Opis przypadku *Case report*

A case report of lymphosarcoma in an aquarium fish: a red swordtail *Xiphophorus hellerii*

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Summary

A male red swordtail *Xiphophorus hellerii* with a large tumour in its branchial cavity was described in this study. The tumour, diagnosed as lymphosarcoma, grew rapidly, was pale yellow-white, hard in texture, and well-differentiated. It primarily infiltrated the gills and showed no visible metastasis. Histopathology of the tumour mass revealed dense sheets of tight compacted pleomorphic, round neoplastic cells with eosinophilic cytoplasm, exhibiting mild to moderate anisocytosis and anisokaryosis. Nuclei were generally round with fine granular chromatin. Mitotic figures were abundant. The precise aetiology of the tumour is unknown. The single occurrence of a tumour in this fish suggests that it developed spontaneously.

Keywords: neoplasm, lymphosarcoma, fish

Tumors of lymphoid elements are common tumors of mammals and less common in poikilotherms, but have been reported in several species of fish. Lymphosarcoma have been described in fish i.e. *Esox lucius* (16, 17, 19, 20), *Esox masquinongy* (3, 20), *Oncorhynchus mykiss* (2, 22), *Salmo salar* (5), *Ictalurus punctatus* (4), *Stizostedion lucioperca* (1), *Thymallus thymallus* (11), *Salvelinus fontinalis* (9), *Sphyma tiburo* (15) and *Ameiurus catus* (10). Lymphohematopoietic neoplasms of the gills in fishes are rare lesions, which is notable considering the exposure of the gills to various environmental agents (6, 21). Spontaneous gill neoplasms have also been reported in various species of fishes (13, 23). The purpose of this study was to describe the histopathological lesions of gill lymphosarcoma in a red swordtail *Xiphophorus hellerii*, theornamental, freshwater fish belonging to family Poecilidae.

Material and methods

In January 2022, a male red swordtail *Xiphophorus hellerii* (72 mm length) was referred to the Department of Biology and Fish Diseases, Faculty of Veterinary Medicine, University of Life Sciences in Lublin, Poland. The fish was referred due to a large mass in the branchial cavity (Fig. 1). The live fish was killed with an overdose of buffered tricaine methane sulfonate (MS-222) at 200 mg/L. The study was performed in accordance with the guidelines set out by the Local Ethics Committee.

The tissue was fixed in 10% buffered formalin for 24 h. After fixation, tissue was dehydrated in ethanol, equilibrated in xylene and embedded in paraffin according to standard histological techniques. The sections (5 μm) were stained with haematoxylin and eosin (HE). Selected fields were photographed using Nikon Eclipse E-600 microscope coupled with a digital camera Nikon DS-Fi1 (Nikon Instruments, Tokyo, Japan). The diagnosis of lymphoid neoplasm was made based on morphological findings in light microscopy.

Results and discussion

One fish, a male red swordtail *Xiphophorus hellerii*, showed a large mass in the left branchial cavity (Fig. 1a). The diseased fish was lethargic and had exophthalmia. In the studied fish, the tumor grew rapidly, was pale yellow-white, hard/solid in texture, well-differentiated, mainly infiltrated gills, and showed no visible metastasis. None of the remaining fish in the exhibit aquarium showed a similar visible neoplasia during the one year following the introduction of the fish.

Fish neoplasms are classified according to mammalian tumor classifications. In the present study, the diagnosis of lymphosarcoma was based on the characteristic light microscopic features of the neoplasm as

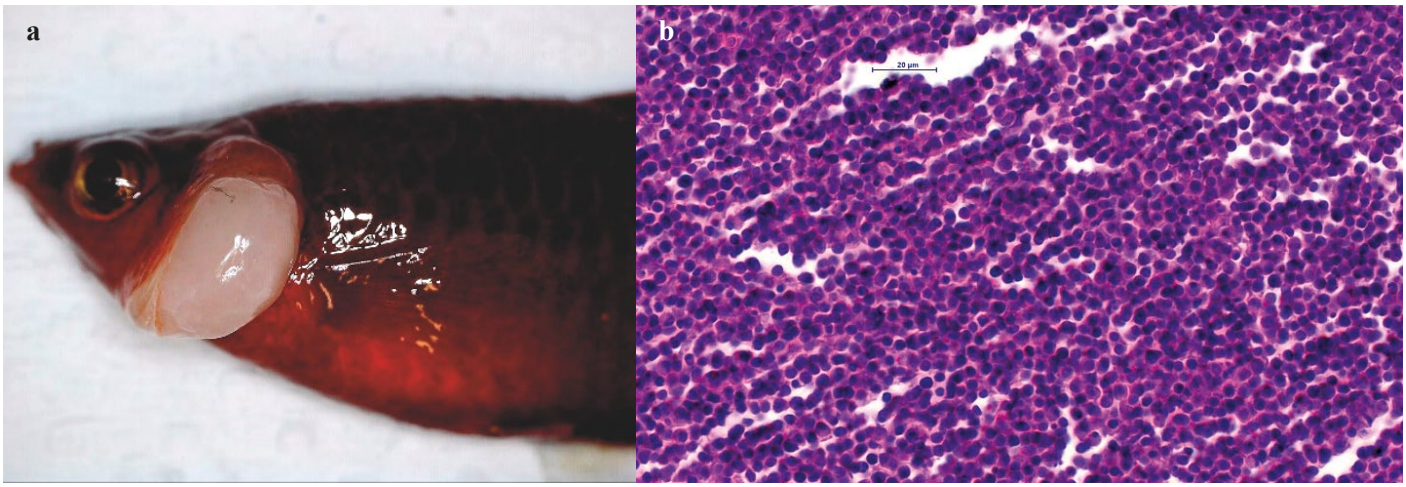

Fig. 1. Lymphosarcoma in the branchial cavity of a male red swordtail *X. hellerii* (a). The cytology of a tumor mass revealed dense sheets of tight compacted round neoplastic cells with eosinophilic cytoplasm, a high nuclear to cytoplasm ratio and granular chromatin. With an absence of detectable bacteria and fungi, the fish was presumptively diagnosed with lymphosarcoma (b). HE, scale bar = 20 µm

described in fish (18). A tumor mass was composed of dense sheets of tightly compacted pleomorphic, round neoplastic cells with eosinophilic cytoplasm, exhibiting mild to moderate anisocytosis and anisokariosis (Fig. 1b). Nuclei were generally round with fine granular chromatin. Themitotic figures were abundant. The precise etiology of this tumor in fish is unknown, but it may appear spontaneously (13, 23) and may involve chemicals (7, 12) and viral factors (8). It is not possible to establish a relationship between the prophylactic administration of widely used chemicals and the occurrence of the tumor in the studied fish. The single occurrence of tumor in this fish suggests spontaneous development of the tumor.

In summary, we described a rare case of spontaneous gill lymphosarcomain a red swordtail *Xiphophorus hellerii*.

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