and “thion” OP. Thion OP is an inactive form, where as its metabolite (oxon) OP is the active form. Thion is also more fat distribution than oxon. This difference has contributed for the varieties of effects of OP poisoning.

Oxime therapy is the most controversial issue. Theoretically, oxime reactivates acetylcholinesterase (ACh) enzyme which is irreversibly inhibited by OP. Therefore, it would be beneficial for acute OP poisoning. Unfortunately, meta-analysis of the clinical studies in the past did not conclusively demonstrate their beneficial effects. Chemically, most of OPs are either dimethyl or diethyl. Recent studies have shown that dimethyl OPs caused aging of the enzyme more rapidly than diethyl OPs. Thus, oximes would have beneficial effect to diethyl OP poisoning than dimethyl OP poisoning. However, some studies show this discrepancy of the treatment. The most recent randomized control trial of pralidoxime therapy on OP poisoning showed the different outcomes between the 2 groups of OP, but it did not demonstrate the beneficial effects over placebo. Surprisingly, the outcome is worse than placebo. The reason for these findings has not been elucidated yet. Conclusion: different OP causes different clinical severity and outcome. Mechanism of OP poisoning may not only be inhibition of ACh. Oxime therapy needs more extensive studies.