DIPHYLLOBOTHRIUM LATUM IN MASSACHUSETTS

A Report of Two Indigenous Cases*

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A number of cases of infection with the broad or fish tapeworm, Diphyllobotrium latum, occurring in patients of Boston hospitals have come lately to the attention of the Department of Comparative Pathology of the Harvard Medical School. As all infections were in adults of foreign birth who had lived for several years in Russia or one of the Scandinavian countries before coming to the United States, the infections were not considered of particular interest, although the frequency with which they occurred aroused our suspicions. Very recently, however, we have found at the Childrens' Hospital, Boston, two cases of unquestionable indigenous infection with this parasite. Apparently these are the first reported cases of native infection with D. latum in this state, and the first native cases reported outside the immediate Great Lakes District.

Report of Cases

Case 1—D.A., a boy, aged 3 years 2 months, of native Russian Jewish parentage, began to pass "white strips" about five months before admission which were identified by the family physician as "tapeworms". The child was treated by this physician, but he continued to pass worms and his mother thought that he had not been as well since treatment. He became apathetic, dull and listless, and had poor appetite. The child was brought to the Children's Hospital for examination and treatment. At the medical outpatient department a diagnosis of tapeworm was made from the presence of segments found in the stool, and a specimen of the stool was sent to the Department of Comparative Pathology of the Harvard Medical School, where the diagnosis of Diphyllobothrium latum was made by Dr. D.L. Augustine on the finding of numerous typical eggs in a simple smear examination. The eggs had been missed in the ward examination because the salt flotation method was used. This method gives an excellent concentration and a very clear preparation for examination for all nonoperculate helminth eggs, but as operculate eggs burst and do not float in concentrated salt solution, this method is of no value in the detection of D. latum.

Further questioning elicited the fact that the patient was very fond of fish and had been caught stealing and eating bits of raw fish while his mother prepared a meal. He also ate canned salmon and sardines.

Physical examination was essentially negative.

Laboratory analyses showed a normal urine; hemoglobin, from 55 to 65 per cent; red blood cells, 4,500,000 to 5,250,000; white blood cells, from 6,600 to 8,200, and eosinophils, 1-8 per cent.

The stool did not show any segments of D. latum, but numerous ova were present.

* From J.A.M.A. 90 : 1607-1608 May 19, 1928.

Treatment consisted of oil of chenopodium, 7 minims (0.4 cc.) on a piece of sugar followed in one half hour by $1\frac{1}{2}$ tablespoons of castor oil. No bowel movement resulted. The next day, 2 ounces of magnesium sulphate was given, but still no movement occurred. In the evening, 10 grains (0.65 Gm.) of compound powder of jalap resulted in a movement.

A worm was not passed, and the patient was discharged to return again for treatment in three or four weeks.

Case 2.—M.G., a girl, aged 4 years 2 months, was born in Greater Boston and had lived in Chelsea, Mass., all her life. The father was born in Russia, the mother in Boston; both were of Jewish parentage. Nov. 23, 1927, three weeks before admission, the patient passed a 20–foot long yellowish white, ribbon-like worm. No head was found. There were no symptoms at all, and the patient was well all the time. She was brought to the Medical Outpatient Department of the Children's Hospital and the worm was diagnosed as Diphyllobothrium latum, but the specimen unfortunately was not preserved. On the next visit, eggs of the same organism and segments were found and were indentified as D. latum by Dr. G.M. Guest, which was later confirmed by Dr. D.L. Augustine. Further history revealed that the family had fish twice a week, usually fried and occasionally as fish balls. The mother had never noticed any parasites or anything unusual in the fish that she had bought. She obtained her fish from local markets in Chelsea. They ate silver fish, white fish, cod and flounders, but no foreign preserved fish; occosionally pickled herring was eaten raw with vinegar. They did not eat fish eggs. The mother did not remember that the patient had her meals anywhere except at home.

She had noticed that the patient was in the habit of picking up and putting into her mouth bits of raw hamburger steak while she cooked the family meal. They had not observed the child picking up any raw fish but would not exclude the possibility.

Physical examination showed that child was very well developed and well nourished and entirely normal.

Laboratory analyses showed a normal urine; hemoglobin, 80 per cent; red blood cells, 6,000,000; white blood cells, 9,850; eosinophils, 1 per cent. Eggs were present in large numbers in the stools but segments were not found.

Treatment consisted of oil of chenopodium, 7 minims (0.4 cc.) on sugar, followed by 3 ounces (85 Gm.) of magnesium sulphate in one–half hour. No bowel movement resulted. The does was repeated in the evening, and an enema was given the next morning. No worms were passed, but eggs were found in the stool specimen as well as in that passed the next day.

The patient was discharged to rest and to return again for further treatment.

Reported Cases of Diphyllobothrium Latum Among Native Born Americans

Case	Author	Reference	Sex*	Age	Parentage	Residence
1	Nickerson.....	J.A.M.A. 46 : 711 (March 10) 1906	♂	2	Finnish	Minnesota
2	Nickerson.....	Science, 33, 1911; J.A.M.A. 74 : 457 (Feb. 14) 1920	♀	?	?	Minnesota
3	Warthin.....	Pub. Health Michigan 7 : 1920	♀	5	?	Michigan
4	Riley.....	J.A.M.A. 73 : 1186 (Oct. 18) 1919	♂	8	?	Minnesota
5	Riley.....	Ibid.....	?	Child	Indian	Minnesota
6	Calvin.....	J.A.M.A. 78 : 84 (Jan. 14) 1922	♀	7	Jewish	Illinois
7	Calvin.....	Ibid.....	♂	3	Jewish	Illinois
8	Wallace & Grant	J.A.M.A. 78 : 1050 (April 8) 1922	♀	25	German	Indiana
9	Lyon.....	J.A.M.A. 86 : 264 (Jan. 23) 1926	♂	4	Jewish	Indiana
10	Levy & Pierson	J.A.M.A. 87 : 848 (Sept. 11) 1926	♀	4	Jewish	Michigan
11 †	Becker.....	Illinois M.J. 30 : 416 (Dec.) 1916	♂	11	Jewish	Illinois

* In this column, ♂ indicates male; ♀, female.

† This patient was born in Odessa, Russia, and brought to the United State when an infant in arms. It therefore seems that this might be considered a native infection.

COMMENT

It is interesting to note in relation to both these cases that the families maintained that they always cooked their fish for a long time, boiling it in deep fat or frying for at least an hour or more. On further questioning, however, a perfect, definite history of occasional stealing and eating of raw fish or meat by both children was obtained. Both families were reported as being fond of certain "white fish" which, along with other varieties, were always purchased from near-by fish markets.

Inquiries made at these fish markets showed that the chief wholesale supply of fresh water fish comes from the Great Lakes region and the Ohio river. Therefore, the fresh-water fish apparently responsible are either white fish, Coregonus clupeaformis; lake herrings, Leucichthys; carp suckers, Carpoides thompsoni; suckers, Catastomus commersoni; the common pike, Esox lucius, and the yellow perch, Perca flavescens, all of which are shipped in large quantities out of the Great Lakes region to eastern markets. Some freshwater fish from Maine are also sold in Boston markets and may be responsible for carrying the infection. Salmon, which pass a portion of their life in fresh water, might also be involved, but we do not have any evidence against our salt water fish in this connection. Investigations on the source of this infection are now in progress in this laboratory. Because the sewage of so many towns empties directly into the Great Lakes or other bodies of fresh water, the fish of these regions have every opportunity of becoming infected and must be considered as the probable source of infection.

In view of the wide market distribution of these fish, it is probable that the distribution and incidence of Diphyllobothrium latum in the United States is far greater than is now generally believed.

At present there are eleven known cases of native infections with D. latum in the United States. These cases are listed in the accompanying table. It is of interest to note that in all the cases (except case 8) in which the age is recorded, the infection occurred in children not over 11 years. In five cases the children were of Jewish parentage.