

J. Bastert^a
A. Sing^b
A. Wollenberg^a
H.C. Korting^a

^a Dermatologische Klinik und Poliklinik und
^b Max-von-Pettenkofer-Institut für Hygiene und
Medizinische Mikrobiologie der
Ludwig-Maximilians-Universität München,
Deutschland

Aquarium Dermatitis: Cercarial Dermatitis in an Aquarist

Key Words

Cercarial dermatitis
Aquarium
Watersnail

Introduction

The frequency of dermatitis caused by contact with water contaminated by cercariae in Central Europe has not yet been finally established. On the one hand there is no duty to notify such cases to a special authority, and on the other hand cercarial dermatitis is often misdiagnosed. Midsummer is the main season for this type of dermatitis. In most cases the patients show disseminated red papules spread over the entire integument which present after swimming in warm water. In our case the patient came to the out-patients' clinic in spring. He presented with lesions restricted to the back of his hands and forearms after contact with his aquarium's water. This is the first case published in the literature of cercarial dermatitis in an aquarist.

Case Report

A 33-year-old patient came to the out-patients' department in May. One day before he had cleaned his aquarium without using gloves. It was a so-called cold water aquarium with native fish and watersnails. Two weeks before the patient had collected the snails in a little pond. A few days before he cleaned the basin the radiator of the aquarium had broken down. The temperature of the

Abstract

A 33-year-old man presented with very itchy red papules on the back of his hands and forearms. These papules appeared about 90 min after he had cleaned his aquarium in which he kept native fish and watersnails. He had obtained the watersnails some weeks before from a nearby pond. Examination of water from the aquarium revealed cercariae. The clinical diagnosis of cercarial dermatitis was corroborated. Cercarial dermatitis has repeatedly been seen in swimmers but not in aquarists keeping fish in a home aquarium.

water had risen above 17°C. About 90 min after the cleaning had been finished the patient noted red itchy papules on the back of his hands and his forearms, restricted to those parts of his arms which had been exposed to the water. During the following hours the redness of the papules and the itch increased.

The patient presented himself with multiple, erythematous seropapules and papulovesicles up to 3 mm in diameter, on the back of both hands and forearms (fig. 1).

Histologically a slightly broadened epithelium and subepidermal edema were found. Moreover there was perivascular lymphohistiocytic infiltration in the dermis (fig. 2). Special stains for microbial pathogens were not of diagnostic relevance.

The patient brought one of the snails in a bowl containing water from the aquarium upon request (fig. 3). Macroscopically cercariae could be seen swimming in the water. Microscopic examination of the water revealed cercariae of the genus *Trichobilharzia* (fig. 4).

On day 1 and day 14 after development of the dermal manifestations, serum was obtained and analyzed by the cercaria-hullen reaction and the circumoval precipitin test, respectively. Both serological tests yielded negative results. As expected, an indirect hemagglutination assay detecting *Schistosoma mansoni* antigen (Celloghost Schis-

tosomiasis, Behringwerke, Marburg, Germany) of a human pathogenic trematode species was also negative.

Discussion

Cercarial dermatitis or swimmer's itch is caused by the larval stages (cercariae) of the trematode family Schistosomatidae whose definitive hosts are water birds and whose intermediate hosts are watersnails [1–4]. Because man is not the definitive host, the cercariae die within hours after penetration of the skin. The cercariae can be found in fresh water (swimmer's itch) and in salt water (sea bather's eruption) [5–8]. In Central Europe especially *Trichobilharzia szidati* and *Trichobilharzia ocellata* are found. The adult trematodes live in the mesenteric blood vessels of ducks, where they produce eggs. After the passage from the blood system to the intestinal lumen, the trematode eggs reach the water with the host's feces [1, 3, 6, 9–11]. In the water short-lived miracidia hatch from the eggs and penetrate an intermediate host, in our case a snail of the species *Lymnaea stagnalis*. The middle gland of the snails is where they gather and develop into cercariae within 2–3 months [12, 13]. At a water temperature $\geq 17^\circ\text{C}$ infectious cercariae leave the snails, gather in the top 5 cm of the water and

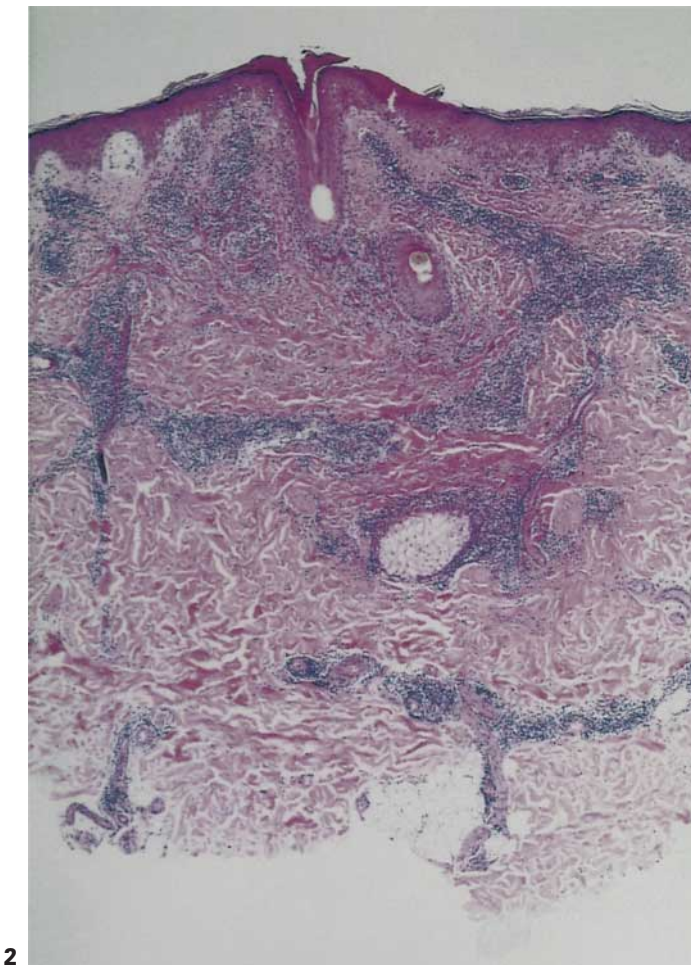


Fig. 1. Cercarial dermatitis. Forearm with red papules, 3 days after infestation.

Fig. 2. Cercarial dermatitis. Histology of a papule from the forearm. HE. $\times 25$.

Fig. 3. Watersnail from the aquarium.

Fig. 4. Cercaria from the aquarium.

again infest water birds [12, 14]. Cercariae react very unselectively to chemo- or phototactic stimulation [13–15]. This means that they do not only recognize ducks as their definitive host, but also rather unspecifically infest other occasional hosts, humans for example. While the cercariae are able to enter the blood vessels of their definitive host, after penetration of their skin, they are not adapted to complete their life cycle in occasional hosts where they die within a few hours after penetration of the skin without reaching deeper tissue. In humans the first infestation does normally not lead to a reaction but causes sensitization. Thereafter all further exposures cause local inflammation with erythematous papules and papulovesicles [2, 12]. The disease can also present as an exanthema.

In our case there are two points to consider. On the one hand we do not exactly know if the patient ever had any contact with cercariae before, on the other hand it could be the first infestation with cercariae with a quantity of parasites that would normally never occur in the natural environment, thus dramatically accelerating development of hypersensitivity. People who have contact with contaminated water at work are especially endangered. It is acknowledged as an occupational disease in carp fishermen in Europe and in rice farmers in Asia [16].

The diagnosis can easily be made by knowing the exact medical history. The possibility of contaminated water has always to be considered. The routine laboratory investigations are not indicative. In some laboratories there is the possibility to detect antibodies by the cercaria-hullen reaction or the circumoval precipitin test 2 weeks after the infestation [17]. Both tests, however, only very rarely yield positive results.

The histology of the papules only shows an unspecific picture which is comparable to that of an insect bite.

The differential diagnosis comprises 'whirl-pool dermatitis' caused by *Pseudomonas* spp. Also contact dermatitis has to be excluded. A useful treatment is the local application of glucocorticoids or peroral doses of antihistamines.

In our case it should be pointed out that the unusual localization of the lesions, the unusual extent of the erythema and the unusual season in which the dermatitis developed made the diagnosis more difficult. In most cases, cercarial dermatitis appears disseminated over the entire body or is restricted to the legs after standing in a natural water reservoir [17]. Our patient, however, presented with a cutaneous reaction localized to the hands and forearms. Interestingly, the palms were spared. An explanation for this

might be that the cercariae were not able to penetrate the skin in this area due to its different skin quality. The unusual intensity of the lesions may be best explained by the fact that keeping 5 contaminated watersnails in a normal-sized home aquarium led to an accumulation of the cercariae which is not the case in a pond or lake.

The main season for cercarial dermatitis is midsummer. When the water temperature rises above 17 °C the cercariae which under natural conditions hibernate in their intermediate host leave the snails to complete their life cycle in ducks [14, 18]. By the breakdown of the radiator of the aquarium the water temperature dramatically rose and a midsummer day was simulated. The cercariae left the infested snails, appeared in the water and could thus attach themselves to the skin of an occasional host [19, 20].

Since cercariae cannot survive without a host for longer than a few hours the aquarium could have been decontaminated by removing the snails [12, 15]. Also heating the water to a temperature above 45 °C would have killed the larval trematodes. Yet our patient preferred to start a new less contagious hobby and took all fish and snails back to the rural pond where he had caught them.

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