

## SINUS BRADYCARDIA IN A COLLIE DOG WITH IVERMECTIN TOXICOSIS

### BRADICARDIA SINUSAL EM UM CÃO DA RAÇA COLLIE INTOXICADO COM IVERMECTIN

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#### SUMMARY

The authors report a clinical case of toxicosis induced by ivermectin in a Collie dog with nervous and cardiac symptoms and emphasize the measures to be taken to control the disease, and bradycardia in particular.

**UNITERMS:** Ivermectin; Collie dog; Bradycardia; Dogs.

#### INTRODUCTION

The avermectin family, first described in 1978, is formed by macrocyclic lactones produced by *Streptomyces avermitilis*<sup>1,2</sup>. Ivermectin (Merck, MK-933) is a mixture of 80% or more 22,23-dihydroavermectin B<sup>1</sup> and 22,23-dihydroavermectin B<sup>2</sup> in quantities not exceeding 20% of the total. Ivermectin differs from avermectin B (abamectin) because it is equally effective when administered orally or parenterally for the treatment of nematodes, insects, acarids and ticks parasiting domestic animals<sup>3,4,5</sup>. The drug acts by paralyzing the parasites through the inhibition of the transmission of stimuli from interneurons of the central cord, which are directed towards motor neurons<sup>6</sup>. This inhibition is made possible by a greater release of the neurotransmitter gamma-aminobutyric acid (GABA) at the presynaptic level and by potentiation of specific GABA receptors. Thus, the drug acts as a GABA agonist. In parasites, the BLOCKAGE is irreversible unless the neurons are washed with the antagonist picrotoxin<sup>7</sup>. In contrast to invertebrates, in mammals that only have neurons that utilize GABA as a neurotransmitter within the central nervous system (CNS), ivermectin does not cross the meningeal barriers or act on cholinergic receptors. Medication with ivermectin has been followed by adverse reactions in horses, cats and dogs, especially Collies<sup>8,9,10,11,12</sup>.

The objective of the present report was to inform veterinarians about the adverse effects - bradycardia in particular - observed in a Collie dog injected subcutaneously with ivermectin, that developed toxicosis with bradycardia and CNS depression.

#### CASE REPORT

We describe the therapeutic management of a male - Collie dog, aged seven years, seen at the Veterinary Hospital of

FCAV-UNESP, Campus de Jaboticabal. The animal presented intense bradycardia (HR = 55 bpm), severe CNS depression, tetraparesis with hyporeflexia except for the patellar reflex, sialorrhoea, decreased sensitivity to painful stimuli, dehydration, and diffuse alopecia of limbs, thorax and abdomen after receiving an unknown dose of ivermectin\* by subcutaneous route. Complementary tests included electrocardiography, which revealed intense sinus bradycardia, and measurement of blood counts, alanine transferase (ALT); urea and creatinine gave normal results, except for an increase in total plasma protein. Treatment included constant electrocardiographic (ECG) monitoring with an ECG Biomonitor (RFI) and continuous intravenous infusion of dopamine\*\* at the rate of 10 g/ kg/ minute, increasing the heart rate to the normal level, since this is a sympathomimetic drug effective for the treatment of bradycardia.

We also administered fluids, vitamins of the B\*\*\* complex, antibiotics\*\*\*\* and gangliosides \*\*\*\*\*, according to a normal supporting therapy, and performed a pharyngotomy to force feeding, and emptying of the urinary bladder three times a day, with the use of an appropriate bed. Recovery occurred gradually over a period of 21 days.

\* IVOMEK - Merck Sharp-Dohme

\*\* REVIVAN - Dopamine Zambon - Lab. Zambon

\*\*\* VALLEE BIOXAN COMPOUND - Vallee Nordeste S.A.

#### DISCUSSION AND CONCLUSIONS

The description of the present case is consistent with data from the veterinary scientific literature, reporting Collie dogs as highly susceptible to ivermectin intoxication<sup>13</sup>.

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This susceptibility characterized by idiosyncrasy, was found to be extremely variable in a study by PAUL et al.<sup>8</sup> (1987). Another debatable aspect is that not only Collies may be affected by ivermectin toxicosis, but also Dobermans and Old England Sheepdogs have presented signs of neurological alteration due to ivermectin<sup>1,15</sup>.

Studies on Collie dogs, sensitive or not to ivermectin, have demonstrated that there are no differences in plasma ivermectin concentrations<sup>3,13,16</sup>, or in brain electric activity detected by electroencephalography in intoxicated dogs<sup>1</sup>.

On this basis, two important questions arise: why are Collie dogs more sensitive than other dog breeds to ivermectin, and why are dogs more sensitive to ivermectin than other species? These questions still await an answer. However, another, more immediate concern is how to treat dogs with ivermectin toxicosis. This problem is intimately related to practical aspects of veterinary medicine. The answer may be intensive patient care<sup>3,4,9,14</sup>, as well as admi-

nistration of picrotoxin as an antidote - a still debatable conduct<sup>9</sup> - or of physostigmine, with encouraging results<sup>3,14</sup>.

Nevertheless, the warning against the use of ivermectin in Collie dogs by injectable route and its indiscriminate use resulting in damage to the animal health and a technical responsibility problem, the description of the present case is meant to alert veterinarians to the side effects on the cardiovascular system, leading to intense bradycardia and death. Thus, it is plausible to assume that this idiosyncratic reaction may be managed successfully even in severely affected dogs, with a good interpretation of clinical signs and intensive treatment of general condition, mainly in order to restore cardiovascular function.

\*\*\*\* OPTACILIN - BYK

\*\*\*\*\* SYNAXIAL - TRB PHARMA

## RESUMO

Os autores relatam um caso clínico de toxicose com ivermectin em um cão da raça Collie com sintomatologia nervosa e cardiomuscular. Assesam para todos os cuidados a serem tomados quanto ao controle da afecção, mormente a bradicardia.

**UNITERMOS:** Ivermectin; Cães da raça Collie; Bradicardia; Cães

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