COMPARISON OF THERAPUTICAL EFFICACY OF ALBENDAZOL, LEVOZAN AND IVERMECTINE IN TREATMENT OF BUFFALOES NATURALLY INFECTED WITH GASTRO-INTESTINAL WORMS IN MOSUL, IRAQ

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ABSTRACT

The object of this study is to compare the efficacy of a single dose of albendazol (Group 1) (10 mg/kg. BW oral suspension) and a single dose 2.5 ml/10 kg. BW. of levozan (Group 2) oral suspension (a mixture of levamisole and oxyclozanide) and ivermectine (Group 3) 0.2 mg/kg. BW. (S.C injection) for one time in the treatment of buffaloes naturally infected with gastro-intestinal worms. Thirty buffaloes of local breed 6 months to more than 4 years old were used in this study, the animals were divided into three equal groups (10 buffaloes for each). Based on the number of days taken for parasitological cure, and mean reduction EPG. Total erythrocytes count (RBCs), hemoglobin concentration (HB), packed cell volume (PCV), total platelets count (Plt) and erythrocytes sedimentation rate (ESR), were also encountered pre-and post treatment. Results indicated reduction in EPG to zero on the 7th day post treatment (Group 1) which also showed a significant increase in RBCs, HB, PCV and Plt and a significant decrease in ESR on the 14th day post treatment,while there was gradual reduction of EPG without complete elimination of total eggs count on day 21 of treatment with Groups (2) and (3). Levosan was found highly effective in the treatment of buffaloes naturally infested with gastro-intestinal worms.

Keywords: efficacy, albendazole, levosan, ivernectine, buffaloes, gastrointestinal worms

INTRODUCTION

Buffaloes are considered as one of the most important sources of milk and meat production (AL-Jamass, 1999) However, they can become infested with different types of parasitic gastro-intestinal worms resulting in serious effects and health deterioration, leading to substantial economic losses (Solusby, 1986, El-Sherif *et al*., 1999).

Gastro-intestinal worms which comprise nematodes such as Osretagia, Trichostrongylus, Hemonchus, Cooperia, Toxocara, Marshelagia and Cestodes such as *Monezia spp*., and others, affect the health of animals and their productivities and also decrease resistance to diseases which adversely effect the nutritional status and even cause severe mortalities (Jithendran and Bhat, 1999).

The anthelmintic activities and therapy of albendazol, levozan and ivermectin have been studied (Kasarilikar *et al.*, 1997, Dale and Haylett, 2004). Albendazol act by inhibiting tubulin polymerization (Adams, 2001), ivermectine produces flaccid paralysis of parasites by acting as an agonist of the neurotransmitter gamma-aminobutyric acid (GABA), thereby disrupting GABA-mediated central nervous system (CNS)

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neurosynaptic transmission (Einstein *et al.*, 1994; Dacasto and Cocuzza, 1995), whereas oxyclozanide is a salicylanilde anthhelmentic that acts by uncoupling oxidative phosphorylation, thereby decreasing the availability of high energy phosphates such as ATP to the parasites; it is formulated as an oral drench containing oxyclozanide alone or in combination with levamisole hydrochloride (Einstein *et al.*, 1994).

The goal of this study was to compare the therapeutic efficacy of albendazole, levozan and ivermectin in buffaloes naturally infested with gastro-intestinal worms.

MATERIALS AND METHODS

Animals and study design

The study was conducted on thirty local breed buffaloes 6 months and more than 4 years old, naturally infested with gastro-intestinal worms, such as *Osretagia spp*., *Trichostrongylus spp Hemonchus spp., Cooperia spp*., and the worm of *Monezia expansa*, *Toxocara vitulorum*, *Marshelagia marshalli*. Animals were divided randomly into three equal groups (10 animals in each). Single doses of Albendazol 10 mg/kg BW oral suspension (Group 1) (Alfabendazole, Alleppo Laboratories for Veterinary products, Syria), levozan (Group 2) (a mixture of oxyclozanide and levamisole) at the manufacturer's recommended dose rate of 2.5 ml/ 10 kg BW oral suspension (Levozan, Veterinary and Agricultural Products, VAPCO-Jordan) and Ivermectine (Group 3) 0.2 mg/kg. BW (S/C) injection one time (Evanomic, Prima Ingredients S.L, Spain), were evaluated for therapeutic efficacy and to assess the efficacy of the drugs, fecal samples of all infested buffaloes were examined with respect to reduction of eggs on the 7th, 14th and 21th days of treatment.

Blood collection and hematology

Five milliliters of blood drained from each animal by jugular vein-puncture and mixed with EDTA were used to determine RBCs, HB, PCV, Plt (Automatic Full Digital Cell Counter, Beckman, USA), and ESR by westergren method (Meyer and Harvey, 2004).

Statistical Analysis

The data were analyzed statistically using SPSS version 11.5 (SPSS Inc., 2002)

RESULTS

Levosan (Group 1) which was given to infected buffaloes as oral suspension at the dose rate of 2.5 ml/kg. BW, showed the cent percent efficacy on 7th day of treatment and continued to the day 21th, whereas gradual reduction of egg counts where encountered in Group (2 and 3), Table 1. With respect to hemogram (Table 2), there were significant increases in the mean values of RBCs, HB, and PCV, with a significant decrease in ESR in Group (1) on the 14th day of treatment trial, but no differences in these values were indicated in Groups (2 and 3).

DISCUSSION

Results of the present study showed high efficacy of levosan (amixture of levamesol and oxyclozanide) for complete and fast removal of worms eggs. The drug was well tolerated and with no evidence of drug associated toxicity was noticed in any of treated animals, similar

Table 1. Eggs per gram (EPG) of buffaloes naturally infected with gastro-instetinal worms pre and post treatment.

Parameter	Groups	Pretreatment	Post-treatment		
			7 days	14 days	21 days
EPG	Group I	$1211^{a}\pm215$	0^{b}	0^{B}	0^{b}
	Group II	$1120^{a}\pm119$	$800^{b}\pm170$	$206^{C}\pm70$	$98^{d}\pm11$
	Group III	$1050^{a}\pm168$	$753^{b}\pm200$	$117^{C}\pm88$	$55^{d}\pm18$

Values are (mean±standard error of mean).
Values with different letters mean: the presence of significant differences (P<0.05).

Table 2. Hematological parameters of buffaloes naturally infected with gastro-intestinal worms pre and post treatment.

parameters	Groups	Pre-treatment	Post-treatment		
			7 days	14 days	21 days
RBCs	Group I	$5.02^{a}\pm1.633$	$5.9^{a}\pm1.89$	$7.3^{b}\pm0.29$	$7.6^{b}\pm0.8$
	Group II	$5.22^{a}\pm0.96$	$5.8^{a}\pm0.33$	$6.1^{a}\pm0.72$	$6.1^{a}\pm0.95$
	Group III	$5.6^{a}\pm0.33$	$5.1^{a}\pm1.81$	$6.3^{a}\pm0.28$	$6^{a}\pm0.92$
HB	Group I	$9.6^{a}\pm1.65$	$10^{a}\pm0.85$	$12.1^{b}\pm1.21$	$12^{b}\pm1.6$
	Group II	$9.8^{a}\pm0.99$	$10.2^{a}\pm0.82$	$9.9^{a}\pm1.22$	$10.1^{a}\pm0.6$
	Group III	$10^{a}\pm0.78$	$9.8^{a}\pm0.69$	$9.7^{a}\pm0.55$	$10^{a}\pm0.91$
PCV	Group I	$26.8^{a}\pm2.11$	$28^{a}\pm3.11$	$34^{b}\pm1.29$	$33^{b}\pm2.21$
	Group II	$27^{a}\pm1.99$	$27^{a}\pm2.39$	$29^{a}\pm3.1$	$24^{a}\pm2.6$
	Group III	$28^{a}\pm0.82$	$27^{a}\pm1.66$	$28^{a}\pm2.2$	$28^{a}\pm3.39$
Plt	Group I	$225^{a}\pm30.11$	$259^{a}\pm37.5$	$233^{b}\pm5.1$	$321^{b}\pm33.2$
	Group II	$230^{a}\pm40.2$	$250^{a}\pm55.6$	$237^{a}\pm 40.4$	$144^{a}\pm21.4$
	Group III	$251^{a}\pm31.4$	$266^{a}\pm39.5$	$244^{a}\pm20.3$	$149^{a}\pm33.2$

Values are (mean ± standard error of mean).
Values with different letters mean: the presence of significant differences (P<0.05).

results were also recorded by (Kasarilikar *et al.*, 1997) as the oxyclozanide act by uncoupling oxidative phosphorylation, thereby decreasing the availability of high energy phosphates such as ATP to the parasites. Moreover, levamisole acts by making tonic paralysis of the parasites, which gives the mixture a wide range of anti parasitic activity (Riviere and Papich, 2009). Ivermectin acts on the GABA system of the nervous tissues and has little or no activity on some worms like cestods (Vermunt and Pomroy, 1995), beside some resistance which was recorded for albendazole (Figueroa *et al.*, 2000; Hoque *et al.*, 2003; Sissay *et al.*, 2006). The anthelmintic resistance to albendazole is usually notice when worm control policies fail dramatically; however, resistance is present when there is a greater frequency of parasites in population able to tolerate doses of a compound than in the normal population of the same species. The problem of anthelmintic albendazole has been reported (Mckenna, 1996; Familton *et al.*, 2001), it is thought that regular suppressive dosing had probably resulted in anthelmintic resistance in many countries. Schwab *et al*. (2005) added that many helminth parasites have developed resistance against both albendazole and ivermectin and they thought that the resistance to albendazole is known to be caused by either of two single amino acid substitutions from phenylalanine to tyrosine in parasite beta-tubulin at position 167 or 200.

CONCLUSIONS

Levosan has a wide range of anti parasitic activity compared to albendazole and ivermectin in the treatment of buffaloes naturally infested with gastro-intestinal worms.

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