EVALUATION OF SOME BROAD SPECTRUM ANTIPARASITIC DRUGS AGAINST NATURAL STRONGYIE INFECTIONS IN HORSES

K. Saeed, Z. Qadir, S. A. Khan K. Ashraf and S. Nazir*

Department of Veterinary Parasitology, 'Department of Veterinary Pathology,
University of Veterinary & Animal Sciences, Lahore-54000 Pakistan.
*PCSIR Laboratories, Lahore.

ABSTRACT

Three anthelmintics Oxfendazole (Oxafex, Glaxo Wellcomc), Ivermectin (Ivomec, MSD) and Albendazole (Farbenda, Farvet) were evaluated against natural strongyle infections in horses. Forty horses naturally infected with strongyle infections were randomly divided into four equal groups A, B, C and D. Horses from group A, B, C were dosed with Oxafex, Ivomec and Farbenda according to manufacture's recommendation. Group D served as an un-medicated positive control. Faecal samples were collected on day zero (day of drug administration), day 14th (post medication) and day 28 (post medication). Egg counts per gram of faeces were determined by Modified McMaster technique. The efficacy of three drugs was evaluated by comparing percent reduction in faecal egg counts on day 14th and day 281h from day zero. The medicated groups were compared with each other and also with the control group. The efficacy of Oxafex, Ivomec and Farbenda was 94.7, 98 and 81% respectively on day l4-post medication. Their efficacy on day 28th post medication was 100%, 96% and 86%, respectively.

Key words. Horses, srongylosis, round worms, chemotherapy.

INTRODUCTION

Parasites are one of the greatest constraints and dilemma for managers and owners in successful horse rearing operations all over the world and Pakistan is not an exception. Horses carry a large variety of internal and external parasites that produce variable pathogenic effects on their hosts under different management conditions. Economically important gastrointestinal helminths of horses are nematodes (round worms) that include large and small strongyles, ascarids, threadwoms, hairworms, pinworms and tapeworms (Urquhart *et al*., 1996). Surveys conducted in various parts of the world have reported varied prevalence of these parasites under different management and climatic conditions (Chapman *et al*., 2003, Boxell, *et al*., 2004).

Strongylosis (strongyle infection) is the most common and devastating disease of horses throughout the world. Horses harbour many species of large and small strongyles and mixed infections (more than one species) are frequently encountered in the field. Major clinical signs include unthriftiness, anaemia, weight loss, colic and diarrhea (Urquhart *et al*., 1996). Horses may carry parasite burden of several hundred thousands and experience severe clinical symptoms with certain fatality if not treated (Herd, 1990, Love *et al*., 1999). Three chemically distinct groups of broad-spectrum anthelmintics are available and being employed for the control/treatment of strongylosis in horses for over 20 years (Love, 2003). Varied efficacies of these compounds are reported against different species and stages of the equine parasites (Colglazier, 1979, Singh *et al*., 2002, Konigova *et al*., 2003, Wirtherle *et al*., 2004, Kaplan *et al*., 2004). Efficacies of compounds lower than the expected limit indicate poor efficacy or the presence of drug resistance against these compounds and warrant discontinuation from the parasite control program. Drugs with < 90% of faecal egg count reduction (Herd and Coles, 1995) or a more conservative estimate of < 80% of faecal egg count reduction is indicative of resistance in treated horses. Drug resistance is common and has wide distribution for small strongyles as compared with large strongyles (Kaplan *et al*., 2004). A study was designed to evaluate the efficacy of three anthelmintics in naturally infected horses in this scenario of mixed species infections and reports of poor efficacy of certain drugs in various parts of the world (Herd and Coles, 1995, Love, 2003, Kaplan *et al*., 2004). It is expected that this study will help professionals in selecting more effective anthelmintic for parasite control programs for equine population especially in horses.

MATERIALS AND METHODS

Faecal samples from suspected horses were collected in polythene bags and shifted to Parasitology laboratory of University of Veterinary and Animal Sciences, Lahore in an icebox. Samples were screened for strongyle infections by modified McMaster technique (Sloss *et al*., 1994). This technique has the ability to detect 50 eggs per gram of faeces (epg) and 50 epgs was the cut off value for inclusion in the study. Forty animals

found positive for strongylosis were randomly divided into four groups A, B, C and D of 10 animals each. Faecal samples were collected on day zero (day of drugs administration), 14th and 28th day post medication. The drugs were administered according to manufacturer's recommendations. Group A was medicated with Oxfendazole (Oxafax suspension, Galaxo Welcome) at the dose rate of 1 ml /2.2 kg body weight orally. Group B was medicated with Ivermectin (Ivomec, MSD) at the dose rate of 1 ml / 50 kg body weight subcutaneously to each horse in the group. Animals in group C were administered with Albendazole (Farbenda 10%, Farvet) at the dose rate of 1ml /13 kg body weight orally. Group D served as a non medicated infected control group and horses of this group were examined on day 0, 14th and 28th as for medicated groups. The percentage efficacy of each drug was determined by faecal egg count reduction test by employing the following formula:

FECR (%) = (FECbt - FECat) X 100/ FECbt

FECbt and FECat stand for faecal egg counts before treatment, and egg counts after treatment respectively. Treatments were considered effective if faecal egg count reduction was> 90% and moderately effective if this faecal egg count reduction was < 90% but> 80%.

The data were subjected to oneway analysis of variance and statistical difference among the various groups was determined by least significant difference (LSD) test (Wayne, 1995). Analysis was accomplished by SPSS computer program. Presence of other parasitic ova were also recorded but were not considered in the final analysis.

RESULTS AND DISCUSSION

A greater proportion of sampled horses were found positive for various helminthes (65.51 %) and strongyle eggs were most commonly detected (58.5%). The groups were checked for homogeneity on day zero of the trial and no difference among the groups was detected (P> 0.5). The mean shedding of eggs on day 0 for group A, B, C, and D were 240, 245, 210, 250, respectively. The percent efficacy of oxafex, ivomec and farbenda on day 14 post medication as determined by feacal egg count reduction test was 94, 98 and 81 respectively. In Group A, three horses remained infected (30%) and seven horses became negative for strongyle eggs (70%).The average epg for the group was 15. One horse in group B (10%) and 2 horses in group C (20%) were found positive for strongyle eggs. The mean epg for these group0s was 5 and 40, respectively. All horse in the untreated infected control group remained infected throughout the study period and mean epg for the group was 250 pm day 14 of the trail. All three evaluated broad spectrum anthelmintics had significantly higher efficacy (P <0.05) against natural stronglyle infection in horses as compared with un-medicated control group. The difference among the treatment groups was non significant (P> 0.05). The result of the present study revealed that these broad spectrum anthelmintics are effective against natural strongylosis in horses. Similar findings have been reported by other workers (Nilsson and Klingborn, 1983, Kaplan *et al*., 2004).

The efficacy of farbenda was <90% against natural strongyle infection. The efficacy for oxafax reached 100% on day 28th post medication and no animal in group A was found excreting strongyle eggs. The efficacies for ivomec and farbenda were 96 and 86% respectively on day 28th post medication. One horse in groups B and C were found excreting strongyle type eggs and mean epg of 10 and 30 was recorded, respectively in these groups on day 28th post-medication. Statistical comparison between treatment group and non medicated group indicates a significant difference (P < 0.05) and these differences were non significant among the treatment groups (P > 0.05).

High efficacy of oxfendazole and ivermectin against natural strongylosis ,has been reported (Nilsson and Klingbom, 1983, Tolliver *et al*., 1993, Kaplan *et al*., 2004). Some researchers reported the low to poor efficacy by some members of benzimidazole group (Konigova *et al*, 2003, Wirtherle *et al*., 2004, Kaplan *et al*., 2004) in different horse farms found positive for strongle infections. The non-medicated infected control group remained positive throughout the study period and an increase in the average epg was recorded on day 28th post-medication. Mixed species infections (large and small strongyles) are commonly encountered in horses throughout the world and varied responses even with related compounds are reported against these parasites (Love, 2003, Wirtherle, *et al*., 2004, Kaplan *et al*., 2004). High; efficacy of albendazole was recorded in naturally infected horses and ponies (Mirek and van Meurs, 1982). Relatively low efficacy of farbenda (albendazole) as compared with oxafex and ivomec can be attributed to wide spread prevalence of anthelmintic resistance across the globe in different species of animals (Herd and Coles, 1995, Love, 2003). Prevalence of resistance is quite serious in horse operations with extensive use of same or related anthelmintic for year around without considering the epidemiology of equine parasites. Any antiparasitic compound with an efficacy of < 90% in reducing faecal egg counts should be discontinued and should not be reintroduced without evaluating its effectiveness (Herd and Coles, 1995).

Low average faecal egg counts were recorded in the medicated groups and a small proportion of horses (10%) were found excreting strongyle eggs on day 28th. This indicates a longer egg reappearance period (> 28 days) for majority of the treated horses (90%) and they remained negative for strongyle eggs on day 28 post

medication. Markedly lower strongyle egg output were recorded over a 10 week period for oxfendazole (Nilsson and Klingborn, 1983) and recommended it as a valuable anthelmintic for control of strongylosis in horses. Strongyle egg reappearance period of > 4 weeks was observed for oxafax, ivermectin and farbenda and significantly reduced the faecal egg counts in treated animals as compared with non treated infected horses. Reduced egg shedding will ultimately result in lowered pasture contamination but for a limited period. A longer egg reappearance period for some anthelmintics has led to an interval based treatment (6-8 weeks) regimen for horses throughout the year (Drudge and Lyons, 1966). This interval based treatment system reduces the strongyle egg counts for four weeks but a small increase at six and much greater increase at eight week intervals (Herd, 1990). Treatment intervals of more than 6 weeks are long enough to causes heavy pasture contamination and greater risk of re-infection. Chemical based control strategies will only result in a transient loss of parasites or suppression of egg shedding and treated animals will be re-infected. It is recommended that integrated parasite control strategy that includes an understanding of the epidemiology of equine parasites along with pasture management should be applied to overcome the problems associated with anthelmintics (Herd and Coles, 1995).

It may be concluded that oxafax, ivomec and farbenda are effective in reducing strongyle eggs from naturally infected horses. Farbenda should be used cautiously in horses so that the development of strong resistance against it and the other related compounds can be avoided. It is recommended that all anthelmintics need to be evaluated regularly (at least .annually) by quantitative faecal examination technique so that drug resistance can be detected at an earlier stage.

REFERENCES

Boxell, A. S., K. T. Gibson, R. P. Hobbs and R. C. A. Thompson, (2004). Occurrence of gastrointestinal parasites in horses in metropolitan PC11h, Western Australia. Aust. Vet. J., 82: 91 - 95.

Chapman, M. R., D. D. French and T. R. Klei, (2002). Gastrointestinal hefminths of ponies in Louisiana: a comparison of species currently prevalent with those present 20 years ago. J. Parasito., 88: 1130 - 1134.

Colglazier, W., (1979). Critical anthelmintics trials in ponies with oxfendazole and caviphos and concomitant studies on the spontaneous elimination of small strongylids. Am. J. Vet. Res. 40: 384 - 6.

Drudg, J. H. and E. T. Lyons, (1966). Control of internal parasites of horse. J. Am. Vet. Med. Assoc. 148: 378 - 383.

Herd, R. P. (1990). Equine parasite control- solutions to anthelmintic associated problems Eq. Vet. Edu. 2: 86 - 91.

Herd, R. P. and G. C. Coles, (1995). Slowing the spread of anthelmintic resistant nematodes of horses in the United Kingdom. Vet. Rec. 136: 481 - 485.

Kaplan, R. M., T. R. Klei, E. I. Lyons, G., Lester, C. H. Courtney, D. D. French, S. C. Tolliver, A. N. Vidyashankar, and Y. Zhao, (2004). Prevalence of anthelmintics resistant cyathostomes on horse farms. J. Ame. Vet. Med. Assc., 225: 903 - 910.

Konigova, A., M. Varady, and J. Corba, (2003). Comparison of in vitro methods and feccal egg count reduction test for the detection of benzimidazole resistance in small strongyles of horses. Vet. Res. Communications, 27: 281 - 288.

Love, S., D. Murphy and D. Mellor, (1999). Pathogenicity of cyathostome infection. Vet. Parasitol. 85:113 - 122.

Love, S., (2003). Treatment and prevention of intestinal parasite- associated disease. Vet. Clin. Equine 19: 791 - 806.

Mirck, M. H and G. K. van Meurs, (1982). Effect of albendazole and cambendazole on the egg output of strongylidae in horses. Tijdschr Oiergeneeskd, 107: 731 - 736.

Nilsson, O and B. Klingborn, (1983). Studies on the strongyle egg output of horses after treatment with oxfendazole (synthetic vet. Syntax). Nord Vet Med. 35: 69 - 73.

Sloss, M. W., R. L. Kemp and A. M. Zajac, (1994). Veterinary Clinical Parasitology. 6th ed. Iowa State University Press, USA. pp. 1 - 16.

Tolliver, S. C., E. T. Lyons, J. H. Drudge, S. Stamper, and D. E. Granstrom. (1993). Critical tests of thiabendazole, oxibendazole and oxfendazole for drug resistance of population B equine small strongy1es (1989 - 1990) Am. J. Vet. Res., 54: 908-913.

Urqhart, G. M., 1. Armour, 1. L. Duncan, A. M. Dunn: and F. W. Jennings, (1996). Veterinary Parasitology, 2nd edition, pp 196. Blackwell Science Ltd, Blackwell Publishing Company, Oxford, UK. Pp. 1- 138.

Xyne, W. D., (1995). Biostatistics: A Foundation for Analysis in the Health Sciences, Ed. John Wiley & Sons INC. NJ., USA.pp: 383 - 387.

Wirtherle. N., T. Schinieder, and G. von Samson-Himme1stjema, (2004). Prevalence of benzimidazole resistance on horse farms in Germany. Vet. Rec. 154: 39- 41.