

An Egg-negative Patient of Acute Metagonimiasis Diagnosed Serologically by ELISA

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= Abstract = A 46-year old male was admitted to Seoul National University Hospital with the clinical complaints of fatigue, watery diarrhea and abdominal discomfort for 15 days. Trematode infection especially metagonimiasis, was suspected because of his recent history of consumption of raw sweetfish, the intermediate host of *Metagonimus yokogawai*. Repeated fecal examination revealed no eggs. Serological test by enzyme-linked immunosorbent assay (ELISA) exhibited positive antibody level for *M. yokogawai* antigen. The diagnosis was confirmed by recovery of 110 adult specimens of *M. yokogawai* expelled after chemotherapy with praziquantel. The present patient shows that serological diagnosis is necessary in some cases of metagonimiasis.

Key words: *Metagonimus yokogawai*, *Metagonimiasis*, *Serological diagnosis*, *ELISA*

INTRODUCTION

Metagonimus yokogawai infection is widely distributed in southern parts of Korea (Seo *et al.* 1969 & 1981). Especially along the Sumjin river valley, endemic foci are scattered and as many as half of the people were found infected (Yeo and Seo 1971). Most of the sweetfish (*Plecoglossus altivelis*) caught in the river are harbouring the metacercariae (Hong and Seo 1969; Song *et al.* 1985). This infection is diagnosed by detecting the characteristic eggs in the patient's feces.

Clinical manifestation in *M. yokogawai* infection may be variable. Typical symptoms such as fatigue, bouts of watery diarrhea with abdominal pain and eosinophilia are, in general, manifested in acute stage of infection. Chronic infections, constituting the majority of cases in endemic

areas, are generally symptom-free. Even heavily infected people may reveal little symptom. Pathologically intestinal mucosa shows atrophy of villi and hyperplasia of crypts in man (Chi *et al.* 1988) and animals (Chai 1979; Lee *et al.* 1981).

Only a few studies have been done in immunological aspects of metagonimiasis. Cho *et al.* (1987) described that specific serum antibodies (IgG) were increased from day 7 after infection and reached their peak at 2-4 weeks. This result has indicated that serological test may be applicable for human metagonimiasis. Recently we experienced an egg-negative patient of acute metagonimiasis in whom serological test was needed for the diagnosis.

CASE PRESENTATION

The patient was a 46-year old man who complained of extreme fatigue, watery diarrhea and abdominal discomfort for 15 days. Just 5 days before the onset of the above symptoms, he

had eaten the raw flesh of sweetfish caught at Hwagae-myon, Hadong-gun in the Sumjin river valley. Four to ten attacks of abdominal pain followed by profuse watery diarrhea occurred in a day, and signs of dehydration developed. Upper G-I and lower bowel radiology revealed no abnormalities. Laboratory studies revealed normal findings except 22-34% eosinophilia (1390-1490/ μ l in absolute count).

Stool examination by formalin-ether technique done 5 times every other day (from day 21 to day 29 after the ingestion of sweetfish) revealed neither eggs nor cysts. Numerous Charcot-Leyden crystals were found in fecal smears. Serological test by ELISA was done on the 26th day as described by Cho *et al.* (1987), which revealed a positive level against *M. yokogawai* antigen (absorbance 0.64; positive criterion 0.25). In duodenal aspiration no worms nor eggs were found. Peroral suction biopsy from the jejunum revealed histopathologically severe atrophy of villi, with hyperplasia of crypts (Figs. 1 & 2). These were thought probably secondary to some parasitic infection, though worms were not found. The atrophied villi were characterized by shortening of their height, blunting at the tips, fusion, and inflamed stroma with infiltration of lymphocytes, plasma cells and eosinophils (Figs. 1 & 2).

A trial of therapeutic diagnosis was done on the 30th day after the ingestion of sweetfish. Praziquantel in single dose of 10 mg/kg was given orally. In 3 diarrheal stools induced by the administration of magnesium sulfate, total 110 specimens of adult *M. yokogawai* were collected (Fig. 3). The worms were 9.5 mm long and 3.8 mm wide in average. Non-reproductive organs such as suckers and ceca were fairly well-developed. Male genital organs also developed well. However, female organs such as seminal receptacle, vitelline follicles and uterus showed their poor maturity. The uterine coil contained only a few eggs (3 on average) without miracidium.

After the chemotherapy, the diarrheal attacks stopped in 2 days and general condition improved in 5 days.

DISCUSSION

The present case manifested typical symptoms of acute metagonimiasis. Interestingly,

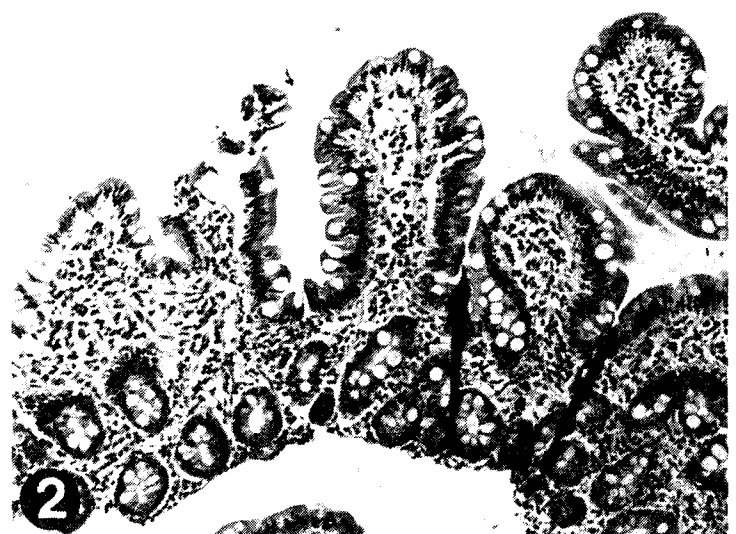
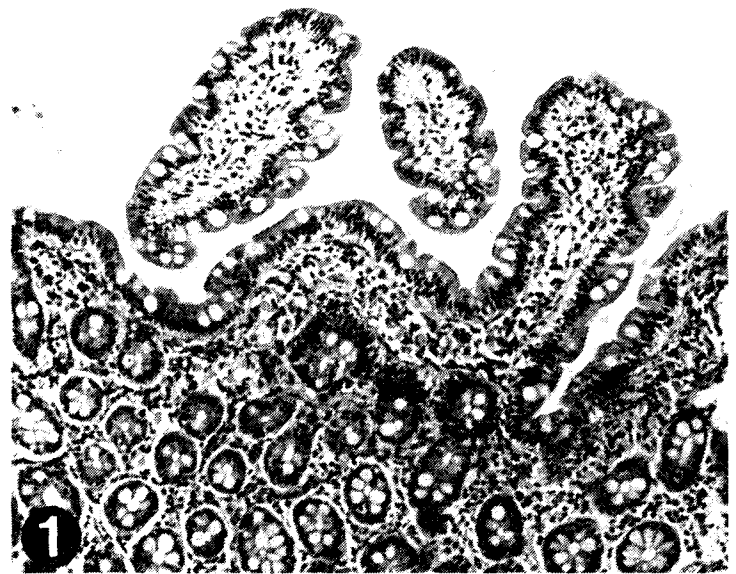


Fig. 1. Jejunal biopsy specimen from this metagonimiasis patient showing atrophy of villi and proliferation of glands (crypts). Some of villi are seen fused and became flat in their height, and reveal marked infiltration of inflammatory cells in the stroma. x 200.

Fig. 2. Another portion of the same specimen showing similar features. A villus is showing its destroyed epithelial layer. x200.

eggs were not found in the patient's stool while specific antibody (IgG) level, as measured by ELISA, was elevated. The diagnosis by ELISA was confirmed by the recovery of worms. After specific treatment, the symptoms improved almost immediately.

In this patient, there is some irrelevance with the previous knowledge concerning *M. yokogawai* infection. The number of eggs in the uterine coil of worms is much smaller than normal; on

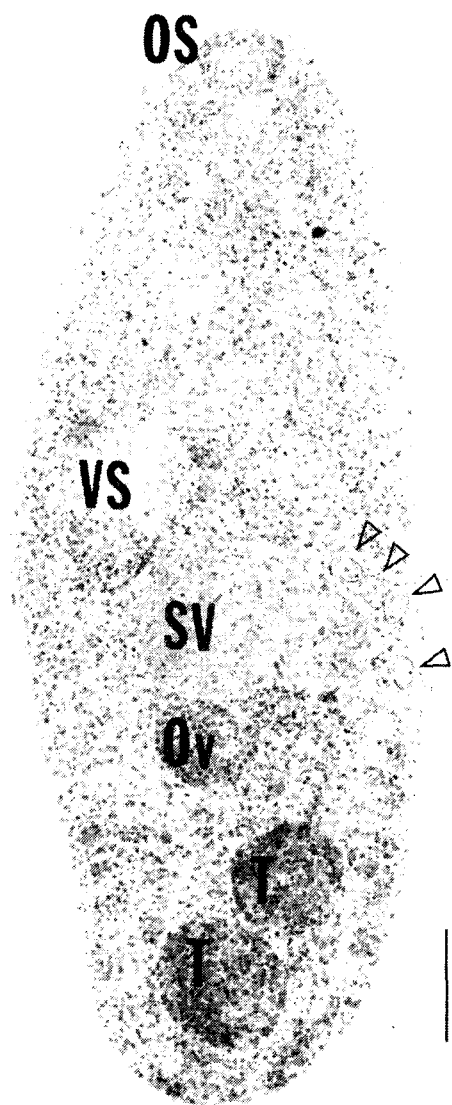


Fig. 3. An adult specimen of *M. yokogawai* recovered from this patient. Organs such as oral sucker (OS), ventral sucker (VS), ovary (OV), testes (T) and seminal vesicle (SV) are fairly well-developed. However, other genital organs such as seminal receptacle and vitellaria are showing their poor maturity, with few eggs (arrow heads) in the uterus (scale: 0.1 mm).

the 30th day of infection, it was reported that about 300 eggs were contained in the uterine coil of a worm (Ahn *et al.* 1981). In addition, the symptoms and pathology in the small intestine were inappropriately severe, compared with the number of worms recovered. The actual number of the infected worms at the time of treatment may have been greater than 110 because the diarrheal stools were collected only 3 times. The 4th stool may have contained a lot of worms. It is also speculated that actual number of worms

at the initial stage of infection was much greater than the harvested number which decreased quickly as the disease progressed.

The present case made us presume that some immunologic mechanisms had worked on *M. yokogawai* worms as well as on the small intestinal mucosa during the course of acute infection. Due to those unrecognized mechanisms, the worm number and fecundity of worms were reduced. Similar mechanisms may be involved in the pathogenesis of mucosal lesions seen in metagonimiasis or other parasitic diseases (Olson and Richardson 1968; Lee *et al.* 1985), coeliac disease (Shiner and Doniach 1960) or tropical sprue (Swanson and Thomassen 1965). As Ferguson and Jarrett (1975) and Manson-Smith *et al.* (1979) reported T-cell immunity may be responsible for the mucosal lesions such as atrophy of villi. The immune destruction of small intestinal villi can complement a view that villi were mechanically or enzymatically damaged by the parasites or other causative agents (Roh *et al.* 1984) in explaining the pathogenesis of non-specific mucosal lesions.

The present patient showed it clear that serologic test for specific antibody is necessary in some patients of metagonimiasis. In order to understand the applicability of the serologic test, studies in human population is necessary in the future.

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= 국문초록 =

혈청학적으로 진단된 요꼬가와흡충증 1례

서울대학교 의과대학 기생충학교실 및 풍토병연구소, 내과학교실*, 및
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은어를 생식한 후 지속성 설사를 호소한 환자가 혈청학적으로 요꼬가와흡충 항원에 대하여 양성 반응을 보였고, 프라지판델 투여 후 충체를 수집함으로써 확진되었다.

환자는 46세 남자로 설사 및 복통이 간헐적으로 15일간 계속되어 입원하였으나 5회 시행한 대변검사서 충란이 검출되지 않았고 다른 원인을 찾을 수 없었다. 그러나 은어 생식 후 26일째에 시행한 혈청 효소면역진단법 (micro-ELISA) 검사에서 흡광도 0.64 (양성기준: 0.25 이상)로 양성반응을 보였다. 경구 공장 생검 (peroral jejunal biopsy)에서 용모 위축과 선와 증식 등 요꼬가와흡충증이나 기타 장점막 질환에서 보이는 것과 동일한 조직 소견이 관찰되었으나 충체는 발견되지 않았다.

결국 충체를 얻어 확진할 목적으로 프라지판델 10 mg/kg를 투여하였고 하제를 써서 설사변을 수집하였던 바 3회의 설사변으로부터 요꼬가와흡충 총 110마리를 검출할 수 있었다. 충체는 대부분 생식 기관의 발육이 미약하였고 특히 자궁내 충란수가 평균 3개로 거의 미성숙 상태의 충체인 것으로 판정되었다. 충체의 미성숙과 감염 충체수가 비교적 적었던 점 등이 대변검사서 충란을 검출할 수 없었던 원인이 되었을 것으로 추측되었다.

이 증례는 요꼬가와흡충증, 특히 충란 검출이 어려운 현증 환자의 진단을 위해 ELISA와 같은 혈청학적 진단법이 유용할 것임을 나타내는 흥미있는 증례로 생각되었다.