

HISTOPATHOLOGICAL CHANGES IN THE INTESTINE OF BUZZARD EAGLE (*BUTASTUR TEESA* FRANKLIN) BY ACANTHOCEPHALAN INFECTION

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ABSTRACT

The occurrence of disease particularly in birds due to helminth parasites is important. Besides mortality, helminth parasites have considerable negative impact on growth and susceptibility to other stressful factors which may lead to secondary infections. In the present study, the intestine of the infected Buzzard eagle collected from Karachi, Sindh, Pakistan was fixed in 10% formalin. Later the infected tissue was dehydrated in ethanol, embedded in paraffin wax, sectioned at 5 µm, stained with Haematoxylin and eosin and examined microscopically. *Mediorhynchus fatimae* Khan *et al.*, 2004 was found to cause severe damage involving all the layers of the intestine including the villi, muscular layers and serosa.

Heavy infections with *Mediorhynchus fatimae* are capable of causing irreversible damage to intestinal tissue which can seriously affect the health of Buzzard eagles. Further studies are required to elucidate possible management measures especially of protected bird species.

KEYWORDS: Buzzard eagle, Intestine, Histopathology, Acanthocephalan, *Mediorhynchus fatimae*.

INTRODUCTION

Only three species of acanthocephalan genus *Mediorhynchus* Van Cleave, 1916 have been reported from Pakistan namely *M. gibsoni*, *M. fatimae* in *Butaster tessa* and *M. nickoli* in kite (*Milvus migrans*) (Khan *et al.*, 2004; Bilqees *et al.*, 2003). Although a large number of species of genus *Mediorhynchus* have been reported from different countries of the World (Yamaguti, 1963; Bhattacharya, 2007).

In the present study, histopathological changes produced by *Mediorhynchus fatimae* Khan *et al.*, 2004 is being reported in Buzzard eagle (*Butastur teesa* Franklin) (Aves: Accipitridae) from Karachi, Pakistan.

MATERIALS AND METHODS

Six birds (*Butastur teesa*) were collected from Karachi suburbs and transported alive to the laboratory, anesthetized and dissected. The intestine were incised longitudinally and examined in 0.7% physiological saline for parasite infections. One bird was found to be infected. Its intestine was fixed in 10% formalin for histopathological examination. In the laboratory, the infected intestine was examined grossly for the presence of parasites and lesions. Seven acanthocephalan were found in the intestine of one infected birds. Out of the seven acanthocephalan, five were found in the intestinal contents while the others penetrated with the proboscis into the intestine. For histopathology, the fixed intestinal tissue of the bird with attached parasites was dehydrated in ethanol, embedded in paraffin wax sectioned at 5 µm, stained with Haematoxylin and eosin and examined microscopically.

RESULTS AND DISCUSSION

All the six birds appeared healthy without any external clinical manifestations concerning activity, weight and feather appearance. The observations on histological sections of intestine of Buzzard eagle (*Butastur teesa* Franklin) infected with *Mediorhynchus fatimae* have revealed severe damage involving all the layers of intestine including the villi, muscular layers and the serosa. Radwan (2012) reported invasion of *Sphaerirostris picae* to the ileum wall of Hooded crow causing noticeable destruction of its layers. Along with shortening and blunting of villi, compression and erosion of epithelial cells and haemorrhage in the connective tissue.

In the present study the worm penetrated all the layers of the intestine making perforation in the muscular layer, the spiny proboscis of the worm made severe mechanical destruction leading to necrosis of the villi, accumulation of large number of inflammatory cells, dislocation and perforation of muscular layers (Fig. 1). In some sections large migration tracts produced a number of tunnels in which host tissue reaction was obvious (Fig. 2).

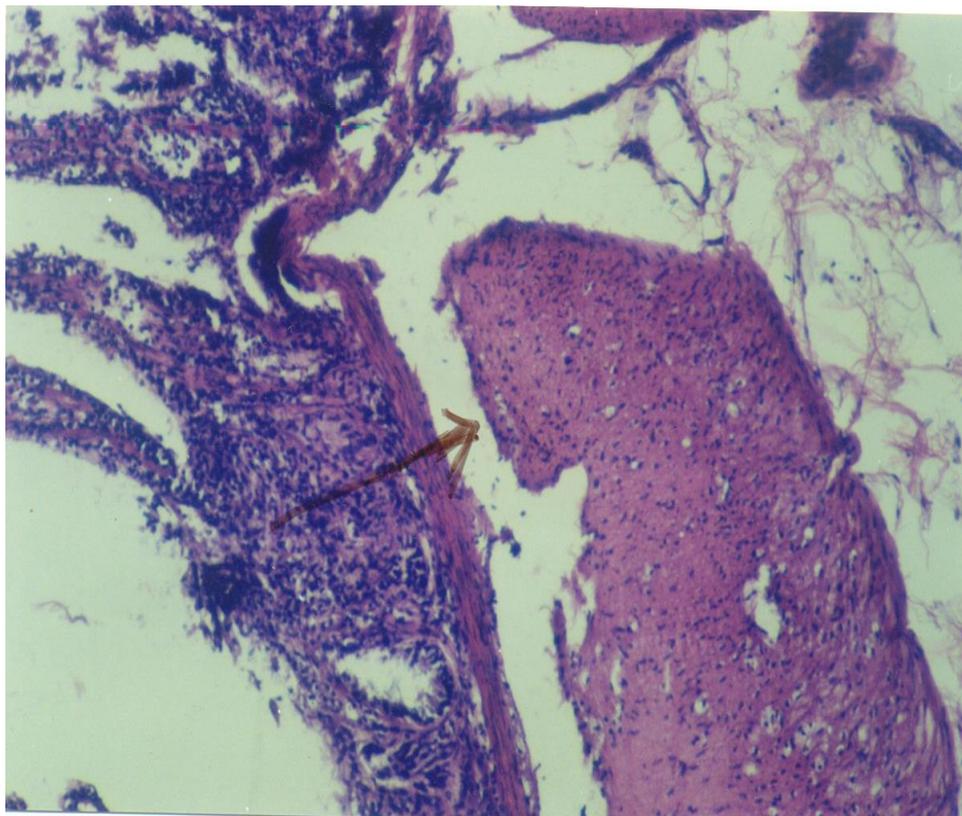


Fig. 1. Portion of intestine showing severe inflammation in the distorted villi and muscles. Also note the separation of muscular layers (arrow) (x 50).

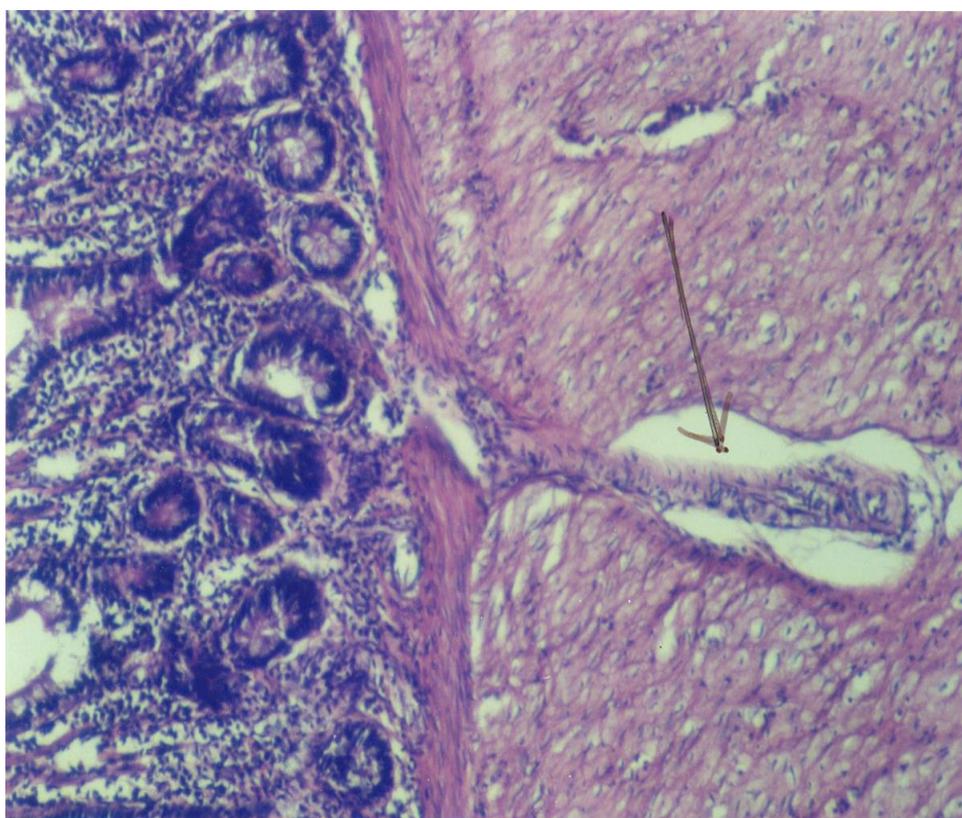


Fig. 2. Section showing migration tracks of the acanthocephalan in the muscular region (arrow) and severe inflammation in the glandular and villous region (x 50).

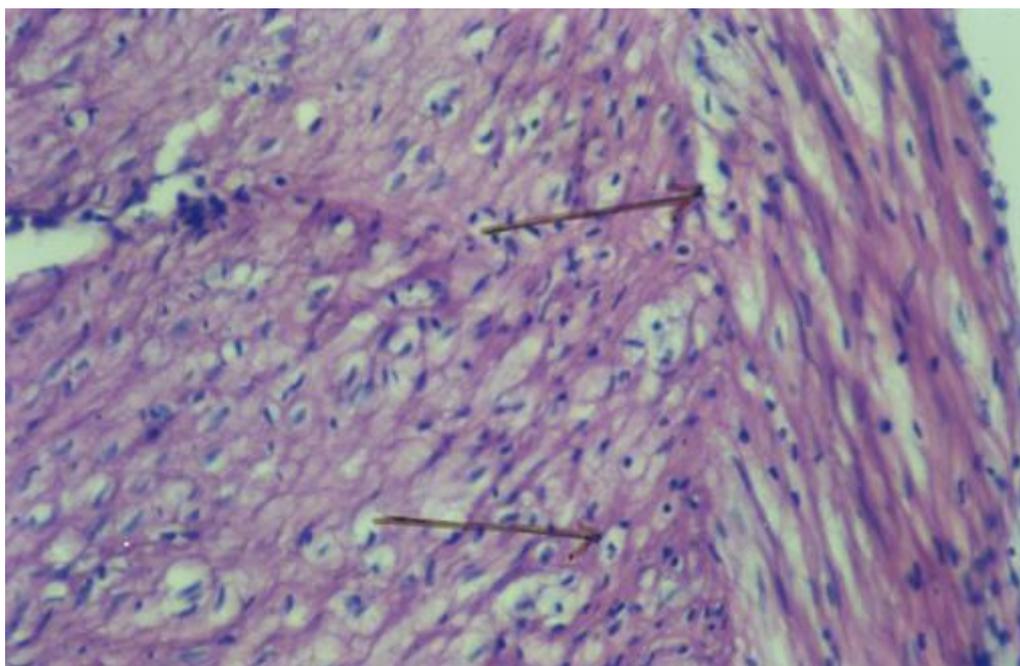


Fig. 3. Muscular region showing vacuolation of muscles due to atrophy (arrow), which has resulted in accumulation of several nuclei (x 100).

In addition to migration tracts in the muscular layers, large lesions and granuloma was obvious indicating the extent of penetration and host tissue reaction. Atrophy of muscles and formation of vacuoles and space were clearly observed (Fig. 3), resulting in accumulation of several nuclei. In some sections erosion of morphological alteration of villi was prominent. Shirazi *et al.* (2014) reported histology of *Centrorhynchus aluconis* in common buzzard (*Buteo buteo*) of Iran. The inflammatory tissue reaction was intensive around the attachment of the worm. Granulomas surrounded by fibrous tissue were composed of foreign body giant cells and large number of macrophages around the necrotic area in the lamina propria mucosa. Furthermore, fused short villi were also present. Nickol (2006) has suggested that acanthocephala depending on their attachment mechanism are able to seriously disrupt the integrity of mucosal gut layer, inducing lesion of wide degree from shallow erosions to deep ulcerations with haemorrhage and perforation of gut wall. On the whole severe tissue destruction was prominent including necrosis of villi and crypt glands, penetration tracts, granulomatous lesions and atrophy in the muscular layers and formation of vacuoles and large spaces were obvious.

Acanthocephala can be pathogenic helminths of birds (La Sala *et al.*, 2013). Pathology occurs due to physical damage caused by the proboscis and spines which pierce and rupture the lining of host intestine. In heavily infected host the amount of nutrients absorbed by the parasites can be significant and may cause harm to the host (La Sala and Martorello, 2007).

The infected intestine of the Buzzard eagle (*Butastur teesa* Franklin) shows severe tissue damage with morphological alteration. The acanthocephalan *M. fatimae* are large worms with proboscis and neck region heavily armed with hooks and spines. The villi are badly infested resulting in erosion of superficial surface and infiltration of large number of inflammatory cells. Penetration of proboscis create large migration tracts, similar to the findings (Crompton, 1973). These conditions are more or less similar to those described in other vertebrates such as marine fishes (Bilqees and Fatima, 1992). It has been noticed that *Butastur* eagle intestine is severely damaged by traumatic and toxic effects as reported earlier in snake (*Naja naja*) where intestinal villi were badly affected, fused together and had lost their upright position in the lumen, total destruction of mucosal and serosal layers could be due to strong proboscis penetration (Khatoun *et al.*, 2002).

Pathology occurs due to physical damage caused by the proboscis hooks and spines which pierces and ruptures the lining of host's intestine. In heavily infected hosts the amount of nutrients absorbed by the parasites can be significant if worms are found in high frequency and may lead to death to the host. El-Dakhly *et al.* (2012) have suggested on examination of intestinal contents of a Japanese golden eagle that acanthocephala could have been one of the cause of its death. Pathological changes in the parasitized tissue may depend on the adaptation ability of acanthocephala parasites to their environment. The praesoma (proboscis and neck) has the ability to penetrate into the intestinal wall of the host.

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