SURVEY ON ANTHELMINTIC EFFICACY OF FENBENDAZOLE AGAINST GASTROINTESTINAL PARASITES IN HORSES OF MARAGHEH CITY, IRAN

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ABSTRACT
The prevalence and anthelmintic efficacy of Fenbendazole against gastrointestinal parasites under field conditions in Maragheh city, Iran was studied in 100 horses. The overall prevalence of gastrointestinal parasites was 65%, including Strongylus spp. (52%), Oxyuris equi (8%), Parascaris equorum (5%) and mixed infection (4%). Among these naturally infected animals, 15 were selected. These horses were assigned to three groups on the basis of prevalent species of gastrointestinal parasites. Each group had five animals, comprising four treatment horses and a control horse. Fenbendazole was evaluated against these gastrointestinal parasites with a single shot at the dose rate of 15 ml/50kg body weight administered through Orally route which resulted in 97% reduction in faecal egg count after day 14 post-treatment. Non-treated horses remained positive for gastrointestinal parasites. No adverse reactions were observed during the experimental period. It was concluded that Fenbendazole is highly effective against gastrointestinal parasites in horses.

KEY WORDS: Gastrointestinal parasites, horses, efficacy, Fenbendazole, Maragheh, Iran.

INTRODUCTION
Over the years, technological improvement has replaced the use of the horse profoundly, especially in military operations. Horses which were once the mainstay of military
transportation have been replaced by automobiles and aircrafts. However, horses are still kept by many for ceremonies, sports and recreation while military authorities in many countries including Iran still maintain minimal capabilities to train and manage these animals in case of wars in unfavorable terrain or for military ceremonies (Wannas HY, 2012). The Iranian Defence Academy (IDA) is the only military institution in Iran set up with the mandate to train and produce graduate professional military officers for the Iranian Armed Forces. The institution still train and maintain horses for cadets training. For maximum performance of these horses to meet the training needs of cadets, there is the need to constantly monitor the health of these animals and to prevent parasite contamination of the environment. Parasitic diseases are the major obstacle in the growth and development of animal health. Incidence of clinical and sub-clinical diseases of horses can be minimized through controlling the gastrointestinal parasites (Sattar, 2003). There are various approaches to achieve this goal, but traditionally, control has relied on regular treatment with anthelmintic drugs (Meara and Mulcahy, 2002). Fenbendazole has potent antiparasitic activity (Echeverria et al., 2001). This compound has shown excellent antiparasitic activity against a wide range of gastrointestinal parasites of equines (Bennett, 1986). A variety of adverse reactions have been reported in horses after parentral administration of Fenbendazole at the recommended dose of 15 ml/50kg body weight (Leaning, 1983; Reed, 1983). These reactions have occurred in a small percentage of treated horses and the drug is now sold as a paste for oral administration. Fenbendazole at a dose rate of 15 ml/50kg body weight is currently used by many horse owners, who are claiming excellent results without any adverse sideeffects. The aim of the present study was to determine the prevalence of gastrointestinal parasites in horses in Maragheh city, Iran and to study the anthelmintic efficacy of Fenbendazole orally against gastrointestinal parasites.

MATERIALS AND METHODS

Animals: One hundred horses were studied for the prevalence of gastrointestinal parasites from Maragheh city, Iran. Intestinal contents were taken for counting and identifying species of gastrointestinal parasites. Infections were confirmed before the beginning of the treatment by direct smear and flotation technique. After treatment, experimental animals were penned by treatment groups until the end of the observational period.

Design of study: Fifteen horses positive for gastrointestinal parasites were randomly assigned to three groups based on the species of the prevalent gastrointestinal parasites i.e.
Strongylus spp. (group-I), Oxyuris equi (group-II) and Parascaris equorum (group-III). Each group had five horses, with four treatment and one control. Treatment groups of horses were administered a single shot of Fenbendazole 2.5% suspension (Iranian Damloran-Razak Company) at the dose rate of 15 ml/50kg body weight through orally route, while horses of control groups were kept untreated. Treated horses were observed for possible adverse reactions for 2 hours after administration. General body conditions of all treated animals were observed throughout the study period regarding to clinical signs i.e. soundness, irritation, depression, feed intake and faecal appearance. Faecal egg counts were performed for all animals on days 0, 3, 7 and 14 posttreatment.

Detection of parasites in faeces: Faecal samples of all horses were collected and analyzed by using McMaster technique (Soulsby, 1982). After that, parasites were identified on the basis of classifications described by Noda (1979), Georgi and Georgi (1990) and Lichtenfels et al. (1998).

Data analysis: Anthelmintic efficacy was calculated by the faecal egg count reduction (FECR) test (Coles et al., 1992) according to the following formula:

\[
\text{FECR} (%) = \frac{\text{Pre-treatment EPG} - \text{Post-treatment EPG} \times 100}{\text{Pre-treatment EPG}}
\]

RESULTS AND DISCUSSION

Prevalence of GIT parasites: Out of 100 horses, 65 animals were positive for the gastrointestinal parasitic infection, indicating that the prevalence was 65%. Species wise prevalence was 52, 8, 5 and 4% for Strongylus spp., Oxyuris equi, Parascaris equorum and mixed infection, respectively.

These results are in accordance with Hutchison and Mfitlidoze (1989), who reported that 80% horses in the Australian subcontinent were infected with gastrointestinal parasitism.

Faecal egg count reductions: All horses of the treatment groups were positive for GIT parasites with the mean eggs per gram (EPG) value on day zero was 1567.5. This decreased to 456.25, 115.25 and 21 on 3, 7 and 14 days post-treatment, respectively (Table 1). The efficacy of Fenbendazole at the dose rate of 15 ml/50kg body weight was 71.67, 93.32 and 98.86% on the day 3, 7 and 14 of treatment. However, all horses of the control groups were found positive for gastrointestinal parasitism, with mean EPG value of 1541.25 at the start of
trial that increased to 1610.5, 1727.75 and 1843.75 at day 3, 7 and 14 post-trial (Table 2). In this study, more than 97% reduction in faecal egg count was observed after 14 days of administering Fenbendazole orally. Trobert et al. (1982) reported that after treatment of six horses with Ivermectin products at 0.2 mg/kg body weight, neither Strongylus nor P. equorum eggs were found in the faecal samples on post-treatment day 7. Our findings did not coincide with these results because of the huge gastrointestinal parasitic burden just before the treatment. Our results agree with the findings of Itagaki et al. (1993) and Yoshihara et al. (1994), that a wide range of species of parasites were observed, with the exception of small Strongylus. The results are also comparable with the findings of Adquith and Kivipelto (1987). They treated 120 parasitic infected horses and ponies with Ivermectin at dose rate of 1ml/50 kg (0.2 mg/kg) body weight. The EPG count in treated animals was reduced to almost zero on day 14 post-medication. Dipietro et al. (1982) and Klei et al. (1993) reported the potent anthelmintic efficacy of Ivermectin against these parasites at dosage of 200μg/kg b.wt. In this regard, our study has confirmed that Fenbendazole has excellent anthelmintic efficacy against many species of GIT parasites.

Table 1: Efficacy of Fenbendazole against gastrointestinal parasites of horses.

<table>
<thead>
<tr>
<th>Parasite</th>
<th>Day 0</th>
<th>Day 3</th>
<th>Day 7</th>
<th>Day 14</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongylus</td>
<td>1870</td>
<td>470(74.82)</td>
<td>92(95.53)</td>
<td>16(99.25)</td>
</tr>
<tr>
<td>Oxyuris equi</td>
<td>935</td>
<td>290(70.22)</td>
<td>67(93.79)</td>
<td>13(99)</td>
</tr>
<tr>
<td>Parascaris equorum</td>
<td>785</td>
<td>295(65.29)</td>
<td>83(91.35)</td>
<td>21(98.02)</td>
</tr>
<tr>
<td>Strongylus + Oxyuris equi</td>
<td>2680</td>
<td>770(72.01)</td>
<td>219(92.42)</td>
<td>34(98.85)</td>
</tr>
<tr>
<td>Mean</td>
<td>1567.5</td>
<td>456.25(71.67)</td>
<td>115.25(93.32)</td>
<td>21(98.86)</td>
</tr>
</tbody>
</table>

Figures in parentheses indicate reduction (%) in EPG.

Table 2: Mean eggs per gram (EPG) of faeces in untreated group of horses.

<table>
<thead>
<tr>
<th>Parasite</th>
<th>Day 0</th>
<th>Day 3</th>
<th>Day 7</th>
<th>Day 14</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongylus</td>
<td>1750</td>
<td>1867</td>
<td>1980</td>
<td>2010</td>
</tr>
<tr>
<td>Oxyuris equi</td>
<td>911</td>
<td>974</td>
<td>1080</td>
<td>1301</td>
</tr>
<tr>
<td>Parascaris equorum</td>
<td>802</td>
<td>850</td>
<td>960</td>
<td>1063</td>
</tr>
<tr>
<td>Strongylus + Oxyuris equi</td>
<td>2702</td>
<td>2751</td>
<td>2891</td>
<td>3001</td>
</tr>
<tr>
<td>Mean</td>
<td>1541.25</td>
<td>1610.5(4.03)</td>
<td>1727.75(10.80)</td>
<td>1843.75(16.41)</td>
</tr>
</tbody>
</table>

Figures in parentheses indicate percent increase in EPG.
General clinical conditions
No abnormalities were observed in physical conditions such as soundness, appetite and faecal Appearance in any of the treated horse during 14 days post-treatment period. Davies et al. (2000) reported that animals medicated with Ivermectin showed no adverse effects, except a minor type of local reaction in the form of swelling at the site of injection, which subsided Within a short period after the injection. But no side effects was observed in our study after administrating Fenbendazole orally in any of the animal due to the use of Fenbendazole instead of Ivermectin.

CONCLUSION
This study showed that a single orally of Fenbendazole administered at dose rate of 15 ml/50kg body weight was highly effective against gastrointestinal parasites in horses.

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COMPETING INTERESTS
Authors have declared that no competing interests exist.

REFERENCES
