Therapeutic Contraindications in Exotic Pets

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KEYWORDS

• Ivermectin • Fipronil • Benzimidazoles • Glucocorticoids
• Antibiotic-associated dysbiosis • Ibuprofen • Ketoprofen

KEY POINTS

- Veterinarians who treat exotic pets are often forced to prescribe drugs to a particular species without any knowledge of the pharmacokinetics or safety of that drug in that species; a drug may cause no problems in certain species but lead to death in another, sometimes closely related species.
- Ivermectin, even at low doses, has led to flaccid paralysis and death in many chelonians, and this drug should not be used in any of these species.
- When applied topically to rabbits, fipronil can lead to seizures and death and is not recommended for use in this species.
- Benzimidazoles can negatively affect rapidly growing cells, leading to pancytopenia in many species.
- β-Lactam and macrolide antibiotics often lead to a fatal dysbiosis if given orally to hind-gut fermenters, such as rabbits, guinea pigs, and chinchillas.

INTRODUCTION

Many of the drugs used in exotic pets have never been pharmacologically evaluated in the species of interest, and doses are sometimes extrapolated from nonrelated animal species. In addition, many of these drugs have no safety data in anything other than common domestic species. A drug may cause no problems in certain species but lead to death in other—sometimes closely related—species. Widespread death of Old World *Gyps* vultures after ingestion of cattle carcasses treated with diclofenac is an example of this phenomenon, because no apparent toxicity is seen in certain

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other vulture species when treated directly with various nonsteroidal anti-inflammatory drugs (NSAIDs).[1,2] The purpose of this review is to provide a brief overview of drugs that have documented contraindications in certain exotic pet species but could be administered in other species without apparent complications. Specific toxins (ie, lead), drugs that have known complications in all species (ie, renal toxicity of aminoglycosides), and drugs that are contraindicated for regulatory reasons are not discussed, because they are outside the scope of this review.

ANTIPARASITIC MEDICATIONS

Ivermectin

Ivermectin is a macrocyclic lactone that targets the ivermectin-sensitive glutamate-gated chloride channel receptors, only found in invertebrates, and the γ-aminobutyric acid (GABA) receptors.[3] In many species of animals, it does not cross the blood-brain barrier; however, in certain species, neurologic signs can occur after ivermectin administration, even at recommended doses. Ivermectin toxicity in chelonian species was first described in 1983 by Teare and Bush[4] Five red-footed tortoises (*Chelonoidis carbonarius*) received a single intramuscular (IM) injection of ivermectin (0.4 mg/kg) and developed paresis or flaccid paralysis. Additional studies in the red-footed tortoise showed that paresis occurred with dosages as low as 0.05 mg/kg. These investigators found several other species of chelonians were considered susceptible to ivermectin toxicosis at dosages of 0.1 mg/kg or less. The leopard tortoise (*Stigmochelys pardalis*) seemed the most susceptible of the species tested, and they consistently developed paresis with a dosage of as low as 0.025 mg/kg and death with dosages as low as 0.3 mg/kg. Based on these and other published data, the use of ivermectin in any chelonian species is not recommended. Treatment of ivermectin toxicity is largely supportive, and respiratory support must be maintained for at least the duration of action of ivermectin at the neurotransmitter site (7 days).[5] Anecdotal reports of full recoveries after 4 weeks to 6 weeks of supportive care have been reported in tortoises.[6] Aside from reported toxicities in tortoises, ivermectin toxicosis has also been suspected in a chameleon (*Chamaeleo senegalensis*), which received a single dose of 0.2 mg/kg IM of ivermectin. This animal's clinical signs resolved within a week with supportive care.[7] In addition, there are conflicting reports of toxicity in prehensile-tailed skinks (*Corucia zebrata*)—1 reported death 24 hours after an oral dose of ivermectin at 0.2 mg/kg[8] and a second report of the same dose administered up to 6 times IM with no apparent adverse effects.[9] Nevertheless, several investigators advise against the use of ivermectin in skinks. Similarly, specific recommendations to avoid the use of ivermectin in crocodilians and indigo snakes have also been previously published.[10]

Ivermectin toxicosis in birds has been reported sporadically. There are several toxicity studies, which examined the histologic effects of feeding high levels of avermectins to pigeons.[11,12] The purpose of those studies, however, was to examine the potential negative effects of avermectin residues in the environment rather than for use in the clinical setting. Additionally, there are anecdotal reports of ivermectin toxicity in finches.[10]

Fipronil

Fipronil is a phenylpyrazole insecticide used for the treatment of fleas, ticks, pediculosis, sarcoptic mange, and cheyletiellosis in dogs and cats.[13] Fipronil blocks GABA receptors in the central nervous system by preventing chloride ion uptake. This results in excessive central nervous system stimulation. Fipronil has a greater binding affinity