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The efficacy of 30% FENBENDAZOLE anthelmintic paste in cyathostominosis in horses

Eficacitatea pastei antihelmintice FENBENDAZOL 30% în ciatostominoza cabalinelor

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Abstract

Horse cyathostominosis is a large intestine helminthosis caused by parasites belonging to the family *Strongylidae*, subfamily *Cyathostominae*. The cyathostomins (small strongyles) represent a challenge for the parasitologists and animal owners due to the different ontogenesis, the high number of parasite species and their ability to develop anthelmintic resistance. The faeces were examined by flotation (Willis) method and the infestation level was determined by McMaster method in day 0, 7 and 14 post treatments. The product Vanbendazol (30% fenbendazole) had a 97.7% efficacy in the treated horses from Şofronea, Arad County, using the Faecal egg count reduction test (FECRT). Also were performed Presidente and Borgsteede relations and the anthelmintic efficacy was 98.2% for the both relations.

Rezumat

Ciatostominoza cabalinelor este o helmintoză a intestinului gros produsă de paraziți din familia *Strongylidae*, subfamilia *Cyathostominae*. Ciatostominele (strongili nemigratori) reprezintă o provocare atât pentru parazitologi cât și pentru proprietarii de animale datorită ontogenezei variabile, numărului mare de specii și al abilității lor de a dezvolta chimiorezistență. Fecalele au fost examinate prin metoda flotației (Wllis), iar în zilele 0, 7 și 14 post tratament a fost determinat nivelul infestației prin metoda McMaster. Eficacitatea produsului Vanbendazol (fenbendazol 30%) a fost de 97,7% în urma deparazitării cabalinelor din Șofronea, județul Arad, determinată prin testul reducerii numărului de ouă din fecale (FECRT). De asemenea a fost determinată și prin relațiile Presidente și Borgsteede, iar în ambele relații eficacitatea a fost de 98,2%.

Introduction

Cyathostomins are considered to be the most pathogenic group of strongyles in equids worldwide, due to decline of large strongyles *Strongylus* sp. [1, 4, 5, 7, 11, 12, 13].

Horse cyathostominosis is a large intestine helminthosis caused by parasites belonging to the family *Strongylidae*, subfamily *Cyathostominae*, which consist in 14 genera and 50 species.

The parasitized horses present clinical signs like: weight loss, colic, diarrhea, protein losing enteropathy and in severe infestation death.

The parasitosis can occur in horses either in grazing or in stables [3] causing a high morbidity and mortality in horses [5, 6].

The incorrect dosage and frequently administration of the same substance can lead to a anthelmintic resistance.

Benzimidazole resistance in cyathostomins is widespread [1, 2, 8, 9, 10, 15].

The aim of the study was to find out the efficacy of 30% Fenbendazol (FBZ) in the infestation with cyathostomins in horses.

Materials and methods

The study was performed from October 2013 to February 2014 in Şofronea, Arad County on 12 horses from different breeds (draft horse to light draft horse) with the age between 1 and 20 years old.

The horses come from households not farm, they were kept on pasture for the summer and in autumn-winter were kept in stables of 1-2 horses per household.

Some horses have presented clinical signe like: weight loss, despite normal appetite, apathy, dull hair coat, diarrhea.

From each horse fresh faeces samples were collected in plastic bags, labeled and carefully examined each sample.

The methods used for examination of the faeces samples were: Willis method (qualitative flotation method) and McMaster method (quantitative flotation method).

The parasite burden (EPG-eggs per gram of faeces) was calculated by McMaster method (Figure 1) before deworming in zero day and in seventh and 14th day post treatment.

Larval cultures were performed for the strongilid eggs differentiation, cyathostomines and/or large strongilids.

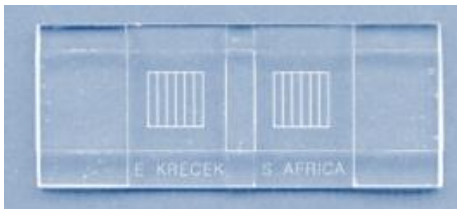

Figure 1. McMaster blade [16]

The horses examined were divided into two groups:

- group A (8 horses) was treated with 30% FBZ;
- group B (4 horses) the control group, was not treated.

Prior to the feeding or before taken out to grazing, in the morning, each horse was administered orally anthelmintic paste based on their weight. 1 ml anthelmintic paste contains 300 mg FBZ.

It was administered the recommended dosage: 10 mg FBZ / kg body weight.

Description of Vanbendazol (30% FBZ) according to the producer's prospectus [17].

Composition:

1 ml paste contains: Fenbendazole (methyl 5 - (phenylthio)- 2 –benzimidazole carbamate) 300 mg.

Excipients:

monopropilenglicol, carboxymethylcellulose, sodium benzoate, Purified Water

Description:

Vanbendazol acting on digestive and respiratory nematodes (of the digestive and respiratory) in all stages of parasite development (adults, larvae, pupae and eggs).

Indications:

The product contains a class endoparaziticid benzimidazoles which is active against gastrointestinal and lung nematode species (adults, larvae, eggs) that parasitize the horses.

It recommends preventive and curative treatment of nematodes products: *Strongylus vulgaris, S. equinus, S. edentatus, Trichonema* (*Cyathostomum*) *Paraascaris equorum, Strongyloides wester, Oxyuris equi*.

Dosage:

Vanbendazol is administered orally. The single dose is 10 mg fenbendazole/kg body weight, equivalent to 10 ml Vanbendazol administered to a horse of 300 kg. A 20 ml syringe provides the required dose for a 600 kg horse.

The syringe is inserted at the corner of the lips, then press the plunger. Due to its sweet taste of the drug, the animal will readily accept * veterinary advice, antiparasitic treatment may be extended up to 5 days.

Contraindications:

There are no known contraindications to use of the VANBENDAZOL, paste for horses.

Side effects:

The product is well tolerated in therapeutic doses. If you notice any serious effects or other effects not listed in this leaflet, please inform your veterinarian.

Withdrawal times:

Not applicable. Product is not intended for horses for human consumption.

The number of eggs per gram of feces (EPG) is calculated after the formula:

$$EPG = n \times 100 / 2$$

Where: n- number of eggs found in both chambers of the McMaster blade [2].

The anthelmintic efficacy (E%) of the product administered was calculated after the FECRT formula.

$$E\% = \frac{\text{EPG Pretreatment (0 day)} - \text{EPG 14th day post treatment}}{\text{EPG 0 day}} \times 100$$

The efficacy was also calculated after the two relations: Presidente (1985) and Borgsteede (1987):

$$\text{Presidente (\%)} = \left(1 - \frac{T2}{T1} \times \frac{C1}{C2}\right) \times 100$$

$$\text{Borgsteede (\%)} = \left(1 - \frac{T2}{T1} \times \frac{\text{Global mean of the subjects 0 day}}{\text{Control group mean 14th day}}\right) \times 100$$

Where:
T1, T2 - coproscopic mean in 0 day and in 14th day from the treated group;
C1, C2 - arithmetic mean in 0 day and in 14th day from control group.

Results and discussion

The clinical signs presented by horses: weight loss, apathy, dull hair coat and diarrhea have diminished in intensity after deworming with 30% FBZ. The strongilid eggs were identified by flotation method (Figure 2).

Fig. 2. Cyathostomins egg [16].

Only strongyle eggs were found through Willis method.

Is impossible to differentiate the cyathostomins eggs by large strongyle eggs by morphological criteria and for knowing which strongyles were found, larval cultures were performed.

The arrangements and the number of larvae intestinal cells were observed and counted.

All the larvae found were belonging to cyathostomins type.

The mean EPG found in 0 day pretreatment was 1310, in 7th post treatment was 50 and in the 14th day post treatment 30. The mean EPG from the control group was 1400.

The anthelmintic efficacy (E%) of the product administered after the:

- FECRT formula was 97.70%

$$E\% = \frac{1310-30}{1310} \times 100 = \frac{1280}{1310} \times 100 = 97.70\%$$

- Presidente relation was 98.20%

$$\text{Presidente (\%)} = \left(1 - \frac{30}{1310} \times \frac{1400}{1650}\right) \times 100 = 0.982 \times 100 = 98.20\%$$

- Borgsteede relation was 98.20%

$$\text{Borgsteede (\%)} = \left(1 - \frac{30}{1310} \times \frac{1355}{1650}\right) \times 100 = 0.982 \times 100 = 98.20\%$$

The mean EPG from control group was constantly increasing, in 7th day was 1500 and in 14th day 1650 and the health status of horses has been deteriorating continuously.

In a study conducted by Traversa et al., 2012, in France, was tested the efficacy of different anthelmintics [15].

Resistance to FBZ (7.5 mg/kg per os) was found on 17 of 18 farms investigated, with a 95% confidence interval (CI) of 38.5–71.2%.

Suspected resistance for pyrantel was found on 6 of 30 farms, and confirmed on another 3 of 30 farms, with 95% CI: 88.9–98.5%.

Reduced efficacy was found on: ivermectin was found in one animal on one farm and moxidectin in one animal on another farm. This reduced efficacy was combined with resistance against FBZ and/or pyrantel [15].

In Sweden a field study showed that 72% of the FBZ-treated groups met the criteria for resistance [10].

Benzimidazole resistance was also found in western Anatolia, Turkey on four of ten and seven of ten stud farms [2] and was also confirmed in an exhaustive study accomplished in Romania [1].

Similar studies were carried out also in Romania by Morariu et al., 2007, which

showed the effectiveness of FBZ against horse strongilids by 99.49% [14].

Prior to this study, the horses have been dewormed once per year or less, or never (1-2 years old horses) with ivermectin and/or FBZ. Probably for this reason the resistance against FBZ was not found in our study.

Conclusions

- The anthelmintic efficacy of the product 30% FENBENDAZOLE after the FECRT formula was 97.70%.
- After the Presidente and Borgsteede relations the efficacy of 30% FBZ had the same value for the both-97.80%.
- In the control group the mean EPG was constantly increasing and for this reason we recommend the deworming of the horses.
- The clinical signs in cyathostominosis were diminished in intensity after the deworming with 30% FENBENDAZOLE.

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