

Basic and clinical toxicology of organophosphorus compounds

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What are organophosphates in toxicology? In severe organophosphate toxicity, the prototypical patient may exhibit unresponsiveness, pinpoint pupils, muscle fasciculations, and diaphoresis. Additional symptoms can include emesis, diarrhea, excessive salivation, lacrimation, and urinary incontinence.

What are the clinical features of organophosphorus compound poisoning? The typical toxidrome in organophosphate (OP) poisoning comprises of the Salivation, Lacrimation, Urination, Defecation, Gastric cramps, Emesis (SLUDGE) symptoms.

What does organophosphorus do? The chemicals in this class kill insects by disrupting their brains and nervous systems. Unfortunately, these chemicals also can harm the brains and nervous systems of animals and humans. These chemicals stop a key enzyme in the nervous system called cholinesterase from working, and this can make people ill.

What is OP poisoning? Definition. Acute organophosphorus poisoning occurs after dermal, respiratory, or oral exposure to either low volatility pesticides (e.g., chlorpyrifos, dimethoate) or high volatility nerve agents (e.g., sarin, tabun).

What are the 4 organophosphates? Diazinon, ethoprop, tribufos and phosmet are part of the group of pesticides known as organophosphates. These pesticides are used in both agricultural (e.g., fruit and nut trees, vegetables and herbs, cotton) and non-agricultural settings for a range of purposes.

Which drug is commonly used to detoxify the organophosphates? Atropine are the most widely used antidote against OP poisoning in conjunction with pralidoxime

or other pyridinium oximes (such as trimedoxime and obidoxime) for AChE reactivation.

How do you manage organophosphorus toxicity? The mainstays of medical therapy in organophosphate (OP) poisoning include atropine, pralidoxime (2-PAM), and benzodiazepines (eg, diazepam). Initial management must focus on adequate use of atropine. Optimizing oxygenation prior to the use of atropine is recommended to minimize the potential for dysrhythmias.

What are the current issues in organophosphate toxicology? These include: 1) possible long-term effects of chronic low-level exposures; 2) genetic susceptibility to OP toxicity; 3) developmental toxicity and neurotoxicity; 4) common mechanism of action; 5) mechanisms of delayed neurotoxicity; and 6) possible additional OP targets.

What are the classic signs are seen in organophosphate toxicity? Symptoms included salivation, lacrimation, urination, defecation, GI distress, and emesis (SLUDGE) and were more commonly observed in adults than in children. Sofer et al (1989) retrospectively examined 25 patients aged 3 months to 7 years with carbamate or organophosphate poisoning in Israel.

What is an organophosphorus compound? Organophosphorus compounds (OPCs) are organic chemicals derived from phosphoric acids and its derivatives and contain at least one carbon-phosphorus bond. The pentavalent types of phosphorus-containing compounds are primarily used in industrial and environmental applications.

What is the difference between organophosphate and organophosphorus? In organic chemistry, organophosphates (also known as phosphate esters, or OPEs) are a class of organophosphorus compounds with the general structure $O=P(OR)_3$, a central phosphate molecule with alkyl or aromatic substituents. They can be considered as esters of phosphoric acid.

What are the stages of organophosphate poisoning? Acute organophosphate insecticide poisoning can manifest 3 different phases of toxic effects, namely, acute cholinergic crisis, intermediate syndrome (IMS), and delayed neuropathy.

What are the four 4 types of poisoning?

What are the 4 elements of poisoning? Poisoning involves four elements: the poison, the poisoned organism, the injury to the cells, and the symptoms and signs or death. These four elements represent the cause, subject, effect, and consequence of poisoning.

What is the first step to treat a patient who has ingested a poison? If you think someone has been severely poisoned and they're still conscious, ask them to sit still and stay with them while you wait for medical help to arrive. If they've been poisoned by swallowing something, try to get them to spit out anything that is remaining in their mouth.

What do organophosphates do to the body? Within the human body, organophosphates act as inhibitors of the enzyme acetylcholinesterase, leading to excess neurotransmitter acetylcholine (ACh). This surplus of ACh in the body leads to the manifestation of symptoms associated with the cholinergic toxidrome.

What foods are high in organophosphates? The foods that expose the most children age six months through five years to unsafe levels of OPs (because they are more heavily consumed) are apples, peaches, applesauce, popcorn, grapes, corn chips, and apple juice.

Why are organophosphates banned? The only way to protect people is to ban organophosphates. Organophosphates are acutely neurotoxic. They make people sick with symptoms like headaches, nausea, dizziness, breathing difficulties, and at very high exposures even seizures and death.

What muscles are weak in OP poisoning? The IMS is clinically characterized by weakness in the cranial nerves, weakness of respiratory, neck and proximal limb muscles, and depressed deep tendon reflexes. These symptoms appear within 24 to 96 h post OP exposure in two types of paralysis.

How do you test for organophosphate toxicity? Laboratory Studies. Organophosphate (OP) toxicity is a clinical diagnosis. Confirmation of organophosphate poisoning is based on the measurement of cholinesterase activity; typically, these results are not readily available in a clinically relevant timeframe.

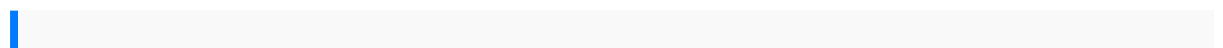
How do paramedics treat organophosphate poisoning? Treatment includes resuscitation of patients and giving oxygen, a muscarinic antagonist (usually atropine), fluids, and an acetylcholinesterase reactivator (an oxime that reactivates acetylcholinesterase by removal of the phosphate group) (panel 3). 35 Respiratory support is given as necessary.

What is an example of an organophosphate? Organophosphate (OP) compounds are a diverse group of chemicals used in both domestic and industrial settings. Examples of organophosphates include the following: Insecticides – Malathion, parathion, diazinon, fenthion, dichlorvos, chlorpyrifos, ethion. Nerve gases – Soman, sarin, tabun, VX.

What are organophosphates in chemical warfare? Neurotoxic chemical warfare agents are essentially organophosphorus compounds (OPCs) that inhibit AChE activity, resulting in several deleterious effects in the victim (including death). OPCs and carbamates are the AChE inhibitors most used nowadays.

What does organophosphate toxicity inhibit? The canonical mechanism of organophosphate (OP) neurotoxicity is the inhibition of acetylcholinesterase (AChE).

What do organophosphates target? Their effect is similar to neonicotinoids, another class of pesticides often included in state policies. Organophosphates target the nervous system of insects, inhibiting pollinators' capacity to function properly.



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