

Prevalence of Cryptosporidial Infection in Horse and Man in Mashhad, Iran

Short Communication

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Received 17 Des 2001; accepted 23 Jul 2002

Summary

The prevalence of cryptosporidial infection in human and horse has been determined in Mashhad. The cryptosporidium spp. oocysts from horse and human fecal samples were floated and concentrated by Sheather's sugar flotation technique and were stained by the modified Ziehl-Neelsen procedure. Out of 300 horse samples, 26.66% were infected. We could not find any significant differences between the rates of equine cryptosporidiosis in cold and warm seasons, and between different sexes. In human, cryptosporidial infection was diagnosed only in persons (3 out of a total of 120) who were in contact to animals. Our results also indicate that more likely infection would primarily occur in animal, and human would be a secondary host for cryptosporidium.

Key words: cryptosporidiosis, human, horse, prevalence, Iran

Introduction

Cryptosporidium infections associated with diarrhea are common in man and animals (Dubey *et al* 1990). Both anthroponotic and zoonotic cycles have been documented in the life cycle of this parasite (Olson *et al* 1997, Ong *et al* 1999). The first case of cryptosporidium infection in a human was described in 1976 in a previously healthy 3-year old child from a farm community in rural Tennessee (Nime *et al* 1976). There have been recent reports of human outbreaks of

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cryptosporidiosis through contaminated potable and recreational water and food (Fricker & Crabb 1998). Two reports illustrate the rate of human cryptosporidiosis in different parts of Iran as 1.2% of adults with diarrhea in Mashhad (Sardari & Noori 1990) and 0.64% of adults with diarrhea and 0.23% of adults without diarrhea in Ahwaz (Fathi & Noori 1990). Equine clinical cryptosporidiosis in horses was first reported in immunodeficient Arabian foals in the United States (Snyder *et al* 1978). In Iran, one report indicates the rate of equine cryptosporidiosis as 8% in the region of Miandoab (Davoodi & Noori 2000). Due to the importance of the clinical forms of cryptosporidiosis and its zoonotic potential, we studied the rate of the prevalence of cryptosporidium spp. infection in horses and man in suburbs of Mashhad in Iran.

Materials and Methods

The fecal samples of horse and human were collected from eight stud farms situated within 20 km from Mashhad. About 10 g of feces was collected from each horse directly from the rectum in a wide mouth plastic container. In case of man, the sterile glass containers were used for sample collection. Immediately after collection, the samples were floated, concentrated, and stained as previously described. For floating and concentrating of cryptosporidium oocysts, the Sheather's sugar flotation technique (Current *et al* 1983) was used. Briefly, a heavy suspension of the feces was made in physiological saline and strained through gauze into a centrifuge tube to one half full. An equal volume of Sheather's sugar solution was added to bring the surface of the liquid slightly above the top of the test tube. The suspension was then gently mixed with an applicator stick. A cover slip was placed on the surface of the suspension and was allowed to stand undisturbed for 45 min. The cover slip was then removed and mounted on a glass slide and examined under binocular microscope. The cryptosporidium oocysts were stained using the modified Ziehl-Neelsen procedure (Henriksen & Pohlenz 1981). Samples with the presence of oocysts were considered positive (Figures 1 and 2). The data were analyzed using

Yates' corrected chi-square (contingency table) test and considered "significantly different", when P was less than 0.05.

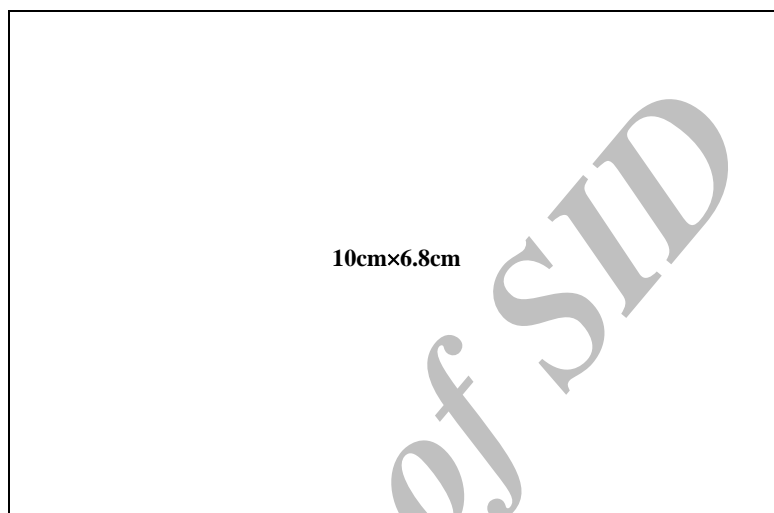


Figure 1. Oocysts of *cryptosporidium* spp. from equine fecal samples stained using the modified Ziehl-Neelsen procedure

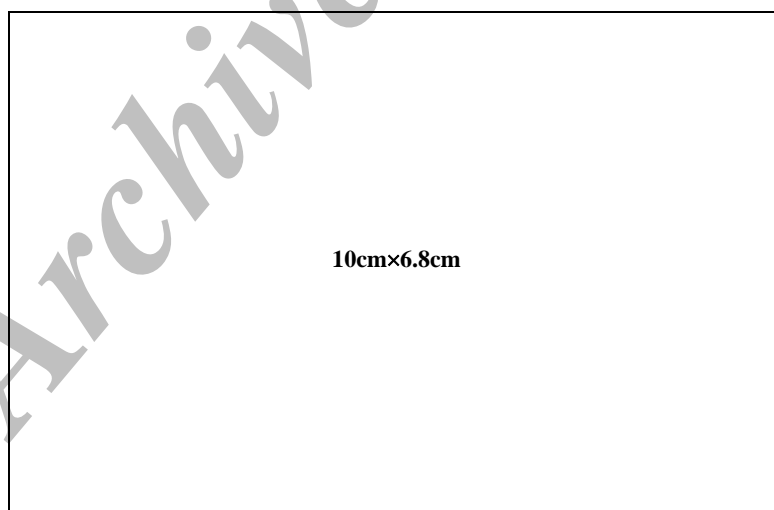


Figure 2. Oocysts of *cryptosporidium* spp. from human fecal samples stained using the modified Ziehl-Neelsen procedure

Results and Discussion

A total of 300 fecal samples was collected from horses and studied for the presence of cryptosporidium oocysts. Of the total of 300 equine fecal samples, eighty (26.66%) contained cryptosporidium oocysts (Table 1), which is higher than previous report (Davoodi & Noori 2000) and more closer to the rate of equine cryptosporidiosis which is reported from Canadian farms (Olson *et al* 1997). From 75, 115, 60, and 50 samples that were collected in spring, summer, autumn and winter, the infection percentages were 24, 34.75, 20, and 20, respectively. However, there was no significant difference in the rates of infection between cold (autumn and winter) and warm (spring and summer) seasons (P Yates=0.0641). Likewise, there was not any significant difference in the rates of infection between mares and stallions (P Yates=0.6427). A total of 120 stool samples were also collected from human (60 samples were from animal handlers). The cryptosporidial infection was detected only in 3 (5%) persons, who all either themselves or their family members were animal handlers (Table 1). This rate of infection is much higher than the rate of human cryptosporidiosis, which has been reported before (as 1.2%) in Mashhad (Sardari & Noori 1990).

Table 1. Prevalence of cryptosporidium spp. infection in horse and human

	Horse						Human	
	Sex		Season				Animal handler	Non-animal handler
	Male	Female	Spring	Summer	Autumn	Winter		
Positive	42	38	18	40	12	10	3	0
Negative	124	96	57	75	48	40	57	0
Total	166	134	75	115	60	50	60	60

Since we could not find any infection in people who were not in contact to animals, perhaps the previously reported rate would have been from a population of

persons who were and were not in contact with animals. This indicates that the zoonotic potential of cryptosporidial infection might be important only in animal handlers or people who are in contact in animals. However in our study, the statistical analysis showed no significant difference between the rates of infection in persons who were and were not in contact with animals (P Yates=0.2422). We also analyzed the rates of infection between horses and humans (animal handlers) and found a significant difference (P Yates =0.0005), indicating that infection might occur primarily in animals (horses) than humans.

References

- Chattopadhyay, U.K., Chowdhury, D., Dasgupta, C.K. and Pramanik, A.K. (2000). Prevalence of cryptosporidiosis in man and animals in and around Calcutta. *Journal of Veterinary Parasitology* 14:167-168.
- Current, W.L., Reese, N.C., Ernest, J.V., Bailey, W.S., Heyman, M.B. and Weinstein, W.M. (1983). Human cryptosporidiosis in immunocompetent and immunodeficient persons. Studies of an outbreak and experimental transmission. *New England Journal of Medicine* 308:1252-1257.
- Davoodi, Y., Noori, M. (2000). Horse as a source of cryptosporidial infection for human. *The 4th national congress of zoonoses*. Pp:240.
- Dubey, J.P., Speer, C.A. and Fayer, R. (1990). *Cryptosporidiosis of man and animals*. CRC Press.
- Fathi, B., Noori, M. (1990). Study of human and animal cryptosporidial infections in Ahwaz. DVM Thesis, University of Urmia.
- Fricke, C.R., Crabb, J.H. (1998). Water-borne cryptosporidiosis: detection methods and treatment options. *Advances in Parasitology* 40:241-278.
- Henriksen, S.A., Pohlenz, J.F. (1981). Staining of cryptosporidia by a modified Ziehl-Neelsen technique. *Acta Veterinaria Scandinavica* 22:594-596.

Majewska, A.C., Werner, A., Sulima, P. and Luty, T. (1999). Survey on equine cryptosporidiosis in Poland and the possibility of zoonotic transmission. *Annals of Agricultural and Environmental Medicine* 6:161-165.

Nime, F.A., Burek, J.D., Page, D.L., Holscher, M.A. and Yardley, J.H. (1976). Acute enterocolitis in a human being infected with the protozoan *Cryptosporidium*. *Gastroenterology* 70:592-598.

O'Donoghue, P.J. (1995). *Cryptosporidium* and cryptosporidiosis in man and animals. *International Journal of 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. *Veterinary Parasitology* 68:375-381.

Ong, C.S., Eisler, D.L., Goh, S.H., Tomblin, J., Awad-El-Kariem, F.M., Beard, C.B., Xiao, L., Sulaiman, I., Lal, A., Fyfe, M., King, A., Bowie, W.R. and Isaac-Renton, J.L. (1999). Molecular epidemiology of cryptosporidiosis outbreaks and transmission in British Columbia, Canada. *The American Journal of Tropical Medicine and Hygiene* 61:63-69.

Sardari, K., Noori, M. (1990). Study of animal and human cryptosporidiosis with and without clinical signs in Mashhad. DVM Thesis, Urmia University.

Snyder, S.P., England, J.J. and McChesney, A.E. (1978). Cryptosporidiosis in immunodeficient Arabian foals. *Veterinary Pathology* 15:12-17