

CASE REPORT

CAPILLARIASIS: CHRONIC WATERY DIARRHEA - NOT ONLY FROM MICROORGANISMS

Teera Kusolsuk¹, Weerapong Phumratanaprapin², Kirana Paohintung³, Somchit Pubampen¹,
Surapol Sa-nguankiat¹, Supaporn Nuamtanong¹, Tipayarat Yoonuan¹,
Malinee Thairungroj Anantaphruti¹ and Chalit Komalamisra¹

¹Department of Helminthology, ²Department of Clinical Tropical Medicine, ³Hospital for Tropical Diseases, Faculty of Tropical Medicine, Mahidol University, Bangkok, Thailand

Abstract. A 54-year-old male Thai patient from Prachin Buri Province presented with a history of chronic watery diarrhea for many years. He passed stool five to ten times per day with occasionally colicky pain, abdominal distension, nausea and vomiting. He had visited hospitals and private clinics and received treatment but with no improvement. He presented to the Hospital for Tropical Diseases, Bangkok, Thailand, where on physical examination, he had moderate dehydration, weakness, abdominal distension and a gurgling abdomen. The eggs, larvae and adult worms of *Capillaria philippinensis* were found on stool examination. The patient was admitted and treated with Mebendazole for 20 days, whereupon his symptoms resolved. Two months previously, he had ingested a raw small fresh-water fish dish called "Phra-Pla Siw/So". Small fresh-water fish near the patient's home were collected and examined for *Capillaria philippinensis* larva. The results were negative for parasitic organisms.

INTRODUCTION

Intestinal capillariasis, a fish-borne parasitic zoonosis, is endemic mainly in the Philippines and Thailand, with sporadic cases reported from Korea (Lee *et al*, 1993) Taiwan and China (Hwang *et al*, 1998; Bair *et al*, 2004; Lu *et al*, 2006).

Humans become infected with *Capillaria philippinensis* (Cross *et al*, 1991) by eating raw or insufficiently cooked freshwater fish. In 1964, the first case of *C. philippinensis* infection was found on autopsy of a 29-year-old man from Ilocos Norte Province, Northern

Luzon, the Philippines, who died from intractable diarrhea (Chitwood *et al*, 1968). In Thailand, the first case was an 18-month-old child from Samut Prakan Province in 1973 (Pradatsundarasar *et al*, 1973). In 1974, Saraburi Provincial Hospital reported a second case of *C. philippinensis* infection (Sanpakit *et al*, 1974). After the two first cases, intestinal capillariasis cases were found in other provinces in Thailand including Nakhon Phanom, Surin (Mangmanee *et al*, 1977), Phetchabun (Bhaibulaya *et al*, 1977) and Maha Sarakham (Prakitrittranon *et al*, 1980). In 2007, endoscopy revealed intestinal capillariasis in a 27-year-old male Thai patient (Sangchan *et al*, 2007). In a survey of 25 species of freshwater fish, more than 8,000 specimens were negative for *C. philippinensis* larvae. Humans contract these parasites by eating infected raw freshwater fish, resulting in an infection of the

Correspondence: Dr Teera Kusolsuk, Department of Helminthology, Faculty of Tropical Medicine, Mahidol University, 420/6 Ratchawithi Road, Bangkok 10400, Thailand.

Tel: 66 (0) 2643 5600; Fax: 66 (0) 2643 5600

E-mail: tmtku@mahidol.ac.th

small intestine with larvae, causing chronic inflammation and villous atrophy. The patients usually present with watery diarrhea, weight loss, abdominal pain, muscle wasting, weakness and edema. The laboratory investigations have shown low levels of albumin and electrolytes in the blood (Pradatsundarasar *et al*, 1973; Mangmanee *et al*, 1977). A definitive diagnosis relies on identification of worm eggs, larvae, or adult worms in the stool. We report here a case of chronic watery diarrhea and weight loss over many years duration and a field investigation examining freshwater fish for *C. philippinensis* larvae.

CASE REPORT

A 54-year-old male Thai patient from Prachin Buri Province, Thailand, presented with a four-year history of watery diarrhea. A review of medical records from Simahaphot Hospital found the clinical history began in June/September, 2003, when the case was diagnosed as acute diarrhea and treated with antibiotics. A second visit occurred in September 2006, when he presented with chronic diarrhea and dehydration. He was admitted to Simahaphot Hospital for fluid-replacement therapy. Stool examination was negative for acid-fast bacilli and parasites; antibiotics were administered.

One month before this admission, the patient passed stool 5-10 times daily and took medicines to treat the problem which he procured himself, but without clinical improvement. He then visited a private clinic, which referred him to the Hospital for Tropical Diseases, Faculty of Tropical Medicine, Mahidol University, Thailand. He visited the Hospital on 27 August 2007, and a physical examination showed moderate dehydration, weakness, abdominal distension, and a gurgling abdomen. His body weight was 48 kg (down from 57 kg), his blood pressure was 100/60 mmHg, body temperature was 37.0°C, pulse was 89

beats/minute, and no pretibial edema was noted.

The patient's history revealed that prior to admission, he had frequently consumed a dish consisting of a raw, freshwater fish called "*Phra-Pla Siw/Soi*", which is a common practice in the Prachin Buri area.

The patient was initially treated with intravenous fluid replacement, a high protein/carbohydrate diet, antispasmodics and oral rehydration solution. Initial stool (Fig 1-A) examination was conducted by direct smear method at the Central Laboratory of the Hospital for Tropical Diseases and the Department of Helminthology, Faculty of Tropical Medicine. The results were positive for *Capillaria philippinensis* eggs (Fig 1-B), adult female worms (Fig 1-C), adult male worms (Fig 1-D) and larvae. Complete blood count and blood chemistry investigations showed hypoalbuminemia, while other parameters were normal (Table 1).

Mebendazole (400 mg daily for 20 days) was administered with daily stool examinations. The number of stools, number of adult worms, larvae and eggs decreased daily until complete disappearance (Table 1).

Patient follow-up and field investigation took place from 6 to 8 November, 2007. On physical examination, his blood pressure was normal (110/70), no pallor or jaundice were appreciated. His bodyweight had increased to 57 kg (an increase of 9 kg in 9 weeks). His defecation and urination were normal, and no abdominal disturbances were reported. Laboratory investigations showed a normal complete blood count and increased total protein and albumin levels (7.5 and 4.1, respectively). A stool examination was negative for parasitic organisms (Table 1).

A total of 990 small freshwater fish were studied, with sizes ranging from 0.4 x 1.8 to 0.6 x 2.5 cm for *Rasbora myersi* (*Pla siw*, n=480), 0.3 x 0.9 to 0.6 x 1.8 cm for *Hemicorhynchus siamensis* (*Pla Soy*, n=346)

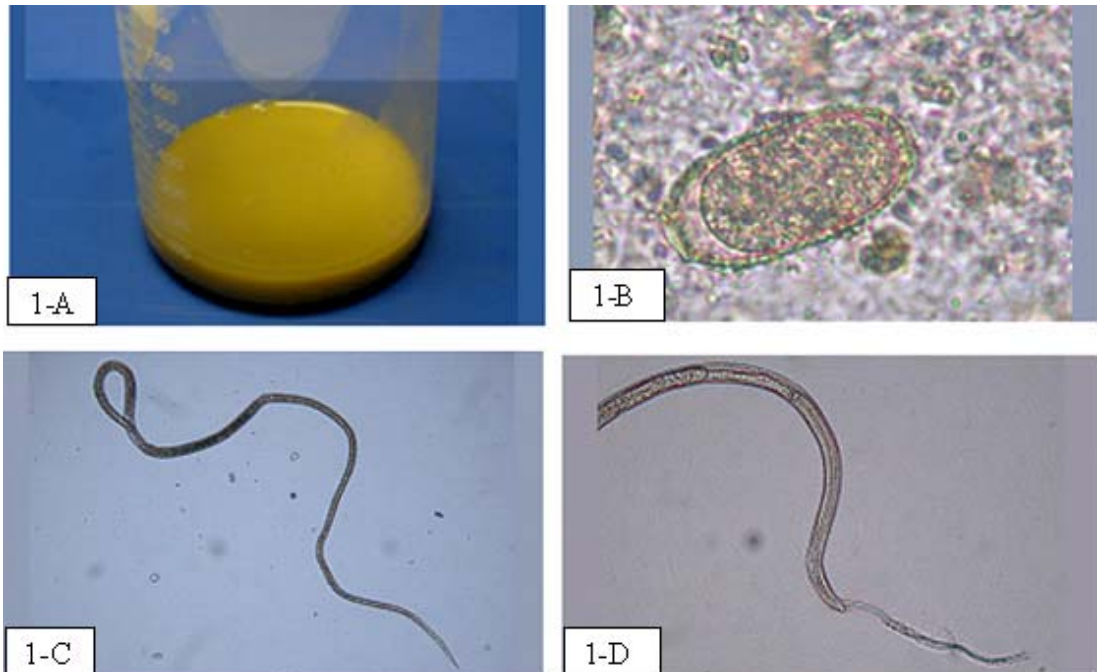


Fig 1-A: typical watery stool collected from the patient during hospitalization;

1-B: *C. philippinensis* egg; 1-C: adult female and 1-D: male worms were found on stool examination during hospitalization.

and 2.5 x 7.6 to 3.1 x 8.2 cm for *Barbodes gonionotus* (Pla Ta-pien Khao, n=168) (Fig 2). These were collected by villagers from a canal "Klong-Pradoo" using bamboo fishing traps and fishing nets. The fish were dissected and the intestines recovered and put into normal saline solution. The intestinal contents were examined under a stereomicroscope, all were negative for *C. philippinensis* larvae.

DISCUSSION

Common clinical symptoms in intestinal capillariasis are chronic watery diarrhea, mal-absorption, and wasting. A history of raw fresh-water fish consumption is an important clue to diagnosing *C. philippinensis* infection. Delayed and incorrect diagnoses are common with *C. philippinensis* infection, leading to delays in treatment and clinical suffering. Not just micro-organisms cause chronic watery diarrhea. Phy-



Fig 2—Small fresh water fish (n=990) examined for *C. philippinensis* larvae; all were negative.

sicians suspecting parasitic infections, such as *C. philippinensis*, should take a diet history for eating habits. A careful history along with repeat stool examinations improves the likelihood

Table 1
Results of laboratory investigations.

Laboratory examinations	Date	Results
1. CBC		Hb ^a Hct ^b WBC ^c (N ^d - L ^e - M ^f - E ^g - B ^g) Plt ⁱ
	27/08/2007	15.6 45.8 10,900 (59.7-34.8-3.9-1.2-0.4) 571,000
	08/11/2007	13.3 41.2 7,500 (26.0-49.0-7.0-12.0-0) 385,000
2. Blood chemistry	27/08/2007	FBS ^j BUN/Cr ^k Na ^{+l} K ^{+m} Cl ⁻ⁿ HCO ₃ ^{-o} TP ^p A ^q G ^r
	30/08/2007	106 14/0.9 133 4.2 103 23
	03/09/2007	3.3 1.0 2.3
	05/09/2007	141 3.0 103 32 1.5
	08/11/2007	141 3.8 104 36 1.8
		140 4.1 101 24 7.5 4.1 3.4
3. Urinalysis	27/08/2007	Normal findings
4. Stool examination	27/08/2007	Watery stool 4 times Direct smear: positive for <i>C. philippinensis</i> eggs Concentration: positive for <i>C. philippinensis</i> eggs
	28/08/2007	Watery stool 4 times Direct smear: positive for <i>C. philippinensis</i> eggs, larvae and adult worms Sedimentation method: positive for <i>C. philippinensis</i> eggs, larvae and adult worms
	29/08/2007	Watery stool 5 times Direct smear: positive for <i>C. philippinensis</i> eggs, larvae and adult worms Sedimentation method: positive for <i>C. philippinensis</i> eggs, larvae and adult worms
	30/08/2007	Watery stool 2 times Direct smear: positive for <i>C. philippinensis</i> eggs and adult worms
	31/08/2007	Semi-solid stool 2 times Direct smear: positive for <i>C. philippinensis</i> eggs Sedimentation method: positive for <i>C. philippinensis</i> eggs and adult worms
	03/09/2007	Semi-solid stool 1 time Direct smear: negative result
	07/11/2007	Normal stool and negative results on direct smear

^aHb = hemoglobin, ^bHct = hematocrit, ^cWBC = white blood cell count, ^dN = neutrophils, ^eL = lymphocytes, ^fM = monocytes, ^gE = eosinophils, ^hB = basophils, ⁱPH = platelets, ^jFBS = fasting blood sugar, ^kBUN/Cr = Blood Urea Nitrogen/Creatinine, ^lNa⁺ = sodium, ^mK⁺ = potassium, ⁿCl⁻ = chloride, ^oHCO₃⁻ = bicarbonate, ^pTP = total protein, ^qA = albumin, ^rG = globulin.

of correctly diagnosing suspected cases. If the results are negative, panendoscopy or surgical biopsy for histopathological examination may be necessary (Lu *et al*, 2006).

Field investigations and community observation found that eating behavior was a risk factor for *C. philippinensis* infection, similar to previous reports of raw fresh water fish eating

behavior associated with intestinal capillariasis in Thailand (Saichua *et al*, 2008).

The villagers prefer a raw freshwater fish dish call "Phra-Pla Siw" because it tastes sweeter than the cooked dish. Health education is important when making behavioral changes to prevent *C. philippinensis* and other parasitic infections.

Chronic watery diarrhea is not just caused by microorganisms, but by parasitic infections, such as *C. philippinensis*. Suspected cases should be interviewed for food consumption history, and repeat stool examinations or panendoscopy done to obtain biopsy specimens for histopathological examination to improve the likelihood of a correct diagnosis. Health education campaigns should promote the consumption of cooked fish and avoid defecation in water resources to prevent *C. philippinensis* and other parasitic infections.

ACKNOWLEDGEMENTS

The authors thank the Thanat-Molee Khoman Foundation for financial support of this project, Dr Ratima Issarachaikul and the nursing staff of Ward 8, Hospital for Tropical Diseases, for patient details and collection of stool samples, Dr Sirikiat Prechamanun, Director of Simahaphot Hospital, for providing facilities during the field investigation, and to the patient and villagers in Ban Trok Somboon, Si Maha Phot District, Prachin Buri Province, for their cooperation and help collecting freshwater fish for examination.

REFERENCES

- Bair MJ, Hwang KP, Wang TE, *et al*. Clinical features of human intestinal capillariasis in Taiwan. *World J Gastroenterol* 2004; 10: 2391-3.
- Bhaibulaya M, Benjapong W, Noeypatimanond S. Infection of *Capillaria philippinensis* in man from Phetchabun Province, northern Thailand: a report of the fifth case. *J Med Assoc Thai* 1977; 60: 507-9.
- Chitwood MB, Valasquez CC, Salazar NG. *Capillaria philippinensis* sp. n. (Nematode: Trichinellida), from the intestine of man in the Philippines. *J Parasitol* 1968; 54: 368-71.
- Cross JH, Basaca-Sevilla V. Capillariasis philippinensis: a fish-borne parasitic zoonosis. *Southeast Asian J Trop Med Public Health* 1991; 22 (suppl): 153-7.
- Cross JH. Intestinal capillariasis. *Clin Microbiol Rev* 1992; 5: 120-9.
- Hwang KP. Human intestinal capillariasis (*Capillaria philippinensis*) in Taiwan. *Zhonghua Minguo Xiao'erke Yixuehui Zazhi* 1998; 39: 82-5.
- Mangmanee L, Aswapokee N, Vanasin B. Intestinal capillariasis. Report of the fourth case in Thailand. *Siriraj Hosp Gaz* 1977; 29: 439-49.
- Lee SH, Hong ST, Chai JY, *et al*. A case of intestinal capillariasis in the Republic of Korea. *Am J Trop Med Hyg* 1993; 48: 542-6.
- Lu LH, Lin MR, Choi WM, *et al*. Human intestinal capillariasis (*Capillaria philippinensis*) in Taiwan. *Am J Trop Med Hyg* 2006; 74: 810-3.
- Pradatsundarasar A, Pecharanon K, Chintanawongs C, Ungthavorn P. The first case of intestinal capillariasis in Thailand. *Southeast Asian J Trop Med Public Health* 1973; 4: 131-4.
- Prakitrittranon W, Eua-Ananta YU, Dhiensiri T, Bhaibulaya M. Intestinal capillariasis from Maha Sarakham Province, northern Thailand: report of a case. *Southeast Asian J Trop Med Public Health* 1980; 11: 496-7.
- Saichua P, Nithikathkul C, Kaewpitoon N. Human intestinal capillariasis in Thailand. *World J Gastroenterol* 2008; 14: 506-10.
- Sangchan A, Wongsasenook A, Kularbkaew C, Sawanyawisuth K, Sukepaisarnjaroen W, Mairiang P. The endoscopic-pathologic finding in intestinal capillariasis: a case report. *J Med Assoc Thai* 2007; 90: 175-8.
- Sanpakit S, Suksungvol S, Bhaibulaya M. Intestinal capillariasis from Saraburi Province, Thailand: report on the second case. *J Med Assoc Thai* 1974; 57: 458-60.