



Diagnosis and Treatment of Animals Poisoned with Organophosphate Insecticides



U.S. ENVIRONMENTAL PROTECTION AGENCY
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DIAGNOSIS AND TREATMENT OF ANIMALS POISONED WITH ORGANOPHOSPHATE INSECTICIDES

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The use of organophosphate insecticides has increased steadily during the past several years and, due to the recent cancellation of DDT products, this upward trend is expected to continue. Some of the more acutely toxic organophosphate compounds (particularly methyl parathion) will be among the chemicals replacing DDT in the future; as their use becomes more commonplace throughout agriculture, the risk to livestock and pets will increase.

The organophosphate insecticides are inhibitors of the enzyme cholinesterase and thus allow the accumulation of large amounts of acetylcholine. Specific antidotes are available for treating this condition, and a favorable prognosis can be expected. Essential to the successful management of an animal or a herd that has been exposed to an organophosphate compound are 1) determination that the animal is in an acute cholinergic condition, and 2) prompt and aggressive therapy.

Organophosphate poisoning should be considered in the differential diagnosis when an animal presents the following signs: sweating, miosis, tearing, excess salivation and other excessive respiratory tract secretions, vomiting, cyanosis, papilledema, uncontrollable muscle twitches, convulsions, coma, loss of reflexes, and loss of sphincter control (last four seen only in severe cases). The degree and severity of the above symptoms are variable and often dependent upon duration and extent of exposure. When an animal presents any of

the above signs, or a combination thereof, the owner or attendant should be questioned about any possible exposure to pesticides, particularly during the 12 hours preceding onset. If the history is not revealing, but the signs are strongly suggestive of organophosphate poisoning, the owner or attendant should be further questioned concerning the presence of organophosphate compounds on the farm or in and around the household. The presence of organophosphate compounds in the animal's environment, along with strong suggestive signs, is reasonably good evidence to begin treatment on a presumptive diagnosis of organophosphate poisoning. Cases do occur in the absence of established history of exposure.

Management of Animal:

- 1) Artificial respiration or resuscitation if animal is cyanotic. (Atropine administered to a cyanotic animal may produce ventricular fibrillation.)
- 2) Atropine sulfate administered I.V. until signs of atropinization appear (decreased salivation; dilation of pupil; dry, flushed skin; and tachycardia).

Dosage guide: (1 grain = 65 mg)

Dog and cat	0.1 - 0.2 mg/kg
Cattle	0.5 - 1.0 mg/kg
Horses	0.1 - 0.2 mg/kg

Repeated doses may be required as often as every 10 minutes except in ruminants where the effects of atropine sulfate generally last for 1 to 2 hours.

3) Protopam® Chloride (2-PAM chloride), I.V.

Dosage guide:

Dog and cat 20 mg/kg

Cattle 20 mg/kg

Horses 4 mg/kg

May be repeated after 1 hour if signs persist or reappear.

4. Decontamination of hair and skin with soap and water if exposure *via* dermal route; emetics or gastric lavage if exposure *via* ingestion.

NOTE: Morphine, aminophylline, and phenothiazine are contraindicated.

Atropine sulfate relieves many of the acute cholinergic signs and may be sufficient therapy in those animals where only a mild exposure has occurred. In cases where moderate to severe exposure to organophosphates has occurred, both atropine and Protopam® Chloride should be administered. It should be kept in mind that a relapse or reappearance of signs may occur due to continued absorption from the gastrointestinal tract, particularly in ruminant animals. Therefore, a mild degree of atropinization, along with close surveillance, should be maintained for 24 to 48 hours in non-ruminants and up to 5 to 8 days in ruminants.

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Carbamate insecticide poisonings produce a similar clinical picture. However, they are reversible cholinesterase inhibitors, and severe poisoning with these compounds is uncommon. *Protopam® Chloride should not be used in an animal that has been exposed to carbamate insecticides.*

Selected References

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