Lessons to be learnt from organophosphorus pesticide poisoning for the treatment of nerve agent poisoning.

Abstract:
The increasing threat of nerve agent use for terrorist purposes against civilian and military population calls for effective therapeutic preparedness. At present, administration of atropine and an oxime are recommended, although effectiveness of this treatment is not proved in clinical trials. Here, monitoring of intoxications with organophosphorus (OP) pesticides may be of help, as their actions are closely related to those of nerve agents and intoxication and therapy follow the same principles. To this end, the clinical course of poisoning and the effectiveness of antidotal therapy were investigated in patients requiring artificial ventilation being treated with atropine and obidoxime. However, poisoning with OP pesticides shows extremely heterogeneous pictures of cholinergic crisis frequently associated with clinical complications. To achieve valuable information for the therapy of nerve agent poisoning, cases resembling situations in nerve agent poisoning had to be extracted: (a) intoxication with OPs forming reactivatable OP-AChE-complexes with short persistence of the OP in the body resembling inhalational sarin intoxication; (b) intoxication with OPs resulting rapidly in an aged OP-AChE-complex resembling inhalational soman intoxication; (c) intoxications with OPs forming a reactivatable AChE-OP complex with prolonged persistence of the OP in the body resembling percutaneous VX
intoxication. From these cases it was concluded that sufficient reactivation of nerve agent inhibited non-aged AChE should be possible, if the poison load was not too high and the effective oximes were administered early and with an appropriate duration. When RBC-AChE activity was higher than some 30%, neuromuscular transmission was relatively normal. Relatively low atropine doses (several milligrams) should be sufficient to cope with muscarinic symptoms during oxime therapy.