

# CRYPTOSPORIDIOSIS IN SIRIRAJ HOSPITAL, BANGKOK, THAILAND

VISANU THAMLIKITKUL, MAYURATANA TEPMONGKOL,\* CHOOMANEE LAMOM,\*  
SOMPONG SRIPOCHANG,\* WAREE RUNGNAPAWATE\* and TONGDEE SUVAJEEJARUN\*

Department of Medicine, Faculty of Medicine, Siriraj Hospital, \*Department of Parasitology,  
Faculty of Medical Technology, Mahidol University, Bangkok, Thailand.

## INTRODUCTION

Cryptosporidiosis is a diarrhoeal disease caused by a coccidian protozoan parasite, *Cryptosporidium* spp. Human cryptosporidiosis was first reported in 1976 from microscopic examination of intestinal biopsy (Nime *et al.*, 1976). Garcia *et al.*, (1983) found that modified acid fast stain was an excellent method to identify *Cryptosporidium* oocysts in stool samples, and this method has been accepted as the best to diagnose cryptosporidiosis in humans although its sensitivity and specificity has not been established. Since the simple identification technique is available, *Cryptosporidium* has recently emerged as a common agent causing diarrhoea especially in children in developing countries with a frequency as high as 33% (Shahid *et al.*, 1985; Weikel *et al.*, 1985; Cross *et al.*, 1985; Guderian *et al.*, 1986). The clinical manifestations of cryptosporidiosis are self-limited gastroenteritis lasting from days to weeks in immunocompetent persons and protracted profuse fatal diarrhoea in immunocompromised hosts such as patients with acquired immune deficiency syndrome (Navin *et al.*, 1984; Cross *et al.*, 1985; Guderian *et al.*, 1986).

The etiologic agents causing acute diarrhoea are unknown in a significant portion of patients in Thailand. Microscopic examination of fecal samples for *Cryptosporidium* is not routinely done in laboratories. As a result, cryptosporidiosis has not been diagnosed and its prevalence is unknown. The objective of

the study was to determine the prevalence of cryptosporidiosis in Siriraj Hospital, Bangkok and to analyse the clinical features of patients with cryptosporidiosis.

## MATERIALS AND METHODS

A total of 1500 fecal specimens from patients who attended Siriraj Hospital, Bangkok between January to July 1986 were studied. One thousand (1000) specimens were from the Out-patients Department (OPD) sent to Medical Technology Laboratory for parasitological examination. Five hundred (500) specimens were from in-patients with clinical diagnosis of diarrhoea, submitted to Microbiology Laboratory for bacterial culture. All specimens were examined and stained according to the modified Ziehl-Neelsen method (Henriksen *et al.*, 1981) for recovery and identification of *Cryptosporidium* oocysts. Five percent sulfuric acid for 30 minutes was used instead of 7% sulfuric acid for 2 minutes. Counterstaining was done with 0.3% methylene blue instead of 5% malachite green. The positive control slides supplied by Microbiology Laboratory, University of Cincinnati, U.S.A. were stained simultaneously. The specimen was considered to be positive for *Cryptosporidium* oocyst when it contained a round, thick wall with various inner structures up to 4 sporozoites densely stained red body with 3 to 5 micrometer in diameter on a blue background. The medical records of patients with positive smears were retrieved for clinical analysis.

Table 1  
Prevalence of Cryptosporidiosis in Siriraj Hospital, Bangkok, Jan.-June 1986.

Selected Denominators	No. Studied	No. Positive	Percent
Out-patients	1,000	2	0.2
Out-patients < 14 yrs.	240	2	0.8
Out-patients with diarrhoea	182	2	1.1
Out-patients < 14 yrs. with diarrhoea	52	2	3.8
In-patients	500	6	1.2
In-patients < 14 yrs.	169	6	3.6
In-patients with diarrhoea	475	6	1.3
In-patients < 14 yrs. with diarrhoea	166	6	3.6
All patients	1,500	8	0.5
Patients < 14 yrs.	109	8	2
Patients with diarrhoea	657	8	1.2
Patients, < 14 yrs, with diarrhoea	218	8	3.7

## RESULTS

Of 1,500 fecal samples studied, 8(0.5%) were found to be positive for *Cryptosporidium* oocysts. From 1,000 samples obtained from out-patients, only 18.2% of the specimens studied were diarrhoeal stools, 44.1% were from males and 55.9% from females, 24% of the patients were children of less than 14 years of age. Two specimens positive for *Cryptosporidium* were from children aged less than 14 years who had diarrhoeal stools. Among 500 specimens from in-patients, 43% were from females and 57% from males, 34% were from patients younger than 14 years and 95% of them were diarrhoeal stools. Six were found to be positive, and all were from children with diarrhoeal stools. The prevalence of cryptosporidiosis according to a variety of denominators is shown in Table 1. The overall prevalence of cryptosporidiosis was 0.5%. However, the prevalence of cryptosporidiosis among children with diarrhoea was much higher, 3.7%. The prevalence

of cryptosporidiosis in children with diarrhoea attending Out-patients Department was not statistically different from that of in-patients (3.8% versus 3.6%,  $p = 0.73$ ).

The medical records of 7 patients were available for analysis. Six patients were children with diarrhoea admitted to Department of Pediatrics and one patient, a child with diarrhoea attended OPD. The clinical features and clinical courses of the patients are shown in Table 2.

## DISCUSSION

Our study carried out in a University hospital in Bangkok showed that *Cryptosporidium* is not an uncommon cause of acute diarrhoea in Thailand. Since all the patients with cryptosporidiosis in the study were children with acute diarrhoea, these findings support previous observation that the disease is prevalent in children and asymptomatic

Table 2

Clinical features and clinical course of patients with Cryptosporidiosis.

Age (Domicile)	Sex	Underlying Diseases	Diarrhoea (Duration)	Vomiting (Duration)	Fever	Treatment and Outcome
4 yrs. (Bangkok)	male	Hepatitis B carrier	2 d.	3 d.	3 d.	oral fluid lost to follow up
4 months (Bangkok)	female	Down Syndrome	4 d.	4 d.	4 d.	Co-trimoxazole, Afebrile within 48 hrs, Diarrhoea for 7 days
10 months (Bangkok)	male	Measles	1 d.	nil	6 d.	Co-trimoxazole, Afebrile with in 48 hrs., Diarrhoea for 3 days.
9 months (Udon Thani)	female	None	7 d.	7 d.	7 d.	Oral fluid, Afebrile with in 48 hrs, Diarrhoea for 4 days.
18 months (Samut Sakorn)	male	Acute lymphoblastic leukemia	1 d.	1 d.	1 d.	Co-trimoxazole, Afebrile within 24 hrs, Diarrhoea for 2 days.
3½ yrs. (Bangkok)	male	Nephrotic Syndrome	1 d.	1 d.	nil	Pen.G, Co-trimoxazole, Endoxan, Prednisolone, diarrhoea for 2 weeks.
5 months (Nonthaburi)	male	Otitis media	3 d.	3 d.	3 d.	Amoxicillin, Afebrile within 48 hrs., diarrhoea for 7 days.

Stool examination, no WBC, no parasites and Stool culture for *Salmonella* and *Shigella* negative in all cases.

carriers are very uncommon (Mata *et al.*, 1984; Cross *et al.*, 1985; Guderian *et al.*, 1986).

The findings of *Cryptosporidium* oocysts in our patients should be clinically significant because microscopic examination of their stools did not indicate inflammatory diarrhoea, no other parasites or enteropathogenic bacteria were found and *Cryptosporidium* oocysts were not seen in patients without diarrhoea. On modified acid fast stain of fecal samples, yeast cells characteristic of *Candida* were seen in 4 out of 8 *Cryptosporidium* positive samples. However, the frequency of this observation was not different from the fecal samples negative for *Cryptosporidium* oocyst.

The clinical manifestations of acute diarrhoea and fever for one to 7 days duration in our series were similar to those reported by Cross *et al.*, (1985) and Guderian *et al.*, (1986). The mechanism by which the parasite causes the fluid loss is not known. The elaboration of a cholera like toxin has been postulated (Navin *et al.*, 1984). To date, the therapy of cryptosporidiosis is supportive. All 7 patients recovered from diarrhoea within 2 weeks, and fever usually subsided within 48 hours after admission to the hospital including patients with acute lymphoblastic leukemia and nephrotic syndrome who were being on chemotherapy or immunosuppressive agents. Six patients received antibiotics for presumed

bacterial diarrhoea. None was diagnosed as having cryptosporidiosis during hospitalization.

The way in which our patients acquired the infection is not clear. The history of animal contact was not taken during patients' admission. However, cryptosporidiosis seems to be an emerging zoonosis (Shultz, 1983) and acquisition by the patient through animal contact seems most likely. Fecal-oral transmission from animals to animals and from animals to human beings has been proved and almost assuredly transmission from human to human occurs (Anderson *et al.*, 1982; Baxley *et al.*, 1983). A patient in our series was an orphan referred from an orphanage for 200 young children. The role of *Cryptosporidium* as a cause of diarrhoeal disease in the orphanage is being investigated.

#### SUMMARY

During January to July 1986, 1,500 fecal specimens from out and in-patients attending Siriraj Hospital, Bangkok were examined for *Cryptosporidium* oocysts by modified acid fast technique. Eight were found to be positive. The prevalence of cryptosporidiosis was 3.7% in children with acute diarrhoea. Medical records of the patients showed that the main clinical presentation was acute diarrhoea with fever for one to 7 days duration. Stool examinations and cultures revealed no white blood cells or parasites or other enteropathogenic bacteria. All recovered within two weeks. The study suggests that *Cryptosporidium* is a relatively common non-viral cause of acute diarrhoea in young children and routine laboratory study to detect *Cryptosporidium* may be justified.

#### REFERENCES

- ANDERSON, B.C., DONNDELINGER, T., WILKINS, K.M., and SMITH, J., (1982). *Cryptosporidium* in a veterinary student. *J. Am. Vet. Med. Assoc.*, 180 : 408.
- BAXLEY, D., HART, C.A. and TAYLOR, C., (1983). Human cryptosporidiosis : a possible case of hospital cross infection. *Brit. Med. J.*, 287 : 1760.
- CROSS, J.H., ALCANTARA, A., ALQUIZA, L., ZARASPE, G. and RANOA, C., (1985). Cryptosporidiosis in Phillipine children. *Southeast Asian J. Trop. Med. Pub. Hlth.*, 16 : 257.
- GARCIA, L.S., BRUCKNER, D.A., BREWER, T.C. and SHIMIZU, B.Y., (1983). Techniques for the recovery and identification of *Cryptosporidium* oocysts from stool specimens. *J. clin. Microbiol.*, 18 : 185.
- HENRIKSEN, S.A. and POHLENZ, J.F.L., (1981). Staining of Cryptosporidia by a modified Ziehl-Neelsen technique. *Acta. Vet. Scand.*, 22 : 594.
- GUDERIAN, R.H., SANDOVAL, C.A. and MACKENZIE C.D., (1986). Cryptosporidiosis in Equadorian children with acute diarrhea. *J. Trop. Pediat.*, 32 : 290.
- MATA, L., BOLANOS, H., PIZZARRO, D. and VIVES, M., (1984). Cryptosporidiosis in children from some highland Costa Rican rural and urban areas. *Am. J. Trop. Med. Hyg.*, 33 : 24.
- NAVIN, T.R. and JURANEK, D.D., (1984). Cryptosporidiosis: clinical, epidemiologic and parasitologic review. *Rev. Infec. Dis.*, 6 : 313.
- NIME, F.A., BUREK, J.D., PAGE, D.L. and HOLSCHER, M.A., (1976). Acute enterocolitis in a human being infected with the protozoa *Cryptosporidium*. *Gastroenterology.*, 70 : 592.
- SHAHID, N.S., RAHMAN, A.S.M.H. and ANDERSON, B.C., (1985). Cryptosporidiosis in Bangladesh. *Brit. Med. J.*, 290 : 114.
- WEIKEL, C.S., JOHNSTON, L.I. and DE SOUSA, M.A., (1985). Cryptosporidiosis in northern Brazil : association with sporadic diarrhoea. *J. Infec. Dis.*, 151 : 963.