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DIAGNOSIS AND TREATMENT OF HUMAN AND ANIMAL PATIENTS SUFFERING FROM CHOLECALCIFEROL TOXICOSIS

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Rodenticides with cholecalciferol (Vitamin D_3) as active ingredient

BASF (Pty) Ltd recently launched a new single feed rodenticide under the trade name Selontra® (registration number L10101, Act No. 36 of 1947, contains 0.75 g/kg cholecalciferol) in South Africa. The company also granted daughter registration rights to Efekto Care (Pty) Ltd to register the same rodenticide under the trade name EcoRat (registration number L10397, Act No. 36 of 1947, contains 0.75 g/kg cholecalciferol).

Possibility of primary and secondary poisoning and prognosis of untreated patients

In the unlikely event of a human being ingesting any of the two brands if is likely that the patient may develop symptoms of cholecalciferol toxicosis if a large dosage has been ingested orally. Emergency stabilization of the patient and follow-up treatment by a registered health care practitioner are both likely to avert serious consequences and the prognosis for such cases is good. Dermal contact is totally unlikely to present any symptoms of any nature. It is extremely unlikely that a human being will eat a dead rodent (died from cholecalciferol).

It is likely that dogs will consume any of the two brands due to irresponsible placing of baits without bait stations. If a dog of average size ingests a single block of the bait the prognosis is very good as it is insufficient to cause advanced toxicosis, especially if some basic treatment is offered. Should a dog however, eat an entire pack of baits, the animal is prone to develop advanced toxicosis and requires intensive treatment and monitoring. A large volume ingestion of the bait is likely to kill a dog if the animal is left untreated. Secondary poisoning of dogs that eat dead rodents is unlikely as the quantity of cholecalciferol ingested by the animal *via* the dead rodent is too small to have any significant effect.

Secondary poisoning of owls that ingest rodents that died from cholecalciferol is extremely unlikely due to the very low avian toxicity of the compound.

Symptoms of cholecalciferol toxicosis

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Cholecalciferol in higher than therapeutic dosages leads to hyper-phosphataemia and hyper-calcaemia. It means phosphate and calcium are deposited in organs and blood vessel. The symptoms are anorexia (rapid onset after first day of exposure), vomiting, diarrhea, constipation, renal failure, lethargy and cardiac abnormalities. Soft tissues such as blood vessels walls and vascular areas of kidneys and lungs may become calcified. Serum phosphate levels rise at 12 to 24 hours after exposure where after serum calcium levels rise.

Treatment protocols for patients with cholecalciferol toxicosis
Immediate actions after ingestion of Selontra or EcoRat rodenticide bait to stabilize patient and minimize risk
DO NOT ADMINISTER MILK TO HUMAN OR ANIMAL PATIENTS!!
It is advisable to induce emesis (vomiting) as soon as possible (less than 2 hours, but preferably within 15 minutes) if it is suspected that a human or animal patient ingested the rodenticide bait.
For human patients, emesis should only be induced by registered health care practitioners unless the patient is already nauseas at the site of ingestion.
For dogs and cats, emesis may be induced by tossing a small ball (pea-sized) of soap powder into the back of the animal's throat. It normally induces emesis very rapidly. If the animal doesn't vomit allow it to drink water to induce emesis. Veterinarians may induce emesis by administering apomorphine in dogs or xylazine in cats.
Once the patient (human or animal) has vomited, administered activated charcoal (2 – 8 g/kg body mass) with water orally and repeat half the dosage six hours later. Keep the patient well hydrated with ample intake of fresh water.
Calciuresis may be necessary by administering 0.9% saline at 2 – 3 times the dosage rates. If furosemide is administered as diuretic the patient must be adequately hydrated. After initial treatment furosemide and prednisolone (1 – 3 mg/kg body mass) treatment for up to 28 days may be required in severe cases of hyper-calcaemia. Serum levels of calcium should be stabilized at less than 12 mg/dL.

After stabilizing the patient
Keep the patient out of direct sunlight for at least four days.
Do not feed any milk or other dairy products (including cheese) until the serum calcium levels have stabilized at 12 mg/dL or below.
Cut back on meat consumption for at least five days and feed non-calcium foods.
Avoid the intake of supplementary multi-vitamins.
Check the patient's calcium and phosphorus serum levels daily until it returns to normal.
If hyper-calcaemia persists, it is advisable to treat the patient with 1.3 to 2 mg/kg pamidronate intravenously over a period of 2 hours. This will also prevent osteoclastic bone resorption. If the patient was on furosemide and prednisolone, decrease the therapy.

GUIDANCE FOR POISON INFORMATION CENTRES MANAGING CALLS AND ENQUIRIES FROM THE PUBLIC, HEALTH CARE PROFESSIONALS AND VETERINARY PROFESSIONALS
PUBLIC
If an animal has ingested the rodenticide bait within the hour, advise on how to induce emesis. If the caller has activated charcoal advise on the correct dosage to be administered with water. Convince the caller to see the support of a veterinarian for the sake of the animal.

If an animal is suspected to have ingested the rodenticide bait more than six hours ago or even days ago (with or without expressing symptoms) convince the caller to seek the professional treatment services of a veterinarian as no home stabilization or treatment will have any positive effects.

VETERINARIANS AND HEALTH CARE PROFESSIONALS

Offer the advice on treatment as presented in the text.

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About BASF

At BASF, we create chemistry for a sustainable future. We combine economic success with environmental protection and social responsibility. The more than 115,000 employees in the BASF Group work on contributing to the success of our customers in nearly all sectors and almost every country in the world. Our portfolio is organized into five segments: Chemicals, Performance Products, Functional Materials & Solutions, Agricultural Solutions and Oil & Gas. BASF generated sales of €64.5 billion in 2017. Originally established in 1865, BASF is currently the largest chemical company in the world. Today, BASF is well known in the agricultural industry for launching innovative crop protection solutions. In 1914, the BASF Agricultural Centre was established by Carl Bosch, with the main objective to conduct research about the application of fertilizers. Since then, BASF has launched many ground-breaking solutions to various markets throughout the world.