

Research Article

Homeopathic Treatment with a Complex of Cina9 CH and Colocynthis CH in Horses Naturally Infected with Intestinal Strongyles

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Abstract

The aim of this study was to evaluate the efficacy of homeopathic and allopathic treatments on gastrointestinal parasites in horses. Eighteen clinically healthy and regularly trained Standardbred horses were used with the informed consent of the owners. The horses were randomly divided into 3 equally groups: Group A was treated with ivermectin, Group B received daily treatment with an homeopathic combination of Cina 9CH and Colocynthis 9CH, and Group C (Control Group) received treatment with placebo. Directly after the first faecal sampling, the horses were treated with anthelmintic drugs (day 0). All horses were observed daily to record for any clinical signs of side-effects (e.g., sweating, mydriasis, colics) caused by the products. Body Condition Score (BCS) measurement was performed on horses before (d0) and after the end of experimental period (d35). The collection of faecal samples was carried out from each animal before (d0) and after 3 (d3), 7 (d7), 10 (d10), 13 (d13), 16 (d16), 20 (d20), 27 (d27), and 35 (d35) days the start of experimental period. Fecal egg count reduction (FECR) tests were performed to evaluate the efficacy of allopathic and homeopathic treatment. Two-way repeated measures analysis of variance (ANOVA) was applied to determine significant effects of treatment and time on BCS values. Differences on efficacy of treatment were found among groups. In particular, the efficacy of ivermectin on Group A based on FECR was of 98.8%. Egg count reduction after homeopathic treatment were lower than 10%, although the parasite eggs showed altered morphological aspect with thinned and coerced walls. Whereas, the Group C had no reduction in FECR and parasite eggs showed no morphological alterations. A statistically significant effect of time was found on the BCS values in group A ($P < 0.05$) and B ($P < 0.001$). Moreover, Groups B showed higher BCS values respect to Group A and Group C. The homeopathic treatment evaluated in the present study did not prove effective in controlling gastrointestinal nematodes in the conditions that it was tested as demonstrated by the lack of FECR.

Keywords: Homeopathic treatment, Horse, Ivermectin, Gastrointestinal parasites

Introduction

The impact of gastrointestinal parasites on animal health and performance of infected animals is cause of important economic losses [Sanna et al., 2016; Álvarez et al., 2002]. Gastro-

intestinal parasites are a widely-recognized problem in equine species [Papini et al., 2015]. Their control commonly relies on anthelmintics, however this strategy has become a subject of discussion because of the spread of anthelmintic resistance to the drugs [Shalaby, 2013].

During the last years, anthelmintic resistance has been increasingly important as a consequence of the broad use of the

main anthelmintic families [Heidi and Wade, 2009; Taylor et al., 2002]. Multi-drug resistance against the three major classes of anthelmintics has become a global phenomenon in gastrointestinal nematodes of farm animals suggesting the need for novel anthelmintic products [Smith et al., 2015; Molento et al., 2012; Várady et al., 2000]. For this reason, the use of unconventional therapies as an alternative to synthetic chemical substance has been searched for minimizing the problems caused by parasites [da Rocha et al., 2006]. In the recent years, homeopathy has become the focus of increasing interest and use as a complementary and alternative treatment for both human [Boehm et al., 2014; Mourão et al., 2014; Arora et al., 2013] and animal disease [Lopes et al., 2016; Orjales et al., 2016; Hektoen, 2005]. The use of homeopathy in veterinary medicine has been traditionally circumscribed to the pets, however in last years it has been widely extended to organic farms [Orjales et al., 2016]. The use of homeopathic medicines added to water, food or semen represents a potential zotechnical resource due to its advantages such as the absence of residues in milk and food and the lower financial costs [Orjales et al., 2016; Sato et al., 2012]. The aim of the present study was to evaluate the effect of homeopathic and allopathic treatments on gastrointestinal nematodes in horses naturally infected.

Materials and Methods

Animals and study design

All treatments, housing and animal care reported below were carried out in accordance with the standards recommended by the EU Directive 2010/63/EU for animal experiments.

Eighteen clinically healthy and regularly trained Standard-bred horses (8 males, 3 geldings, 7 females, mean age 6 ± 5 years; mean body weight 437 ± 15 kg) were used with the informed consent of the owners. Animals were stabled in individual boxes (3.5 x 3.5 m) at the same training centre located in Sicily, Italy ($38^{\circ}00'49''N$, $15^{\circ}25'18''E$, 80 m above sea level) under natural photoperiod (sunrise at 06.11 AM, sunset at 05.13 PM; mean temperature $23^{\circ}C$, relative humidity 70%). Horses were fed, twice a day (07.00 AM; 05.00 PM), a total food amount of about 2.5% of horse body weight (forage:concentrate ratio 70:30) and water was available ad libitum. No anthelmintic treatments were performed in selected animals in the six months before the trial. In this training center owners usually performed anthelmintic treatments once a year. All horses met the inclusion criterion of faecal egg count (FEC) ≥ 150 eggs per gram faeces (epg). The experiment was conducted as a blind, controlled, randomized assay. The horses were randomly divided into 3 equally groups. Group A was treated with ivermectin (Eqvalan®, os pasta Merial, $200 \mu g/kg$ of body weight); Group B (homeopathic group) received daily treatment with a homeopathic combination of Cina 9CH and Colocynthis 9CH (Dynavet CEMON srl, 2ml/animal/day for 15 days); and Group C (Control

Group) was treated with 7% hydroalcoholic solution (2ml/animal/day for 15 days), an inert vehicle used in homeopathic medications preparation. The homeopathic remedy Cina is prepared from *Artemisia cina* an herb called wormseed. The homeopathic remedy Colocynthis is prepared from the gourd or fruit of the plant *Citrullus colocynthis* called bitter apple. Directly after the first faecal sampling, the horses were treated with anthelmintic drugs (day 0). All horses were observed daily to record for any clinical signs of side-effects (e.g., sweating, mydriasis, colics) caused by the products. Body Condition Score (BCS) measurement was performed on each horse before (d0) and after the end of experimental period (d35). Body condition scoring was performed by the same operator using a 1 to 9 scale [Henneke et al., 1983].

Faecal sampling and laboratory analysis

The collection of faecal samples was carried out from each animal before (d0) and after 3 (d3), 7 (d7), 10 (d10), 13 (d13), 16 (d16), 20 (d20), 27 (d27), and 35 (d35) days the start of experimental period. Faecal samples were collected from each horse and stored at $5^{\circ}C$ in a cooler box until laboratory examination. The samples were processed within 24 h after faecal collection and examined by use of a modified McMaster procedure [Várady et al., 2000].

Statistical analysis

Faecal egg count reduction (FECR) tests were performed to evaluate the efficacy of ivermectin and homeopathic combination. Percentage reductions were calculated for each horse according to the recommendations of the World Association for the Advancement of Veterinary Parasitology [Pook et al., 2002] for estimation of anthelmintic efficacy using the following formula:

$$FECR\% = [1 - (\text{mean post-treatment epg} / \text{mean pre-treatment epg}) \times (\text{mean pre-treatment control epg} / \text{mean post-treatment control epg})] \times 100$$

Based on this, worms are considered resistant when $FECR < 90\%$, and arithmetic means are used in the calculations.

Two-way repeated measures analysis of variance (ANOVA) was applied to determine significant effects of treatment and time on BCS values. P values < 0.05 were considered statistically significant. Statistical analysis was performed using the STATISTICA software package (STATISTICA 7, Stat Software Inc., Tulsa, Oklahoma).

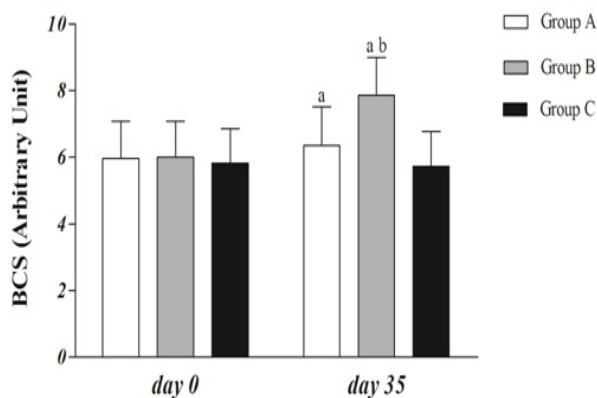
Results

All animals included in the study did not show clinical signs of side-effects (e.g., sweating, mydriasis, colics) caused by the treatments during the experimental period. Pre-treatment faecal egg count (FEC) for the selected animals ranged from 150 epg to 1600

epg. Pre- (d0) and post-treatment (d35) arithmetic mean strongyle egg counts and the resulting FECR for, homeopathic and ivermectin treatment are summarized in Table 1.

Experimental period		Groups		
		A	B	C
		Ivermectin	Homeopathic	Placebo
Mean fecal egg count (epg)	Pre-treatment (d0)	693.0±515.9	579.0±593.1	543.0±456.0
	Post-treatment (d3)	57.5±98.8	430.0±589.3	790.0±426.0
	Post-treatment (d7)	17.5±42.6	284.6±578.9	737.5±552.0
	Post-treatment (d10)	30.0±73.5	312.5±432.8	1197.5±423.0
	Post-treatment (d13)	40.0±90.82	287.5±674.6	839.1±478.0
	Post-treatment (d16)	8.3±20.4	237.5±438.4	970.8±521.0
	Post-treatment (d20)	20.1±42.1	260.0±389.7	789.1±626.0
	Post-treatment (d27)	17.5±42.9	375.0±452.1	689.5±542.0
	Post-treatment (d35)	6.0±13.4	389.6±420.5	735.0±635.4
Percentage Reduction (FECR %) (d35)		98.8	8.9	0

Table 1: Pre- and post-treatment arithmetic mean strongyle egg counts (± standard deviation) of all groups and the resulting FECR obtained in not homeopathic (Group A) and homeopathic (Group B) treatment.



Significance: (effect of time) ^a vs day 0
(effect of group) ^b Groups A and C

Figure 1: Mean ± standard deviation of body condition score (BCS) values recorded in allopathic (Group A), homeopathic (Group B) and control (Group C) groups before (day 0) and after (day 35) the end of experimental period.

Discussion

With increasing levels of parasite resistance to drug parasitology's have recommended changing parasite control regimens from the intensive interval-dose treatment regime into a more sustainable approach, which has a secondary goal of also preserving the effective lifespan of the drugs [Molento et al., 2012; Kaplan et al., 2004]. The development of new drugs has limitations because of the high costs and risks, therefore control alternatives has been searched for minimizing the problems caused by parasitic infection. The therapies based on homeopathy could be recommended although contradictory information are available in the current literature. The results of the present study showed an high efficacy of ivermectin treatment on nematode parasites, effectively Group A showed a FECR of 98.8%. The Group B, receiving homeopathic combination, showed a FECR lower than 10%. This finding agrees with a previous study reporting no statistically significant difference in sheep with natural and artificial infection by gastrointestinal nematodes treated with a homeopathic remedy based on Artemisia cina respect to animals receiving no treatment (Cabaret, 1996). However, in the present study homeopathic treatment with Cina 9CH and Colocynthis 9CH seem to alter the morphological aspect of parasite eggs compromising the final egg development. Although the mechanism involved cannot be explained, the homeopathic drug might be regarded as a solution endowed with water clusters and/or nanoparticulate structures capable of communicating some pharmacological information, through a resonance process, to biological fluids and to cell critical systems (Marzotto et al., 2014). The BCS values recorded in Group A showed an increasing trend respect to Control Group. In addition, Groups B showed higher BCS values compared to both Group A and group C suggesting a positive nutritional effect of used homeopathic treatment [Chagas et al., 2008].

In conclusion, the homeopathic treatment evaluated in the present study did not prove effective in controlling gastrointestinal nematodes, in the conditions that it was tested as demonstrated by the lack of FEC reduction. This could be linked to a non-individualized homeopathic treatment applied in this study. Normally, for medication selection, homeopaths made numerous observations of healthy animals. In fact, in homeopathic therapy should be used "constitutional" homeopathic medications that are prescribed according to the physical and behavioral characteristics of patients as an effective treatment approach in the clinical management of infections. Because of the efficacy of homeopathic remedies in veterinary medicine is largely unproven and quite controversial, a large-scale study is required to establish efficacy and safety profile of various homeopathy drugs in different parasitic infection of horse.

Conflict of interest statement

The authors disclaim any financial support or relationships that may pose conflict of interest.

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