

THE EFFICACY OF EPRINEX[®] (EPRINOMECTIN) ON TRICHOSTRONGYLIDS IN DROMEDARIES

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ABSTRACT

Two groups of each 16 adult lactating dromedaries, positive for trichostrongylidae eggs were used to study the efficacy of a topical application of eprinomectin. The 1st group was treated on day 0 while the 2nd group served as control and was medicated at day 14. Coproscopical examinations were carried out prior to treatment, at day 14 and day 28. All animals of the 1st group were negative for trichostrongyloid eggs but 2 of them became positive again on day 28. All camels of the 2nd group excreted trichostrongyloid eggs at day 14 and only one was still positive at day 28, 2 weeks after the group was treated.

Key words: Dromedary, helminths, eprinomectin

Eprinomectin - a macrocyclic lactone - is a substance belonging to the avermectins. It is a fermentation product of the fungus *Streptomyces avermitilis*. The physical and pharmaco-kinetic features as well as the distribution in the body and the excretion of the original avermectin B molecule had been changed by substituting the epia-cetyl amino group in the original molecule. It is as active against parasites as the original ivermectin and is the only avermectin registered for the use in lactating cows because of its partitions profile between plasma and milk. The pharmacokinetics of eprinomectin in the blood plasma of camels was studied by Oukessou *et al* (2006). The authors used 2 different sites of topical administration and established the highest plasma concentration when Eprinex[®] was applied on the withers region and on the croup zones. In a 2nd study with lactating camels, it was recorded that the maximum concentration of eprinomectin in the milk was even lower than that in cows (Bengoumi *et al*, 2007). The zero withdrawal period makes Eprinex[®] a good candidate to treat lactating animals against ectoparasites and nematodes.

The objective of this trial was to study the efficacy of Eprinex[®] on trichostrongyloids in dromedaries, since data of anti-parasitic activity of this product were available only for cattle.

Materials and Methods

The test was performed on adult dromedaries at Dubai Camel Dairy Farm (Emirates Industry for Camel Milk Products) in May-June 2008. Based on results of coproscopical examination (normal salt flotation in a test tube), the experimental animals were selected from a group of camels purchased from Sudan in April 2008. All the positive camels had a mixed infection with 2 different types of trichostrongyloids. The nematode species were determined through necropsy material of camels of the same herd.

Positive samples were screened with the McMaster method and camels with an EpG of more than 150 were allocated to 2 groups A and B, respectively. The grouping was performed in a way that the average EpG was equal in both groups. Camels of group A were treated with eprinomectin (Eprinex[®], Merial) at a dosage of 0.5 mg/kg b.wt. while group B first served as control. Eprinex[®] was applied topically along the dorsal line from the withers to the base of the tail. A second coproscopical examination was done 2 weeks after treatment. At this time the former control group B was treated and a last coproscopical screening was performed after another 2 weeks.

Results

Two types of trichostrongyloid eggs with an average length of 65 - 70 µm and 80 - 95 µm,

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respectively were coproscopically identified. The examination of the content of abomasum and small intestine of camels of the same herd sent for necropsy showed the presence of *Haemonchus longistipes* and *Camelostrongylus mentulatus* (with the smaller type of eggs) as well as *Trichostrongylus colubriformis* and *T. probolurus* (with the larger type of eggs). *Nematodirus dromedarii* was also found at necropsy, but none of the experimental animals shed *Nematodirus* eggs. It is worth mentioning that 7 of the 10 necropsied camels were infected with *Stilesis vittata* and 5 harboured hydatid cysts in their lungs.

Prior to the treatment, the average EpG was 525 and 563 in groups A and B, respectively (Table 1). None of the camels of group A shed nematode eggs 2 weeks after treatment but 2 of them were positive again after another 2 weeks bringing the average EpG in this group to 61.

Animals of group B continued to shed trichostrongyloid eggs with an average EpG of 753 at the second time of sampling (day 14). Two weeks after treatment of this group, only one camel with a low EpG was still positive. No side effects were observed in connection with the application of the drug.

Discussion

The most significant parasitic diseases of dromedaries are trypanosomosis, mange, hydatidosis and tick infestation. Compared to ruminants, only little work has been done on gastro-intestinal nematodes in Old World Camels. Some information on nematods in dromedaries are available from Kuwait (Abdul-Salam and Farah, 1988); UAE (Kayum *et al*, 1992); Saudi Arabia (Haroun *et al*, 1996); Sudan (Yagoub, 1989); Ethiopia (Woldemeskel *et al*, 2001; Zeleke and Bekele, 2001; Bekele, 2002); Egypt (El-Salahy *et al*, 2000; Wahab and EL-Refail, 2003); Nigeria (Egbe-Nwiyi and Chaudhry, 1994); Mali (Tembely *et al*, 1992); Turkmenistan (Mushkambarova and Dobrynin, 1989); Pakistan (Hayat *et al*, 1998) and India (Partani *et al*, 1996; 1998). The helminth fauna of bactrian camels are reported from Kazakhstan (Prjadko *et al*, 1992; Ashotov, 1994) and Mongolia (Sharhuu and Sharkhuu, 2004).

Despite the large spectrum of more than 20 different gastro-intestinal nematodes, the prevalence and burden of these parasites in dromedaries kept in semi-arid and arid environments is usually low. However, infections with some of the nematodes are known to cause clinical pictures in camels and need attention. Thus, Haroun *et al* (1996) demonstrated that natural infections with trichostrongyloids resulted in

Table 1. The efficacy of Eprinex® (eprinomectin) on trichostrongyloid egg shedding in dromedaries. (Treatment in group A and B was carried out on day 0 and 14, respectively).

Group A			
Camel No.	Day		
	0	14	28
	EpG	EpG	EpG
1	400	0	0
2	500	0	0
3	1000	0	0
4	400	0	0
5	500	0	0
6	400	0	0
7	1400	0	0
8	300	0	0
9	550	0	0
10	400	0	0
11	650	0	900
12	750	0	0
13	250	0	750
14	400	0	0
15	300	0	0
16	200	0	0
Average:	525	0	61
Group B			
1	1600	1200	100
2	500	300	0
3	350	400	0
4	400	300	0
5	450	1300	0
6	400	550	0
7	400	0	0
8	750	1450	0
9	300	700	0
10	500	1000	0
11	1050	1050	0
12	400	350	0
13	550	200	0
14	200	500	0
15	250	750	0
16	900	2000	0
Average:	563	753	6

anaemia, leucocytosis, lower serum protein, increased blood urea and higher serum creatine phosphokinase activity. *H. longistipes* seems to be the most pathogenic trichostrongyloid for dromedaries. This species is well adapted to arid environments showing high infection rates during rainy seasons but only low EpG levels during the dry seasons due to arrested development of the larvae (Jacquiet *et al*, 1996). Partani *et al* (1998) compared EpG levels with clinical symptoms and found that heavy infection resulted in anorexia, weight loss and anaemia. Other nematodes found in community with *H. longistipes* and causing pathological lesions are *T. colubriformis* and *Impalpia tuberculata* (Bekele, 2002).

In our necropsy material *H. longistipes* along with *C. mentulatus*, *T. colubriformis*, *T. probolurus* and *Nematodirus dromedarii* were the nematodes diagnosed whereas, *S. vittata* was the only intestinal cestode. Both abomasal nematodes *H. longistipes* and *C. mentulatus* have not been found so far in camels in the UAE but they were collected from gazelles in a private collection in Dubai in 1994.

Control of gastro-intestinal helminths in camels was recently reviewed by Chhabra and Gupta (2006). Amongst the orally applicable benzimidazoles and imidazothiazoles, best results were found with fenbendazole and albendazole. The use of ivermectin opened a new area of antiparasitic treatment since this anthelmintic is effective also against arthropods and can be administered parenterally. However, ivermectin has a long withdrawal period and could not be used in milk producing animals. Eprinomectin that has the same mode of action as ivermectin but can be used safely with zero milk-withdrawal time has never been tested against trichostrongyloids in camels before.

The average EpG values in our camels prior to treatment were classified as moderate according to Partani *et al* (1998). The EpG values dropped 0 to 2 weeks after treatment in all animals of group A but 2 camels became positive again after another 2 weeks. The reason for the re-appearance of eggs may be explained by the activation of hypobiotic larval stages. However, further examinations are needed to make a final conclusion. To our own experience Eprinex[®] has a good efficacy against trichostrongyloids, it is safe and easy to use. As an endectocide, eprinomectin may also find an application in the control of sarcoptic mange in milk producing camels.

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Letter to the Editor

THE PUZZLE OF DUBDUBA

During the year of 2007, massive epidemiological search started in the North Eastern part of the Kingdom of Saudi Arabia. Camel owners reported a disease that is manifested by signs of head tremors, paralysis of the lower lip, paralysis of the fore- and hind-legs, recumbency and death. Three institutes were asked to conduct a survey: King Abdulaziz City for Science and Technology, King Faisal University and Qassim University. Extensive work based on several visits to the affected area, looking for camel owners who claimed having the problem, was initiated. The investigation lasted over a year. The first report of the disease was published in JCPR (DUBDUBA SYNDROME: A NEW NEUROLOGICAL DISEASE OF CAMELS WITH A POSSIBLE VIRAL ETIOLOGIC AGENT by M. A. Al-Dubaib, A. Al-Swailem, G. Al-Ghamdi, E. Al-Yamani, A. A. Al-Naeem, A. M. Al-Mejali, M. Shehata, M. Hashad, D. A. El-Lithy and O. M. Mahmoud). Three cases were examined. Several diseases were ruled out including Rabies, Equine herpes, West Nile Fever, Panflavivirus, Paramyxovirus, Rift Valley Fever and Listeriosis.

A second article is presented in the current issue of JCPR (Dubduba Syndrome: non-suppurative meningoencephalomyelitis in *Camelus dromedarius* in Saudi Arabia by G. M. Al-Ghamdi, A. A. Al-Naeem, A. Wuenschmann, U. Wernery, M. Al-Dubaib, A. M. Al-Swailem, M. Hamouda, E. Al-Yamani, M. Shehata, D. A. El-Lithy, O. M. Mahmoud, A. M. Al-Mujali). Five cases are described. Several diseases were also ruled out including bovine viral diarrhoea virus, West Nile virus, Rabies virus, Equine herpesvirus, Influenza A virus, Canine distemper virus, Feline herpesvirus, *Toxoplasma gondii*, and *Neospora caninum*. In addition, attempts to isolate a virus and to experimentally reproduce the disease were unrewarding.

This disease is of low morbidity with 3% but with a moderately high case fatality. Three out of five of the cases reported in the second paper were admitted to the Veterinary Teaching Hospital at King Faisal University between May and June 2007. The necropsy was performed at the Department of Pathology with the help of Professor E B Abdelsalam who mentioned that he never has seen such a disease before.

A report of a non-suppurative meningoencephalitis in dromedary camels in Saudi Arabia by F A Al-Hizab and E B Abdelsalam was published in JCPR (December, 2007) and five cases were described. Considering the number of the cases we had during the same time period it brings the total number of cases to 8 camels within approximately two months. This is alarming to know that only 8 camels were detected by the previous teams over a year of extensive work. In addition, the epidemiological data indicated a low prevalence of a highly fatal disease. The report needed more information on herd, duration and clinical history of the disease.

On May 11, 2008, a workshop was held on this disease. Scientists from different parts of the world were invited to King Abdulaziz City for Sciences and Technology to talk about various aspects of neurologic diseases in camels.

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