



NAAHTWG Slide of the Quarter (October – December 2007) – Whirling disease in rainbow trout (*Oncorhynchus mykiss*)

Case History

Young juvenile farm-reared salmonids that had been raised in earthen ponds were found to exhibit blackened tails, some skeletal deformities (especially of the head, jaws and opercula), and were frequently seen to whirl and chase their tails. Older fish and young juvenile brown trout did not seem to be affected.

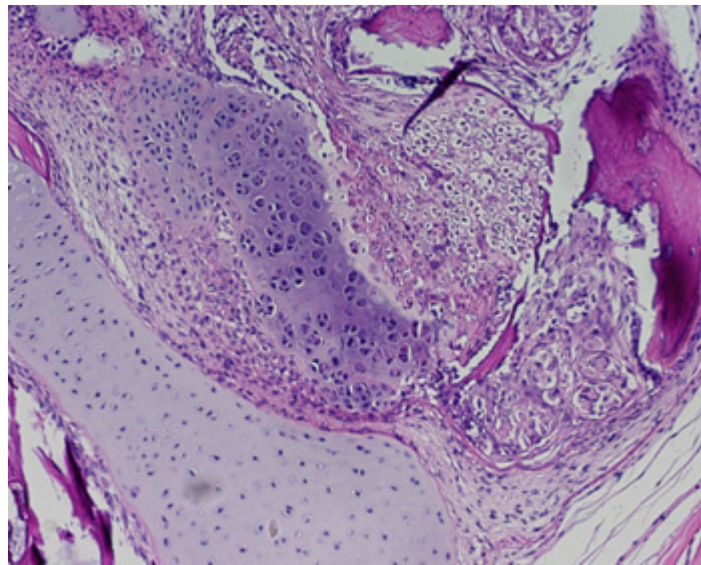


Figure 1

Histopathology

This is a mid-sagittal section of an affected fish from one of the ponds. There is some variation in the extent of the lesions in each of the sections that have been cut, but the most significant changes are multiple foci of acute necrosis and lysis in, and around, the head and vertebral cartilages of the fish.

Myxozoan spores can be seen throughout many of the lesions. A granulomatous inflammatory response is also apparent in many of the affected regions, and, in some sections, this response is impinging on the dorsal and/or ventral cord, and on the floor of the brainstem.

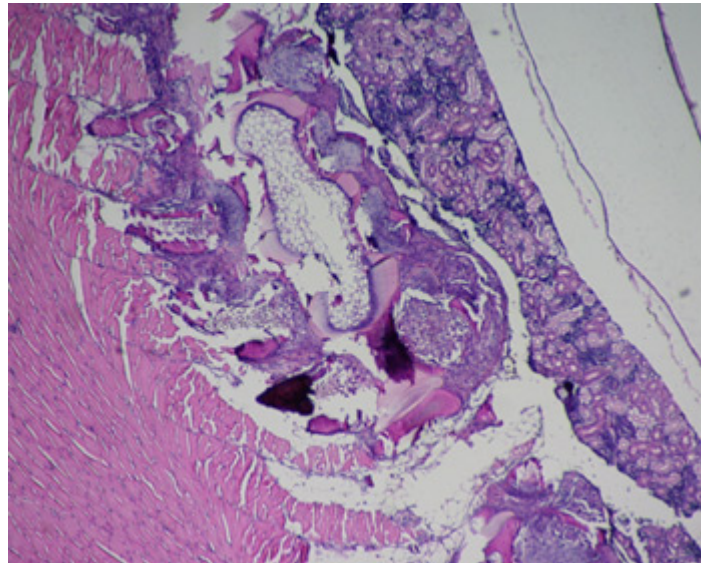


Figure 2

Morphological diagnosis

Moderate-severe, chronic-active, multifocal necrosis and lysis of cartilage in the head and vertebrae.

Aetiological diagnosis

Whirling disease caused by the myxosporean protozoan, *Myxobolus cerebralis*.

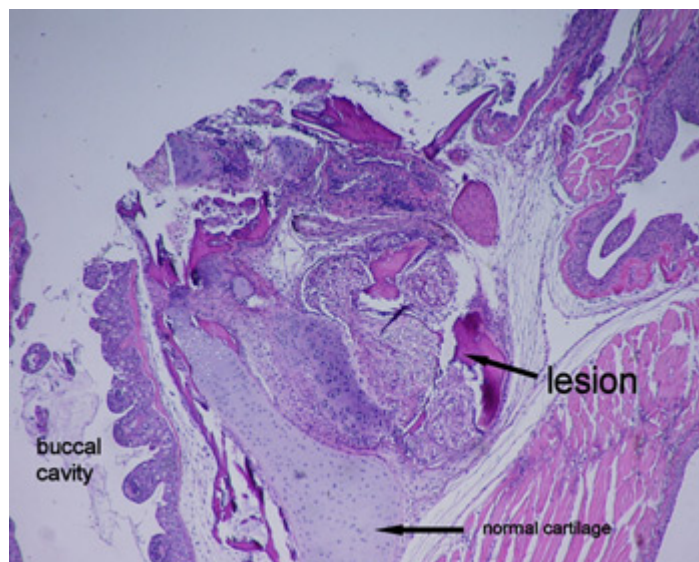


Figure 3

Comments

This is actually an exotic disease of Australia, although it is widespread in many other parts of the world. The protozoan has an indirect life-cycle, requiring a tubificid worm (*Tubifex tubifex*) as an intermediate host. The



parasite affects the cartilage of the head and vertebrae, and, then, as ossification of the damaged cartilage occurs, permanent cranial and vertebral deformities may develop.

Damage to the cartilage around the auditory organ may cause the whirling behaviour, while damage to the cartilage in the vertebral column may cause pressure on spinal nerves, resulting in loss of control of melanophores in the skin (and hence the darkened tails of many affected fish).

Although, originally, it was thought that the parasite reached the cartilage via blood or lymph, El-Matbouli *et al* (1995) demonstrated that the agent entered the fish through skin, fins, gills and buccal cavity, and then reached the cartilage via peripheral nerves and the central nervous system. (Tissue section originally supplied by Dr Dolores Baxa, University of California, Davis)

Reference

El-Matbouli M, Hoffman RW and Mandok C (1995) Light and electron microscopic observations on the route of the triactinomyxon-sporoplasm of *Myxobolus cerebralis* from epidermis into rainbow trout cartilage. *J Fish Biology* 46:919-935.