IVERMECTIN TOXICITY IN A GERMAN SHEPHERD DOG

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Ivermectin is very widely used endectocide in canines, toxicity of ivermectin is seen when excessive dose is administered in pets that are sensitive to the drug. Toxicity results in clinical signs ranging from mild to extremely severe, including death. Ivermectin toxicity in a German shepherd dog and its therapeutic management is reported.

Keywords: Ivermectin, Toxicity, Dogs, Drug, Therapeutic management

Ivermectin belongs to a class of drugs known as anthelmintics. It works by paralyzing and killing the parasites. Ivermectin was introduced in the mid 1980's as a broad-spectrum anti-parasite medication. It is effective against most common intestinal worms (except tapeworms), most mites, and some lice. It is also effective against larval heartworms (the "microfilariae" that circulate in the blood) but not against adult heartworms (that live in the heart and pulmonary arteries). Ivermectin is a widely used endectocide in canines and the toxicity is seen when excessive dose (10-20X of the recommended dose) is administered in pets that are sensitive to the drug. Toxicity results in any clinical signs ranging from mild to extremely severe, including death.

Breed sensitivity to lower doses occurs in some dogs such as in the Collie, Australian Shepherd and Shetland Sheepdogs. Occurrence of toxicity in selective breeds may be due to the reason that these breeds have comparatively more permeable blood brain barrier to the drug (Houston et al., 1987). Present report deals with a case of ivermectin toxicity in a German Shepherd dog and its therapeutic management.

Case History and Observations
A German shepherd dog aged 6 years weighing about 40 kg was presented to college clinic with complaint of developing symptoms of depression, hind limb ataxia, incoordination, tremors, behavioral disturbances, weakness, recumbency and hyper salivation (drooling saliva). The animal was injected 0.6 ml of ivermectin (Ivomec 1% w/v) subcutaneously by the owner about half an hour earlier, to treat ectoparasites. The clinical examination revealed miosis, tachycardia (120 beats/minute), hypothermia (98.2°F), difficulty in breathing with a respiration rate of 16 per minute, incoordination, unable to stand and seizures. Haematological tests revealed the values of haemoglobin, packed cell volume; total erythrocytes count and total leucocytes count were within normal range. On the basis of the history and clinical signs the case was diagnosed as ivermectin toxicity.

Treatment
As there is no specific antidote for ivermectin toxicity, only management care, supportive and symptomatic treatments were suggested. The dog was administered 1.5 ml intravenous injection of neostigmine (0.5mg/ml) @ 0.05 mg /kg body weight and 1ml of dexamethasone (4 mg/ml) @ 0.5 mg /kg body weight intravenously. Additionally, dextrose saline (5%) @ 25ml/kg b.wt. was administered intravenously over a period of 1 hour. Within 6 hours of therapy, the dog developed respiratory distress, slow heart rate and comatose stage. In spite of timely symptomatic treatment, the dog collapsed after 6 hrs of ivomec injection.

Discussion
Collie breed of dogs are more susceptible to ivermectin and can tolerate only up to 0.1 mg/kg dose rate of ivermectin as reported by Paul (1987). The margin of safety for ivermectin in most breeds of dog is well over 100 times of the recommended dose as also mentioned by Hadrick et al. (1995) but in Collies it is about 16 times of the usual dose. Hadrick et al. (1995) also reported that the clinical signs of toxicity with normal dose of ivermectin in two Australian Shepherds who received ivermectin at oral dosage of
0.17 mg/kg and 0.34 mg/kg respectively. Side effects of urgent concern are dilated pupils and drunken gait which can progress to respiratory paralysis and death if medication is not withdrawn and supportive care is not initiated. Unfortunately, ivermectin toxicity cannot be reversed and therefore, it is wise to treat the symptoms to the best of our ability.

Occurrence of toxicity in selective breeds, may be due to the reason that these breeds have comparatively more permeable blood brain barrier to the drug as also narrated by Houston et al. (1987) or due to an autosomal recessive trait (MDR-1) gene that causes a defect in the p-glycoprotein, which is a multidrug transporter in the blood brain barrier and it helps in passage of ivermectin into the brain at low dosages and causes toxicity as also mentioned by Kant (2007). Dog breeds with genetic sensitivity to ivermectin include Collies, Shetland Sheepdogs, Australian Shepherds, Merle colored Pomeranians and Old English Sheepdogs. Not every individual dog from these breeds is sensitive to ivermectin, and other individual dogs from the other breeds may also be prone to sensitivity. This is because it is a genetic mutation that causes the sensitivity as also reported by Hadrick et al. (1995). Very low test doses are often recommended at the start of a treatment to identify these individuals regardless of their breed. Alternatively, a blood test is now available to test for the genetic sensitivity. This genetic test (DNA test using an oral swab) for P-glycoprotein mutation will identify ivermectin sensitive dogs as also narrated by Handrick et al. (1995); Houston et al. (1987).

References