THE TREATMENT OF ANTICOAGULANT RODENTICIDE POISONING

ADVICE TO VETERINARIANS

Bell LABORATORIES, INC.

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INTRODUCTION

This booklet is designed to help veterinarians recognise and effectively treat poisoning by anticoagulant rodenticides, particularly those which are generally known as the second generation anticoagulant rodenticides.

There is a range of rodenticide formulations available in the market. The signatory companies produce several types, including those containing brodifacoum, bromadiolone, difenacoum, difethialone and flocoumafen as active ingredients. Details of locally available formulations are given on the final pages of this booklet.

Certain rodenticides contain mixtures of active compounds, and an anticoagulant may be combined with other chemicals. In poisoning incidents, where possible, establish what product the animal was exposed to, in order to ascertain whether additional treatment procedures may be required. Animals may be exposed to anticoagulant rodenticides by two routes:

- Consumption of bait containing an anticoagulant.
- Secondly poisoning due to consumption of rodents poisoned with an anticoagulant.

MODE OF ACTION

Brodifacoum, bromadiolone, difenacoum, difethialone and flocoumafen are coumarin anticoagulants which like warfarin act by interfering with the synthesis of prothrombin and disturbing the normal blood clotting mechanisms. They therefore cause an increased tendency to bleed.

As in warfarin poisoning, vitamin K_1 (Phytomenadione) is the antidote. The major difference between warfarin and these rodenticides is that they have longer body half-lives and increase the tendency to bleeding for a longer period of time than warfarin. It is therefore important to understand that it may be necessary to continue treatment for weeks rather than days.

SIGNS OF POISONING

Clinical signs are unlikely to occur within 24 hours after ingestion of formulations containing brodifacoum, bromadiolone, difenacoum, difethialone, coumatetralyl or flocoumafen and may not appear for a few days. Thereafter, signs of poisoning become rapidly more pronounced with time.

Typical signs resulting from the increased tendency to bleed may include:

- Bruising easily with occasional nasal or oral bleeding

- Blood in faeces or urine,
- Excessive bleeding from minor cuts or abrasions,
- Laboured breathing,
- Pale mouth and cold gums,
- Anorexia, general weakness,
- Subcutaneous swelling: when around joints may result in lameness.

More severe cases of poisoning include massive haemorrhage (usually internal), shock and coma.

DIAGNOSIS

Diagnosis is based on a combination of clinical signs, circumstantial evidence and laboratory tests.

A reliable indication of a coumarin anticoagulant effect, particularly if clinical signs are minimal, is the determination of prothrombin time. Anticoagulation with coumarins leads to an increase in prothrombin time and successful treatment will quickly return it to normal levels. Prothrombin time testing should be carried out wherever possible, at least before the start of treatment and after antidote is withdrawn.

TREATMENT - GENERAL

Vitamin K_1 – The specific antidote

Vitamin K_1 (phytomenadione) is the only antidote in all cases of coumarin anticoagulant poisoning. Other analogues of vitamin K should not be used.

Length of Treatment

Treatment should start with a single parenteral administration of vitamin K_1 (2 to 5mg/kg body weight). Intravenous injection is the quickest route and should reduce prothrombin time to normal values within a few hours.

Caution should be exercised in severely symptomatic animals as the site of venepuncture may bleed excessively. Always administer vitamin K_1 parenterally with the smallest diameter needle that is feasible.

One parenteral dose is usually sufficient to return prothrombin time to normal. If prothrombin time fails to normalise, parenteral administration should be repeated.

Note: Some preparations of vitamin K_1 are reported to induce anaphylaxis; these preparations must be injected intramuscularly or subcutaneously. Check the label instructions of the vitamin K_1 preparation used.

Once prothrombin time has returned to normal, oral doses of vitamin K_1 (2 to 5mg/kg body weight) can be given. Dosing should continue for three to four weeks without interruption, even if symptoms have regressed.

Prothrombin time should be determined again 24-48 hours after the antidote has been withdrawn. If the prothrombin time is elevated, treatment should be continued for a further two to three weeks.

Supportive measures

In cases of severe blood loss, whole blood transfusion (10 to 115ml/kg body weight) may be needed. This blood should be fresh because some clotting factors (V and VIII) are labile on storage.

Always keep anticoagulant poisoned animals calm and in a warm place in order to avoid unnecessary stress and haemorrhaging.

TREATMENT – SPECIFIC CASES

Animals exhibiting signs of intoxication

- collect a blood sample and carry out a prothrombin test
- parenteral injection of vitamin K_1 at 2 to 5mg/kg. Use the smallest diameter needle feasible, and avoid the intravenous route in severely haemorrhagic animals
- supportive measures
- repeat prothrombin test about four hours after injection
- provided prothrombin time has normalised, start daily oral vitamin K_I treatment and continue it for three to four weeks.
- carry out prothrombin test 24-48hours after end of treatment
- continue treatment if signs of poisoning reappear or if prothrombin time is still abnormal.

Animals suspected of consuming bait

- this includes animals known to have ingested the bait or animals showing evidence of ingestion such as traces of dye from the bait around the mouth or in the faeces
- induce vomiting only if ingestion is recent (less than six hours)
- observe closely for signs of poisoning (see page 2) for one week
- test prothrombin time daily for up to three days after suspected date of ingestion
- treat with vitamin K_1 if signs of poisoning appear or if prothrombin time increase
- prophylactic oral vitamin K_1 treatment could be carried out.

The prothrombin time test

To sample for the prothrombin time test, collect at least 1 ml blood into a citrate tube. Ideally the plasma should be separated within half an hour of collection and the test performed within 2 hours of blood collection. However, unfrozen samples will usually give clinically useful results if examined within 24 hours.

DIAGNOSIS AND TREATMENT GUIDE

Important: Information below is just a guide and should be used in conjunction with information presented above

ANIMAL CONDITION (signs of poisoning)	TREATMENT				
	Induce Vomiting	Blood Transfusion	Parenteral Vitamin K_1	Oral Vitamin K_1	Observe/ Monitor
Severe signs		✓	✓	✓	✓[a]
Early signs			✓	✓	✓[a]
No signs, however bait consumption suspected	✓[b]			✓	✓[a]

[a] Observe animal for several weeks and monitor prothrombin time
[b] Only where bait consumption is known to have occurs with six hours

FORMULATIONS AVAILABLE

Active Ingredient	Product Name	Brief Description
Wafarin	Ratsac®	Pellets
Brodifacoum	Final®, Talon® Pest off®	Wax Blocks and Pellets
Bromadiolone	Contrac® Bromakil®	Wax Blocks and Pellets
Flocoumafen	Stratagem® Storm®	Wax Blocks
Coumatetralyl	Racumin®	Paste and Wax Blocks
Diphacinone	Ditrac®	Wax blocks and Pellets

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