AN INVESTIGATION OF SOME POSSIBLE SOURCES OF TRICHINA INFECTION IN A CENTRAL ILLINOIS COMMUNITY

WAYNE W. WANTLAND AND PAUL MARTIN
Illinois Wesleyan University, Bloomington

According to Chandler, 1944, the incidence of infection by *Trichinella spiralis* is lower in the "Grain Belt" than in other regions of the United States. He suggests that the incidence of infection in both man and hog is correlated with methods of feeding hogs in different parts of the country. We have been unable to find recent publications relevant to possible sources of infection in this area. Because we were unable to find published data for this area, this study was conducted.

We have found data published in the last ten years giving the following percentages in the regions named: Kerr, 1940, found 14.5 percent human infection in the South; Harrell and Johnson, 1939, found 2.8 percent human infection in the grain region of the South. Kerr, Jacobs and Cuvillier, 1941, found 16.3 percent human infection along the Eastern seaboard. Gould, 1940, found 20 percent human infection in the Detroit area. Cameron, 1937-40, found 0.75 percent infection in the hogs of eastern Canada, and 0.2 percent infection in the hogs of the middle Canadian region. Koo, 1945, found 1.56 percent hogs infected, and 11 percent rats infected in China (table 1).

Most of the above surveys were based upon findings in routine autopsies. Since routine autopsies are not made in the hospitals of this area, that line of research is not practical. Since the source of human infection is the hog, we have based our study largely upon examinations of pork and pork products. Rats also were examined because of the general prevalence of rats in areas where hogs are fed. It is conceivable that under certain conditions hogs might feed upon rats. Actually, grain fed hogs probably ingest rats or parts of rats infrequently, but since rats have often been shown to harbor this nematode and since our problem was to cover possible sources of infection, we felt justified in examining muscle tissue from these rodents, and reporting our findings in this regard.

Most hogs raised in Central Illinois for market are grain fed. The pork derived from such feeding is of a superior quality and brings a better price. On the other hand, most garbage fed hogs are raised for home consumption.

On the basis of the above, and to obtain a cross section of the hogs slaughtered in this area, a small packing plant just outside of Bloomington, Illinois, was chosen as one source of material. We believe this to be a good choice because there both custom butchering for home consumption and slaughtering of market hogs are handled.

Another possible source of infection studied was pork products, both

cooked and uncooked, sold in this area. Emphasis was placed upon the canned, ready to eat meats.

Rats were the third source of infection studied. Five rat infested areas were chosen, consisting of two farms where it is known that hogs are fed garbage, and three city dumps where garbage is dumped and burned or fed to hogs. These dumps receive the residential garbage from a community of 40,000 people. These areas were chosen because of the marked possibility of infected pork scraps.

It seemed reasonable to assume that if appreciable numbers of trichina were present, they would be found through the study of material from these sources. We fully realize that there are other possible sources of infection, but believe that this study covers a good cross section of the sources in this area.

In the case of hogs, the diaphragms were inspected. In the case of rats, the diaphragm, masseter and gastrocnemius muscles as well as the intestinal content were examined. In the case of pork products, sample portions were inspected.

The detailed examinations were carried out as follows:

1. Microscopic examination for larvae:—A thin slice of the diaphragm or other muscle tissue was placed between two slides and compressed, thus facilitating microscopic study of the specimen.

2. Digestion of muscle tissue with subsequent microscopic examination for larvae:—The tissue was digested by a modified Baermann method. A solution of 0.5 cc. HCl, U.S.P. plus 0.7 gm. pepsin diluted to 100 cc. with water was used. The tissue was cut into small particles and placed into the solution, kept at a constant temperature of 36.5° C., with occasional shaking for a period of four hours. The solution was then centrifuged and the residue examined microscopically.

3. Examination of the intestinal content of rats for adults:—The small intestine was stripped and the contents mixed with 0.85 percent saline solution in a petri dish. This preparation was then examined under a low power, binocular microscope. When suspicious areas were seen, these were placed upon a microscopic slide and studied under a compound microscope.

In cases where immediate examination was not practical, material was stored in a 0.85 percent saline solution or 1-2-3 solution prepared by mixing 1 part 95 percent ethyl alcohol, 2 parts glycerine, and 3 parts water.

A total of thirty-seven hog diaphragms were examined using the direct microscopic method in all cases, and in a majority of cases the digestion method was used as a check. None of the diaphragms were found to be infected.

Thirty-two rats were studied. In all cases the diaphragms were examined by the direct microscopic method. In a majority of cases these findings were checked by the digestion method, using the diaphragm, masseter, and gastrocnemius muscles. An additional check was made through the inspection of the intestinal content for adults. None of these examinations showed trichina to be present.

Ten samples of meat products were studied by the direct micro-

scopic and digestion methods. The products examined were the following: lunch tongue, potted meat, deviled ham, liver spread and sausage. None of these products were found to harbor this parasite.

On the basis of the above findings, we can conclude that there is little, if any, possibility of trichina infection in the human from the sources studied in this Central Illinois Community.

TABLE 1.—COMPARISON OF INCIDENCE OF TRICHINA INFECTION IN REGIONS OF THE WORLD

Organism	Human		Hogs		Rats	
Regions	No.	%+	No.	%+	No.	%+
Cen. Ill.....			37	0	32	0
Detroit Area	500	20				
Middle Canada...			995	.02		
E. Coast....	3000	16.3				
Eastern Canada...			2000	.75		
South.....	4631	14.5				
M. South...	99	2.8				
China.....			320	1.56	47	11

BIBLIOGRAPHY

CAMERON, THOMAS W. M.: Investigations on Trichinosis in Canada. II. A further survey of the incidence of *Trichinella spiralis* in hogs of Eastern Canada: Canadian Jour. Res. Sect. D. Zool. Sci. 17(7):151-153, 1939.

CAMERON, THOMAS W. M.: Investigation on Trichinosis in Canada. III. On the incidence of trichinosis in garbage fed hogs: Canadian Jour. Res. Sec. D. Zool. Sci. 18(3);83-85, 1940.

CHANDLER, A. C.: Introduction to Parasitology: 1944, 693 pages.

GOULD, S. E.: Incidence of trichina infection among county hospital patients in the Detroit area. Based upon 500 consecutive autopsies: Amer. Jour. Clin. Path. 10(7):431, 1940.

HORRELL, G. T. AND JOHNSON, C.: The incidence of trichinosis in the Middle South: Southern Med. Jour. 32(11): 1091-1094, 1939.

KERR, K. B.: Public Health aspects of the trichinosis problem in the South: Southern Med. Jour. 3(5):511-516, 1940.

KERR, K. B., LEON JACOBS AND EUGENIA CUVILLIER. Studies on Trichinosis. XIII. The incidence of human infection with trichina as indicated by post mortem examinations of 3000 diaphragms from Washington D. C. and 5 Eastern Seaboard cities: Pub. Health Depts. 56(16):836-855, 1941.

KOO, S. Y.: Trichinosis among hogs and rats in Fukein: Lingman Sci. Jour. 21(¼):39-43, 1945.