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Efficacy of Closantel Plus Albendazole Liquid Suspension against Natural Infection of Gastrointestinal Parasites in Jordanian Camels

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ABSTRACT

Oral administration of closantel in a dose of 10 mg/kg plus albendazole in a dose of 5mg/kg liquid suspension was studied in 75 camels naturally infected with various types of gastrointestinal parasites. The camels involved were 15 pregnant she-camels, 20 non-pregnant she-camels and 40 male camels of various ages. Each camel received a single oral dose of closantel (10 mg/kg) plus albendazole (15 mg/kg) orally. Two weeks later, 20 camels of this group were re-dosed again with the same dose of the anthelmintic. Fecal samples were collected from the rectum of all the camels at the time of treatment and again 14 and 42 days post treatment. Fecal egg counts and generic determination of third stage larvae was performed. Results indicated that six different species of gastrointestinal tract parasites were identified in camels. A single treatment of closental plus albendazole mixture reduced egg counts in camels by 100%, 99%, 98% and 77% for *H. longistipes, Ascaris spp., Monezia expansa* and *Fasciola hepatica,* respectively. However, administration of the drug twice, two weeks apart, significantly raised the efficacy of the drug for clearance of the parasites from 92.5% to 100% in camels affected with various parasites. Camels were not adversely affected by treatment.

Key words: Closental, Albendazole, Parasites, Camels, Jordan.

INTRODUCTION

The dromedary camel (*Camelus dromedarius*) is an important domestic animal in Jordan (FAO, 1995). The vast majority of the camels are found in the Northern and Eastern regions of Jordan. Several investigators reported the occurrence of different helminthes in camels in different parts of the world (Altaif, 1974; Dakkak and Ouhelli, 1987, El-Bihari *et al.,* 1984 and Magzoub *et al*., 1997). Mixed infection in which two or three parasites are present in the same animal were diagnosed (Altaif, 1974; Selim and Rahman, 1972). Thus, a combination of anthelmintics to control the different types of camel parasites was reported. Closantel, which is an antiparasitic agent of broad-spectrum, is used against several species and developmental stages of trematodes, nematodes and arthropods in different animal host species. It has been used efficiently in controlling haemonchosis in goats (Dorny *et al.,* 1994), levamisole-resistant *Haemonchus contortus* of sheep (Yadav and Kumar, 1994), *Oestrus ovis* of sheep (Alzieu *et al.,* 1994), *Fasciola hepatica* in sheep and cattle (Boulard *et al.,* 1995; Sanchez and Quiroz-Romero*,* 1995), bovine hypodermosis (Hennessy *et al.,* 1993) and *Ixodes ricinus* tick of sheep (Bates *et al.,* 1995). As far as we are aware, no report for the use of closantel and albendazole suspension against various gastrointestinal parasites of camels was found in the available literature. Therefore, the aim of the present study was undertaken to evaluate the therapeutic efficacy of a mixture of closantel and albendazole against various gastrointestinal parasites of camels kept under field conditions in Jordan.

MATERIALS AND METHODS

Animals

A herd of 250 one-humped camels (*Camelus dromedarius*) was selected for this clinical trial. All were working animals, kept in the northern desert of Jordan where they were fed grass hay together with a supplementary grain ration. No anthelmintics were administered for at least 6 months preceding the trial. One hundred camels of both sexes and of different ages were selected at random to test the efficacy of a mixture of closantel and albendazole on different kinds of gastrointestinal parasites. The camels were divided

into two groups. Group one involved 75 camels suffering from different kinds of gastrointestinal parasites. They included 15 pregnant she-camels, 20 non-pregnant she-camels and 40 males of different ages. All were treated on an individual body weight basis, according to manufacturer's recommended dose rates. Each animal received closantel (10 mg/kg) and albendazole (5 mg/kg) liquid suspension orally. Moreover, 20 camels of this group (15 pregnant she-camel and 5 males) were re-dosed with the same medication 2 weeks after the initial dose. Group two involved 25 camels of various ages and sexes which, were naturally infected with different gastrointestinal parasites, but remained untreated as controls. All animals were subjected to daily clinical examination to find if there was any side effect of the anthelmintics on the animals or their feti.

Sampling

Fecal samples were collected from the rectum of all camels at the time of treatment and again 14 and 42 days post treatment. Direct method of examination including flotation and sedimentation methods were performed. Faecal egg counts were carried out by McMaster method (Thienpont *et al.,* 1979). Faecal samples from each group at day 0, 14 and 42 days were cultured and generic determination was performed on third stage larvae reared in faecal culture. The efficacy of treatment was measured by fecal egg count reduction (FECR) test, according to the methods described by Dash, *et al* (1988). All animals were also subjected to daily clinical examination for any side effect of the anthelmintic on the animals and feti.

RESULTS

The incidence of mixed helminthic infection was 53% while that of single infection was 47% (Table 1). Six different species of gastrointestinal worms were identified in Jordanian camels. They were classified according to the site of lodging in the gastrointestinal tract and liver. The abomasal worm was identified as *Haemonchus longistipes,* with prevalence rate of 8%. Three small intestinal worms were identified and their prevalence rates were *Trychostrongylus probolurus* (73.3%), *Ascaris spp*. (29.3%) and *Monezia expansa* (17.3%). Finally, two large intestinal and liver worms were

identified. *Trichuris ovis* and *Fasciola hepatica* with prevalence rate of 20% and 5.5%, respectively. The intensity of infection for all identified parasites was medium to high. Parasitic eggs output before treatment ranged from 2,000 to 10,000 eggs per gram of feces.In the treatment group, clearance of parasites was significantly higher ($P \leq 0.05$) after 6 weeks of treatment than after 2 weeks of treatment (Table 1). The clearance rate of the parasites after 2 weeks of treatment ranged from 25% for *Fasciola hepatica* to 73.3% for *Trichurus ovis* with an average rate of 49.6% for all the identified parasites . However, the clearance rate of the parasites after 6 weeks of treatment ranged from 75% for *Fasciola hepatica* to 93.3% for *Trichurus ovis* with an average rate of 88.7% for all the identified parasites (Table 1).

Table 1: Efficacy of closantel plus albendazole mixture in treating 75 Camels with different gastrointestinal parasites.

	Prevalence before treatment		Clearance time after treatment			
			2 weeks		6 weeks	
Parasites	No.	%	No.	%	No.	%
Trychostrongylus	55	(73.3)	26	(47.3)	50	(90.9)
Ascaris	22	(29.3)	9	(40.0)	17	(81.8)
Monezia	13	(17.3)	9	(69.2)	12	(92.3)
Trichuris	15	(20.0)	11	(73.3)	14	(93.3)
Fasciola	4	(5.5)	1	(25.0)	3	(75.0)
Haemonchus	6	(8.0)	1	(50.0)	5	(83.3)
Total	115*		57	(49.6)	102	(88.7)

*115 = No. of parasites identified in 40 mixed infection plus 35 single infection camels.

The percentage reduction of the fecal egg counts is set out in Table 2. Single treatments of closantel plus albendazole mixture reduced egg counts by 100%, 100%, 98% and 77%, for *H. longistipes, Ascaris spp., Monezia expansa* and *Fasciola hepatica,* respectively. Administration of the drug twice, of two weeks apart, significantly raised ($P \leq 0.05$) the efficacy of the drug for clearance of the parasites from 92.5% to 100% in camels infected with single type of parasite, and from 75% to 100% in camels infected with mixed parasites (Table 2). On the other hand, the efficacy of the drug for clearance of the parasites was significantly higher ($P < 0.05$) in animals infected with a single parasite than in the animals infected with mixed types of parasites. No fatality, abortion or congenital anomalies were recorded in any animal receiving medication under the trial. The egg count in untreated camels were 2,500 egg / gram or more during the experiment.

Table 2: Efficacy of single and double doses of closantel plus albendazole mixture in treating camels infected with gastrointestinal parasites.

Oral dose*	Total	Single infection			Mixed infection		
		No. treated	Clearance		No. treated	Clearance	
			No.	(%)		No.	(%)
One	55	27	25	(92.6)	28	21	(75)
Two**	20	8	8	(100)	12	12	(100)
Total	75	35	33	(94.3)	40	33	(82.5)

*10 mg/kg for closantel plus 5 mg/kg for albendazole.
**Two doses 2 weeks apart.

DISCUSSION

In Jordan, the prevalence of gastrointestinal parasitic infection in camels was very high. Mixed infection in which two or even three parasites were present in the same animals were diagnosed. These findings were in agreement with the finding of (Selim and Rahman, 1972). Six species of helminths (4 nematodes, 1 cestode and 1 trematode) were found in camels examined in the present study. *Haemonchus longistipes* is the common abomasal nematodes which has been reported from almost all countries in which camels are kept (El-Bihari, 1985). Other helminths which are reported in camels include *Ostertagia spp., Cooperia spp., Bunostomum spp., Nematodirella spp., Impalaia nudicollis* and *Impalai tuberculata* have been reported from India, Kenya and Egypt (Soliman, 1956). Except for *Camelostrongylus mentulatus,* all the species found in our study were either parasites of sheep, cattle or horses.

Closantel is a broad-spectrum antiparasitic agent used against several species and the developmental stage of trematodes, nematodes and anthropodes in different animal host species (Dorny *et al.,* 1994; Yadav and Kumar, 1994; Barger *et al.,* 1991; Guerrero, 1984; Gupta and Yadav, 1994; Hall *et al.,* 1981 and Owen, 1988). Closantel has been used in a dose of 5 mg/kg body weight given by subcutaneous injection or a dose of 10 mg/kg body weight gives orally for the treatment of *H. contortus* in goats (Dorny *et al.,* 1994). An oral dose of 7.5 mg/kg body weight given virtually complete protection against *H. contortus* for at least 4 weeks in sheep (Owen, 1988). Also, closantel prevented establishment of re-infections with *H. contortus* in sheep for at least 2 weeks with an oral dose of 10 mg/kg body weight and for 4-5 weeks with a dose of 10 mg/kg subcutaneously (Hennessy *et al.,* 1993).

There is some uncertainty about the development of resistance against closantel since selection of resistant worms may be enhanced if the sustained activity is associated with a prolonged period of decreasing drug concentration (Dash, 1986). There have been reports of closantel resistance in *H. contortus* in sheep in South Africa (Van Wyk and Malan, 1988; and Van Wyk *et al.,* 1982) and Australia (Rolfe *et al.,* 1990). Our results showed that mixed infection in camels is high. Therefore, in order to preserve the full potential of closantel and to control mixed infection, it is recommended that

administration of the drug be used in full dose and in combination with other broad-spectrum anthelmintics. Albendazole is widely used as a broad-spectrum anthelmintic. At a doses of 7.5 mg/kg body weight used as a broad-spectrum anthelmintic, at a dose of 7.5% mg/kg body weight, albendazole has been reported to have good efficacy against mature *F. hepatica* in sheep (Campbell and Hall, 1979).

There has been some concern about the safety of closantel in animals. Spongiform changes in the brain and retinal degeneration causing blindness have been associated with overdose of closantel in kid goats (Button *et al.,* 1987) and adult goats and sheep (Obowlo *et al.,* 1989). In dogs, a case of overdose with closantel was described. The dog received 6 times the recommended dosage of closantel. The main clinical signs were optic neuritis, retinal degeneration, partial deafness, hepatotoxicosis and myopathy (McEntee *et al.,* 1995).

The present study demonstrated the high efficacy of a mixture of closantel and albendazole against various gastrointestinal parasites of camels. Also, we recommend giving the mixture into two doses. The first dose reduced egg counts by 75 to 93.3% and the second dose cleared most animals of all parasites. However, according to the available literature, this is the first report on the use of closantel for the treatment of gastrointestinal parasites in camels. Our results and the follow up of the treated camels showed that a mixture of closantel plus albendazole did not cause any adverse reaction in the 75 camels treated in this study.

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