

A Faunistic Survey of Cercariae Isolated from *Melanoides tuberculata* and Their Role in Transmission Diseases

Short Communication

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Summary

To faunistic survey of the cercariae of *Melanoides tuberculata* (fresh water snail) 1540 *M.tuberculata* were collected from various streams, swamps, ditches and canals in the central area of Khuzestan province in the south west of Iran. Infected snails, 46 (2.9%), were isolated and cercariae were obtained by emerging or crushing methods and then measuring and drawing were made from specimens. In some cases experimental infection was established in the animals for further identification. A total of 5 trematode families were identified as follow: Heterophyidae: *Haplorchis pumilio*, *H.taishui*, *Stellantchasmus falcatus* and *Centrocestus formosanus*; Echinostomatidae: *Echinochasmus milvi*; Schistosomatidae; Plagiorchiidae and Philophthalmidae. These results have been recorded for the first time and show the potential of *M. tuberculata* for transmission of zoonotic disease in the region.

Key words: cercariae, *Melanoides tuberculata*, Iran

Introduction

Snail species are the first intermediate host of majority group of helminth diseases (trematode) such as schistosomiasis, fascioliasis, and heterophyidiasis in the world and Iran. The Larvae of trematodes (cercariae) develop in the snail tissue, escape and find suitable secondary intermediate host or definitive host (man and animals). Thiaridae snails including *Melanoides tuberculata* has been examined for cercarial fauna in the northeastern part of Leyte Island, Philippines (Ito 1977). *M.tuberculata*

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has been recorded for the first time as the first intermediate host of *Echinochasmus japonicus* and its natural infection rate was found to be 1.1% (Cheng & Fang 1989). These snails also collected from ponds around the Ninh Binh province, Vietnam settlements and were infected with cercariae of *Clonorchis sinensis*, as a causative agent of human clonorchiasis, at a rate of 13.3% (Kino et al 1998). Furthermore *M.tuberculata*-associated larval stages of *Philophthalmus* have been recorded from Israel and Jordan (Dimitrov et al 2000). Xiphidiocercariae are described from seven Egyptian snails, includes *M. tuberculata* which collected from Giza and Qualiobyia (Wanas et al 1993). Over wintering *M. tuberculata* populations can harbor viable infections and in the spring infect shore birds by cercaria of shistosomes which could be result to cercarial dermatitis in human (Barber & Cairra 1995). *M.tuberculata* is a fresh water snail, which lives in the bottom of water and is abundance in the agriculture canals and ponds of Khuzestan province in the south west of Iran. Due to the presence of infected *M.tuberculata*, water of this region could be contaminated by cercariae that able to attack to men directly or by metacercaria ingestion indirectly.

The present study was carried out as a part of research project entitled "Faunistic survey of cercariae from fresh water snails". Thus the aim of this research was to determine cercarial fauna of *M.tuberculata* snail and their role in transmission diseases in the central area of Khuzestan province.

Materials & Methods

1540 *M.tuberculata* snails (Mansorian 2001) were collected from agriculture canals and drains in the central area of Khuzestan province by a wooden handle paddle with 1.5m long and net size 30×40cm and transferred to Ahwaz Health Research Center. To find the cercariae, *Melanooides* snails were examined for cercariae by using emerging or crushing methods. In the emerging method snails put in the Petri dish contained dechlorinated tap water and were placed against artificial light for 2h

or over night in room. In the crushing method, shell of snails was broken and soft tissues were placed between two slides then squashed. Collected cercariae were observed carefully and fixed in 50% ethanol or 5% hot formaldehyde and cleared in lactophenol and/or stained with azocarmin. Drawings were made with aid of a leica microscope drawing attachment (camera lucida). Recognition of cercariae species were made by using systematic key references (Frandsen & Christensen 1984). In some cases for developing cercariae to metacercariae or metacercaria to adult parasite, laboratory animal including rat and chicken were used respectively. Heterophyid mtacercariae were isolated from subscales, fins or gills of fish (*Gambusia affinis*) which was in an aquarium in the vicinity of infected *M.tuberculata*. The adult parasites were collected from rats and chickens after oral infection via water contained metacercariae. Then their intestinal tracts were removed, dissected, scrapt and searched carefully for collecting of adult parasites. Philopthalmidae metacercariae were obtained on the Petri dish shortly after cercariae emerging from infected *M.tuberculata* under light stereoscope.

Results and Discussion

From the total of 1540 *M.tuberculata* (Figure 1), which were examined in this research, 46 (2.9 %) snails were infected with various species of larva trematodes.



Figure 1. *Melanoides tuberculata* snail from Khouzestan province of southwestern Iran

Cercariae species were as follow: Heterophyidae (26 cases); Echinostomatidae (1 case): *Echinochasmus milvi*; Schistosomatidae (5 cases); Plagiorchiidae (10 cases) and Philophthalmidae (4 cases) (Figure 2a-d). Heterophyid metcercariae were obtained from gambosia fish following one month. After one month from oral infection by heterophyid metacercariae, adult parasites were obtained from intestine of rat and chicken as follow: *Haplorchis pumilio*, *H. taihui*, *Stellantchasmus falcatus* and *Centrocestus formosanus*.



Figure 2. a) *Shistosomatidae* cercaria, b) *Heterophyidae* cercaria, c) *Echinostomatidae* cercaria, d) *Plagiorchiidae* cercaria

Heterophyid cercariae may infect the local fish such as *liza abu*, *cyprinids* spp in the canals (Farahnak & Massoud 1999). Infected fish cause to heterophyiasis in the birds and mammals including man. Heterophyidae cercariae as causative agent of heterophyiasis have been reported in this area (Farahnak & Massoud 1996). Schistosomatidae cercariae have a great medical and veterinary importance because may infect bird or man by penetration into skin (Farahnak & Essalat 2003). Echinostomatidae cercariae may infect fish or snail as secondary intermediate host and birds or mammals including man as definitive host. Plagiorchiidae trematodes are intestinal parasites in all groups of vertebrates as well as human and may infect them by frog, snail, fish or aquatic insects. Philopthalmidae cercariae encyst and develop to adult in chicken or human eye (Coombs & Crompton 1991, Radev *et al* 1999). Various ecological factors, including season, water temperature, pH, oxygen and so forth are very effective on cercariae emergence from the snails and their release inside the water, where they could penetrate into the human body and/or secondary host such as fish. For these reasons during the hot seasons, May to September, due to the swimming, cercariae transmission to the local people are increased and also uncooked fish may be serving as a source of diseases in man in this area.

In summary, due to the presence of various cercariae in *M.tuberculata* snails and their potential for establishment of zoonotic diseases such as heterophyiasis, schistosoma dermatitis, echinostomiasis and philopthalmiasis in man and animal, these findings may be concerned by Health System Officials for surveillance of this fresh water snail in the region.

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