EPIDEMIOLOGICAL ASPECTS OF HUMAN CATHAEMASIASIS IN THE PHILIPPINES (A NEWLY DISCOVERED PARASITIC INFECTION)

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ABSTRACT

The newly discovered intestinal fluke of man *Cathaemasia cabrerai* sp.n. gives rise to epigastric pian similar to that of peptic ulcer. Survey of seventeen barangays of Echague for *Cathaemasia* eggs in the stool revealed 19.4 percent prevalence, with barangay Malibago having the highest prevalance (35.7%) followed by barangay San Fabian (33.3%) and Soyung (20.2%). Adults had higher prevalence than children. All those found positive gave a history of having eaten uncooked *Bullastra* snails, locally known as "birabid" which are taken with alcoholic drink or with rice. There appears to be a positive correlation between the eating of raw "birabid" snails and *Cathaemasiasis*. Attempts to establish the life cycle of the parasite have failed so far and work on this is still going on.

Treatment of cases using Praziquantel and Bithionol has been successful but the former drug appears to be more efficacious and with less side reactions.

The "birabid" snails have been identified to be *Bullastra velutinoides* Bergh which belongs to the family Lymnaeidae.

Introduction

In July 1984, a 34-year old male, native of Echague, Isabela (about 340 km north of Metropolitan Manila) was referred to the Department of Parasitology, Institute of Public Health by the Philippine General Hospital for fecalysis (Cabrera *et al.*, 1984; Jueco *et al.*, 1984). The main complaints of the patient were epigastric pain associated with daily passage of soft stools, left upper quadrant heaviness accompanied by flatulence (Cabrera *et al.*, 1984). Routine stool examination using DFS and FECT, revealed eggs resembling those of either fasciola, fasciolopsis or echinostoma species. The eggs were large, averaging 132.3 x 89.2 microns in size, golden yellow in color, operculated with thick protruberance at the abopercular end. Because of the uncertainty in the microscopic diagnosis, we attempted to recover the adult worms. Praziquantel was first given but only few flukes were recovered. Bithionol was given next and thirty-two adult flukes were recovered; these were fixed, stained and identified as a new species of *Cathaemasia* (Cabrera *et al.* 1984; Jueco *et al.*, 1984; Dawes, 1956).

When interviewed, the patient claimed that he started experiencing the symptoms mentioned above, approximately one month after the intake of raw

snails locally known as 'birabid" (Cabrera *et al.*, 1984). The interview also revealed that several other people, mostly his relatives, partook of the same raw snails and he claimed that the practice was rather widespread in the area. Realizing that this parasite might be causing a disease of public health importance, we decided to investigate the nature of this new parasitic disease by conducting field surveys during the months of October 1984 to May 1985.

Materials and Method

Studies were conducted during seven visits in Echague town lasting for seven months. Stool specimens were collected from the population with the help of a native from the study area, serving as guide and interpreter, and some local health workers from the Rural Health Unit of the Ministry of Health. The thumb-sized stool sample was placed in a cone-shaped paper cup lined inside with wax paper and bearing the subjects' name, age, sex and barangay. The stool was then emulsified thoroughly in a screw-cup vial containing 10 percent formalin. All preserved specimens were shipped and examined at the Institute of Public Health using formalin-ether-concentration technique (FECT). All individuals found positive for Cathaemasia eggs were interviewed with emphasis on signs and symptoms of the disease as well as their eating habits.

Treatment of cases with Cathaemasia eggs in their stool was done on a voluntary basis. The subjects were weighed for drug dosage determination and then divided randomly into two groups. One group received Praziquantel while the other received Bithionol. The doses used were 15 mg per kilo body weight single dose for Praziquantel and a total adult dose of 2 gms per subject for Bithionol. The subjects were later interviewed concerning side effects (if any) during and after the course of treatment. They were also requested to submit stool samples, two and four weeks after treatment to determine the efficacy of the two drugs.

Whenever possible, life cycle studies of the parasite were done. Infected individuals were requested to collect snails from the source indicated by them. The snails were placed on a petri dish and then dissected under a stereoscope for larval stages of the parasite. Snails found to harbour metacercaria-like organisms were fed to experimental animals like white mice, rats, gerbils and ducklings. The feces of these animals were examined periodically for eggs of Cathaemasia. After sometime, these animals were sacrificed and were searched for the adult flukes. During snail collection, we noted the natural breeding sites of the "birabid" snails as well as other snails in the same environment. Some of these snails were taken to the Institute of Public Health for identification and/or verification by competent malacologists. The rest of the snails were allowed to breed in shallow water for experimental infection in the future.

We planned to catch the cattle egrets by trapping or shooting them with air rifles and then dissect them for the presence of the adult flukes in the esophagus. We shall also tried to collect the fresh droppings of these migratory birds and preserve these in 10 percent formalin for eggs of this fluke.

Results and Discussion

Out of the 64 barangays of Echague, Isabela, only 17 or 27 percent were covered by our survey team. The topography of Isabela province consists of an area of lowland plains used for rice farming and of distant highlands planted to tobacco, corn and peanuts. For our purpose, we concentrated the survey on the lowland plains planted to rice because ricefields are the habitat of the "birabid" snails. A total of 464 stool samples were collected during the survey period.

Table 1 shows the age and sex specific prevalence rates of Cathaemasiasis in some barangays of Echague. The total prevalence rate of the disease for the sample surveyed was 19.4 percent. There was no statistical significant difference between the male and female population. The older age group (15 years and above) had higher prevalence rates than the lower age group (0-14 years). The 20-29 and 30-39 age groups had the highest prevalence compared to all other age groups. The youngest case encountered in our surveys was a 5-year old male while the oldest was a 70-year old female.

Interviews among those who frequently eat the "birabid" snails revealed that they are "Ilocanos" who migrated to Echague, Isabela. They were the group that introduced the practice of eating the "birabid" snails as appetizer during cocktail sessions. The females and children, however, eat the snails with rice. This may probably explain the higher prevalence among the older age group.

Table 2 shows the prevalence rates in the barangays surveyed. A total of 90 cases out of 464 individuals examined, or 19.4 percent, came from seven barangays. Barangay Malibago had the highest prevalence rate of 35.6 percent, followed by San Fabian with 33.3 percent, Castillo with 25 percent, and Soyung with 20.2 percent. More than half of the barangays surveyed were found negative for Cathaemasiasis.

The distribution of the 90 cases of Cathaemasiasis by barangay is shown in Table 3. There were 56 cases or 62.2 percent from barangay Malibago and 20 or 22.2 percent from barangay Soyung. The original or first case reported was a native of Soyung. It was also observed that barangays with high prevalence rates are usually situated farther away from the "poblacion" or center of town and are always surrounded by vast ricefields which are the main source of the "birabid" snails during the planting season.

Table 4 shows the other parasitic infections found among the ninety *Cathaemasia* cases. *Ascaris*, hookworm and *Trichuris* infections were the three most commonly found among them. Trematode, cestode and protozoan infections were also found, although quite rarely. It appears that the population was quite susceptible to soil-transmitted helminthiases probably because of farming and the close contact with polluted soil. Unsanitary disposal of human excreta and lack of environmental sanitation were commonly observed in several barangays.

The team was able to interview only 65 individuals for the symptomatology of Cathaemasiasis because some people were on vacation, others had moved to other areas or were too far away to be reached by the team. Table 5 shows the symp-

Table 1. Population distribution and age and sex specific prevalence rates of Cathaemasiasis in selected barangays of Echague, Isabela (as of May, 1985)

Age Group (Years)	*MALE*			*FEMALE*			*TOTAL*		
	No. Exam.	*No. (+)*	*Percent (+)*	*No. Exam.*	*No. (+)*	*Percent (+)*	*No. Exam.*	*No. (+)*	*Percent (+)*
0-4	7	0	0.0	6	0	0.0	13	0	0.0
5-9	45	4	8.9	47	6	12.8	92	10	10.9
10-14	63	8	12.7	63	6	9.5	126	14	11.1
15-19	17	4	23.5	10	2	20.0	27	6	22.2
20-29	21	4	19.0	25	10	40.0	46	14	30.4
30-39	27	8	29.6	35	11	31.4	62	19	30.6
40-49	21	7	33.3	24	5	20.8	45	12	26.7
50-59	18	6	33.3	18	4	22.2	36	19	27.8
60-up	9	4	44.4	8	1	12.5	17	5	29.4
TOTAL	228	45	19.7	236	45	19.1	464	90	19.4

Table 2. Prevalence of Cathaemasiasis by barangay as of May, 1985

Barangay	*No. Examined*	*No. Positive*	*Percent Positive*
1. Babaran	38	4	10.53
2. Buneg	1	0	0.00
3. Cabugao	13	0	0.00
4. Castillo	4	1	25.00
5. CFS (assorted)	22	0	0.00
6. Fugu	10	0	0.00
7. Gucab	3	0	0.00
8. Malibago	157	56	35.67
9. Maligaya	17	1	5.88
10. Matartarang	5	0	0.00
11. Pangal Sur	32	5	15.63
12. San Fabian	9	3	33.33
13. Sto. Domingo	6	0	0.00
14. Silauan Norte	9	0	0.00
15. Silauan Sur	16	0	0.00
16. Soyung	99	20	20.20
17. Taggappan	20	0	0.00
18. Tuguegarao	3	0	0.00
TOTAL	464	90	19.40

Table 3. Distribution of 90 Cathaemasiasis cases by barangay in Echague, Isabela, 1985.

Barangay	*No. of Cases*	*No. of Total (%)*
1. Babaran	4	4.44
2. Castillo	1	1.11
3. Malibago	56	62.22
4. Maligaya	1	1.11
5. Pangal Sur	5	5.56
6. San Fabian	3	3.33
7. Soyung	20	22.22
TOTAL	90	100.00

Table 4. Concomittant parasitic infections among 90 cases of *Cathaemasia*

Helminth/Protozoan	*No. of Cases*	*% Frequency*
1. *Ascaris lumbricoides*	37	41.11
2. Hookworm	33	36.67
3. *Trichuris trichiura*	29	32.22
4. Heterophyid flukes	5	5.56
5. *Taenia* sp.	1	1.11
6. *Entamoeba coli*	10	11.11
7. *Entamoeba histolytica*	4	4.44
8. *Endolimax nana*	7	7.78
9. *Giardia lamblia*	2	2.22
10. Negative	19	21.11

Table 5. Cathaemasiasis symptomatology (based on 65 cases) interviewed from Echague, Isabela as of May, 1985

Symptoms	*No. of Patients*	*% Frequency*
Epigastric pain (similar to peptic ulcer)	56	86.2%
Headache	35	53.8%
Diarrheic stools (soft)	29	44.6%
Difficulty of respiration	16	24.6%
Painful micturition	13	20.0%
Dizziness	5	7.7%
Borborygmi	1	1.5%
Tympanism	1	1.5%

toms enumerated by the respondents. The symptoms mentioned were not pathognomonic of the disease since many of them could be attributed to other causes. Epigastric pain is the most common symptom. Realizing this problem, the survey was extended to those found negative for *Cathaemasia* eggs in the stool and they also reported headache, difficulty of respiration and dizziness.

In barangay Malibago, twelve families consisting of 76 members were given questionnaires. Each family had at least one member found positive for *Cathaemasia* eggs in the stool. Out of the 76 household members, only 61 or 80.3 percent were able to respond. The question on the kind of food eaten raw, other than snails, revealed that shrimps, fish, pork or beef were likewise eaten by some which

explains the finding of heterophyed and taenia eggs among the people in this barangay.

The snails are usually collected from ricefields and occasionally in irrigation ditches. Eating of "birabid" snails is an acquired habit parents may teach their children.

Inquiry into the manner of preparing "birabid" snails revealed that the snails are placed in a shallow perforated bamboo basket where they are vigorously mixed with salt. During the process, the snails exude a thick mucus secretion which is washed with water. The secretion is supposed to be poisonous, giving rise to dizziness and vomitting when ingested. After the snails have been washed, salt, ginger, onions, vinegar, pepper and other assorted spices are added. Some people prefer to eat the snails right after mixing with the above ingredients while others would allow the snails to ferment for a day or two.

Among the 45 cases treated with Praziquantel and Bithionol, only 39 could be followed-up at Malibago and more than half of them reported no side effects. There were slightly more side effects, like vomitting, reported after Bithionol treatment than after Praziquantel but the difference was not statistically significant. Praziquantel appears to be more efficacious than Bithionol.

The "birabid" snails collected initially were brought to Manila. Some snails were sent for identification to Dr. Suchart Upatham and Dr. Viroj Kitikoon, both malacologists from Mahidol University, Bangkok, Thailand thru the kindness of Prof Chamlong and Dean Santasiri. Dr. Bonifacio Dazo of WPRO was also given snails for identification. These three malacologists identified the snails as *Bullastra velutinoides* Bergh which is synonymous with *Myxas cumingiana* (Pfeiffer) or *Lymnaea cumingiana* (Pfeiffer), all belonging to lymnaeid snails (Bequaert and Clench, 1939; Burch, 1980). This species is believed to be endemic in the Philippines (Pagulayan and Enriquez, 1983). Prior to the report of Cathaemasiasis in humans in the Philippines, *Bullastra* was of no medical importance (Abbot, 1948). Although it was suspected to be one of the second intermediate hosts of *Echinostoma ilocanum*, they failed to incriminate it (Tubangui and Pasco, 1983). *Bullastra* was usually found together with other lymnaeids (Padix), planorbids (Gyraulus), ampullarids (Pila) and viviparids (vivipara).

Dissection of *Bullastra* collected from barangay San Fabian revealed metacercaria-like stage in clusters mostly from visceral organs of the snails while those from barangay Cabugao were all negative. Some of these metacercaria-like stage were fixed in AFA, stained and mounted. Others were placed in syringe and fed to white mice, rats, gerbils and ducklings. Unfortunately, none of the experimental animals were infected. Apparently, these *Bullastra* snails are abundant during the rainy months and absent during the dry season. Live *Bullastra* were brought to our laboratory for cultivation but failed to survive, at that time.

The cattle egret (*Bubulcus ibis coromandus* Boddaert) locally known as "tagak" is our principal suspect as the natural reservoir host for *Cathaemasia*. The suspicion is based on information that this fluke has been described as an esopha-

geal parasite found in snail-eating birds such as storks and herons (Dawes, 1956). Cattle egrets are commonly found resting on the back of water buffaloes after feeding and usually defecate there too. Dried droppings of these birds were found along banks of rice paddies where *Bullastra* snails were found. These migratory birds are abundant from October to February and rare during the summer months. Attempts to capture these birds have failed so far but hope has not been given up. Feces of ducks in the area were examined for *Cathaemasia* egg but were found negative. Local surveys in the past revealed that the cattle egrets harbor a wide variety of parasites in their gastrointestinal tract, such as *Centrocestus formosanus, Haplorchis taichui, H. yokogawai, Posthodiplostomum larai, Nephrostomum bicolanum* and *Pegosomum bubulcum* (Tubangui and Pasco, 1933).

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