Ternidens Deminutus Infection: First Pathological Report of a Human Case in Asia

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This is a report of Ternidens deminutus infection in a 33 year old Thai female who was admitted to the hospital because of abdominal pain and a right lower quadrant mass. Exploratory laparotomy revealed an omental mass with attached terminal ileum. Resection of the mass together with the terminal ileum and the right sided colon was performed. Pathologically, the omental mass was an abscess with an immature male Ternidens deminutus identified.

The parasite usually is found in the intestine of primates in Africa and Asia. Human infection occurs when food contaminated with infective filariform larvae is ingested. The larvae molt in the intestinal wall and become adults. They pass eggs in feces. Eggs in contaminated soil hatch and become rhabditiform larvae and then infective filariform larvae.

This is the first pathological report of this parasite in Asia.

Keywords: *Ternidens deminutus, Parasite, Human, Asia, Strongylidae*

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Ternidens deminutus was first identified by Railliet and Henry in 1905 while examining the collection of parasitic nematodes in the Museum of Natural History in Paris. The parasites were in a vial collected in 1865 at autopsy of a native of Mayotte, in the Cormoro Islands of Mozambique. The autopsy was performed by Monestier, a physician in the French navy, who initially identified these parasites as *Ancylostoma duodenale* and considered them the cause of the clinical condition of anemia[1].

T. deminutus normally inhabits the large intestine of primates such as chimpanzees, gorillas, macques and *Cercopithecus* monkeys in Africa, India and Indonesia[2]. It was found in 21% of 100 *Macaca mulatto* from China[3]. Infection in humans has been found in natives of Africa such as Rhodesia, Tanzania etc[2,4-6]. In Asia, it has been recorded in monkeys only. A case of *T. deminutus* infection presenting with abdominal mass and identified by histopathological examination is presented. To the best of the author's knowledge, this is the first report of a human case in Asia.

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Case Report

A 33-year-old Thai female was admitted to Rajvithi Hospital on June 20,1983 because of abdominal pain and palpable, movable, firm mass in the right lower quadrant. Exploratory laparotomy revealed an omental mass attached to the terminal ileum. Resection of the omental mass with attached segment of the right half of the colon and terminal ileum was performed. The patient recovered well postoperatively and was discharged without complication.

The pertinent clinical history regarding the place of dwelling, the occupation, the habit of ingestion and the history of travelling were not available due to the long delay of this report for 21 years duration.

Specimen of the resected omentum and bowel segment was sent to the Institute of Pathology. It was fixed in 10 percent formalin. The terminal ileum measured 2.3 cm in length and 3 cm in diameter. The right half of the colon measured 17 cm in length and 4 cm in diameter. An omental mass,measuring 4 x 5 x 2.5 cm was attached to the serosal surface of the ileum. Cut section of the mass revealed yellowish firm tissue, enclosing a sinus tract lined by necrotic tissue. On opening the bowel, the colonic mucosa was unremark-

able. The ileal mucosa was focally congested and intact. The ileal wall was focally thickened and indurated. A sinus tract was identified in the peri-ileal fat. The ileal serosa was dull and partly covered with fibrinous meterial.

Microscopic examination of the bowel revealed intact mucosa, focal areas of fibrosis and diffuse infiltration of eosinophils in the ileal muscularis and serosa. A tract in the peri-ileal fat with numerous eosinophils was noted. The omental mass revealed a cavity lined by necrotic tissue admixed with acute inflammatory exudate including numerous eosinophils. Within the exudate were many sections of a nematode (Fig. 1). The diameter of the worm was 300-500 μm. The maximum diameter was about 550 μm. The cuticle of the worm was about 6 μm thick and had prominent transverse striation 5 μm apart (Fig. 2). Lateral chords were identified. There were a few, large, flat somatic muscle cells in each quadrant of the worm. The intestine consisted of a few multinucleated cells lined by prominent microvilli. Two copulatory spicules were seen (Fig. 3). The microscopic slides were sent to the Armed Forces Institute of Pathology for consultation. The parasite was identified as immature male Ternidens deminutus by Douglas J Wear, Col, MC, USAR, Chif, Geographic Pathology Division and Ronald C Neafie, MS, Parasitologist, Infectious Diseases Branch, AFIP.

Fig. 1 Omental abscess with sections of immature *Ternidens deminutus* (Hematoxylin - eosin stain; original magnification x 40)

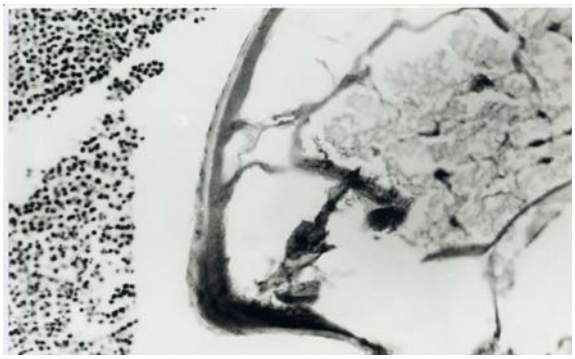

Fig. 2 Cuticle with transverse striations (Hematoxylin - eosin stain; original magnification x 400)

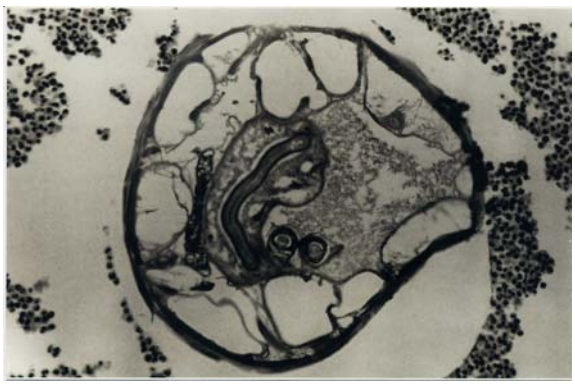

Fig. 3 Cross section of immature male *Ternidens deminutus* demonstrating few, large, flat somatic muscle cells, intestine with prominent microvilli and two spicules (Hematoxylin - eosin stain; original magnification x 200)

Discussion

Ternidens deminutus is a small nematode belonging to the Rhabditida order, suborder Strongylina, superfamily Strongyloidea, family Strongylidae. It was first described by Railliet and Henry in 1905 as *Triodontophorus deminutus*. Subsequently in 1909, these authors established it as a new genus, *Ternidens*[1]. The parasite is found in various species of apes and monkeys in Africa and Asia[2,3]. Humans are also definitive hosts[2,4-6]. Hosts become infected by ingestion of infective filariform larvae in contaminated food. Larvae molt in the intestinal wall and return to the lumen where they molt into adult worms and attach to the intestinal mucosa by their mouths. Eggs appear in feces 30-40 days after ingestion of infective larvae. Eggs hatch in soil and become rhabditiform and then infective filariform larvae[7,8].

Most human infections have been found in natives of Africa[2,4-6]. The worm usually does not give rise to particular symptoms except anemia in cases with heavy infection[2] Helminthic pseudo - tumors of the bowel[9] and helminthic abscess of the bowel[10]

have been described. In acute helminthic abscess, the cavity is filled with inflammatory cells mainly macrophages and eosinophils. Immature worms may be identified in the abscess. Anthony and McAdam reported 34 cases of helminthic pseudotumors of the bowel from Uganda. Parasites were identified in 8 cases, 4 of these were definitely identified. 3 were identified as *Oesophagostonum apiostonum* and one as Ternidens deminutus. That case was an 8-year-old male, African who had abdominal pain, tenderness and fever. The mass was found at the ileum. A live worm was extracted from the mass by the surgeon. It was identified as Ternidens deminutus.It was postulated that the worm failed to return to the bowel lumen and migrated furthur and persisted in the tissue[9].

The present report revealed an immature male nematode in the omental abscess. A tract was identified in the peri-ilial mesentery. Both the cavity and the tract contained numerous neutrophils and eosinophils. The morphologic features of this worm were consistent with the diagnosis of an immature male *Ternidens deminutus*. Adult *T. deminutus* closely resemble *Oesophagostonum* species and hookworms. They differ from both by buccal morphology[8,11] and greater diameter[8]. In tissue sections of nodules or abscesses, immature *T. deminutus* are morpholgically indistinguishable from immature *Oesophagostonum* species, except for their greater diameter. Adult male *T. deminutus* are 560 μm in diameter. Adult *Oesophagostonum* species reported from man have a maxinum diameter of 350 μm[8].

Pyrantel pamoate gives very high rates of cure with relative side-effects free for human infections with Ternidens deminutus[12]. For helminthic pseudo tumors and helminthic abscess, surgical resection of the involved bowel, or removal of worms from nodules is curative[8,9]. To the best of the author's knowledge, this is the first report of a human case in Asia.

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References

1. Railliet & Henry A. Un nouveau sclerotomien (Triodontophorus deminutus Nov sp.) parasite de'I' homme. CR Soc Biol 1905; 58: 569-71.
2. Amberson JM, Swarz E. Ternidens deminutus Railliet & Henry , a nematode parasite of man and primates. Ann Trop Med Parasit 1952; 46: 227-37.
3. Bezubik B, Furmaga S. The helminth parasites in Mucacus rhesus Auded , from China. Acta Parasit Polon 1959; 7: 591-8.
4. Sandground JH. Studies on the life-history of Ternidens deminutus , a nematode parasite of man, with observations on its incidence in certain regions of Southern Africa. Ann Trop Med Parasit 1931; 25; 147-84.
5. Sandground JH. Ternidens deminutus (Railliet & Henry) as a parasite of man in Southern Rhodesia; together with observations and experimental infection studies on an undifferentiated nematode parasite of man from this region. Ann Trop Med Parasit 1929; 23: 23-32.
6. Kilala CP. Ternidens deminutus infection in Southern Tanzania. East Afr Med J 1971; 48: 636-45.
7. Goldsmid JM. Studies on the life cycle and biology of Ternidens deminutus (Railliet & Henry, 1905), (Nematoda: Strongylidae). J Helminthol 1971; 45: 341-52.
8. Neafie RC, Marty AM. Oesophagostomiasis and Ternidenamiasis. In: Pathology of disease infectious diseases. Vol. 1: Helminthiasis. AFIP 2000: 499-506.
9. Anthony PP, McAdam IW. Helminthic pseudotumors of the bowel: thirty four cases of helminthoma. Gut 1972; 13: 8-16.
10. Welchman JM. Helminthic abscess of the bowel. Br J Radiol 1966; 39: 372-6.
11. Goldsmid JM, Lyons NF. Studies of Ternidens deminutus Railliet & Henry, 1909 (Nematoda). I. External morphology. J Helminthol 1973; 47: 119-26.
12. Goldsmid JM. Ternidens deminutus (Railliet & Henry, 1909) and hookworm in Rhodesia and a review of the treatment of human infections with T. deminutus. Cent Afr J Med 1972; 18: 1-14.

เทอร์นิเดนส์ เด็มมินูตัส รายงานทางพยาธิวิทยารายแรกในเอเชีย

วิจิตรา เหมศรีชาติ

รายงานนี้เป็นรายงานพยาธิ เทอร์นิเดนส์ เด็มมินูตัส ในผู้ป่วยหญิงไทย อายุ 33 ปี มาโรงพยาบาลราชวิถี ด้วยอาการปวดท้อง และมีก้อนในท้องน้อยข้างขวา ผู้ป่วยได้รับการผ่าตัดเอาก้อนพร้อมลำไส้เล็กส่วนปลาย และลำไส้ใหญ่ด้านขวาที่อยู่ติดกับก้อนออกมา ตรวจทางพยาธิวิทยาพบมีพยาธิตัวผู้ชนิด เทอร์นิเดนส์ เด็มมินูตัส ในก้อนฝีที่อยู่ติดลำไส้เล็กส่วนปลาย

พยาธิชนิดนี้พบในลำไส้ของลิง ในอัฟริกา และเอเชีย และพบในคนอัฟริกา ในคนเกิดจากการกินตัวอ่อนที่ปนเปื้อนในอาหาร ตัวอ่อนเจริญเติบโตเป็นตัวแก่ในลำไส้ และไข่ออกมากับอุจจาระ ไข่ที่อยู่ในดินจะเจริญเป็นตัวอ่อน

รายงานนี้บรรยายลักษณะทางพยาธิวิทยาของพยาธิ และเป็นรายงานแรกของทวีปเอเชีย