

HISTOPATHOLOGICAL ASPECTS IN FISH *CHELON KLUNZINGERI* TESTES INFECTED WITH *PHILOMETRA* SP. FROM KARACHI AND MAKRAN COAST, PAKISTAN

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Abstract

In most fish the testes are paired elongated organs that are attached to the dorsal wall of the body by a mesorchium. The testes of fish produce both, the male gamete called sperm or spermatozoa and the testicular hormone which is the primary sex hormone. The Sertoli cells having sharply defined elongated or triangular nucleus with hardly visible nucleoli and cytoplasm forming as spermatocyst. The histopathological sections of infected testes of fish showed several pathological alterations including solitary and necrotic sertoli cells, atrophic spermatozoa, and degenerated spermatids.

Keywords: Histopathology, Fish, Testes, Nematode, Coastline of Pakistan.

INTRODUCTION

Fish and fishery products provide a salient vehicle in running the economy of many countries including Pakistan beside their nutritional values. The increasing population of human has raised an urgent demand for the high quality of protein that is being fulfilled largely by aquaculture and marine fisheries.

Parasites and their diseases, however, exert a negative impact on the health of fish by extracting nutrients and energy from the hosts causing immunological, physiological, and pathological alteration in fishes (Vigneshwaran *et al.*, 2017).

Parasitic nematodes have been recorded to be associated with several pathological condition such as degradation of tissues, granulomas, hemorrhage, and mesenteric and visceral adhesion (Mohammed *et al.*, 2017).

Gonad infecting round worms of the family Philometridae infect abdominal cavity and other tissues of various fish hosts of marine and freshwater bodies. These nematodes complete their lifecycle using copepods and other aquatic crustaceans as intermediate hosts that are then subsequently transmitted to final vertebrate hosts.

The genus *Philometra* Costa, 1845 is distributed to a wide range of fish hosts from Pacific, Atlantic, and Indian oceans with occurrence also in brackish waters. Representatives of this genus have been reported from different species of fishes in different parts of the world (Chavez and Oliva, 2011; Moravec *et al.*, 2011; Selvakumar *et al.*, 2014; Moravec *et al.*, 2016; Ali and Afsar, 2018).

Infection of Philometrid nematodes recovered from body cavity and female gonads of different species of mugilidae reported by Moravec *et al.* (2016); Periyasamy *et al.* (2020). This study also recovered a *Philometra* sp. from mullet fish *C. klunzingeri*. In the present paper histopathological changes in fish *Chelon klunzingeri* testes infected with *Philometra* sp. is being studied.

MATERIALS AND METHODS

Hosts were sampled from two different localities of Pakistan namely Karachi coast and Makran coastline and brought to the Laboratory of Parasitology, University of Karachi, Karachi. After gross inspection fish were dissected ventrally to expose the visceral organs and observe any possible parasitic infection. Nematode infected testes were separated and preserved in 10% buffer Formalin. After preservation dehydrated the tissue by passing it into ascending series of ethyl alcohol cleared, impregnated, and embedded in molten paraffin wax. Sections of 4-5 microns obtained through microtomy were stained in Harris hematoxylin and eosin.

Permanently mounted tissue sections were observed, and microphotographs taken using photomicroscope, Nikon (Optiphot-2).

RESULTS

Specimens of gonad infecting nematodes were found in the form of bunches in the testes of the host being highly coiled and penetrated deep into the testicular tissues. The Sertoli cells of infected male gonads usually occurred solitary and appeared necrotic besides atrophy of spermatozoa was common (Fig. 1) which may generally be due to loss of protein, cytoplasm, and organelles. The shape of tubules was not well defined. It appeared that spermatids had lost their shape and were damaged (Fig. 2).

DISCUSSION

Nematode parasites elicit a number of pathological changes to infected tissues of the fish host the severity of which greatly depends on number and species of parasites. The damages induced in testicular tissues involved structural changes of the Sertoli cells, atrophic condition of spermatozoa was obvious along with degenerative spermatids. Reduced number of spermatozoa were observed along with irregular alterations in seminiferous tubules. Infiltration of lymphocytes especially at the site of debris of dead worms was observed. The current findings show consistency with the observations of Mir *et al.* (2012) who found disorganization of testicular structure, disruption of germinal epithelium, necrosis, and reduction in spermatozoa due to infection of larvae of *Eustrongylides* sp.

Deformation and degeneration of gonads of fish host in heavy infestation by *Eustrongylides* larvae was noted by Paperna (1974). Bakenhaster *et al.* (2014) recorded that nematodes of genus *Philometra* cause severe damages to the gonads of their fish hosts which reduce the reproductive potentiality. Rasheed (1965) and Eslami *et al.* (2011) observed testes of host fishes infected with *Philometra pellucida* and anisakid nematodes respectively but they did not record on their pathology.

Several histopathological works have been conducted (Rizwana *et al.*, 2007; Sattar *et al.*, 2016; Parveen *et al.*, 2018) but to date there is no literature available on histological pathology of gonads of fishes due to helminth parasites. In heavy infestation the tested showed reduction in size on gross inspection which indicate these worms as a stress that might affect the reproduction capability of their hosts.

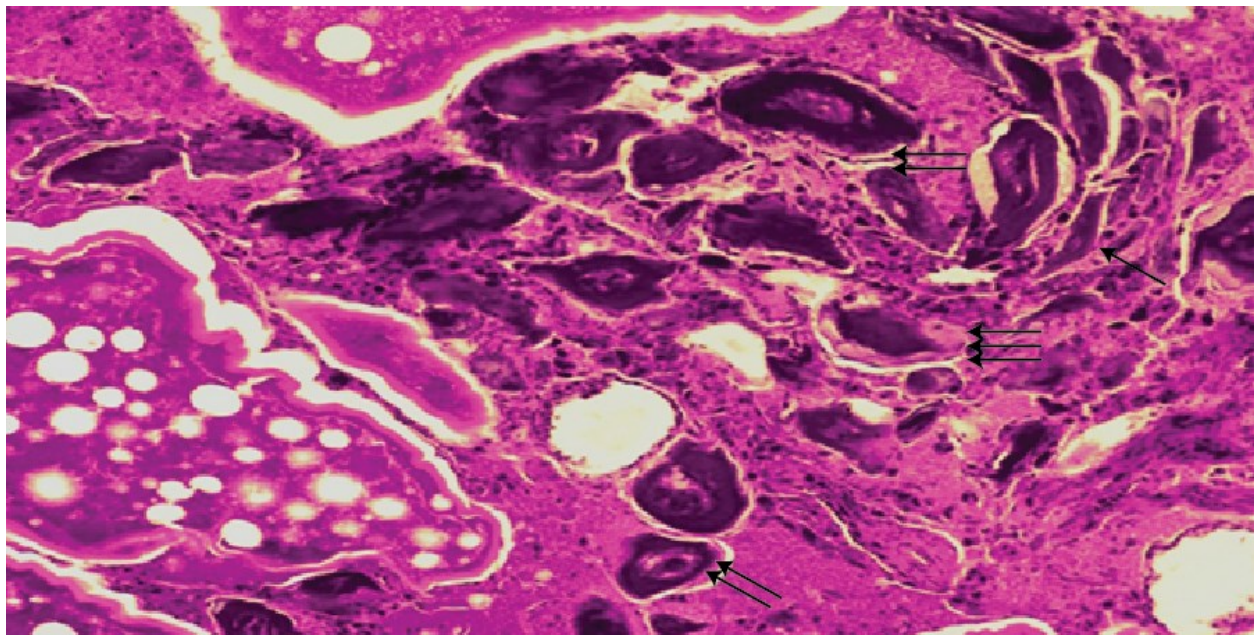


Fig. 1: Photomicrograph of testis showing the necrotic Sertoli cells (←), atrophic spermatozoa (⇌), undefined seminiferous tubules (≡) (20X).

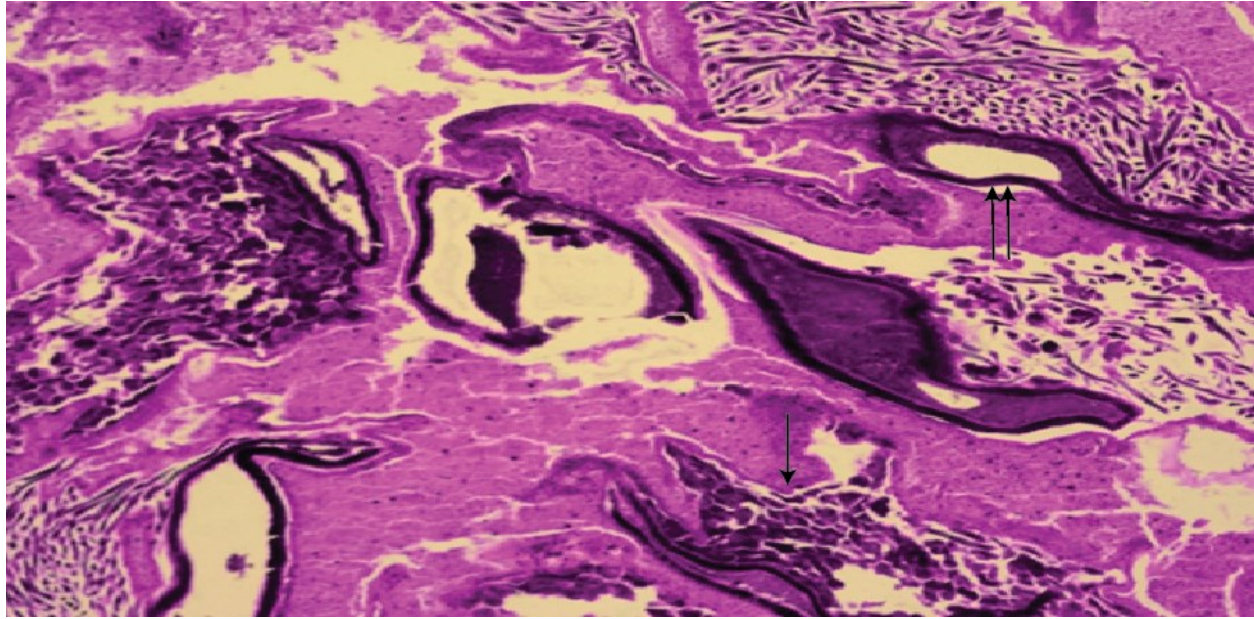


Fig. 2: Section of testis showing spermatids which had lost their shape and appeared damaged due to infection (↔) and debris of nematodes (⇌) (10X).

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