PARAGONIMUS WESTERMANI *

REPORT OF CASE PRESENTING ABDOMINAL INVOLVEMENT.

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INTRODUCTION

We are presenting a case of *Paragonimus westermani*, which we consider merits attention on account of the rarity of its type, abdominal paragonimiasis westermani, which is a singularly unusual form of this disease considering that the larval trematode traverses the peritoneal cavity before reaching its most favorable location, the lung.

CASE REPORT

Past History:

The patient is a married female, aged 29, a native of southern Korea, in which region lung distoma (*Paragonimus westermani*) is endemic.

In 1922 the woman developed a cough with bloody sputum, and a diagnosis of lung distoma was made.

In 1926, when she was 23 years old, an ovarian cyst, weighing with the fluid 65 lbs., was removed from the left ovary. Three years later a similar operation was performed on the right ovary, the cyst weighing 25 lbs.

Present Illness:

The present symptoms began in February 1931, with gradual swelling of the abdomen, indigestion, epigastric pain and anorexia. Food aggravated these symptoms, but bowel movement, rather than vomiting, relieved them. A slight cough and occasionally some blood-tinged sputum were noted.

Physical Examination:

Physical examination revealed decreased respiratory motion. Tactile fremitus was decreased over the upper right chest posteriorly. There was generalized hyperresonance over the entire chest, but no breath sounds, rales, or friction rubs.

Examination of the abdomen was made following the removal of 16,000 cc. of bloody fluid. No masses were palpable except at the brim of the pelvis, where there was a group of small nodules about 1 cm. in diameter, hard, but freely moveable, and attached to the parietal peritoneum. These masses, all of which were discrete and slightly painful, studded the parietal peritoneum of the lower half of the abdomen. The mesenteric glands were easily palpable through the relaxed abdominal wall. There was one gland in the anterior ab-

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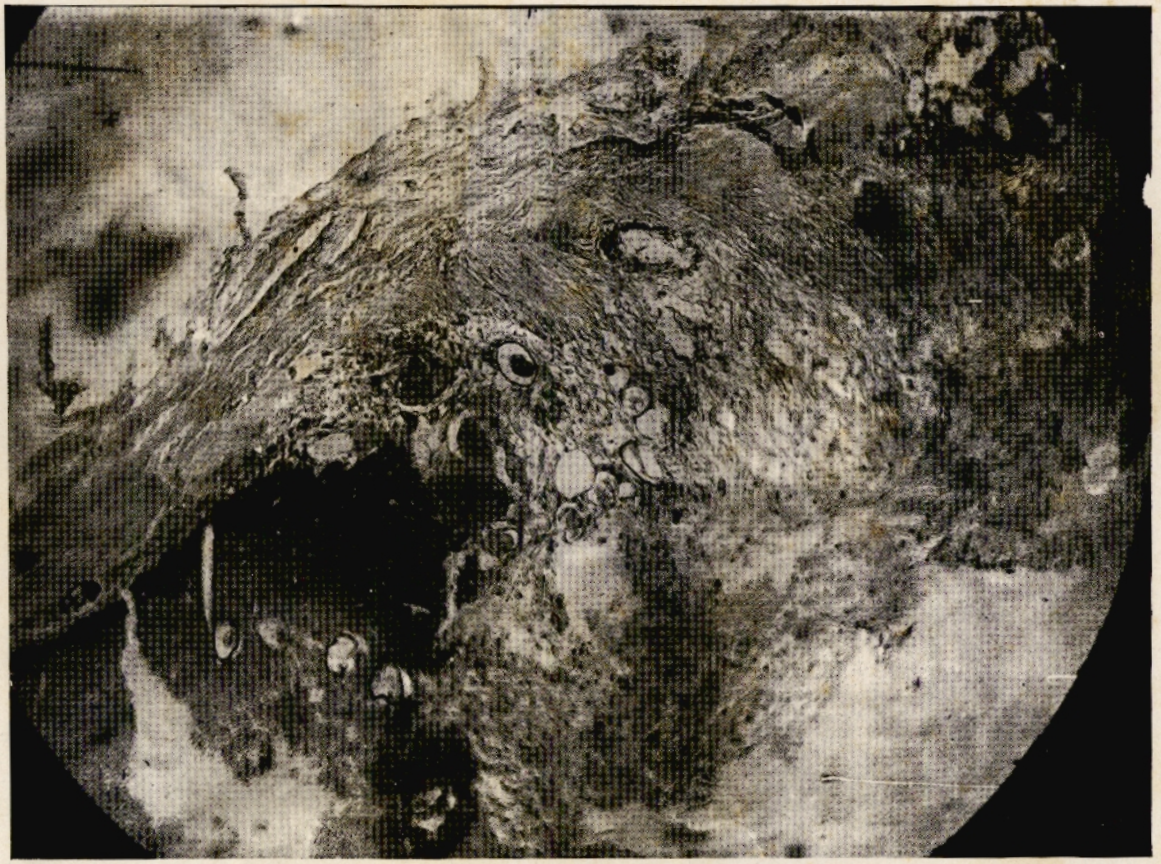

Section through a lymph node showing the ova of *Paragonimus westermani* both in endothelial tissue and in the nodule.

dominal wall in the upper left quadrant. The spleen and the liver were not palpable.

Laboratory Examination:

Erythrocytes, 4,120,000; leucocytes, 22,000. The differential leucocyte count showed 72 per cent neutrophilic polymorphonuclears, and 28 per cent lymphocytes. The hemoglobin was 90 per cent, the sputum was positive for the ova of *Paragonimus westermani*.

COURSE

During the time of her admission to the hospital, the patient's temperature varied from 37°C. to 37.5°C. The morning temperature was usually subnormal. The pulse was from 86 to 102 per minute, and respiration, from 22 to 24 per minute.

On February 29, 1932, laparotomy was performed by one of us (J.M.R.) following a preliminary aspiration of ascitic fluid.

The parietal and visceral peritoneum were studded thickly with blebs or vesicles, which appeared as small pink excrescences, and bled easily on handling. There were more in the pelvis than in the upper portion of the abdomen. The parietal peritoneum was thickened and friable between, and underlying, the vesicles. On both the parietal and visceral surface there was a pronounced inflammatory induration. The mesenteric lymph glands were enlarged. The liver and spleen were atrophied. The stomach was normal in size and position.

The clinical impression was that of a generalized abdominal malignancy as a result of the former ovarian cysts.

Two masses were removed from the omentum and sent to the Pathological Department of Severance Union Medical College, Seoul, Chosen. Dr. Choy made the diagnosis of worm abscess, *Paragonimus* eggs and necrosed tissue. No adult worms were found.

On July 9, 1932, a second incision was made, and another mass removed. This was sent to Professor H. Kobayashi of the Keijo Imperial University, who confirmed the previous diagnosis of *Paragonimus westermani* ova in the tissue.

No worms were found in any portion of the tissues examined. The ova of *Paragonimus westermani* were scattered throughout the mesenteric lymph nodes (See Illustration). There was hyperplasia of the endothelial cells, which were frayed and cloudy, and in many places the sinuses were distended and contained groups of *Paragonimus* ova. The capsule showed proliferation, swelling and clouding. The eggs were not distributed evenly throughout the reticular connective tissue, but were found in groups in the marginal sinus, and were more or less associated with the lymph cords which traversed the lymph sinuses. In one low-power field, 17 ova were found. In some lymph nodes, no ova were found, and in these the cell nuclei were intact. Naturally, we found cell-degeneration where there were many ova, rendering nuclei indistinguishable. The more involved nodules were separated from the healthier by proliferation of the reticular connective tissues.

DISCUSSION

Alluding to animal experimentation Faust[1] states "Although the lungs are perhaps the most favorable location, the fluke is at times more generalized in its distribution in the

body, being found in the liver, intestinal wall, mesenteric glands, muscles, testes, brain, or attached to the peritoneum or pleura." In the same reference [1] he shows a section of tumor mass infiltrated with *Paragonimus westermani* eggs. No details of such infestation in a human being are recorded in this reference, neither could we, in an extensive search through numerous files of the Tropical Diseases Bulletin, find any allusions to cases of abdominal *Paragonimus westermani* in man. Professor H. Kobayashi states in a private communication, that he has had no similar cases in animal experiments. We have been informed that Tsuchiya and Yoshizawa [2] have reported a rare case of paragonimiasis in which there were cystic bodies in the subcutaneous abdominal tissues and omentum majus. The article has not been available to us either in the original Japanese, or in abstract form. In experimental animals, Nakagawa [3] has shown that the larval trematode, after it has once escaped from the cyst, moves from the stomach to the lungs, by way of passage "through the intestinal wall, near the jejunum, and reaches the abdominal cavity, perforates the diaphragm and reaches the thoracic cavity. Travelling beneath the pleura the larva reaches and pierces the parenchyma of the lung, and there the cysts are formed." This author also states, "These parasites can bore through various tissues and may reach other organs than the lungs, where they form their regular cysts, but the lungs seem to be the most favorable place for their development and the laying of their eggs. In other organs they can never reach the perfect growth." Yoshida [4] has reported that in feeding experiments he found eighteen young worms "floating in serous fluid and adhering to the omentum, mesentery and inner surface of the abdominal wall" of the animal. In another like experiment he found numerous perforations on the surface of the diaphragm. He also states that he discovered a good specimen which demonstrates that the worms perforate the pleura and thus enter the lungs by their surface. Nakagawa [5] has shown that the young parasites hatch in the ileum in 24–42 hours, and then penetrate the intestinal wall. They make their way towards the diaphragm in about 77 hours, penetrating it chiefly in the tendinous portion. Yokogawa and Suyemori [6] took young *Paragonimus* out from the cyst by means of artificial digestion, and introduced them through the jugular vein of dogs.

The young did not settle in the lung, but sooner or later migrated into the pleural or abdominal cavity by way of penetration of the diaphragm on about the 30th day. Yokogawa and Suyemori [7] injected young *Paragonimus* through the carotid and directly beneath the dura mater of the dogs, and in many cases some adult distomas were found inside the thoracic cavity. Again, the same author showed that enclosed cercariae swallowed by the animal are excreted without being set free inside the alimentary tract; also, that the young, liberated from the cyst, may not be able to break through the intestinal wall; he found many young, dead or dying, in sections of various organs, and concluded that some cercariae cannot develop further after arrival in the abdominal cavity. Yokogawa and Suyemori [8] inferred that young, active larvae cannot penetrate the sound skin, but can pass through a fresh wound. They can also infest the body when taken by mouth, and the course of invasion follows that taken by encysted larvae under natural conditions of infestation. Young flukes, just freed from cysts, can penetrate the mucous membrane apart from the digestive tract (*e. g.* the conjunctiva), and bore their way through the tissue to the lungs.

It is evident from this amount of experimental information that the route taken by the larvae of *Paragonimus westermani* in its journey from the stomach to the lungs includes the abdominal cavity in animals.

SUMMARY

The details are recorded of abdominal involvement in a patient with lung fluke (*Paragonimus westermani*). The ova, unevenly distributed, were found in the lymphoid tissue and lymph sinuses, but not in any of the blood vessels of nodules removed from the mesentery and parietal peritoneum. Surrounding each group of ova there was evidence of cloudy swelling and hyperplasia of the endothelial cells. Degeneration of the nuclei took place in the nodules surrounded by the clustering ova. No adult worms were found in any of the tissues. The clinical impression was that of generalized abdominal malignancy. A discussion is given, showing the rarity of abdominal involvement in human beings and the general route of infestation in animals.

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