Dermocystidium sp. in the skin of the common carp (Cyprinus carpio) in the Czech Republic - a case report

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Abstract

Dermocystidium infections generally manifest as cysts, with different localisation and morphology in the fish. The current study reports on the infection of a Dermocystidium sp. with unusual skin localization and morphology in common carp in the Czech Republic. Clinical examination revealed red coloured lenticular lesions, with a diameter of 3 – 5 mm on the bases of the ventral and anal fins. Inflammation was observed in the tissues surrounding the lesions. A tangle of vermiform structures was seen in wet mounts from the lesions. Histopathology revealed the presence of cysts of elliptic and spherical shape with globoid PAS-positive spores. The size of these spherical cysts varied from 50 to 110 µm in diameter and elliptic cysts had length of 550 µm and width 150 µm. The one layer cyst wall consisting of fibrocytes was surrounded by macrophages with progress to the granuloma. Hyperplasia of epidermis with abundant goblet cells and lymphocyte infiltration was seen near the cysts. Cysts with mature and also with immature spores were present. Mature spores measured 5 to 6 µm in diameter; immature spores were 3 to 4 µm in diameter. Hyphae-like structures were noted.

Infection by protist organisms of the genus Dermocystidium was first described by Perez (1908) in the amphibian of the genus Triturus and in rainbow trout (Oncorhynchus mykiss) by Leger (1914). Taxonomy of this parasite has long been unclear. Regan et al. (1996) assigned the genus in a group called the DRIPs clade (Dermocystidium, rosette agent, Ichthyophonus, Psorospermium), near the dichotomy of animals and fungi. Herr et al. (1999) established under phylogenetic analysis, with the 18S small-subunit ribosomal DNA, for the DRIPs clade a new clade Mesomycetozoa. Dermocystidium infections manifest as cysts with different localisation and morphology of the spores which varies between parasite species. Dermocystidium cyprini (Cervinka & Lom, 1974) forms cysts in the gills of the common carp (Cyprinus carpio). Dermocystidium koi (Hoshina & Sahara, 1950) forms cysts measuring up to 10 mm in the skin of koi carps (Cyprinus carpio) and goldfish (Carassius auratus) with the spores ranging from 6.3 to 14.4 µm in diameter (Lom & Dykova, 1992). Cysts are filled with spores which have a refractile body or large central vacuole (Lom & Dykova, 1992). Spores of D. koi are greatly variable in size and form coenocytic, ramified hyphae with a thick homogenous wall. Spores of D. cyprini contain

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a solid central refractile body with negative PAS reaction (Lom & Dykova, 1992). Garkavi et al. (1980) described *D. erschoi* in the common carp. This species is localized in the subcutis of the lateral and ventral parts of body, where they form dark red structures filled with the thread-like cysts, which are convoluted in the skin. Length of the extended cyst is up to 20 mm and width is from 0.10 to 0.16 mm. Cysts can penetrate the muscle tissue. Measure of the spores varied from 14 to 16 µm.

Our study reports the infection of *Dermocystidium* sp. with unusual skin localization and morphology in the common carps in the Czech Republic.

Common carp from the fishery in South Moravia were examined for skin lesions in May 2005. The carp were originally imported from Hungary. Carp were 2 years old and measured about 30 cm. Fish were kept in a pond with a surface area of around 30 ha and a mean water temperature of 20°C. Clinical examination revealed red coloured lenticular lesions, measuring 3-5 mm at the bases of ventral and anal fins in approximately 40% of the fish stock. Inflammation was observed in the tissues surrounding the lesions. A tangle of nematode-like structures were seen by microscopy of wet mounts from the lesions. Samples for histopathology were taken and fixed in 10% buffered formalin. Samples were processed using standard histological techniques and stained with haematoxylin and eosin and Periodic Acid Schiff (PAS).

**Figure 1.** Histopathology of the skin of the common carp (*Cyprinus carpio*) with spherical cysts and globoid spores. The cyst is surrounded by macrophages, which form the granuloma. Haematoxylin and Eosin, x 400.

**Figure 2.** Mature spores with PAS positive content. PAS reaction, x 400.

**Figure 3.** Hyphae-like structures in the skin of the carp. In these structures were also noted the spores. Haematoxylin and Eosin, x 400.
Histopathology revealed the presence of cysts of elliptic and spherical shape with globoid spores. The size of the spherical cysts varied from 50 to 110 µm in diameter and elliptic cysts measured 550 µm by 150 µm. One layer of the cyst wall consisted of fibrocytes and was surrounded by epitheloid cells (Figure 1) with progress to the granuloma. Hyperplasia of epidermis with abundant goblet cells and lymphocyte infiltration was seen in the place of cysts. Cysts with mature and also with immature spores were present. Content of the mature spores was PAS positive (Figure 2). Measurements of mature spores varied from 5 to 6 µm in diameter, whilst immature spores measured between 3 and 4 µm in diameter. Hyphae like structures were noted (Figure 3).

Morphology and size of spores, cysts and their localization agree with infection with *D. koi*, which is unusual in common carp. The localization and macroscopic appearance are symptomatic for infections with *D. erschowi*, but the size of the spores in the current study were much smaller. Koi carps are held on the same site examined in the current study, but infections with *Dermocystidium* have not been observed in these fish. There is limited data available on therapeutic methods for this disease, although Wildgoose (1995) demonstrated the surgical removal of cysts coupled with the use of antifungal therapy. Infections with *Dermocystidium* reduces the market value of fish for both human consumption and the aquarium trade and thus it should be considered necessary to control imported fish and remove diseased fish from any breeding programme.

References


