RESEARCH NOTE

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Comparative efficacy of piperazine, albendazole and ivermectin against ascariasis in buffalo calves

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ABSTRACT : A comparative efficacy of piperazine, albendazole and ivermectin against natural infection of Toxocara vitulorum based on fecal egg count in calves was studied. Early recovery was found with Piperazine followed by Albendazole and Ivermectin. However, all the three drugs were effective against ascariasis in buffalo calves.

KEY WORDS : Piperazine, Albendazole, Ivermectin, Ascariasis, Buffalo calves, Toxocara vitulorum

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The agro-climatic condition of Kymore Plateau Satpura Zone, Jabalpur, with an average relative humidity of 70 per cent, environmental temperature of 15 to 35^{0}C and soil pH of 6.5 to 7.5, is highly favourable for the multiplication, propagation and perpetuation of the helminthic parasites for which this region is often referred as the 'paradise of parasites'. Earlier reports revealed as high as 78.2 and 54.7 per cent helminthic infection in young and adult bovines, respectively (Borkakoty *et al.*, 1984). In India and south East Asia, ascariasis caused by Toxocara vitulorum in young bovines is one of the important causes of mortality (Radostits *et al*., 2003). The infection in 1-3 months old calves is very common (Patnaik and Pandey, 1963) and has been reported in 75 per cent calves examined in Bangladesh, Myanmar, Ceylon, India and Nigeria (Thienpont and De Keyser, 1981). A proper anthelmintic medication at regular interval is necessary to achieve the target of production by reducing the morbidity and mortality of calves. The present investigation was thus envisaged to find out the comparative efficacy of piperazine, albendazole and ivermectin against natural infection of Toxocara vitulorum based on faecal egg count in calves.

A total of 15 buffalo calves (reared by rural people in and around Jabalpur city) of either sex, aged between 1-4 months, naturally infected with Toxocara vitulorum based on faecal examination were selected for this study. The animals under study clinically manifested constipation followed by loose faeces mixed with mucous, partial loss of appetite, pale conjunctival mucous membrane, rough body coat and stunted body growth. The calves were randomly divided into three groups *viz.*, group-I, II and III comprising of equal number of calves (5in nos) in each group. The calves of group-I were treated with piperazine citrate @ 200 mg/ kg body weight orally as single dose. Group-II calves were treated with albendazole @ 5 mg/ kg body weight orally. Ivermectin @ 0.2 mg/ kg body weight was injected subcutaneously to the animals of group-III. The efficacy of the drugs was assessed based on reduction/ absence of eggs per gram (EPG) of faeces and gradual disappearance of clinical signs. The EPG was performed by modified Stoll's dilution technique (Soulsby, 1982) on 0, 5th, 10th, 17th and 24th day of post-treatment in all the three groups.

The treatments with piperazine citrate, albendazole and ivermectin resulted in a gradual decline in EPG count (Table 1). The average EPG count in piperazine treated group showed considerable reduction by 50.48 and 89 per cent on 5th and 10th day of post treatment was observed in the animals of group- I. On 17th day of post-treatment all the animals of this group were free from ascaroids ova. The present finding was in agreement with the earlier reports of Rao *et al.* (2000). Piperazine might have induced neuromuscular hyper-polarization in the worms, producing reversible flaccid paralysis

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Table 1: Comparative efficacy of piperazine, albendazole and ivermectin against natural Toxocara vitulorum infection in buffalo calves (n=15)

Groups	EPG pre-treatment	EPG post-treatment (days)			
	(0 day)	5th	10th	17th	24th
Group-I (n=5)	1030	510(50.48%)	110(89%)	0(100%)	0(100%)
Group-II (n=5)	960	650(32.29%)	290(69.79%)	0(100%)	0(100%)
Group-III (n=5)	980	690(29.59%)	350(64.75%)	200(79.59%)	0(100%)

which prevented it from maintaining their position in the host's gut and thereby voided with faeces (Roy, 2001).

A decline of average EPG counts by 32.29 and 69.79 per cent on 5th and 10th day of post treatment was observed in the animals of group- II. On 17th day of post-treatment all the animals of this group were free from ascaroids ova. The present finding simulates the findings of earlier workers (Waghmare *et al.,* 1991 and Anwar *et al.,* 1996). Albendazole in hibits polymerization of tubulin in the parasite and blocks the glucose uptake. It also interferes with the enzyme fumerate reductase and thus, the energy level of the parasite diminish and death results. It has vermicidal, larvicidal and ovicidal action (Goodman and Gilman, 1975).

The EPG count was reduced by 29.59, 64.75 and 79.59 per cent on 5th, 10th and 17th day of post treatment in the animals of group-III and by 24th day all animals of this group were free from ascaroid ova. The present finding is in agreement with the finding of Rajkhowa *et al.* (2002) in Mithun. Ivermectin acts on the parasites by affecting GABA mediated signals between nerves and muscles. It increases the normal resting potential of post-synaptic cells and resulting in blocking neurotransmission which lead to flaccid paralysis of worms (Goodman and Gilman, 1975).

Use of piperzine was found advantageous over the other two drugs as it is cheaper, less toxic and resulted in early recovery. It can be concluded that piperazine is more effective than either albendazole or ivermectin in calves suffering from ascariasis.

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