

Further Cases of Human *Heterophyes heterophyes nocens* Infection in Korea

Jong-Yil Chai, Sung-Jong Hong, Woon-Mok Shon, Soon-Hyung Lee
and Byong-Seol Seo

Department of Parasitology and Institute of Endemic Diseases, College of Medicine,
Seoul National University, Seoul 110, Korea

Abstract—Eight further cases of human infection by *Heterophyes heterophyes nocens* (Trematoda; Heterophyidae) were found by the recovery of adult worms in Korea. The cases were residing either in the southern coastal areas or in Seoul. All of them had the history of eating raw brackish water fishes such as the mullets (*Mugil cephalus*). After the treatment with praziquantel 1-28 specimens of *H. heterophyes nocens* were recovered from their stools, together with other kinds of intestinal flukes. This observation confirms that human infection by this fluke is not rare in Korea but most cases are lightly infected and/or mixed-infected with other intestinal flukes.

Key Words: *Heterophyes heterophyes nocens*, *Heterophyidae*, *Heterophyiasis*, *Mulletts*, *Intestinal fluke*

Recently the metacercariae of *Heterophyes* sp. in the flesh of the mullets, *Mugil cephalus*, in Korea were identified as those of *Heterophyes heterophyes nocens* through experimental infection (Seo *et al.* 1980). Morphologically the adult is differed from the Egyptian type, *H. heterophyes*, in the different number of chitinous rodlets on gonotyl.

Human infection by *Heterophyes* sp. in Korea was suggested at earlier times by the eggs in human stools (Stryker 1914). Much later than that, the first (Seo *et al.* 1981) and two succeeding human cases of *H. heterophyes nocens* (Chai *et al.* 1984) were proven by the recovery of adult worms. Those cases were all mullet eaters and had the clinical manifestations of general malaise, gastrointestinal troubles and/or heart palpitation. It is suggested that Korean people are not infrequently infected by this fluke. In this paper, 8 further human cases identified by the worms are reported.

The present cases are all males between the age of 36-55 years, residing in the southern coastal areas or in Seoul (Table 1). Cases 1, 2, 3 and 4 were found during the study of *Metagonimus yokogawai* infection along the Tamjin River basin in Kangjin-gun, Chollanam-do, where is one of the

well-known endemic areas of metagonimiasis. They used to eat the raw sweetfish and/or mullets. They revealed numerous eggs of *M. yokogawai* in their stools, and to enumerate their worm burdens by recovery of worms, treatments with 10 mg/kg single dose of praziquantel were tried. As many as 3,093-52,030 *M. yokogawai* were collected from the watery stools, with 1-3 specimens of *H. heterophyes nocens* and/or other intestinal flukes such

Table 1. The cases and number of recovered worms from each case

Case No.	Name	Age & Sex	No. of recovered <i>H. h. nocens</i>	Address of cases
1	OYS	48 M	1	Kangjin-gun*
2	KJH	55 M	2	Kangjin-gun
3	KJG	36 M	1	Kangjin-gun
4	OSI	36 M	3	Kangjin-gun
5	SBH	40 M	28	Seoul
6	KJN	42 M	8	Namhae-gun**
7	KJW	52 M	2	Namhae-gun
8	KCW	50 M	1	Namhae-gun

* Chollanam-do

** Kyongsangnam-do

as *Pygidiopsis summa*, *Echinostoma hortense* and *Echinochasmus japonicus*, or a tapeworm, *Taenia saginata*. They had variable degrees of gastrointestinal troubles.

Case 5 visited our Department because of the episodes of abdominal pain and indigestion. He is a manager of a Construction Company in Seoul and has eaten raw fishes including mullets at Japanese restaurants. Two years ago he travelled Saudi Arabia, where is an endemic area of *H. heterophyes*, but denied that he had eaten raw mullets there. After the treatment with praziquantel, 28 *H. heterophyes nocens* and 13 *Stellantchasmus falcatus* were recovered. Cases 6, 7 and 8 were incidentally found to be infected with *H. heterophyes nocens* and/or *P. summa* during a survey on *T. saginata* infection. They are living in a seashore village of the Namhae Island and engaged in fishing/agriculture. They have frequently eaten raw mullets, other brackish water fishes, as well as the raw pork or beef. Their clinical complaints were light degree of gastrointestinal troubles together with passing of the tapeworm proglottides.

All of recovered *H. heterophyes nocens* were ovoid in shape and having oral, ventral and genital suckers (Fig. 1 & 2). The size of worms were 0.92-1.60 mm (1.31 in average) long and 0.47-0.77 (0.63) mm wide when 20 worms were measured. The oral sucker was 0.092-0.113 (0.103) mm and the ventral sucker 0.174-0.351 (0.265) mm in diameter. The genital sucker protruded ventro-anteriorly at the left lower margin of the ventral sucker, 0.131-0.215 (0.172) mm in size, and armed with 52-62 (average 56) rodlets on its gonotyl (Fig. 3). The right cecum always did not exceed the right testis, which extended more posteriorly than the left testis (Fig. 1 & 2). The intrauterine eggs measured 0.025-0.028 (0.027) mm long and 0.014-0.016 (0.015) mm wide.

The clinical symptoms due to heterophyid infections are generally mild, probably because most of the cases are lightly infected. In heavy infections, however, gastrointestinal troubles such as abdominal pain, nausea, vomiting, diarrhea, dysentery or indigestion occur not infrequently by infection with *H. heterophyes* (Khalil 1937), *M. yokogawai* (Ito 1964; Seo *et al.* 1971) or *S. falcatus* (Alicata *et* Schattenburg 1938). In the present cases, the symptoms complained are considered not necessarily due to *H. heterophyes nocens* infection since the worm burden of this fluke was light. So far, the worm burden of ever-reported human cases by

this fluke in Korea has been under 100 without exception. However, possible occurrence of heavy infection should be always taken into considerations.

Heart, brain or spinal cord heterophyidiasis was reported as an erratic parasitism by the eggs of heterophyids (Africa *et al.* 1940). For the genus *Heterophyes*, the eggs of *H. heterophyes* were found encapsulated in two cases of human brains (Collomb *et al.* 1960) and the eggs of *H. heterophyes nocens* were detected from a tumor mass of an inflamed appendix (Nakano *et* Inoue 1955). A case of *H. heterophyes nocens* infection, reported by Chai *et al.* (1984), suffered from heart palpitation due to ventricular premature beat, however, the etiology of the heart problem was not proven. The erratic, extraintestinal manifestations by the heterophyids deserve further studies.

Taxonomically the name *H. heterophyes nocens* is a result of compromise (Asada 1934) for debates on the synonymy of *H. nocens* (Onji *et* Nishio 1916) to *H. heterophyes*. Recently Tarashevski (1984) reviewed the literature on the genus *Heterophyes* and described that the two species seemed biologically and morphologically closely related. However, because of the different number of rodlets on gonotyl (58-92 in *H. heterophyes* and 52-62 in *H. heterophyes nocens*) and the different termination of intestinal ceca, he was of opinion that the two species could be distinctly different. For its taxonomical justification, further studies on the biological characteristics are needed.

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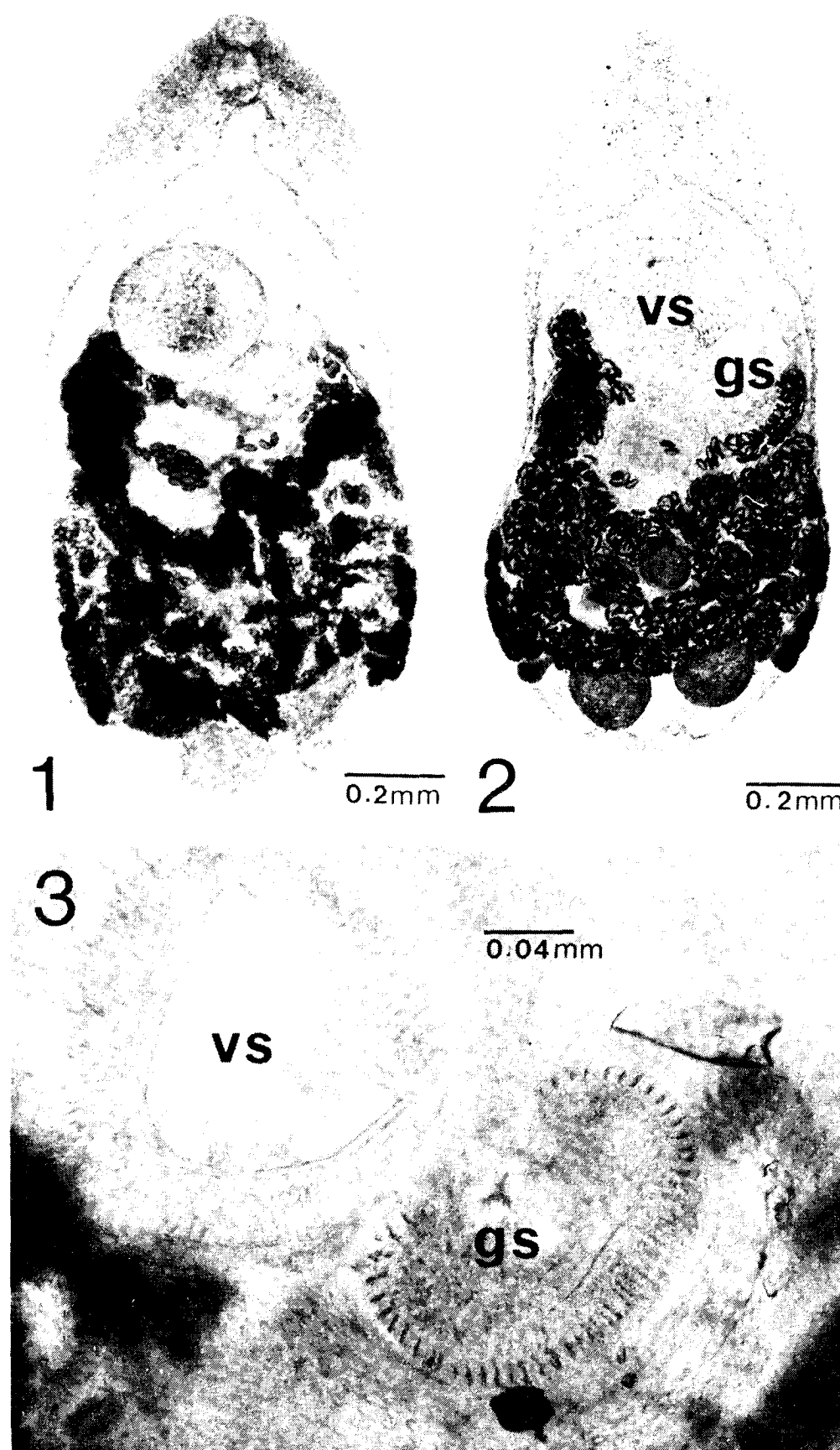


Fig. 1. Ventral view of an adult specimen of *H. heterophyes nocens* recovered from Case 5 after treatment with praziquantel. Note three suckers and unequal termination of two ceca.
Fig. 2. *Ibid* from Case 6. The ventral sucker(VS), genital sucker(GS) and two unequally terminating ceca are seen. Acetocarmine stain.
Fig. 3. Magnification of the area near the ventral sucker(VS) and genital sucker(GS) of a specimen from Case 5. The number of rodlets on the genital sucker(gonotyl) are 53 in this specimen.

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= 국문초록 =

인체 *Heterophyes heterophyes nocens* 感染例의 추가보고

서울대학교 醫科大學 寄生蟲學教室 및 風土病研究所

채종일 · 홍성중 · 손운목 · 이순형 · 서병설

*Heterophyes heterophyes nocens*의 人體感染 8例를 成蟲으로 確診하였다. 感染者는 모두 中年의 男子이었고 우리나라 南海岸地方 또는 서울에 거주하고 있었으며 모두 崇魚(mullet) 등 각종 魚類를 生食한 經驗이 있었다. 이들을 praziquantel 10 mg/kg로 治療하고 下劑를 사용하여 蟲體排出을 시도한 바 *H. heterophyes nocens* 1~28마리와 함께 다른 종류의 腸吸蟲 또는 條虫이 수집되었다. 이 症例들은 우리나라 *H. heterophyes nocens*의 人體感染 제4-11례에 해당된다.