

Fifteen Human Cases of *Fibricola seoulensis* Infection in Korea

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INTRODUCTION

Fibricola seoulensis Seo, Rim and Lee, 1964 (Trematoda: Diplostomatidae) is the only diplostomatid fluke known to infect human in its adult stage, since this fluke was recovered from a man in Korea (Seo *et al.*, 1982). The clinical manifestations observed from the case were epigastric discomfort or pain, diarrhea, fever and eosinophilia.

In natural conditions, *F. seoulensis* is widely prevalent among house rats in inland Korea (Seo *et al.*, 1964; Seo *et al.*, 1981). *Rana nigromaculata* and its tadpole are known as the second intermediate host (Hong *et al.*, 1982; Hong *et al.*, 1983) and several terrestrial snakes are regarded as the paratenic host; *Natrix tigrina lateralis*, *Elaphe dione*, *E. rufodorsata*, *Dinodon rufozonatum rufozonatum* and *Agkistrodon brevicaudus brevicaudus* (Hong *et al.*, 1982; Cho *et al.*, 1983).

Those studies on the intermediate and reservoir hosts of *F. seoulensis* suggest that the life cycle of this fluke is continuously maintained in Korea. Therefore, human fibricoliasis is expected to appear more, as one of zoonoses, in a certain group of people such as the snake-eaters.

The authors had a chance to examine the fecal specimens of a special group of Korean males aged in twenties, who ingested the snakes or frogs once or more. The eggs of *F. seoulensis* were found from 15 cases and six of them were

proved by worms after treatment. Some aspects of human fibricoliasis in Korea are briefly discussed in this paper.

CASE DETECTION AND RESULTS

A total of 244 Korean males was examined for their intestinal parasites by both cellophane thick smear method and formalin-ether concentration technique in Seoul from December, 1983 to March, 1984. The eggs of *F. seoulensis* were observed from 15 cases. They were treated with praziquantel (Distocide®, Korean product) 20mg/kg single dose. And magnesium salt purgation was followed to 9 out of them. The diarrheal specimens were collected 3 to 5 times individually, examined under dissecting microscopy, and the adult worms were isolated from 6 cases.

Table 1 summarizes the results of egg counts and worm collection. The numbers of eggs per gram of feces (E.P.G.) ranged from 0 to 500 by Stoll's method. And the worms were counted from 0 to 78 per individual. All but one of the egg positive cases ingested the roast or raw snake once or more and one case ate the frog muscle. The last time of snake ingestion ranged from September, 1981 to November, 1983 by the case.

A total of 100 *F. seoulensis* eggs from the cases measured 0.081-0.102mm long and 0.051-0.063mm wide. Their opercular depth measured 0.002-0.010mm and width 0.014-0.027mm (Table 2). About half of the eggs had well-

Table 1. Egg counting, worm collection and history of 15 *F. seoulensis* egg positive cases

No. of cases	Name (age, sex)	EPG	No. of worms	Last time of snake ingestion
1.	C.H.Y. (26, M)	500	2	*n.c.
2.	L.D.J. (23, M)	100	78	Dec., 1981
3.	K.C.S. (25, M)	100	n.c.	n.c.
4.	L.S.Y. (24, M)	50	0	Dec., 1981
5.	B.S.Y. (25, M)	0	17	Sep., 1981
6.	C.H.J. (25, M)	0	3	Sep., 1983
7.	Y.M.Y. (21, M)	0	1	Sep., 1983
8.	H.T.Y. (26, M)	0	1	Apr., 1982
9.	B.J.H. (26, M)	0	0	Apr., 1982
10.	**L.K.Y. (25, M)	0	0	Dec., 1981
11.	#M.J.B. (24, M)	0	n.c.	Jan., 1982
12.	H.H.K. (22, M)	0	n.c.	Nov., 1983
13.	L.W.J. (28, M)	0	n.c.	n.c.
14.	C.S.K. (23, M)	n.c.	n.c.	n.c.
15.	P.C.N. (25, M)	n.c.	n.c.	n.c.

* n.c. : not checked

** L.K.Y. complained of dizziness and sleepiness after praziquantel treatment.

M.J.B. ate the frog rather than the snake.

Table 2. Measurements of *F. seoulensis* eggs from human feces (in mm)

	Range	Mean
Length(A)	0.081~0.102	0.092
Width(B)	0.051~0.063	0.056
B/A ratio	0.52~0.71	0.61
Opercular depth	0.002~0.010	0.005
Opercular width	0.014~0.027	0.020

Table 3. The number of eggs grouped by their length

Length(mm)	No. of eggs
0.081~0.084	6
0.085~0.089	20
0.090~0.093	27
0.094~0.096	34
0.097~0.099	11
0.100~0.102	2
Total	100

demarcated opercula. The operculum located obliquely to the equatorial plane of the egg at the more pointed one end (Fig. 1-9).

The length of 100 eggs was grouped into 6

as in Table 3. The majority (61%) of them were in the range of 0.090-0.096mm. Two were over 0.100mm and 6 below 0.084mm.

DISCUSSION

The only recorded case of human fibricoliasis was quite incidentally infected. He visited a small rural village and captured 2 snakes by chance. He ate the raw viscera and roast muscle of the snakes. He began to suffer from acute gastrointestinal symptoms 5 days after the incidental ingestion of the snakes. Those symptoms helped the early diagnosis during acute phase of infection(Seo *et al.*, 1982).

However, the present cases had no clinical manifestations at all related to fibricoliasis. This finding can be explained by chronic and repeated infection of small amount metacercariae, and relatively small numbers of worms in intestine. Because the cases preferred to eat the snakes or frogs after roasting. And they didn't eat the viscera of snakes which harbour a plenty amount of the metacercariae. From the snake muscle, only a small number of the metacercariae was detected (Hong *et al.*, 1982; Cho *et al.*, 1983).

Any human who ingests raw or semicooked snakes has the risk of *Fibricola* infection regardless of the locality and species of the snakes when the status of metacercarial infection in the snakes is considered(Hong *et al.*, 1982; Cho *et al.*, 1983). In Korea, there is a customal belief that the snake has some therapeutic effects for certain chronic wasting diseases or it potentiates the masculine activity. And someone simply eats the snake as a protein source. Therefore, it is suspected that fibricoliasis may be prevalent among those habitual or incidental snake-eaters, though most of them eat the snake after boiling. Actually all of the present cases had the history of eating the snakes or frogs once or more during the survival training.

The eggs of *F. seoulensis* can be easily differentiated from those of *Paragonimus*, *Echinostoma* or fasciolid flukes. Therefore, the eggs which have following characteristics; 0.081-0.102mm

long, 0.051-0.063mm wide, bilaterally asymmetrical shape with one more convex margin, oblique opercular margin, immature and golden brown in color, can be regarded as those of *Fibricola* in Korea, unless any other species of the Family Diplostomatidae is discovered from human. In this regard, more sedulous differentiation of the large operculated trematode eggs will be helpful to discover more human cases of fibricoliasis.

As for the life span of *F. seoulensis* in human, the fluke may survive over 2 years. Because 4 cases said that they have not eaten the snakes since December, 1981. If their histories are accepted, the life span of *F. seoulensis* in human intestine may be longer than expected to be a few years. However, it should be confirmed by experimental infection.

The burden of adult worms was not correlated with the egg counts in this study. And even there were the cases of no worm collection, though they were positive for the eggs. The worms must have been collected incompletely. It is probable that not all of the worms infected was discharged through the diarrheal feces, 3 to 5 times of collection after treatment, because their bowels were not evacuated before treatment. And also the worms may be lost during the process of washing the fecal material. Therefore, the worm burden should be interpreted as minimum count in each case. From the Case No. 2, 78 worms were collected. Thus, the real number of the infected worms in case of EPG 100 must be over 78.

We used praziquantel (Distocide®) to treat the cases of fibricoliasis in this study. Seo *et al.* (1982) treated the first case with bithionol. However, bithionol seems incomplete in fibricoliasis treatment (Hong, 1984). Praziquantel was very effective to obtain 100% cure rate in the 15 cases of present study when 20 mg/kg was dosed. If further cases are discovered, praziquantel could be tried in reduced dose.

SUMMARY

A mass fecal examination was performed in Seoul, Korea from December 1983 to March 1984 and 15 egg positive cases of *Fibricola seoulensis* were discovered. They were treated with praziquantel (Distocide®) 20mg/kg single dose and magnesium salt for purgation. The adult worms of *F. seoulensis* were collected from 6 of them. The number of the flukes ranged 1-78 by the case.

The cases had no clinical manifestation at all.

They were all Korean males in twenties, and had the histories of eating the roast or raw snakes or frogs.

Fibricoliasis is expected to be prevalent among the snake-eaters in Korea. Further cases will be detected by sedulous differentiation of thin-shelled immature operculated eggs of 0.081-0.102mm length. Praziquantel seems to be an excellent chemotherapeutic for fibricoliasis.

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＝國文抄錄＝

***Fibricola seoulensis*의 人體感染 15例**

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1983년 12월부터 1984년 3월까지 서울에서 실시한 大便檢査에서, *Fibricola seoulensis*의 蟲卵이 15명에게서 발견되었고, 이들을 Stoll씨 蟲卵계 산법으로 檢査한 결과 EPG는 0~500의 범위에 있었다. 이들 모두에게 praziquantel을 20mg/kg의 用量으로 1회 投與하고, 그 중 9례를 대상으로 淸瀉劑를 이용하여 蟲體 수집을 시도하였다. 대상자 중 6례에서 *F. seoulensis*의 成蟲을 1~78마리 수집할 수 있었다. 이들 15례에 대하여 치료 2~6주후에 추적 檢査한 결과 모두가 蟲卵을 배출하지 않음을 확인하였다.

이들 감염자들은 임상적인 症狀이 전혀 없었고, 따라서 임상검사는 시행하지 않았다. 이들은 모두가 20대 한국인 남자로, 혼련의 일환으로 뱀 또는 개구리를 구워서 또는 날로 1회 이상 먹은 경험이 있었다. 이들이 마지막으 로 뱀을 먹은 시기는 각각 1981년 9월에서 1983년 11월 사이에 있었다.

이들의 대변에서 발견된 蟲卵중 100개를 計測한 결과 길이가 0.081~0.102mm, 폭이 0.051~0.063mm이었다. 약 절반에서 卵蓋(operculum)가 확인가능하였고 대부분의 경계선이 蟲卵 長軸에 비스듬하게 관찰되었다.

우리나라에서 뱀과 개구리를 먹는 민간의 습관을 고려하면 인체 fibricoliasis가 보다 널리 퍼져 있을 것으로 생각 된다. 蟲卵의 감별만으로도 진단이 가능할 것으로 판단되므로 앞으로 많은 症例의 발견이 기대된다.

EXPLANATIONS FOR FIGURES

- Fig. 1. Egg of *F. seoulensis* photographed ×400, with typical size, shape and distinct operculum.
- Fig. 2. Ibid, short, stout and blunt ended, distinct operculum.
- Fig. 3. Ibid, short, almost symmetric and diagonal shaped.
- Fig. 4. Ibid, long, asymmetric and distinct operculum.
- Fig. 5. Ibid, long and slender, symmetric.
- Fig. 6. Ibid, long and stout.
- Fig. 7. Ibid, average sized with blunt ends.
- Fig. 8. Ibid, long and distinct operculum.
- Fig. 9. Ibid, oval shaped but asymmetric.

