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AN APPARENT CASE OF HUMAN INFECTION WITH THE WHIP-WORM OF DOGS, *TRICHURIS VULPIS* (FROELICH, 1789)

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INTRODUCTION

During December 1954 and January 1955, a series of stool specimens from a pediatric patient was forwarded from the U. S. Army Hospital at Fort George G. Meade, Maryland to the Second Army Area Medical Laboratory for routine examination for parasites and ova. These specimens contained adults of the pinworm, *Enterobius vermicularis*, and eggs of a trichurid nematode too large to agree with measurements for eggs of *Trichuris trichura* or *Capillaria hepatica*.

DESCRIPTION OF THE CASE

The patient, a four-year-old Caucasian male, had been brought by his parents to the Fort Meade Hospital exhibiting symptoms of nervousness. He had never left the State of Maryland and had lived with his grandparents on a farm in Severn from the spring of 1953 till October of 1954. To his parents' knowledge, he had never had contact with domestic animals other than three bird dogs, which were kept in a yard where the boy played during his residence on the farm. At the time of this investigation only two of the dogs were living. Fecal specimens from these dogs yielded numerous eggs of *Trichuris vulpis*.

METHODS AND OBSERVATIONS

Following treatment with gentian violet by the Outpatient Department of the Fort Meade Hospital, stools were again forwarded to the Second Army Area Medical Laboratory where examination included straining through a #60 mesh sieve in an attempt to recover adult worms. Though adults of *E. vermicularis* were present, no trichurids were found at this time.

Between December 29, 1954 and July 1, 1955, 16 stool specimens were examined. All 16 stools contained the large trichurid eggs. On May 4, 1955, 3.5 months after treatment, a portion of an adult female *Trichuris*, consisting of the hindbody and about one third of the forebody, was recovered by straining.

This fragment measures 21 mm. in length, hindbody 10 mm. with a maximum width of 0.490 mm. The 11 mm. fragment of forebody varies in width from 0.084 to 0.115 mm., and at the junction of the esophagus and the intestine, the specimen is 0.208 mm. in diameter. The anterior rim of the vulva is 0.029 mm. behind this junction. The vulva consists of a fairly prominent cuticular ridge 0.059 mm. in diameter encompassing the round genital aperture. The posterior margin of the ovary is 0.153 mm. from the caudal extremity. The uterus has a maximum width of 0.281 mm. and narrows to form a nearly straight and very muscular vagina 2.5 mm. from the vulva. Diameter of the vagina is approximately 0.120 mm. No vulvar or vaginal spines were observed, though papillae were seen towards the posterior of the vagina. The rectum is 0.364 mm. long, anus subterminal. The eggs of this fragment correspond in size, shape, and general appearance with the

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eggs found in the feces. Measurements taken on 103 of the latter show them to vary from 75 to 90 micra in length (including opercula) and from 33 to 46 micra in width, mean 82 by 38 micra. The adult was examined by Mrs. M. B. Chitwood, A.D. P.R.B., Agricultural Research Center, Beltsville, Maryland, who agreed with a tentative diagnosis of *Trichuris vulpis*. This specimen has been deposited in the U. S. National Museum Helminthological Collection and has been assigned No. 38014.

Some of the eggs, brought to the infective stage in vitro following the methods of Miller (1939, 1941, 1947), were fed to dogs. Each dog received three doses of 2 cc. in butyl chloride prior to experimental feeding of the eggs, but it was later found that larvae of *Trichuris vulpis* were established in the dogs at this time, and that the larvae were resistant to treatment. This phase of the investigation was therefore discontinued.

**DISCUSSION**

Tentative identification as *Trichuris vulpis* is based on the size of the eggs and the character of the vulva and vagina.

Measurements given for the eggs of *T. trichiura* in the majority of recent textbooks of parasitology vary from 50–56 micra by 21–25 micra. Mönnig (1949) gives the measurements for eggs of *T. vulpis* as 72–89 by 37–40 micra. Though the eggs in question exhibit more variation in size (75–90 by 33–46 micra) than Mönnig has indicated, the variation is centered about his measurements, and the average (82 by 38 micra) is comfortably within the accepted egg size for the dog whipworm.

The vulva is more prominent in this specimen than in specimens of *T. trichiura* examined by the writers, and in this respect, due to the lack of spines, it compares closely with the vulvar regions of previously identified specimens of *T. vulpis* from dogs. Further differentiation from *T. trichiura* is based on the nature of the vagina which corresponds with that of *T. vulpis* in that it is nearly straight and muscular throughout, while the vagina of *T. trichiura* is convoluted.

Schwartz (1926), in comparing whipworms from swine and man, based his taxonomic decisions on egg size, position of the vulva, size of the esophagus, and length and width of the spicules. Chandler (1929) considered certain characters of the male to be most reliable. These characters include spicule length, appearance of the testes, and measurements of the sperm ducts, ejaculatory duct, and cloaca. Clapham (1945) agreed with Chandler but added that certain characteristics of the female reproductive system could also be of aid in specific diagnosis. Chandler (1930) considered egg size to be usually of little value since the measurements for most species lie within a range of 50–60 by 25–35 micra. He cited *T. ovis*, with egg measurements of 70–80 by 30–35 micra, as an exception. The eggs of *T. vulpis* are even larger than those of *T. ovis*, and the close correlation between mean measurements for *T. vulpis* eggs and those in question lead the writers to consider this a valid character. Tiner (1950) used egg size in a key differentiating among species of *Trichuris* from North American rodents. The position of the vulva was disregarded in the present comparison as it is located slightly posterior to the esophageal-intestinal junction in both species. Other characters used by Schwartz and Chandler are not applicable in this case as males were not recovered and the single female specimen is not intact. Mrs. Chitwood (personal communication)
has examined female specimens of *T. trichiura*, *T. vulpis*, and several species of *Trichuris* from rodents, and considers the vulvar and vaginal characteristics sufficiently consistent to be valid as a diagnostic aid. The size of the hindbody of the present specimen is smaller than is usually reported for *T. vulpis*, but this is very likely a result of development in an abnormal host.

This specimen is distinguished from *Trichuris opaca*, *T. muris*, *T. citelli*, *T. perognathi*, *T. fossor*, *T. sylvilagi*, *T. madisonensis*, and *T. leporis* of rodents and lagomorphs and *T. campanula* of cats by the large egg size; and from *Trichuris ovis* and *T. discolor* of cattle and sheep by the lack of vulvar spines and vaginal convolutions. Two species reported from California rodents, *Trichuris neotovvzae* Chandler, 1945 from *Neotoma fuscipes* and *T. peromysci* Chandler, 1946 from *Peromyscus californicus*, possess large eggs, straight muscular vaginas, and fairly prominent vulvae. Chandler (1945, 1945) stated that the ovejectors (vaginas) of *T. neotomae* and *T. peromysci* are 1.0 to 1.4 mm. long and 0.7 to 1.4 mm. long respectively. This may serve to distinguish our specimen as its ovejector is 2.5 mm. in length. This measurement was found to be 1.7 to 2.9 mm. in specimens of *T. vulpis* examined for comparison. The authors have recently conducted a survey of rodent parasites in the Fort Meade Area (unpublished data) and have found only *Trichuris opaca* and an unidentified species of *Trichuris* with eggs less than 70 micra in length. Eighty-two specimens of *Peromyscus leucopus* were included in this survey; woodrats are not present in this area. The likelihood of the patient's exposure to eggs of *T. vulpis* over a period of 1.5 years appears to support the tentative placing of the worm with this species. Lack of male specimens prevents a definitive diagnosis. No previous reports of *T. vulpis* occurring in man could be found in the literature.

**SUMMARY**

A female specimen of *Trichuris*, obtained from the feces of a four-year-old boy who had spent his entire life within Maryland, is tentatively identified on the basis of egg size and characters of the female reproductive organs as *Trichuris vulpis* (Froelich, 1789).

**LITERATURE CITED**


———1946 *Trichuris peromysci* n. sp. from *Peromyscus californicus*, and further notes on *T. perognathi* Chandler, 1945. J. Parasit. 32: 208.


