

CASE REPORT

## 탈북민에서 진단된 만성 복통과 성장 지연을 유발한 편충 감염

김종빈, 서광일, 문원

고신대학교 의과대학 내과학교실

### *Trichuris trichiura* Infection in North Korean Defector Resulted in Chronic Abdominal Pain and Growth Retardation

Jong Bin Kim, Kwang Il Seo and Won Moon

Department of Internal Medicine, Kosin University College of Medicine, Busan, Korea

*Trichuris trichiura* infection is a common helminth infection, which is transmitted via soil, with worldwide distribution, especially in rural areas of developing countries. Occasionally, sporadic cases occur in non-endemic, developed areas due to the widespread of immigration. We experienced a case of *Trichuris* dysentery syndrome in a young North Korean defector, who had been suffering from chronic abdominal pain for 10 years. He is relatively short and thin compared with his older brother. Unexpectedly, the diagnosis, made by a colonoscopy, revealed numerous, small, white, and gently moving worms at the cecum and ascending colon. After 3 days of albendazole (400 mg once daily) administration, clinical symptoms subsided dramatically. On the follow-up colonoscopy, which was performed two months after the completion of his treatment, complete eradication was identified. Soil-transmitted helminths, including *Trichuris trichiura*, are disappearing becoming less prevalent in South Korea as a result of both national driving force and environmental improvement. However, these diseases should be considered when we meet foreign patients from developing countries, like North Korea, presenting chronic abdominal pain. Moreover, proper treatment of North Korean defectors and performing cohort studies of them would help to prepare for the possible unification era in the field of gastroenterology. (Korean J Gastroenterol 2017;69:243-247)

**Key Words:** *Trichuris trichiura*; Growth retardation; Abdominal pain

## INTRODUCTION

*Trichuris trichiura* (*T. trichiura*) infection is a disease that is becoming less prevalent in South Korea, attributed to both the national control system and economic development.<sup>1</sup> However, a few sporadic infections have been reported in non-endemic, developed countries, mainly in cases of immigrants.<sup>2</sup>

Commonly, *T. trichiura* infection does not cause specific

symptoms, except only patients with heavy infection. Severe colonic infection causes mucoid diarrhea, rectal prolapsed, and iron deficiency anemia, often resulting in growth retardation.<sup>3</sup> Diagnosis is made by a stool examination identifying *T. trichiura* eggs. However, stool examination may occasionally be difficult in male-only parasitic infection. Several studies have reported making a diagnosis of *Trichuris* colonic infection using a colonoscopy.

Herein, we report a case of *T. trichiura* infection diagnosed

**Received** December 25, 2016. **Revised** February 1, 2017. **Accepted** March 3, 2017.

© This is an open access article distributed under the terms of the Creative Commons Attribution Non-Commercial License (<http://creativecommons.org/licenses/by-nc/4.0>) which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

Copyright © 2017. Korean Society of Gastroenterology.

**교신저자:** 서광일, 49267, 부산시 서구 감천로 262, 고신대학교 의과대학 내과학교실

**Correspondence to:** Kwang Il Seo, Department of Internal Medicine, Kosin University College of Medicine, 262 Gamcheon-ro, Seo-gu, Busan 49267, Korea.

Tel: +82-51-990-5207, Fax: +82-51-990-5055, E-mail: kisem@naver.com

Financial support: None. Conflict of interest: None.

with colonoscopy in a North Korean defector. According to his history, he was diagnosed with *Trichuris dysentery syndrome* (TDS), which resulted in growth suppression. This sporadic infection case should remind us of neglected diseases, like *T. trichiura*, when we meet foreign patients from developing countries, like North Korea, presenting chronic abdominal pain.

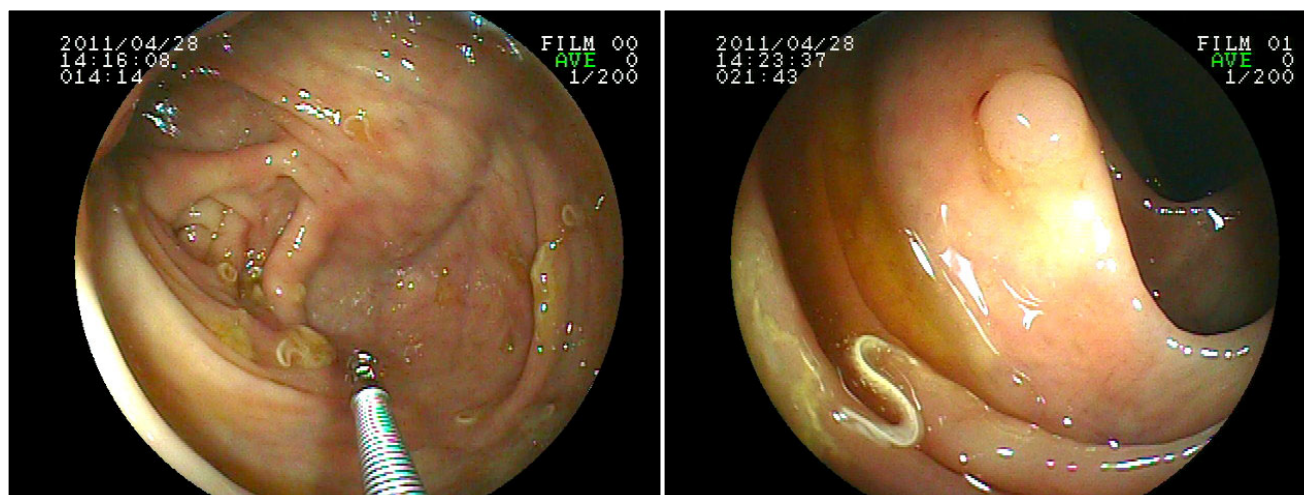
## CASE REPORT

A 26-year-old man, who escaped North Korea to South Korea two years ago, was admitted for dyspepsia and postprandial abdominal pain. The physical examination was unremarkable, except for a slightly increased bowel sound. Laboratory tests revealed hemoglobin levels of 15.5 g/dL,

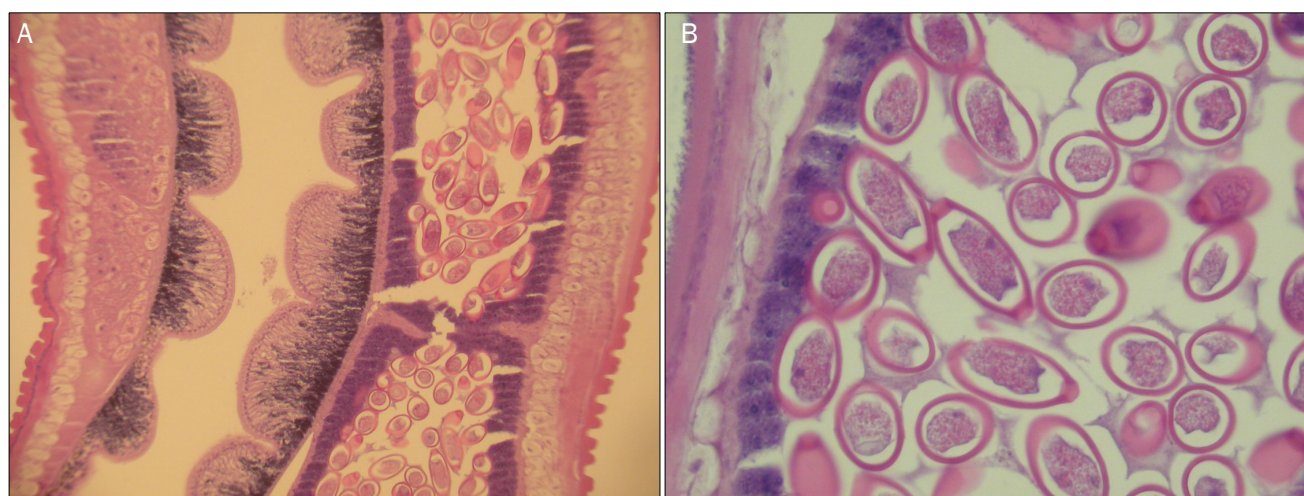
white blood cell count of  $5,700/\text{mm}^3$  without eosinophilia, and normal platelet count. Other biochemical tests were normal, except total bilirubin (1.3 mg/dL; normal value <1.1 mg/dL). Stool examination for parasites or eggs was negative.

He mentioned that postprandial abdominal pain and indigestion lasted for more than 10 years. He became a gymnast because he seemed to be good at digestion after exercise. However, he is very short, with a height of 160 cm, and weighed 50 kg; his older brother, in comparison, is 185 cm in height and 95 kg in weight. He recalled that he ate what was on the ground when he was hungry in North Korea.

He underwent a colonoscopy for sustained abdominal pain. We found numerous, small, white, and gently moving worms attached to the cecal and ascending colonic mucosa



**Fig. 1.** Initial colonoscopy finding. Numerous, small, white, and gently moving worms attached to the cecal and ascending colonic mucosa were noted.

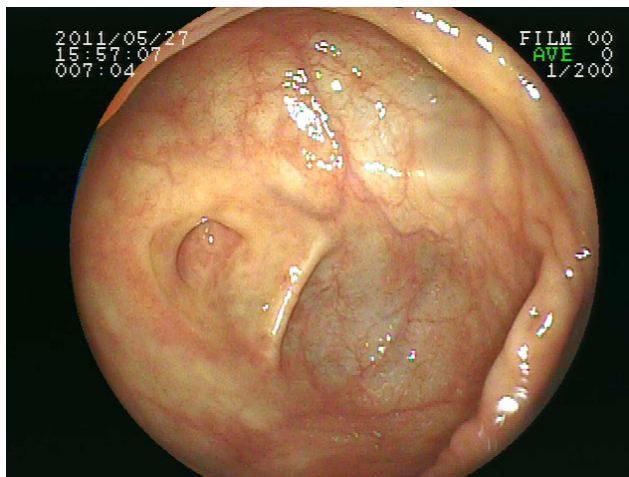


**Fig. 2.** (A) Section shows intestine and many eggs in the uterus of the adult female worm of *Trichuris trichiura* (H&E,  $\times 200$ ). (B) *Trichuris trichiura* eggs are barrel-shaped and measure 50 to 54 microns by 22 to 23 microns. The egg has a thick shell with brownish tinge and bipolar prominences (H&E,  $\times 400$ ).

(Fig. 1). More than twenty parasites were removed using forceps. Microscopic finding was consistent with *T. trichiura* female adult worms with many barrel-shaped eggs in the uterus (Fig. 2). He was treated with albendazole for 3 days. Thereafter, clinical symptoms subsided dramatically. On the follow-up colonoscopy, which was performed two months after the completion of treatment, no signs of parasitic infection was detected (Fig. 3).

## DISCUSSION

*T. trichiura* infection is one of the common helminth infections, which are transmitted via soil, with worldwide dis-



**Fig. 3.** Follow-up colonoscopy. No parasitic infection signs were found.

tribution, especially in rural areas of developing countries, including sub-Saharan Africa, East Asia, and Pacific islands.<sup>4</sup> The prevalence of *T. trichiura* is nearly 95% in children in endemic parts of the world, accompanying protein energy malnutrition and anemia.<sup>5</sup> Until the 1970s, soil-transmitted helminths were highly prevalent in South Korea. In 2004, the positive rate of overall intestinal helminth eggs decreased significantly, about 80% reduction was achieved in a 30-year period.<sup>1</sup> The disease control was achieved by implementation of both the national control system and improvement of environment and sanitation.<sup>6</sup>

Occasionally, sporadic cases occur in non-endemic, developed areas, because of immigration.<sup>2</sup> Therefore, to date, coming across a patient with parasite infection of *T. trichiura* in South Korea is highly rare in South Korea. However, North Korea is suspected to have limited access to improved sanitation and low awareness towards health risks from contained water. Such knowledge leads us to presume a high prevalence of intestinal parasitic infection in North Korea.<sup>6</sup> Recently, a single tertiary hospital in South Korea reported clinical characteristics of defectors from North Korea.<sup>7</sup> Compared with South Korean, the parasitic infection rate was much higher; approximately 41% of North Korean defectors are positive for parasites via colonoscopy or stool examination.

In children, heavy colonic infection called TDS causes diarrhea with blood or mucus, rectal prolapse, and iron deficiency anemia.<sup>3</sup> Moreover, severe *T. trichiura* infection may lead to

**Table 1.** Currently Published Case Reports of Trichuris Dysentery Syndrome

Case	Age/sex	Chief complaint	Duration of symptoms	Hemoglobin	Eosinophils	Short stature	Wasted	Pallor	Colonoscopic finding	Treatment
Diniz-Santos et al. <sup>11</sup> (2006)	8/M	Bloody diarrhea	3 months	7.4 g/dL	$1.15 \times 10^9/L$	Yes	Yes	Yes	Massive population of <i>T. trichiura</i>	Albendazole (400 mg/d for 5 days)
Krishnamurthy et al. <sup>12</sup> (2009)	6/F	Loose stools with blood, mucus	2 years	3.5 g/dL	50%	Yes	Yes	Yes	Whipworms ( <i>T. trichiura</i> )	1st: albendazole (400 mg/d single) 2nd: mebendazole (100 mg bid for 3 days)
Azira and Zeehaida <sup>13</sup> (2012)	4/F	Loose bloody stools with fever	2 years	6.8 g/dL	4.5%	Yes	Yes	Yes	Numerous <i>T. trichiura</i> adult worms	1st: albendazole (400 mg/d for 3 days) 2nd: albendazole (400 mg/d for 3 days)
Zanwar et al. <sup>14</sup> (2016)	7/F	Loose bloody stools with mucus	2 months	3.8 g/dL	10%	Yes	Yes	Yes	Numerous small, white, mobile worms	Albendazole (400 mg/d for 3 days)

M, male; F, female; *T. trichiura*, *Trichuris trichiura*.

growth retardation and impaired mental development and cognitive function.<sup>4,8-10</sup> This severe infection can be considered as a critical public health problem in children of endemic areas.<sup>5</sup> However, compared with clinical presentation of TDS in children, adult patients with TDS do not commonly have colonic symptoms and usually present iron deficiency anemia and its related results.<sup>3</sup>

The currently published TDS case reports are summarized in Table 1.<sup>11-14</sup> Their age ranged from 4 to 8 years. The main clinical presentation was bloody diarrhea. Their common physical appearances were short stature and pallor. Our patient experienced sustained postprandial abdominal pain and indigestion for 15 years, and he was very short compared with his older brother. Probably the abdominal pain with indigestion was developed at the age of 11 years. Unlike previous reported cases, he did not suffer from bloody diarrhea or rectal prolapsed. His clinical symptoms had been sustained during his growth period. He visited our hospital at an adult age. Khuroo et al.<sup>3</sup> reported about TDS in adults in an endemic area. The main clinical presentation of adult TDS was progressive iron deficiency anemia. A few cases of adult TDS had abdominal symptoms, including abdominal pain, diarrhea, and hematochezia. Unlike previous reported adult TDS cases, our patient had abdominal pain without hematochezia and anemia.

Based on the history and physical appearance, we suspected that our patient had been infected with *T. trichiura* from childhood. If he had visited our hospital at an earlier age, we might have been able to identify the clinical manifestations of TDS at childhood. Unfortunately, as we could imagine, he most likely did not have access to proper medical services in North Korea, which resulted in growth suppression. Two years ago, he escaped from North Korea to South Korea. And at that time, he was unable to have the laboratory tests to not show anemia due to malnutrition. Therefore, we presumed that *T. trichiura* infection was the main cause of abdominal pain and growth suppression in our North Korean defector.

According to a recently published meta-analysis, treatment of *T. trichiura* with a single oral dose of current anthelmintic was unsatisfactory. However, several studies reported higher cure and egg reduction rates when albendazole (400 mg twice per day) and mebendazole (400 mg once daily) were administered for three consecutive days. Therefore,

treatment recommendations are as follows: albendazole (400 mg once daily for 3 days) or mebendazole (100 mg twice daily for 3 days).<sup>15</sup> In our case, albendazole administration for three days dramatically improved the clinical symptoms and eradicated the infection.

In this year, Korea Development Institute published a report, 'The current status of medical service utilization by North Korean defectors and tasks in preparation for unification'. According to the report, based on the medical records between 2006 and 2015 of North Korean defectors who have been treated at the National Medical Center, one of the major departments was gastroenterology. The most frequent gastrointestinal diseases were gastroenteritis, hepatitis B, and liver cirrhosis.<sup>16</sup> Another study reported that defectors from North Korea showed high rates of chronic hepatitis B and C, as well as parasitic infection.<sup>7</sup> Therefore, we could expect that gastroenterology would be one of the main needs during the unification era.

Korea is divided into North Korea and South Korea, hoping for a unification. As a gastroenterologist, this case report bring forth the real status of the lack of medical service available to North Koreans and the need for specialized strategies, such as research and education, regarding gastrointestinal disease incidence, prevalence, and treatment of North Koreans to prepare unification in the future. Without such preparation, some of the diseases, including soil-transmitted helminth infections, such as trichuriasis, may result in improper treatment, and due not by knowledge deficiency but by neglect. Therefore, proper treatment of North Korean defectors and cohort study including them would be help to prepare for unification in the field of gastroenterology.

## REFERENCES

1. Hong ST, Chai JY, Choi MH, Huh S, Rim HJ, Lee SH. A successful experience of soil-transmitted helminth control in the Republic of Korea. *Korean J Parasitol* 2006;44:177-185.
2. Sahimin N, Lim YA, Ariffin F, Behnke JM, Lewis JW, Mohd Zain SN. Migrant workers in Malaysia: current implications of sociodemographic and environmental characteristics in the transmission of intestinal parasitic infections. *PLoS Negl Trop Dis* 2016;10: e0005110.
3. Khuroo MS, Khuroo MS, Khuroo NS. Trichuris dysentery syndrome: a common cause of chronic iron deficiency anemia in adults in an endemic area (with videos). *Gastrointest Endosc* 2010;71:200-204.
4. Hotez PJ, Molyneux DH, Fenwick A, et al. Control of neglected trop-

- ical diseases. *N Engl J Med* 2007;357:1018-1027.
5. Stephenson LS, Holland CV, Cooper ES. The public health significance of *trichuris trichiura*. *Parasitology* 2000;121 Suppl: S73-S95.
  6. Fuhrmann S, Winkler MS, Pham-Duc P, et al. Intestinal parasite infections and associated risk factors in communities exposed to wastewater in urban and peri-urban transition zones in Hanoi, Vietnam. *Parasit Vectors* 2016;9:537.
  7. Ann SY, Ryou SH, Kim SB. Clinical characteristics of defectors from North Korea visiting a single tertiary hospital in South Korea. *Korean J Med* 2015;89:54-63.
  8. Cooper ES, Bundy DA, MacDonald TT, Golden MH. Growth suppression in the *trichuris* dysentery syndrome. *Eur J Clin Nutr* 1990;44:285-291.
  9. Simeon DT, Grantham-McGregor SM. Nutritional deficiencies and children's behaviour and mental development. *Nutr Res Rev* 1990;3:1-24.
  10. Callender J, Grantham-McGregor S, Walker S, Cooper E. Developmental levels and nutritional status of children with the *trichuris* dysentery syndrome. *Trans R Soc Trop Med Hyg* 1993; 87:528-529.
  11. Diniz-Santos DR, Jambeiro J, Mascarenhas RR, Silva LR. Massive *trichuris trichiura* infection as a cause of chronic bloody diarrhea in a child. *J Trop Pediatr* 2006;52:66-68.
  12. Krishnamurthy S, Samanta D, Yadav S. *Trichuris* dysentery syndrome with eosinophilic leukemoid reaction mimicking inflammatory bowel disease. *J Postgrad Med* 2009;55:76-77.
  13. Azira N MS, Zeehaida M. Severe chronic iron deficiency anaemia secondary to *Trichuris* dysentery syndrome - a case report. *Trop Biomed* 2012;29:626-631.
  14. Zanzwar VG, Pawar SV, Jain SS, Rath SP, Contractor QQ, Rath PM. An unusual cause of overt gastrointestinal bleeding in a malnourished child. *Trop Doct* 2016;46:100-102.
  15. Keiser J, Utzinger J. Efficacy of current drugs against soil-transmitted helminth infections: systematic review and meta-analysis. *JAMA* 2008;299:1937-1948.
  16. KDI review of the North Korean economy. [Internet]. Sejong (KR): Korea Development Institute (KDI); 2016 Mar 15 [cited 2016 Mar 15]. Available from: [http://www.kdi.re.kr/kdi\\_eng/research/research\\_view.jsp?pub\\_no=14649](http://www.kdi.re.kr/kdi_eng/research/research_view.jsp?pub_no=14649).