Comparison of Pyrantel Tartrate (Strongid C) and Pyrantel Pamoate (3× Strongid) for the Control of Equine Tapeworms

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As measured by the number of tapeworm eggs per gram of feces, pyrantel tartrate, fed on a daily basis (Strongid C), was more effective in eliminating tapeworms than was 3× pyrantel pamoate (Strongid) administered at 8-week intervals. Horses treated with pyrantel tartrate had an egg count of zero tapeworms by 4 weeks following the initiation of treatment. Horses treated with 3× pyrantel pamoate continued to pass tapeworm eggs for 10 weeks following the initiation of treatment. © 1998 AAEP.

1. Introduction

While various species of tapeworms, including Anoplocephala perfoliata, Anoplocephala magna, and Paranoplocephala mamillana, are commonly found in the horse, to our knowledge no commercial parasiticides are labeled for the treatment of equine tapeworms. Consequently, treatment programs for these parasites are often speculative. Pyrantel pamoate at 13.2 mg/kg and 19.8 mg/kg (two and three times the recommended use level) has been reported to be effective against tapeworm infections. Daily treatment with pyrantel tartrate has also been investigated as a treatment for tapeworm infection in the horse. It has been suggested that the extensive use of ivermectin, a highly effective broad-spectrum anthelmintic that removes most intestinal parasites other than tapeworms, can increase the number of horses with heavy tapeworm infection by allowing the tapeworms to flourish. Subsequent research refuted the theory, as it found no significant differences either in the number of horses infected with tapeworms or in the degree of infection between horses treated routinely with ivermectin and those that received no anthelmintic treatment during the course of a 5-year period. However, the same research found that positive tapeworm counts of eggs per gram of feces (EPG) were recorded more frequently in ivermectin-treated horses than in horses that received no anthelmintic treatment. This may be a result of the difficulty in detecting tapeworm eggs when a large number of other parasite egg types are present in fecal samples.

Reports have been published that suggest an association between heavy tapeworm infections and the risk of ileocecal colic and intestinal intussusception in the horse. The purpose of our study was to obtain additional data on two treatment programs: the daily administration of pyrantel tartrate and pyrantel pamoate administered at 19.8 mg/kg (3×) at 8-week intervals. The latter has been reported to be efficacious in
reducing the number of tapeworm eggs in the feces of the horse.8

2. Materials and Methods

Twenty-four horses positive for tapeworm eggs were included in this study, which was conducted from October of 1995 through April of 1996. The horses ranged in age from 6 months to 30 years, and there were fillies, stallions, geldings, and both pregnant and open mares. All horses were maintained on pasture for the duration of the study.

Three treatment groups were included. A daily dose of pyrantel tartrate9 at 2.6 mg/kg was given for 26 weeks to horses in group 1. Group 2 horses received pyrantel pamoate9 at 19.8 mg/kg (3× the therapeutic dose rate) at 8-week intervals for the 26-week test period. Ivermectin9 at 200 µg/kg at 8-week intervals for 26 weeks was given to control horses in group 3.

Horses were assigned to treatment groups by a blind drawing. The first ten horses selected were assigned to group 1, and the second ten were assigned to group 2. The remaining four horses were to be assigned to the control group (group 3); however, it was decided that one of the control group horses, a 30-year-old broodmare, should receive a tapeworm treatment. This mare was added to group 2, the 3× pyrantel pamoate group. Group 2 then contained 11 horses, and the control group contained three horses.

To ensure that the 24 test horses had essentially the same parasite infections, that is, tapeworms only, at the start of the study, all horses in the three treatment groups received ivermectin at 200 µg/kg on the first treatment day. For horses in group 1, the administration of ivermectin also satisfied the manufacturer’s recommendation that a larvicidal anthelmintic be given prior to the start of daily pyrantel tartrate treatments. Group 3 control horses continued to receive ivermectin at 8-week intervals to eliminate the majority of intestinal parasites other than tapeworms; this practice was implemented to facilitate isolation and identification of tapeworm eggs in this treatment group.

To establish that test horses harbored tapeworm eggs, pretrial EPG levels were determined on all horses prior to their assignment to treatment groups. EPG levels were determined by using a modified Cornell–Wisconsin centrifugal flotation (sodium nitrate) technique9 and 5 g of feces. After the initiation of treatment, EPG assays were made at 2-week intervals throughout the 26 weeks of the study. Fecal samples obtained on treatment dates for groups 2 and 3 were collected prior to the administration of pyrantel pamoate or ivermectin.

The weight of each horse was recorded prior to the initial treatment and then at 8-week intervals for dose-calculation purposes. Weights were determined by using either a large-animal scale or a weight calculation of heart girth and body length \([\text{girth}^2 \times \text{length}]/330 + 50\). Efforts were made to ensure that each horse received the appropriate dosage of each treatment, and that no underdosing occurred.

Data from this experiment were analyzed by an analysis of variance and appropriate repeated measures analyses by using the mixed models procedures of SAS.9 Following the allocation of animals into three treatment groups, an analysis of variance was conducted to compare pretrial EPG’s for each group to determine whether statistically significant differences existed at \(p > 0.05\). Significant differences among the three treatment groups in the percentage of horses passing tapeworm eggs following the initiation of treatment were determined by using data from an analysis of repeated measures.

3. Results

Tapeworm eggs were detected in all 24 horses in a pretrial EPG assay made prior to the initiation of the first treatment. Only strongyle and tapeworm eggs were found in the pretrial assays. A statistical analysis of pretrial EPG counts revealed no significant (\(p = 0.05\)) differences among the three treatment groups for either tapeworm or strongyle EPG levels.

At each of the sample collection dates from week 2 through week 26, one to three (33.3–100%) of the horses in the control group had positive tapeworm EPG counts, substantiating continuous tapeworm infection in group 3 controls that were treated with ivermectin (Table 1). The percentage of horses with positive tapeworm EPG counts from week 2 through week 26 was significantly (\(p = 0.0001\)) greater in the control group than in groups 1 and 2.

At week 2 following the first 3× pyrantel pamoate treatment, no tapeworm eggs were detected in fecal samples from any of the 11 horses in group 2. However, at week 4 following the first treatment, two of the 11 horses (18.2%) had positive EPG counts. At 6 weeks following treatment, one of 11 horses (9.1%) had a positive tapeworm EPG count, and at 8

<table>
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<th>Treatment Group</th>
<th>Week Number</th>
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<tr>
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*The counts were at 2-week intervals over a 26-week period of study.*
weeks following treatment, two of 11 horses had one (18.2%). At week 10, 2 weeks after the second 3×
pyrantel pamoate treatment, one of 11 horses (9.1%) had a positive tapeworm EPG count. At weeks
12–26, no tapeworm eggs were detected in samples from group 2 horses (Table 1).

At week 2 following the initiation of daily treat-
ment with pyrantel tartrate, one of ten horses (10.0%) in group 1 had a positive tapeworm EPG count. From week 4 through week 26, no tapeworm eggs were detected in any of the ten horses in group 1 (Table 1).

Both treatment with 3× pyrantel pamoate at 8-week intervals and daily treatment with 2.6 mg/kg pyrantel tartrate significantly \((p = 0.0001)\) reduced the percentage of horses with positive tapeworm EPG counts. At test weeks 2–26, there was no significant difference between treatment with pyran-
tel tartrate and that with pyrantel pamoate in the reduction of the percentage of horses with tapeworm eggs. Actual percentages of horses positive for tape-
worm eggs following treatment with pyrantel tartrate, pyrantel pamoate, and ivermectin are presented graphically in Fig. 1.

4. Discussion

While the normal use level reduced the number of tape-
worm eggs to zero in 100% of the horses at 2 weeks after treatment, tapeworm eggs reappeared in 9.1–18.2% of the same horses at 4–8 weeks following treatment. Moreover, at week 10, 2 weeks follow-
ing a second 3× dose of pyrantel pamoate, one horse continued to pass tapeworm eggs, indicating that a single 3× pyrantel pamoate treatment is less than 100% effective in treating tapeworm infection in all horses. By extension, it is unlikely that the often-
utilized 2× dosage of pyrantel pamoate would be an effective treatment for tapeworm infection. The current study also demonstrates the potential for error that exists in evaluating the efficacy of an anti-parasitic treatment solely on the basis of a single posttreatment EPG assay.

While the difference was not statistically signifi-
cant, the percentage of horses with positive tape-
worm EPG counts during the first 10 weeks of the study was smaller in the group receiving pyrantel tartrate daily than it was in the group receiving 3×
pyrantel pamoate at 8-week intervals. The effective-
ness of daily pyrantel tartrate treatment docu-
mented in this study appears to support previous research that demonstrated efficacy against tape-
worms in the horse.³

5. Conclusions

Although the number of tapeworm eggs detected in
the horse is usually low, averaging only a few EPG’s in most cases, these eggs are a source of pasture infection by way of the oribatid mite, which serves as an intermediate host. Even in the absence of infected horses, pastures can remain infective for several years as a result of the longevity of both the oribatid mite and cestode eggs.¹⁰ The reduction of the number of tapeworm eggs passed onto the pas-
ture is an important factor in controlling the parasite. Reducing the percentage of horses passing tapeworm eggs controls the buildup of infective forms on pas-
ture, which in turn reduces the potential for future
tapeworm infections. The use of daily pyrantel tartrate treatments can be a helpful tool in managing tapeworm infections in the horse.

References and Footnotes

aThis paper was previously published in the Journal of Equine Veterinary Science, 1988;18(2):125–129.
bStrongid C, Pfizer Animal Health, Inc., 812 Springdale Dr, Exton, PA 19341.
cStrongid P, Pfizer Animal Health, Inc., 812 Springdale Dr, Exton, PA 19341.
dEqvalan, Merck & Co., Inc., Rahway, NJ 07065-0912.