DETECTION OF *ENTEROBIA VERMICULARIS* EGGS IN THE SUBMUCOSA OF THE TRANSVERSE COLON OF A MAN PRESENTING WITH COLON CARCINOMA

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**Abstract.** We report a case of a chronic infiltrate of the intestinal wall of the transverse colon by the eggs of *Enterobius vermicularis* in a man who had immigrated to Taiwan from mainland China 50 years ago. During surgery for suspected transverse colon carcinoma, histologic examination of the tumor mass revealed eggs of *E. vermicularis* embedded in granulation tissue in the submucosa of the transverse colon. Results of a stool examination were negative for eggs but strongly positive for occult blood. The mass in the transverse colon was completely removed during surgery. At the present time, the patient remains asymptomatic.

**INTRODUCTION**

Human infection with *Enterobius vermicularis* is very common and usually manifests with pruritus ani.1,2 According to a recent report from Taiwan, the current estimate of the overall infection rate of *E. vermicularis* among school children was 11%.3 Occasionally, adult worms undergo ectopic migration.4 Salpingo-oophoritis and appendicitis caused by this parasite have been reported.5–9 We report a case of chronic infiltrate of the intestinal wall of the transverse colon by the eggs of *E. vermicularis* in a man presenting with colon carcinoma.

**CASE REPORT**

A 76-year-old man, a retired veteran, had coronary arterial disease for several years and had received coronary stenting of left anterior descending artery and regular medical treatment at our clinics. Two days prior to admission, bloody stool with abdominal pain and distention were noted. On May 3, 1999, he was admitted to our hospital for further management. There was no fever, conscious disturbance, cough, hemoptysis, or diarrhea.

The patient was born in mainland China in 1923 and immigrated to Taiwan in 1949. He reported no other foreign travel and that he had not eaten raw freshwater crabs or fish. During his residence in mainland China, he had a history of pruritus ani in childhood.

Clinical examination indicated a moderately ill individual. He had a temperature of 36.8°C, a respiration rate of 18/minute, a pulse of 72/minute, and a blood pressure of 110/80 mm of Hg. He was not anemic or icteric. His respiratory and cardiovascular systems were normal. The abdomen was soft and tympanic on percussion with mild tenderness. The bowel sounds were normal. There was no hepatosplenomegaly or lymphadenopathy. Results of a neurologic examination were negative. There were no skin or muscle abnormalities.

On admission, the patient had a hemoglobin level of 15.5 g/dL, a hematocrit of 43.9%, and a white blood cell count of 9,100/mm³ with 73.5% neutrophils, 19.6% lymphocytes, and 5.5% monocytes. His platelet count was 180,000/mm³. The following biochemical test results were observed: blood urea nitrogen = 14 mg/dL, creatinine = 1.0 mg/dL, glucose = 81 mg/dL, blood apurate aminotransferase = 13 units/L (normal = 0–33 units/L), alanine aminotransferase = 15 units/L (normal = 0–40 units/L), alkaline phosphatase = 74 units/L (normal = 0–100 units/L), albumin = 3.4 g/dL, and globulin = 2.7 g/dL. Serum concentrations of sodium, potassium, and calcium were normal.

A chest radiograph revealed emphysema of lungs. Results of urinalysis were negative. His stool was strongly positive for occult blood. A colonoscopy was performed on the third day of admission and revealed a large, irregular, ulcerative, annular mass in the transverse colon that resembled colon carcinoma. Further insertion of a colon fiberscope was impossible due to lumen narrowing. A double-contrast lower intestinal radiograph done on the fifth day after admission showed constant asymmetric narrowing of the middle part of the transverse colon (Figures 1 and 2), consistent with colon carcinoma.

After admission, transverse colon carcinoma was suspected and surgery was performed on the tenth day after admission. An ulcerative, annular tumor mass in the transverse colon with partial obstruction was found. Transverse colon colectomy with end-to-end anastomosis and resection of lymph nodes along the greater curvature of stomach and the transverse colon were performed. Pathologic examination of the resected transverse colon showed a focal, shallow, ulcerative lesion based on granulation tissue. There were numerous skipping foci of aggregation of eggs within the mucosal and submucosal layers. Dense neutrophilic cell infiltration and necrotic debris were seen. The features of the eggs were compatible with those of *E. vermicularis* (Figure 3). Some eggs were fragmented and calcified. The lymph nodes from periocolonic tissue and greater curvature of stomach showed reactive changes. No malignancy was seen. The hospital course was uneventful and he was discharged on May 26, 1999. No symptoms or signs of *E. vermicularis* infestation have been noted in the outpatient clinic follow-up after his discharge and no anti-parasitic drug was prescribed. The patient currently remains asymptomatic.

**DISCUSSION**

*Enterobius vermicularis* is usually regarded as a relatively innocuous inhabitant of the human intestinal tract.1,2 The most common symptoms are related to perianal skin irritation.1,2 Atypical locations of *E. vermicularis* have been reported.4 The migration of the worm into the vagina of the host followed by intraperitoneal invasion via the uterus and the fallopian tube can cause salpingitis and paraoophoritis.5–11 Perianal abscess and granuloma caused by this parasite have also been described.1 Because *E. vermicularis* com-
monly inhabits the cecum and can be seen within the submu-
cosa of appendectomy specimens, some investigators have
postulated that it may have a causal relationship with appen-
dicitis.5,6

In 1945, Bjilmer described a patient with numerous ulcer-
ative lesions of the ileum and colon who was found by histo-
logic examination to be infected with E. vermicularis.12 He
concluded that the ulceration probably occurred before the
infection and served as a mucosal break through which pen-
etration occurred. In our case, worms of E. vermicularis may
have also invaded the transverse colon through a pre-existing
mucosal break and laid their eggs in the submucosa. These
worms eventually died, leaving only the eggs. Although this
invasion is likely, direct invasion of colon by the male worm
has been previously suggested.12,13 The time of active pin-
worm infestation and penetration of the mucosa of the trans-
verse colon in our case is not certain. Although our patient
had a history of pruritus ani in childhood, it is of little signifi-
cance because this is a common occurrence in Taiwan.

The patient had been a soldier in mainland China who had
immigrated to Taiwan 50 years ago and had been retired for
15 years. He claimed that he had not eaten raw freshwater
crabs or fish and that his personal hygiene was good. He had
12 grandchildren and had lived with grandchildren for seven
years until five years ago, when he lived only with his sick
wife. He reported no close contact with small children, in-
cluding his grandchildren. However, the prevalence rate of
pinworm infestation among school children in Taiwan is not
low (11%), and the hygienic conditions in some parts of Tai-
wan have not been satisfactory over the past 30 years.3 It is
possible that he ate food contaminated with eggs of E. ver-
micularis in the community or at home during this period.

Although some cases of E. vermicularis infestation show
peripheral and tissue-specific eosinophilia, others have not
shown these manifestations.1,4–6,10,13,14 Because eosino-
philia usually indicates a hypersensitive reaction to foreign
proteins, the absence of eosinophilia may be related to the
intrinsic immunologic status of the patient. The absence of
peripheral and tissue-specific eosinophilia in our patient indi-
cated that he was not hypersensitive to the proteins of
E. vermicularis. Previous reports have indicated that white
blood cell counts in those infected with E. vermicularis were
usually normal, and that the differential white blood cell
counts were normal or slightly elevated, with band forms and
toxic granules.1,4–6,10,13,14

FIGURE 1. A double-contrast, lower intestinal radiograph of the
patient on the fifth day after admission showing constant asymmetric
narrowing of the middle part of transverse colon (arrow), consistent
with colon carcinoma.

FIGURE 2. A double-contrast, lower intestinal radiograph of the
patient on the fifth day after admission showing constant asymmetric
narrowing of the middle part of transverse colon (arrow), consistent
with colon carcinoma.

FIGURE 3. Histopathologic analysis of the mass in the transverse
colon containing Enterobius vermicularis eggs in the submucosa
(arrow) (hematoxylin and eosin stained, original magnification ×
150).

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Other uncommon, ectopic, distant sites to which these worms have migrated include the peritoneal cavity, lung, liver, urinary tract, and natal cleft.\textsuperscript{2,4,9,15–19} Pathologic examination of ectopic \textit{E. vermicularis} infestation in humans has usually revealed chronic granulomatous inflammation with or without central necrosis and surrounded by polymorphonuclear neutrophil leukocytes, eosinophil leukocytes, and fibroblasts.\textsuperscript{1–5,9,13,14} Macrophages, giant cells, epithelioid cells, and Charcot-Leyden crystals may also be present.\textsuperscript{4,14} The pathologic findings in our case were consistent with those of previous reports. Although chronic inflammatory intestinal obstruction due to \textit{E. vermicularis} has been reported, infestation of this parasite presenting as colon carcinoma has not been described.\textsuperscript{14} It would have been impossible to differentiate malignancy from parasite infestation in our patient without histologic examination. Therefore, we conclude that a biopsy specimen for histologic examination is mandatory in any case of intestinal tumor to differentiate malignancy from parasitic infestation.

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