Kawasaki Med. J. Vol. 4: No. 3, 165-172, 1978

A CASE OF PARAGONIMIASIS IN GREATER OMENTUM

Ryo HATSUSHIKA and Akio ENDO*

Department of Parasitology, Kawasaki Medical School, Kurashiki 701-01 and
**Department of Surgery, Tottori University, School of Medicine, Yonago 683, Japan*

Accepted for Publication on August 25, 1978

Abstract

An autopsy case of extrapulmonary paragonimiasis was reported. The patient was a forty-six year-old male who has been diagnosed as gastric ulcer. Receiving the laparotomy a number of yellowish-white elastic nodules were revealed in greater omentum, being identified as lymph nodes by histological examination, which revealed the presence of ova of the lung fluke, *Paragonimus westermani* (Kerbert, 1878), while no adult worms were found in the lymph nodes.

INTRODUCTION

Although the trematodes belonging to the genus *Paragonimus* have been reported about thirty species with the present knowledge, while five species of them are distributed in Japan, i. e., *Paragonimus westermani* (Kerbert, 1878), *P. ohirai* Miyazaki, 1939, *P. iloktsuenensis* Chen, 1940, *P. miyazakii* Kamo, Nishida, Hatsushika et Tomimura, 1961 and *P. sadoensis* Miyazaki, Kawashima, Hamajima et Otsuru, 1968. A source of human paragonimiasis in Japan had long been believed to only species, *P. westermani*, until the patients of paragonimiasis miyazakii were found in Kanto district such as Tokyo, Yokohama, City, Kanagawa and Yamanashi Prefectures (Hayashi *et al.*[1], Yokogawa *et al.*[2]).

The occurrence of paragonimiasis is acquired by ingestion of the fresh water carbs infected with the metacercariae of this fluke, therefore it has been recognized as a major public health problem in the endemic areas. The adult flukes usually inhabit in the mammalian lung. On the other hand, it is well known that the individuals of the genus *Paragonimus* have the extrapulmonary infection in every place of the human body. In Japan, a great many human cases of heterotopic parasitism caused by this fluke were reported since Otani[3] had found the tumors of worm cyst for the first time in the brain, liver, intestinal wall, peritoneal cavity, diaphragum, mesentery, and as well as cervical lymph nodes.

初鹿　了，遠藤昭穂

The authors had a rare experience of finding accidentally the eggs of *Paragonimus westermani* in the lymph nodes of greater omentum of a patient undergoing the laparotomy as gastric ulcer, though paragnimiasis westermani lately shows a marked decreasing tendency in Japan.

CASE REPORT

Patient: T. T. a 46-year-old male, office worker, living in Ogi-hara, Minakami Cho, Ohda City, Shimane Prefecture, Japan.

Chief complaint: Pain in the stomach.

History: The patient began to complain of pain in the stomach about five years ago. He consulted with a physician and was diagnosed as having gastric ulcer. He first vomited by accident in mid-Sept., 1971, and on the following month he went again to the same physician, and underwent a minute examination by X-ray gastroscopy and gastrocamera. Then, he was admitted to the Department of Surgery, Tottori University, School of Medicine, in Oct. 11th, 1971 for gastric resection.

Family history: Not remarkable.

Past history: He was treated for one month as paragonimiasis in 1953, and hospitalized again for one year as pulmonary tuberculosis in 1963.

Physical examination: There were no dyspnea, cough or sputum. Examination of eyes revealed anemia in bulbar conjunctivae but no signs of jaundice palpebral conjunctivae. The lymphatic glands of cervical region showed slightly enlarged lymph nodes. The boundary between lung and liver was palpable over the 5th costal interspace. The abdomen was evenly flat in appearance and no unusually abnormality could be recognized in the inspection. Upon palpation, both the percussion and the ausculation were normal except for epigastric pain.

Hematological examination: Hemoglobin 86 %, erythrocytes 353×10^4, leucocytes 4600, lymphocytes 12 %, monocytes 2 %, segmented neutrophils 35 %, nonsegmented neutrophils 4 %, and eosinophils 3 %.

Examination of urine: The urine appeared citrine color and clarity, and specific gravity of 1.018 but no sugar. Urobilinogen was of plus-minus reaction.

Liver functional tests: Total protein 6.6 g/dl, A-G ratio 1.90, total cholesterol 175 mg/dl, jaundiced index 4 units, S-GOT 22 Karmen U, S-GPT 10 Karmen U, CCF plus-minus reaction, chymol turbidity test 1.3 units, zonic sulfate test 5.7 units and alkaline phosphatase 8 K-AU.

Examination of feces: The stools were soft and yellowish in color, occult reaction plus-minus. No parasites or ova were seen.

Intradermal test for *Paragonimus*: He gave positive intradermal reaction to VBS antigen (6.5 mm in diameter) performed after the operation.

Course after admission: The patient underwent the operation for gastric ulcer on Oct. 30th, 1971. After the operation the patient progressed satisfactorily, and he was discharged on the 37th hospital day in much improved conditions.

METHODS OF OBSERVING NODULES

The stomach of the focus was resected with some of the greater omentum attached to it. The nodules found in the greater omentum were removed from the tissue and fixed in a solution of 10 % formalin. Some nodules were serially sectioned at 10 μm, and stained with hematoxylin and eosin. The eggs discovered in the nodules were also examined.

RESULTS OF EXAMINATION

The nodules were firmly fixed to the greater omentum and seemed as cancer or masses of tumor tissues at the first glance. Fifteen nodules in total were found in the greater omentum. The nodules were spherical in shape, relatively elastic in consistency, and measured about 10 to 30 mm in diameter. The surface was white-yellowish in color and surrounded by the filamentous

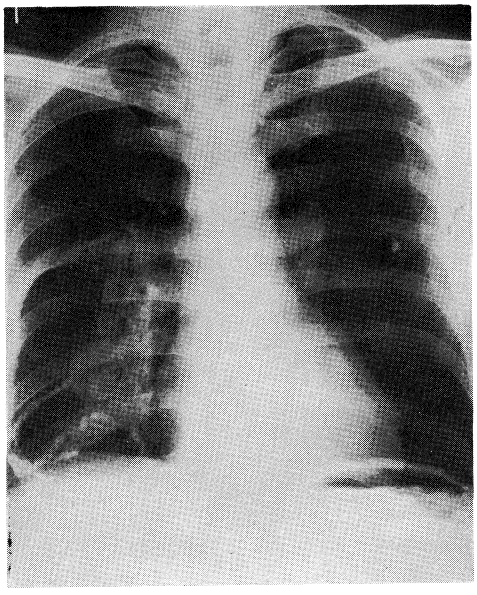

Fig. 1. Chest X-ray film, showing a calcified infiltrative shadow in the broad zone of the right lung.

tissues. In some places of the filamental tissues there were recognized narrow canals indicating afferent or efferent lymphatics of lymph nodes. The capsule stripped off with ease and the contents were creamy granular in appearance.

Microscopic examinations of a divided plane showed the circumference of the nodule to be covered with a comparatively thick membrane and the inside to be filled with caeseous substances (Fig. 2). When the nodules were sectioned, almost the entire substances fell into coagulation necrotic state, and the circumference of the nodules was covered with connective or fibrous tissues. The circumferential membrane was in a hyaline amorphous condition, and did not stain well with hematoxylin. It was about 0.6 to 1.5 μm thick (Fig. 3).

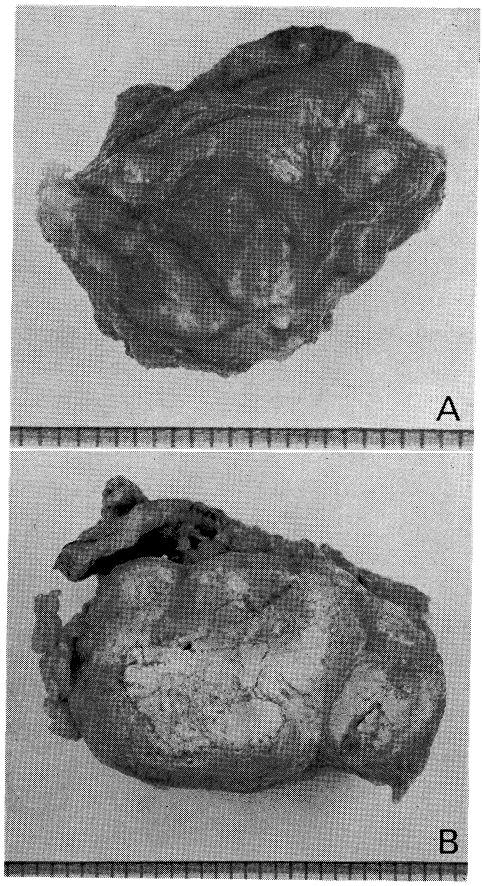

Fig. 2. Whole body of the lymph nodes isolated from greater omentum (A), and on section of it (B).
(Scale=millimeter)

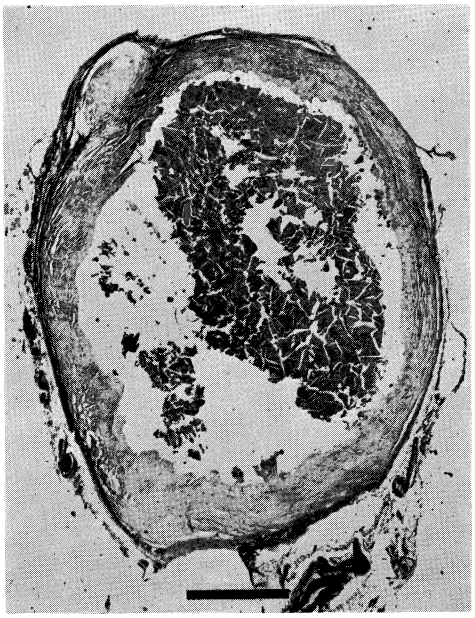

Fig. 3. Section through a lymph node, showing the complete obliteration of normal architecture. (Scale=2 mm)

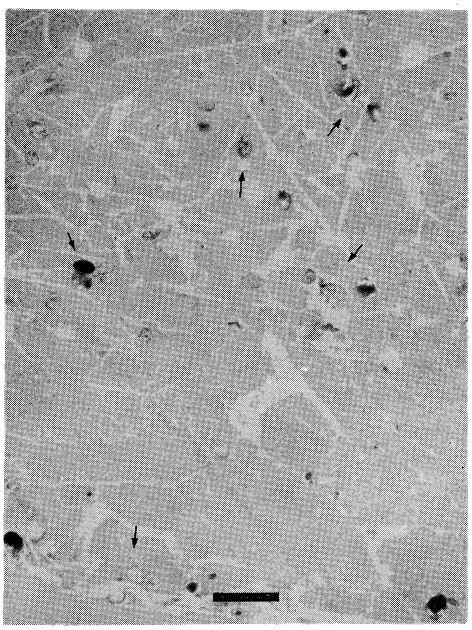

Fig. 4 Higher magnification of the contents to show many *Paragonimus* eggs (arrows). (Scale=0.2 mm)

The contents of the nodule, on the other hand, stained fairly well with hematoxylin, and there were several calcified amorphous granules, Charcot-Leyden crystals as well as the eggs of *Paragonimus* in the nodules (Fig. 4). But no adult flukes were found in the contents of the nodules.

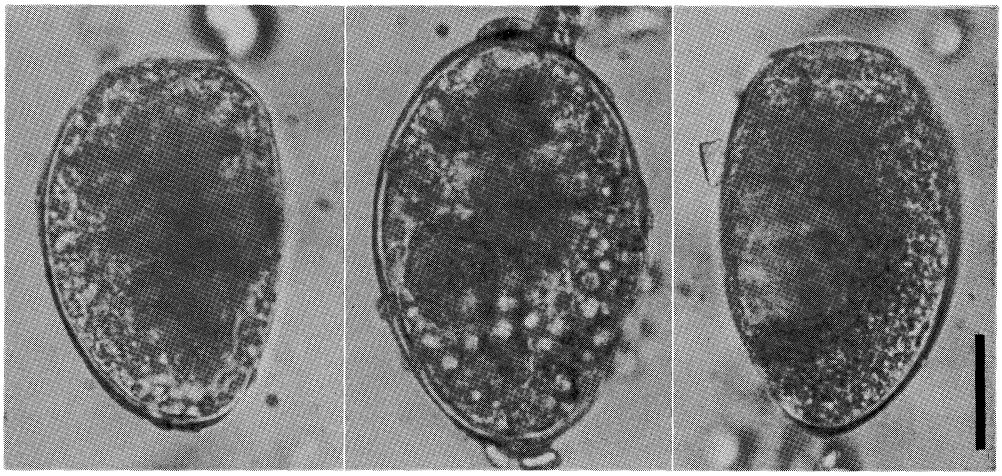

Fig. 5. Eggs of *Paragonimus westermani* from the contents of lymph node. (Scale=0.03 mm)

The eggs found in the contents were yellowish brown in color, and the greatest width was obtained mostly at the operculated half of the body. The eggs were about 70 to 102 μm (av. 85.3) in length and 49 to 65 μm (av. 56.8) in width. The egg shell was comparatively thick, and at the lateral side it was 1.4 to 3.2 μm (av. 2.5) in thickness. Moreover, aboperculated end of the egg shell was slightly thicker than that of lateral side (Fig. 5).

The intradermal test with VBS antigen was positive reaction in the patient after finding the eggs in the nodules which had swollen to 6.5 mm in diameter. X-ray examination of the chest (planigraphy) confirmed the slightly hypertrophic pleura and also revealed the escort shadows of the calcification in the broad zone of the right pulmonary field (Fig. 1).

DISCUSSION

The nodules containing the eggs of *Paragonimus* were found accidentally in the greater omentum of the patient who had a surgical operation for gastric ulcer. The data of his medical examinations before the operation showed little or nothing about the *Paragonimus* infection except for anemia in the

bulbar conjunctivae. In other words, it is certain that the present case gave a diagnostic difficulty in detecting the heterotopic parasitism of *Paragonimus*.

The present case is a very rare one to be reported recently in Japan. As stated in the introduction, the adult flukes of *Paragonimus* do inhabit in the mammalian lung, and if the situation allows this flukes can be parasites in any organs or tissues of the human body. In Japan, paragonimiasis occurring in the greater omentum have been reported in about thirty cases so far, and the major cases were discovered accidentally at the operation or at the postmortem examination in the same manner as the present case.

The nodules or tumor masses, although clinging to the greater omentum, seem to consist of two types in the formative process. According to the past cases, sections through the nodules taken from each greater omentum clearly reveal the nodules to be composed of fibrous connective tissue with some *Paragonimus* eggs in the center, or the parasites or ova residing in the lymph nodes of greater omentum. The nodules in the present case seem to be lymph nodes by the external and internal appearances of the sections, and these lymph nodes are considered to represent the old lesions. Moreover, the architecture of nodules in the present case is very similar to that of the past cases. The present case, therefore, is a typical example of the heterotopic parasitism of *Paragonimus* ova in the lymph nodes, but it is not clear whether the adult flukes have parasitized in the lymph nodes or not, because only eggs were found.

On the migration route of *Paragonimus* larvae in mammalian hosts Yokogawa[4] and Yokogawa *et al.*[5] clarified that the larvae migrating into the abdominal cavity after penetration through the intestinal wall immediately enter the abdominal wall and stay there for a week, and then appear in the abdominal cavity again. These larvae, for the most part, penetrate diaphragm although some of them penetrate into the liver, and entering the lung, later appear in the pleural cavity. Yokogawa et Suemori[6] described that the route of migration of *Paragonimus* flukes into the cerebral cavity ran along soft tissues around the neck-veins, and these flukes entering the brain could come back to the lung again.

The problems with the present case would seem to be whether the adult flukes inhabiting the lung had migrated to the lymph nodes of the greater omentum or the eggs were produced from the adult flukes that had migrated to the lymph nodes via lymphaeduct or blood circulations. The morphological features of the eggs in the lymph nodes were comparable to characteristics of *Paragonimus westermani*. The patient must have had paragonimiasis about twenty years ago, and X-ray films of the chest also revealed the escort shadows

of the calcification in the right lung. The patient could not simply remember when he had eaten the fresh water crabs. From these findings, it is assumed that the heterotopic parasitism of *Paragonimus* to the lymph nodes had occurred when the period of his paragonimiasis was detected.

REFERENCES

1) Hayashi, S., Yamamoto, H., Sugamura, H., Motoyoshi, K. and Akiyama, M.: Five human cases of paragonimiasis miyazakii with the studies on the infection sources. Jap. J. Parasit. 23 (Suppl.): 60, 1974 (in Japanese)
2) Yokogawa, M., Araki, K., Saito, K., Momose, T., Kimura, M., Suzuki, S., Chiba, N., Kutsumi, H. and Minai, M.: *Paragonimus miyazakii* infections in man first found in Kanto district, Japan — Especially, on the methods of immunosero-diagnosis for paragonimiasis. Jap. J. Parasit. 23: 167-179, 1974 (in Japanese)
3) Otani, S.: On the anamnesis and the post morten examination of paragonimiasis patients. Tokyo Igakkai Zasshi 1: 458-464; 2: 297-302, 1887-1888 (in Japanese)
4) Yokogawa, M.: *Paragonimus* and paragonimiasis. Progress of Medical Parasit. in Japan Vol. 1: 61-156, 1964
5) Yokogawa, M., Yoshimura, H., Sano, M., Okura, T. and Tsuji, M.: The route of migration of the larva of *Paragonimus westermani* in the final hosts. J. Parasit. 48: 525-531, 1962
6) Yokogawa, S. and Suemori, S.: Supplement of investigations on lung fluke. On the route of migration of the worms of *Paragonimus westermani* transplanated in the orbit to the pleural cavity. Okayama Igakkai Zasshi 354: 1-3, 1919 (in Japanese)