Intas Polivet (2011) Vol. 12 (II): 239-240 *Short Communication*

Levamisole overdosing in a Kathiawari Stallion and its treatment

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ABSTRACT

Levamisole is an imidathiazole anthelmintic with broad spectrum of activity, but low margin of safety. The present paper describes a case of over dosage of levamisole and its successful treatment in a Kathiawari stallion. The animal had consumed more than six times, the recommended dose of levamisole and started exhibiting cholinergic symptoms. Treatment included parasympatholytic atropine sulphate, fluid and diuretic therapy. The horse was hyper excited and had to be sedated. The animal responded well to treatment and recovered in 24 hrs. Levamisole is seldom used in horses and in fact banned for use in race horses. An overdosage of more than 10 times can even cause fatal asphyxia and use of the drug must be at accurate doses under the supervision of a qualified veterinarian.

KEYWORDS: Emergency; equines; levamisole; overdosage; toxicity.

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Introduction

Anthelmintics effective against a variety of helminths are available, but these drugs must be used correctly and judiciously to get optimal clinical response. Indiscriminate use of anthelmintics result in either over or under dosage. Administration in quantities less than the recommended dose results in selection for resistance to anthelmintics. Higher doses within the margin of safety is a waste of drug and money. When the dose level breaches the margin of safety, the action on the parasite is extended to the host and consequences may lead to toxic symptoms even resulting in death. The present paper reports a case of over dosage of levamisole in a Kathiawari horse.

Case History and Diagnosis

Levamisole is an imidazothiazole compound, widely used as an anthelmintic. It has broad spectrum of activity against gastrointestinal helminths and lung worms. A white Kathiawari stallion aged about 7 years was presented with symptoms of excessive sweating, salivation, ataxia and muscular tremors. The animal was restless and hyperaesthetic. Defecation and urination was frequent but in small quantities. Temperature was recorded as 102°F and mucous membrane was pink in colour. History revealed that the owner had given half a packet of 30% w/w levamisole 9 hr earlier to the occurrence of symptoms. The quantity of drug given to the animal was estimated as 53 g (remaining quantity of the 100 g pack was weighed as 47 g) and this would contain 16 g of the active ingredient levamisole. Levamisole over dosage was confirmed based on history and cholinergic symptoms observed.

Treatment

The weight of the animal was estimated as 338 kg from girth and length measurements. The treatment included atropine sulphate (0.1 mg/kg bwt), Ringer's lactate (3 litres) and DNS (1tr) by intravenous route. General antidote containing activated charcoal, egg white and tannic acid was administered orally. The animal was hyperexcited and had to be sedated with a tranquilising dose of xylazine (1 mg/kg bwt) before commencement of treatment. The cholinergic symptoms of convulsion and salivation subsided as atropine sulphate was administered. Furosemide (1mg/kg bwt) was given intravenous in addition to fluids on the next day. The animal responded well and was back to normal in 24 h.

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Discussion

Levamisole is a cholinergic agonist leading to neuromuscular paralysis of the parasites. Compared to other commonly used anthelmintics like benzimidazoles and ivermectins, its margin of safety (3-6) is less and mammalian toxicity is greater (Aiello, 2000). At higher doses the toxicity is extended to the host and the usual symptoms noticed are salivation, muscular tremors, ataxia, hyperaesthesia and irritability, urination, defecation and collapse. An over dosage of more than 4 times causes exhibition of cholinergic symptoms, while doses above 10 times leads to fatal asphyxia. Toxicity is also dependent on route of administration; the parenteral s/c route is 4 times more toxic than oral administration (Miller, 1996). The recommended therapeutic dose of levamisole for this horse at the rate of 7.5 mg/kg bwt is 2.5 g, while the amount consumed was 16 g. This is 6.4 times the recommended therapeutic dose and the animal started showing cholinergic symptoms typical of levamisole toxicity.

The symptoms appeared six hours after consumption of levamisole. Peak concentration of levamisole is reached in 2-6 h, but excretion is rapid with short withholding period. The main route of excretion is through urine and 90 % of the drug is excreted in 24 h (Aiello, 2000). In case of marginal over dosage symptomatic treatment until complete excretion of the drug is effective. Higher doses greater than 10 times the therapeutic dose causes fatal asphyxia. In the present case, the overdose was just above the margin of safety and the animal responded well to treatment. Activated charcoal helps in bringing out the drug unabsorbed by adsorption. Gnanaprakasam and Mahalingam, (1992) have reported a case of tetramisole toxicity in a baby elephant. Elephants have a digestive system comparable with that of equines. Symptoms noticed were similar and the elephant had responded to symptomatic treatment.

Several positive attributes of the drug like ease of administration, lack of teratogenecity, safety during pregnancy, action against benzimidazole-resistant helminths and additional immuno-stimulating properties makes levamisole a good choice of anthelmintic. It is commonly used in cattle, sheep, goat, swine and chicken. However, a narrow margin of safety and limited efficacy against many equine parasites, limits its usage in horses. Levamisole is banned for use in racing horses in Britain by the British horse racing authority (BHA). Pemoline a possible metabolite from levamisole is known for its performance enhancing ability of racing and horses found positive for levamisole, tetramisole or pemoline automatically stands to be disqualified with fine (BHA Report).

Levamisole, even though suitable for most of the livestock, is not the anthelmintic of choice in equines. With a low margin of safety, care should be taken in calculating the correct dosage according to the body weight of the animal. Indiscriminate usage without prescription of a veterinarian can lead to toxicity that can even be fatal.

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