World Journal of Fish and Marine Sciences 4 (5): 467-469, 2012
ISSN 2078-4589

DOI: 10.5829/idosi.wjfms.2012.04.05.6444

First Report of Epidermal Inclusion Cyst in *Cyprinus carpio*

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Abstract: Increasing reports have emerged on fish diseases resulting from a variety of pathogens. Here, a case of epidermal inclusion cyst (EIC) is reported in a sample of *Cyprinuscarpio* obtained from a small pond in Iran. The cyst occurred on the caudal fin projecting from the skin. Microscopic observationsdisclosed a fibrous wall consisted mostly of one cell layer but of two or three squamous cell layers at some regions. The cyst pierced deep into the internal space containing a transparent and colorless fluid. Although EIC is rather common in human but this is apparently the first report of EIC incidence in common carp.

Key words: Fish Diseases % Cyst % Common Carp

INTRODUCTION

Fish culture industry, prevalence of pathogens and contaminants will eventually lead to reduced production yield. It is, therefore, imperative to perform effective measures for continuous identification of farmed fish diseases in order to protect fish and promote final productionaccording to Behroozi *et al.* [1].

The common carp *Cyprinus carpio* as an important food species has been exposed to various diseases according to Mokhaeer [2], one of which is epidermal cyst.An epidermoid cyst is a common skin ailment. It is a small, obvious bump on the skin, usually in a 'dome' shape and appearing as like a sore. Epidermoid cysts are always unicellular (occur as 'one thing') and have a characteristic 'pearl-like' sheen. Sometimes an epidermoid cyst is informally referred to as "pearly tumor", but they are not tumorsin agreement with Lopez-Rios [3]. Causes of epidermoid cysts are not exactly understood. These cystsare likely the result of a proliferation of epidermal cells within a confined space of the dermis. They are also thought to be a genetic anomaly arising from small nests of cells 'left over' from an embryonic phase of developmentby Jehle [4].

MATERIALS AND METHODS

A total of 127 common carp (length 11.68 ±1.92 cm; weight 25.92±6.3 g) were procured from a local fish pond and transferred to a laboratory at SANRU, Iran. Amongst these, a fish was found havinga grossly apparent epidermal cyst on the caudal fin. The cyst was taken and fixed in 10% buffered neutral formalin. Tissues were processed to obtain thick paraffin sections (5 micron) and then stained with hematoxylin and eosin (H&E) according to the methods described by Bancroft *et al*. [5] and examined under light microscope. Histological photos were taken by a camera microscope (OLYMPUS BX41, Japan).

RESULTS

The cyst-bearing fish (Fig. 1) was 11 cm in total length (TL) and 31g in weight. Thecyst was raised as high as 8mm from the bodysurface protruded into the caudal fin. Theywere soft but solid to the touch and had an irregularsurface. The cross-sectional epidermal was spherical (0.6 in diameter). The cyst had a smooth internal surface with a thin wall of 1 mm.

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Fig. 1: Sampleof *C. carpio* with EIC.Fig.2: Closer view of EIC in *C. carpio*.

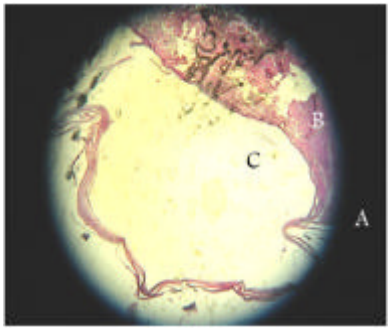

Fig. 2: Hematoxylin and eosin stained photograph of EIC in *C. carpio*. A) Internal space; B) Skin; C) Fibrous wall. Hematoxylin&Eosin 4X.

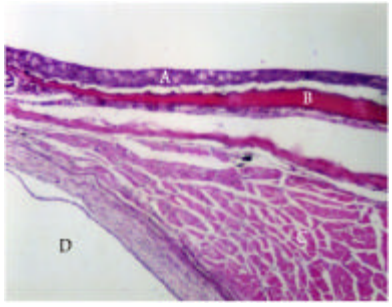

Fig. 3: Hematoxylinand eosin stained histology of EIC in *C. carpio*. A) Epidermis; B) Dermis; C) Skeletal muscular tissue; D) Cyst's internal space. Hematoxylin&Eosin 10X.

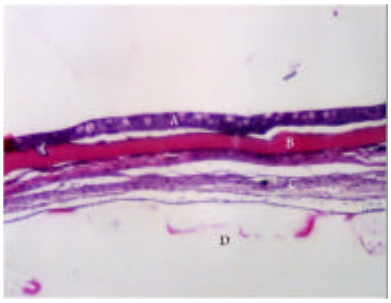

Fig. 4: Hematoxylin and eosinstained histology of EIC in *C. carpio*. A) Epidermis: squamous cell layers; B) Dermis; C) Skeletal muscular tissue; D) Hypoderm (connective tissue). Hematoxylin&Eosin 10X.

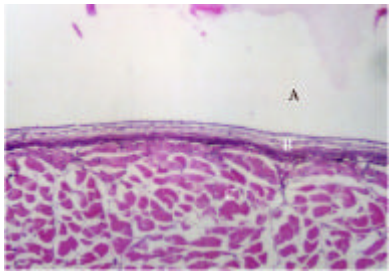

Fig. 5: Hematoxylin and eosin stained histology of EIC in *C. carpio*. A) Cyst's internal space; B) Surrounding tissue; C) Skeletal muscular tissue. Hematoxylin&Eosin 10X.

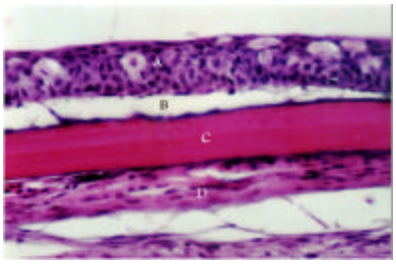

Fig. 6: Hematoxylin and eosin stained histology of EIC in *C. carpio*. A) Club cells; B) Epidermis; C) Dermis; D) Hypoderm (subcutaneous tissue). Hematoxylin&Eosin 40X.

Microscopic Diagnosis: Microscopic examination (Figs. 2-6) revealed an epidermal cyst with a fibrous wall, consisted mostly of one cell layer but of two or three squamous cell layers at some regions. The cyst penetrated deep into the internal space containing a transparent and colorless fluid.

DISCUSSION

The realization of encystment *in vitro* demonstrated that the initial cyst wall is of parasitic origin and fluorescent antibody methods showed that it does not imitate fish tissue in composition. Cysts formed *in vivo* have material, presumably of fish origin, associated with the cyst wall, as do living and fixed *in vitro* cysts following implantation according to Howell [6].

It is considered that cysts are not encapsulated for some weeks after infection because they are disguised as host tissue by material of fish origin associated with the cyst wall. An alternative explanation is proposed if the fish material does not have this functional role; the presence of spikes on the initial cyst wall may form an unsatisfactory substrate for the attachment of cellsin agreement with Howell [6].

CONCLUSION

Epidermal inclusion cyst (EIC) occurred on the caudal fin projecting from the skin. Although EIC is rather common in human but this is apparently the first report of EIC incidence in common carp.

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