



Short Communication

A Survey on horse Cryptosporidial Infection in Tehran Province

Mirian*¹, S.J., Asadi², M.R., Ferdowsi², H.R. Rezakhani², A.H.

1. Tehran Agricultural Research Center, Tehran, Iran

2. Institute of Scientific-Applied Higher Education, Tehran, Iran

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ABSTRACT

To investigate the prevalence of *Cryptosporidium* infection in horses, a total of 200 fecal specimens were collected randomly from five farms in Tehran. Samples were taken during a year, 50 specimens each season. Of these specimens, 57 were obtained from Caspian Pony. The presence of oocysts in the samples was confirmed by modified Ziehl-Neelsen staining of direct smears of the fecal material from each horse. The results show a significant relationship between infection and season, so that the most infected cases were seen in summer. According to the results, the highest parasite activity is seen in warm weather, so care must be taken to prevent its transmission to human.

Keywords: Cryptosporidiosis, Horse, Tehran

INTRODUCTION

Cryptosporidiosis basically is a gastrointestinal infection caused by the coccidian protozoa called *Cryptosporidium* (Chacin-Bonilla 1995). *Cryptosporidium* is also able to infect the respiratory tracts of many vertebrate species. Of the eight valid species (Fayer 1997), *C. parvum* has the broadest host range and this species is infectious for more than 80 species of mammals (O'Donoghue 1995). Cryptosporidiosis has been detected in dogs, cats, and horses and these animals may represent an important reservoir of infection for humans. It is also an important Public Health problem. This is of

particular importance to high risk populations, such as children, the elderly and those with weakened immune systems. Cryptosporidiosis in horses was initially described in 5 immuno-deficient Arabian foals. Subsequently, however, cryptosporidiosis has been reported in immuno-competent horses worldwide (Santin & Trout 2007). *Cryptosporidium* causes acute or asymptomatic self-limiting infection in adult animals and immune-competent humans, but in young livestock, particularly ruminants, as well as in immune-compromised humans, the infection may often be fatal. In comparison to epidemiological data for bovine and human cryptosporidial infection there is scant information concerning equine *Cryptosporidium* infection (Fayer 1997). The major clinical sign of

*Author for correspondence. E-mail: mirian1346@yahoo.com

Cryptosporidiosis in foals is diarrhea, but most Cryptosporidium infections in adult horses are asymptomatic (Santin & Trout 2007). Infection in horses is limited to the small intestine. Gross lesions may consist of hyperemic intestinal mucosa and yellowish intestinal contents (Aiello 2005). Though equine cryptosporidiosis has been reported in various regions of the world (Olson *et al* 1997, Santin & Trout 2007) and has been connected with diarrhea and morbidity in foals, there are contradictory data on this subject and some aspects of the infection remain unclear (Olson *et al* 1997).

MATERIALS AND METHODS

To investigate the prevalence of cryptosporidial infection in horses, a total of 200 fecal specimens were collected randomly from five farms in the North and North-East region of Tehran province. Horses were maintained almost under the same housing and feeding situation and were taken to pasture during spring and summer. All of the horses were 3-7 years old. Samples were taken from different clinically healthy breeds, during April 2002 and March 2003, 50 specimens each season (ten samples from each farm). Five grams of fresh, formed stool was collected from each horse. Each fecal sample was placed in a 10% neutral buffered formalin solution in a 1:3 stool/formalin ratio and refrigerated (Cole *et al* 1999). The presence of oocysts in the samples was confirmed by modified Ziehl-Neelsen staining of direct smears of the fecal material from each horse (Anonymous 1991). Stained slides of each fecal sample were evaluated at magnification of $\times 1000$ (Cole *et al* 1999). ANOVA (Analysis of variance) and F test were used for analyzing statistical association between the data results.

RESULTS

Results of the microscopic investigation for Cryptosporidium in each season are shown in figure

1. The overall infection rate of horses was 25%. The infection rates in spring, summer, autumn and winter were 25%, 50%, 7% and 3%, respectively.

Table 1. Data obtained from Islamic Republic of IRAN Metrological Organization during April 2002 and March 2003.

	Spring	Summer	Autumn	Winter
Mean temperature (°c)	22	30.2	13.7	8.1
Relative Humidity (%)	34.3	24.3	48	52.7
Amount of Precipitation (mm)	115.8	3.6	108	122.1

Based on ANOVA and F test, difference among infection rates in seasons was significant ($p < 0.01$), with the highest infection rate in summer and the lowest infection rate in winter.

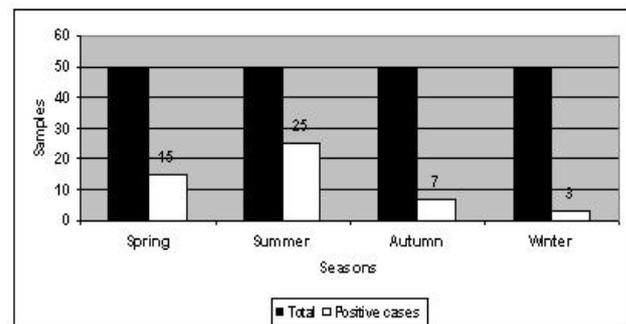


Figure 1. Cryptosporidial infection rates in different seasons

DISCUSSION

In the present study, infection rates among seasons were significantly different. According to the results, the highest and the lowest infection rates were seen in summer (50%) and winter (6%), respectively (Figure 1). It seems that it can be due to the highest and lowest temperature, respectively in the summer (30.2°C) and winter (8.1°C). As well, the highest infection rate was occurred grossly in spring and summer, when horses were taken to pasture after the spring rainfall (Table 1). Seasonal or temporal trends in increased incidence of

cryptosporidiosis vary from country to country. These trends in urban and rural areas may reflect direct zoonotic contact and indirect effects of rainfall, farming events such as lambing, calving, and environmental pollution with farm waste (Fayer 1997). During a two-year study in India, highest prevalence of cryptosporidiosis in bovine was recorded in rainy season followed by summer and winter ($P < 0.01$) (Seuli *et al* 2006). *Cryptosporidium* oocysts were observed in the stools of 9 of 124 Italian children with diarrhea, examined in 1984. All cases occurred in the warm season (Caprioli *et al* 1989). In our study, the overall cryptosporidial infection rate in the horses was higher compared to that reported by authors from Germany and some regions of the U.S.A. (Texas and Colorado) which ranged from 0.33–3% (Cole *et al* 1998 and Forde *et al* 1998), but lower compared to that reported by authors from Canada and other localities of the U.S.A. (Louisiana, Colorado and Texas) which ranged up to 100% (Coleman *et al* 1989, Olson *et al* 1997, Xiao & Herd 1994). It can be concluded that different climatic conditions can affect the prevalence of cryptosporidiosis in horses. Vaccines are not available for cryptosporidiosis in human and the control and prevention of the infection is limited because of the environmentally resistant oocysts and the ignorance of all its possible transmission routes (Chacin-Bonilla 1995). According to the results, the highest parasite activity is seen in warm weather, so veterinarians and the people with close contact to horses need to be aware of zoonotic potential of *Cryptosporidium*.

References

- Aiello, S.E. (2005). The Merck Veterinary Manual. (9th edn.). P: 145. The Merck Publication Group.
- Anonymous. (1991). In: *Basic laboratory methods in medical parasitology*. WHO, Geneva p: 114.
- Caprioli, A., Gentile, G., Baldassarri, L., Bisicchiam, R., Romoli, E. and Donelli, G. (1989). *Cryptosporidium* as a common cause of child-hood diarrhoea in Italy. *Epidemiology Infection* 102(3): 537-540.
- Chacin-Bonilla, L. (1995). Cryptosporidiosis in human. *Investigacion Clinica* 36(4): 207-250.
- Cole, D.J., Cohen, N.D., Snowden, K. and Smith, R. (1998). Prevalence of and risk factors for fecal shedding of *Cryptosporidium parvum* oocysts in horses. *J Am Vet Med Assoc*, 213: 1296-1302.
- Cole, D.J., Snowden, K., Cohen, N.D. and Smith, R. (1999). Detection of *Cryptosporidium parvum* in horses. *Journal of clinical microbiology* 37(2): 457–460.
- Coleman, S.U., Keli, T.R., French, D.D., Chapman, M.R. and Corstvet, R.E. (1989). Prevalence of *Cryptosporidium* sp. in equids in Louisiana. *American Journal of Veterinary Research* 50: 575-577.
- Fayer, R. (1997). *Cryptosporidium* and Cryptosporidiosis. Pp: 1–41. Boca Raton, CRC Press.
- Forde, K.N., Swinker, A.M., Traub-Dargatz, J.L. and Cheney, J.M. (1998). The prevalence of *Cryptosporidium/Giardia* in trail horse population utilizing public lands in Colorado. *J Equine Vet Sci* 18: 38-40.
- O'Donoghue, P.J. (1995). *Cryptosporidium* and cryptosporidiosis in man and animals. *International Journal for Parasitology* 25: 139-195.
- Olson M.E., Thorlakson C.L., Deselliers L., Morck D.W. and McAllister T.A. (1997). *Giardia* and *Cryptosporidium* in Canadian farm animals. *Vet Parasitol* 68: 375-381.
- Santin, M. and Trout, J.M. (2007). Cryptosporidiosis of companion animals. In: Fayer, R. and Xiao, L. *Cryptosporidium and Cryptosporidiosis*. (2nd edn.). Pp: 437–449. Boca Raton. CRC Press.
- Seuli, S.R., Samar, S., Subhasis, B., Kumar, P.A. and Pradeep, D. (2006). Observations on the epidemiology of bovine cryptosporidiosis in India. *Veterinary parasitology*. 141(3-4): 330-333.
- Xiao, L. and Herd, R.P. (1994). Epidemiology of equine *Cryptosporidium* and *Giardia* infections. *Equine Vet. J.* 26:14-17.