Paragonimiasis: an important endemic disease in Perú

Paragonimiasis: una enfermedad endémica importante en Perú

Ibáñez-Herrera, Nicanor [1]

INTRODUCTION

Paragonimiasis is a pulmonary disease that attacks human lungs as well as some domestic and wild animals[1,2,3,4,5,47]

In Peru, this respiratory illness is acquired by eating raw or insufficiently cooked fresh water crabs in "cebiche", a typical Peruvian dish prepared with lemon juice, pepper and salt. It is also usual to sell "cebiche" in Peruvian restaurants prepared with marine fishes, especially *Mustelus dorsalis* (tollo) which does not transmit the illness.

The clinical profile of paragonimiasis or pulmonary distomatosis includes chronic cough and hemoptoic expectoration with slight pain on the back or chest which is why this illness is confused with tuberculosis[1,2,3,5]

The diagnosis of paragonimiasis is made through microscopic exam of sputum or feces, where eggs of the parasite should be found. However, it happens that pulmonary or extrapulmonar parasites not always produce eggs and this hinders the direct diagnosis; therefore an immunological diagnosis is necessary[67]

There are many endemic places in the south provinces of Cajamarca - Peru, being necessary to investigate in other zones with similar ecology.

BRIEF HISTORY OF THE PARAGONIMIASIS IN PERÚ

Although the Paragonimiasis could have existed since immemorial time in Peru, it was in 1910 when Barton made it evident, for first time in a young man from Trujillo. This man, member of an aristocratic family, traveled to Lima in March of 1908 and stayed in his uncle's house[2]

On April of 1909 he went to Ancon to participate in the construction of the railway to Huacho. Then he moved to San Lorenzo Island to build a sanitary area; during this time he suffered an accident and broke his left forearm. He was immediately taken to Guadalupe Hospital in Callao[2]

Once he was healthy and out of the hospital, he was hired as steward of a property named Huaito to command the daily work of 45 Japanese and 30 natives[2] After being working during three months with no health problems, he started to feel a slight chest pain, cough and tiredness. The nature of his work required him to ride a horse most of the day[2]

Wishing himself to feel better, he stopped working for a while and rested in the ranch, but the thorax and back pain were stronger. At the same time, his cough turned to be haemoptic and a severe liver pain appeared.

Unable to continue with his work, he returned to Lima and reentered to Guadalupe Hospital, on January 17 of 1910[2]

After several clinical and laboratory examinations the physicians diagnosed Paragonimiasis based on the finding of eggs in the sputum of the patient, discarding tuberculosis. The young man stayed in the hospital but the chest, back and liver pain did not disappear. The patient left the hospital, deeply depressed. He was convinced that his illness was incurable; the only thing to do was to wait the death to come[2]

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This man of 21 years old never traveled outside Peru, which is why it is considered as the first autochthonous case of Paragonimiasis in Peru[2]

Between 1910 and 1913, Julian Arce detected three more cases of Paragonimiasis by sputum examinations: one of the patients came from Collique, another from Caudivilla, village located in Carabayllo valley, and the third one was from Monterrico Grande (Ate Valley - Lima). In all these properties, the agricultural labors were carried out by Chinese and Japanese people. It was supposed that this pulmonary illness was due to *Paragonimus westermani* (Kerber, 1878) Braun, 1901 etiologic agent of the Asiatic Paragonimiasis that was introduced in Peru by the Asiatic emigrants[1]

In 1921, Aníbal Corvetto reported another Paragonimiasis case. The patient was a Peruvian who referred that he got the illness while he was living in Trujillo, the capital city of the Department of La Libertad. The diagnosis was made in Lima by finding eggs of the parasite in the sputum[5]

In 1956, Bazan reported a native case from the village of Casa Grande, landed property located in the Chicama Valley. The patient was taken to the hospital of Piura, where he was operated in cooperation with Ginocchio Feijó. The quistic area extirpated was taken to Lima and it was subjected to several anatomo-pathologíc studies which shown the presence of necrosed tissue with abundant presence of eggs of *Paragonimus westermani*[3], (According to a report from Lima)[4]

In 1958, Morales Moreno reported four cases of Paragonimiasis while preparing his thesis to get his baccalaureate degree on Medicine. The first one was from Cartavio town, the second was from Casa Grande (both patients were born in Cajamarca), the third was a cavalry man that was living in Chocope (these three cases reported from the same valley of Chicama); and finally, the fourth case was from Huacho but his place of birth was Chincha Alta. All the diagnosis were only made by microscopical examination of the haemoptic sputum[47].

In August of 1967, the author (Nicanor Ibañez Herrera) discovered intrapulmonary/ adults of *Paragonimus* in a domestic cat whose owners were suffering Paragonimiasis too. This discovery was carried out in the limit between San Juan and La Asunción, districts of Cajamarca province[11,12].

The Paragonimus that was found by the author presented differences with the etiologic agent of the Asiatic Paragonimiasis, Paragonimus westermani. These differences gave a good reason to present the discovery in the Fourth Latinoamerican Congress and Second Peruvian Congress of Microbiology and Parasitology held in Lima on November of 1967. These events had a great resonance in the national and international intellectual scope[11,12].

Later studies revealed also for first time In Peru adults of **Paragonimus** in lungs of **Didelphis azarae pernigra** "hurón" from Magdalena, near San Juan, Cajamarca, which named, by that time **Paragonimus peruensis** Ibáñez et Miranda, 1968[13]

Our observations were confirmed by the University of Kyushu, in Japan; the parasite found was a new species. It was named *Paragonimus peruvianus* sp. n.[38].

Before this discovery, it was thought that this pulmonary illness was an imported disease brought by Asiatic emigrants (Chinese and Japanese) that came to Peru to work on agricultural labors of the landed properties in the coast of Lima Department[1,2].

In 1972, Grados et al. reported 168 cases of Paragonimiasis diagnosed by the examination of sputum with cooperation of University of Chiba which was in charge of carrying out the intradermal and complement fixation tests[12].

In 1975, Yokogawa, from the University

of Chiba, came to Peru and traveled with the author to Condebamba valley, in Cajamarca, to develop immunological studies of Paragonimiasis, which had already attained intercontinental importance. In this opportunity, 30 more cases were described[63].

In 1976, Náquira et al. described 22 positive cases in San Juan and Magdalena districts in Cajamarca Department[50].

In 1979 the Japanese team of scientists returned to Peru. It was commanded by Yokogawa. The author accompanied them to Condebamba valley to continue with the immunological studies of the positive cases of Paragonimiasis. The casuistry enlarged to 46 positive cases[64,65].

In 1981, the Japanese scientists visited San Juan and Magdalena found 17 positive cases in the population of both villages. The diagnosis was made by sputum and sputum examinations, intradermal and complement fixation tests[66].

Professors of Department of Microbiology and Parasitology of the National University of Trujillo -Peru (Nicanor Ibañez H., Eduardo Fernandez V., et al.) studied around 325 proved cases of Paragonimiasis and most of the cases were from Condebamba, Cajabamba[19].

Later in Peru, Miyazaki et al. identified other species of *Paragonimus. Paragonimus caliensis,* which metacercariae were found in *Hypolobocera gracilignata* from Condebamba, was identified by experimental analysis in a cat in 1967. *Paragonimus amazonicus* was found in the respiratory system of *Philander opossum* "ferret" and Chironectes minimus "rata de agua" from Tingo Maria, Rupa Rupa District, Leoncio Prado Province, Huánuco Department[42]. *Paragonimus inca* was obtained from *Chironectes minumus, Didelphis marsupialis, Felis yagouaroundi* "jaguar", *Felis concolor* "puma", *Felis catus* "domestic cat". All of them from Tingo Maria, Huánuco[43,45].

In the history of Paragonimiasis in Peru, two important cases are known. In the first one, Bazan and Ginocchio Feijo obtained an anatomic piece containing intrapulmonar adults trematodes and send it to Lima in 1956. At Hospital Obrero in Lima, Dr. Uriel Garcia Caceres diagnosed: parasitary cystosis by *Poragonimus westermani.*

The second case refers to a primary school teacher with initials A.R.M. from San Juan Dístrict-Cajamarca who was operated in Bravo Chico Hospital in Lima in 1967. Grados was in charge of this investigation. Although a morphological study of the parasite is important to determine the real etiologic agent of the lung illness, the authors could not recognize the parasite due to a lack of technique management.

Both cases were reported by Peruvians in the Province of Lima where a good number of Chinese and Japanese peasants dedicated to agricultural labors. As occurred in Huaito case, it is esteemed the possibility that some of these Asian peasants carne to Perú infected with the parasite and it got adapted to our native mollusks and crabs. It ¡s possible that the parasite infected the crustacean *Mocrobachium inca,* a very popular food in Huaito, which was taken to Lima (information collected by the author accompanied by Mr. C. Jara Campos in two visits to Huaito in 1984).

RESUME AND SUGGESTIONS

1.- Since 1910, Paragonimiasis in Peru has been presented as a respiratory illness, standing out Lima at the beginning, later La Libertad and Cajamarca Departments It is necessary to investigate the presence of the illness in other zones or, at least, to realize more studies ¡n Cajamarca Department where a larger number of human cases infected by *Poragonimus peruvionus* has been reported.

2.- It was alarming that other cases of Paragonimiasis was described in places near Lima like Huaito, Collique, Caudivilla, Monterico Grande and Huacho where a

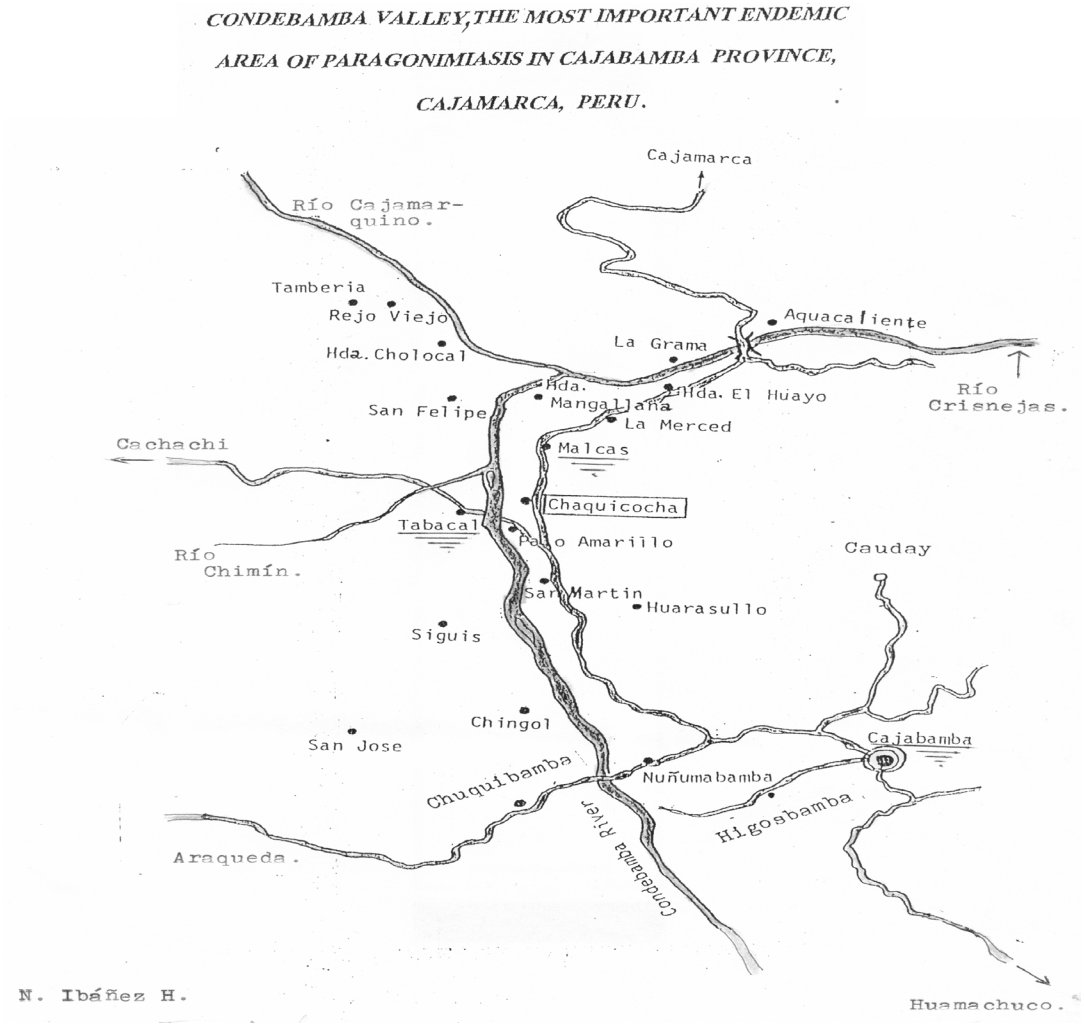
great number of oriental peasants worked and similar circumstances allowed the establishment of *Poragonimus westermani.* This situation incited to dictate several sanitary rules against Asiatic immigration which were given to the V Latin American Congress of Medicine through the outstanding participation of Dr. Arce in 1914.

3.- All cases of Paragonimiasis reported in Lima and La Libertad occurred from 1910 to 1958. Peruvian scientists were profoundly worried about the possibility of a new lung parasitosis, but up today it has not been possible to identify adults or metacercariae of *P. westermani* or *P. peruvianus.* This is the reason because it is suggested to study this important fact from a scientific point of view in Peru.

4.- It has been demonstrated that the crab *Hypolobocera gracilignata* is the second host infecting people and it is acquired through eating them in "cebiche" causing the pulmonary illness. It is necessary to look for infections in other areas and in other species of eatable crabs.

As the years pass by, it has been found more crustaceans host of metacercariae of *Poragonimus peruvianus: Hypolobocera chilensis* from San Miguel Province, Cajamarca Department[25]; and *Hypolobocera henrici* from Amazonas Department[30].

5.- There is also a broad field of study concerning small mollusks of Hidrobiidae Family: *Aroapyrgus colombiensis* from Condebamba Valley which are susceptible to get infected with miracidia of *Paragonimus peruvianus* and with the capacity to multiply those cercariae, (Malex



& Ibañez and Guerra, 1985. J. Parasit. 71 (2): 253-256.)[37].

6.- Due to the human factor, there are only 325 positive cases of paragonimiasis registered in Peru. Most of them are peoples from Condebamba, Cajabamba, Cajamarca Department[19].

Through many years in different seasons the adequate medicine was given (Bithionol), but up today nobody has evaluated the results of the treatment. This aspect requires special attention.

7.- It also has to be mentioned that parasite intrapulmonary stage is limited and it occurs that it not always eliminates microeggs. This hinders the diagnosis using sputum and feces which is why it is necessary to carry out immunological evaluations in skin test and complement fixation test.

Regarding treatment of Paragonimiasis, it has been tested by the author that Praziquantel is better than Bithionol when evaluated in *Felis catus* "domestic cat"[26,27].

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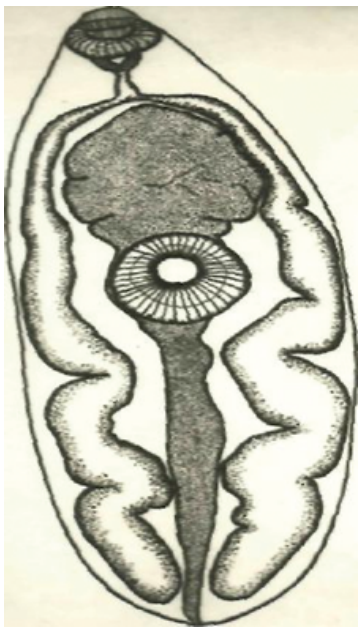

Fig.1. Metacercariae of *Paragonimus peruvianus*. Acording of the author.

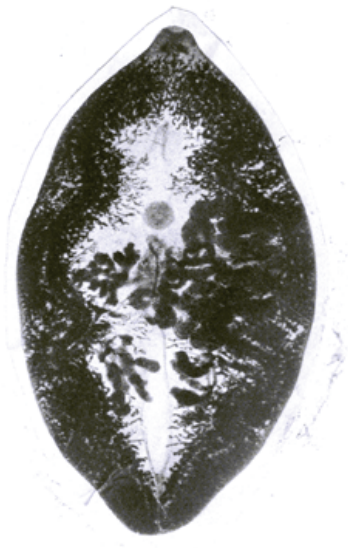

Fig. 2. *Paragonimus peruvianus* by experimentation of the author (360 days)

Fig.3- *Paragonimus peruvianus*: on the .outside Pulmonary, Experimentally 180 days. Acording of the author.

Fig.-4. *The* same Fig.3 by Camera lucida

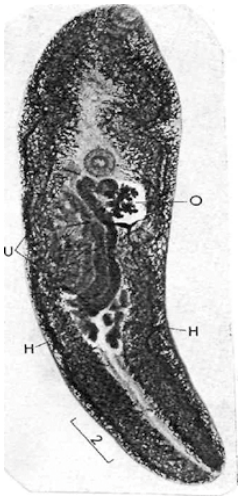

Fig. 5 *Paragonimus amazonicus* Acording Miyazaki et al. 1973

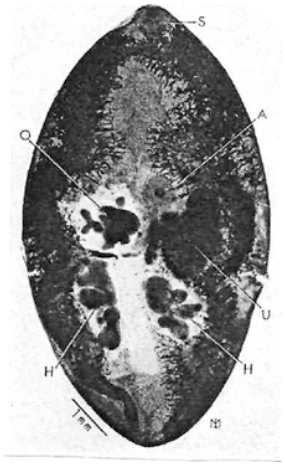

Fig.6: *Paragonimus caliensis* Little, 1968. Acording Miyazaki et al. 1972.

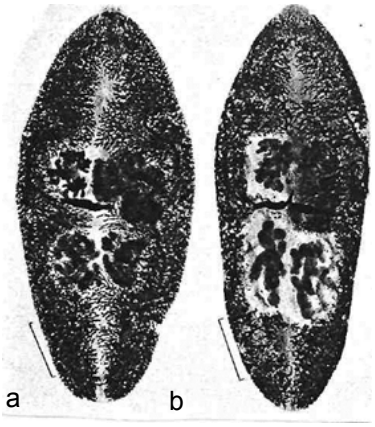

Fig.7 a- *Paragonimus inca*. Icording Miyazaki et al. 1975
Fig. 7b- *Paragoninms pulmonalis* ácording Miyazaki, 1991.

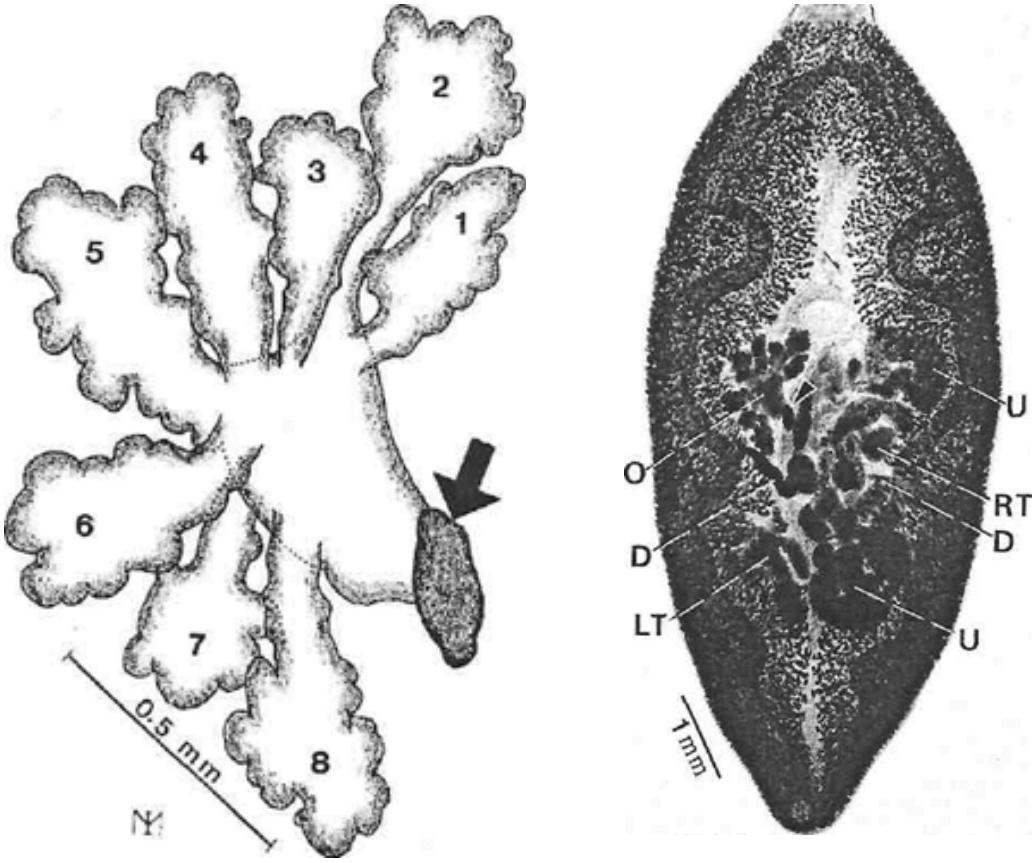

Fig. 8. *Paragonimus wesitermani japonicus* 0= ovary branching into eight lobes with Seminal receptacle (arrow) RT= right testis, LT= left testis,D= Vitelline duct, U= uterus. From Miyazaki, 1991.

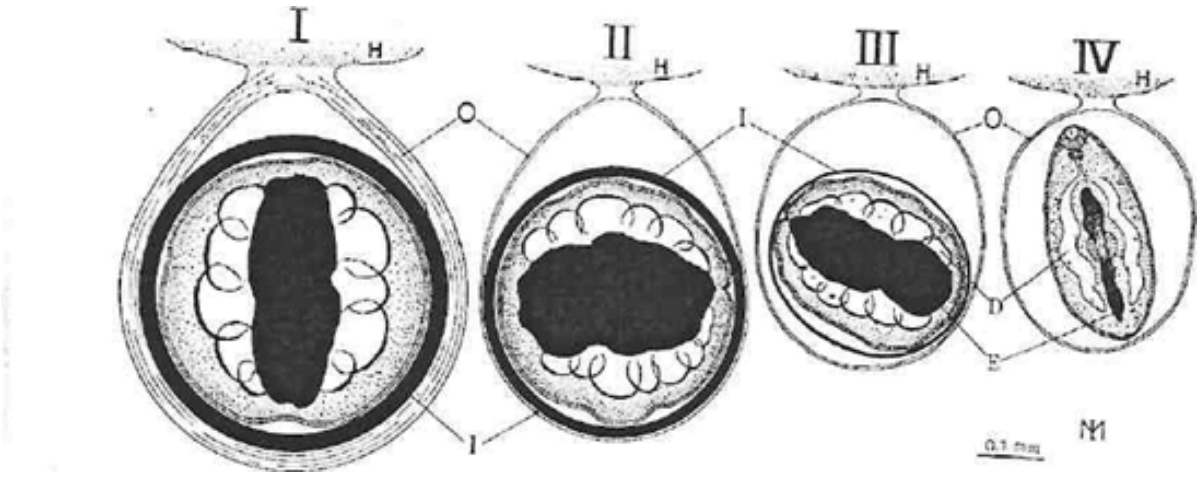

Fig. 9- METACERCARIE OF PARAGONIMUS IN JAPAN. I.- P. miyazakii.- II.- P. pulmonalis and P. westermani japonicus. III.- P. o. ohirai and P. o_ sadoensis. IV.- P. o.f. iloktsuenensis.
D= intestine. E= excretory blader. H= host tissue. I= inner cyst. 0= Outer cyst. Acording Miyazaki, 1991.