

HISTOLOGY OF THE INTESTINE OF OWL (*STRIX LEPTOGRAMMICA* TEMMINCK) ASSOCIATED WITH *POLYMORPHUS MOHIUDDINI* RAHMAN ET AL., 2008

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ABSTRACT

The tissue damage caused to the intestine of owl (*Strix leptogrammica* Temminck) with the acanthocephalan parasite *Polymorphus mohiuddini* Rahman et al., 2008 is described based on 6-8 microns thick histological sections stained with haematoxylin and eosin and mounted permanently in Canada balsam by usual method. Photographs of infected intestinal tissues were prepared in support of the observations and are presented here. The infected intestine revealed full thickness of wall with abnormal villi and crypt glands. Hyperplasia of crypt glands, inflammatory cell and a number of giant cells were present. Shrinkage of muscular layer as well as ulceration was prominent. Ulceration and compression of muscular fibres was observed in a number of sections. It is the first report on intestinal tissue damage caused by acanthocephalan *Polymorphus mohiuddini* Rahman et al., 2008 in owl.

KEYWORDS: Intestine, Histology, Owl, Infection, Acanthocephalan, *Polymorphus mohiuddini*.

INTRODUCTION

Although a large number of acanthocephalan have been reported from various countries of the world, including Pakistan (Amin, 2013), the literature on histology of birds infected with Helminth parasites is scarce in Pakistan. There is only one report available on histology of infected intestine of bird with acanthocephalan (Bilqees et al., 2003). In the present study histology of owl infected with *Polymorphus mohiuddini* Rahman et al., 2008 is undertaken in detail.

MATERIALS AND METHODS

The selected portion of owl (*Strix leptogrammica* Temminck) intestine infected with acanthocephalan, *Polymorphus mohiuddini* was fixed in 10% formalin and processed for histological study by usual methods. Sections (6-8 microns thick) were stained to bring out difference among the tissue components by staining and later counter staining using haematoxylin and eosin.

Photographs were taken with Nikon (Optiphot-2) photomicroscope and Fuji colour film was used. Selected photographs are presented here in support of observations.

OBSERVATIONS

The intestine of owl (*Strix leptogrammica* Temminck) was severely damaged by *Polymorphus mohiuddini* Rahman et al., 2008. It was observed that full thickness of the infected intestine had abnormal villi and crypt glands (Fig. 1). Shrinkage of muscle with prominent spindle shaped nuclei and formation of giant cells in the basal muscular layer was obvious (Fig. 2). Total damage to crypt glands was also recorded with large spaces around the gland. Several inflammatory cells and giant cells were present in the muscular layer (Fig. 3). Compression and ulceration of superficial part of the muscles was also observed with spaces between crypt glands and muscular layers, probably this was the site of penetration (Fig. 4). The basal region of the muscle was the most affected showing fragmentation. In some sections empty spaces were present where crypt glands were not present. These spaces were surrounded by fibrous material. In the deeper layer muscle tissue damage was observed (Fig. 5). Ulcerated area at the superficial region of the muscle layer, numerous inflammatory cells and muscular destruction at the outer surface of intestinal wall were prominent (Fig. 6).



Fig. 1. Section showing full thickness of infected intestinal wall with abnormal villi losing normal epithelial lining and upright position (arrow), also crypt glands and associated structure (X50).

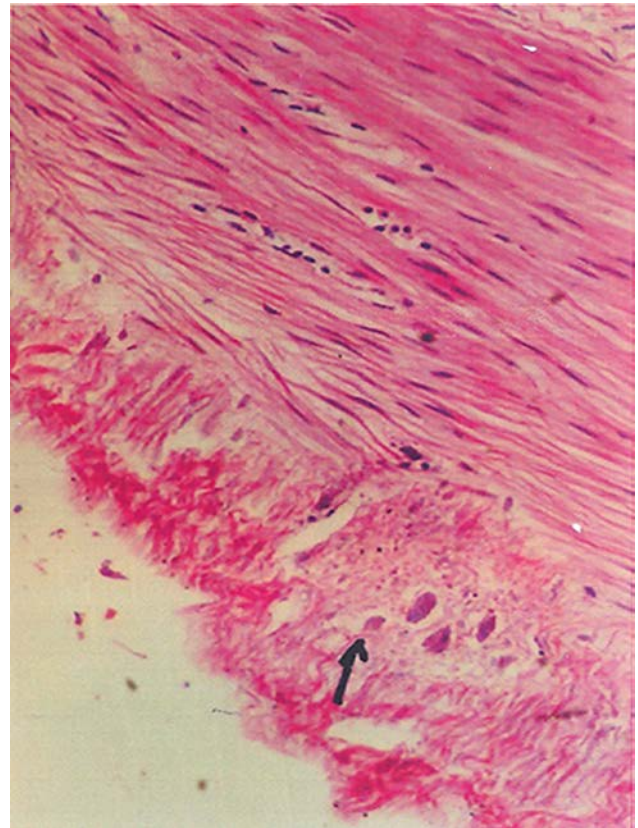


Fig. 2. Section showing crypt gland hyperplasia, inflammatory cells and giant cell (arrow) (X100).

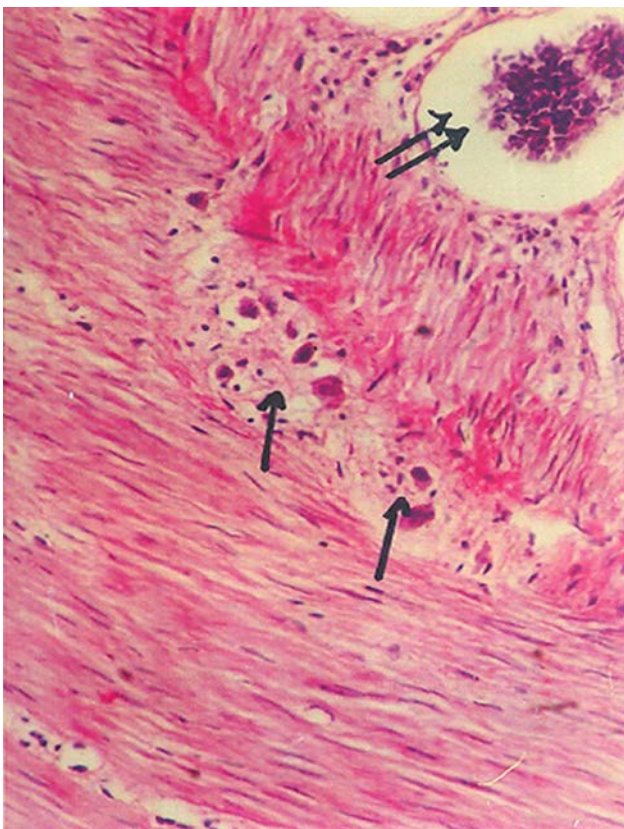


Fig. 3. Muscular layer showing two giant cells (arrow) shrinkage of muscle fibres and distorted crypt gland (double arrow) with a large space around (X100).

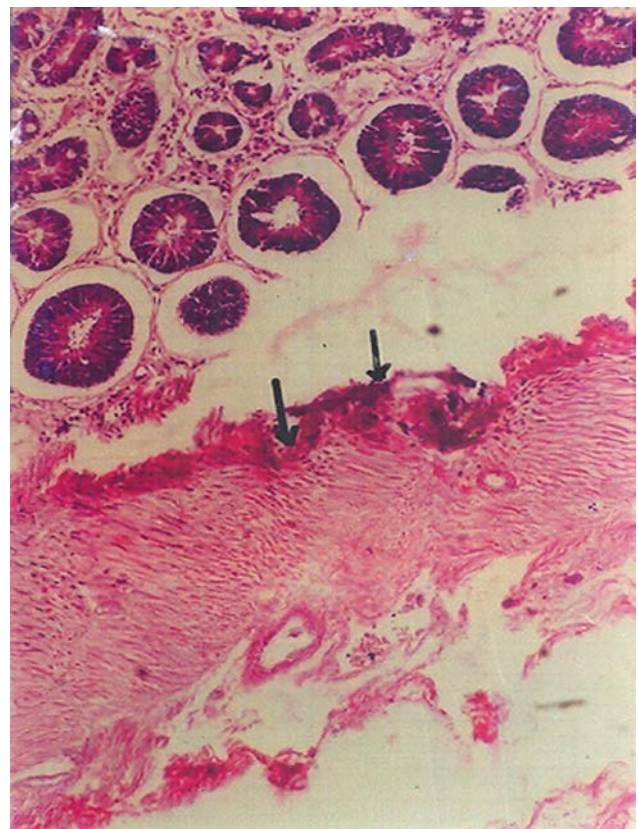


Fig. 4. Ulceration of muscular layer is prominent (arrow) (X50).

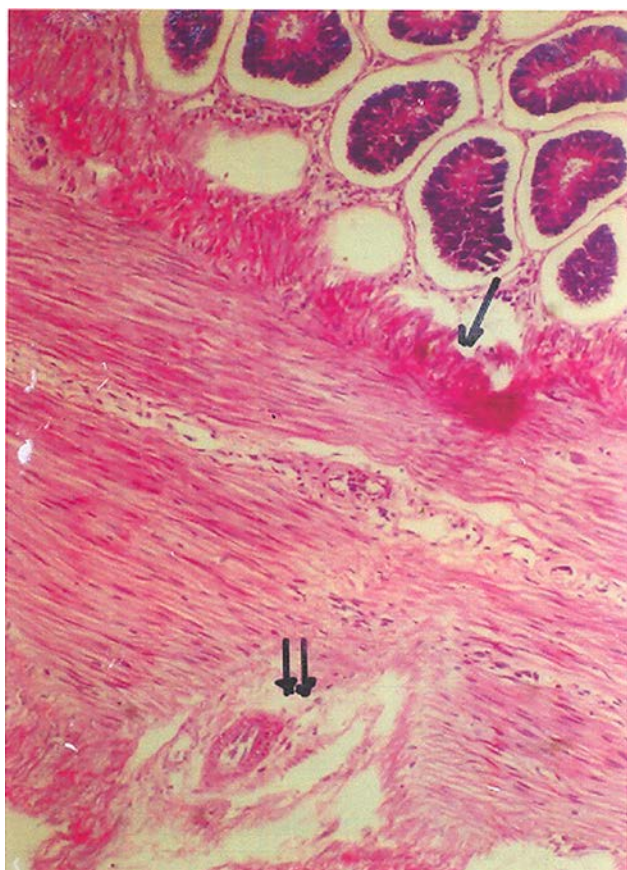


Fig. 5. Showing ulceration of muscular layer (arrow) and lesion in the deeper tissue (double arrow) ($\times 50$).

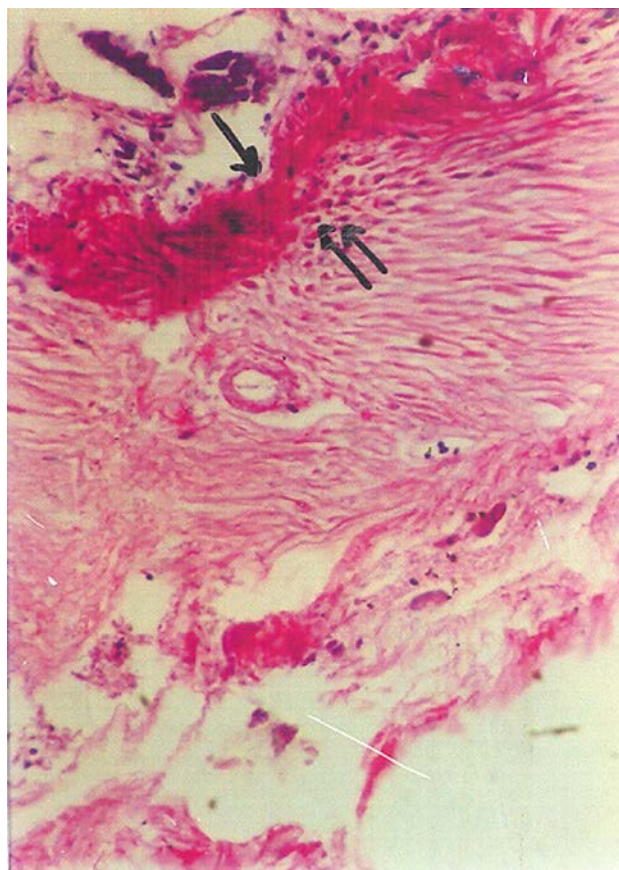


Fig. 6. Section shows aggregation and compression of muscle fibres (arrow) and fragmentation of crypt gland. Several inflammatory cells are obvious below the aggregated muscles (double arrow) ($\times 100$).

DISCUSSION

Histology of owl intestine infected with *Polymorphus mohiuddini* revealed severe tissue damage and alterations. The most affected parts were the villi and crypt glands. Although whole thickness of the intestinal wall was involved, the morphological structure of villi was completely destroyed. Similar to the findings of Kraenoshehekov & Lisitsyna (2009), they further stated that reaction is more pronounced when cystacanth is placed parallel to wall of intestine. Villi were necrotic and appeared as a mass of tissue. The crypt glands were associated with hyperplasia and showed increase in number of crypt glands with many layered epithelium. Histopathology of the intestine of the birds reported by other workers include Moore and Bell (1983) who described the peritonitis and inflammation by the *Plagiorhynchus cylindracous* attachment of proboscis which is also obvious in the owl intestine. Nikishin & Skorobrekova (2007) observed capsule formation around the site of penetration of proboscis of acanthocephalan in the intestinal wall whereas no such type of capsule formation was observed which may be due to activity of host-parasite relationship, other than capsule formation, it was observed that the intestine of owl had an extensive hyperplasia of crypt glands which was several layer thick and probably responsible for obstruction of intestinal lumen. Granulomatous lesions in muscular layers was not observed in the intestine although Bilqees *et al.*, (2003) reported it in kite, while a number of giant cells were present. Atrophy of villi, underlying tissues and submucosal region was similar to that reported by Bilqees *et al.*, (2003).

It was obvious that the intestine of owl is severely damaged by the toxic and traumatic effects. Toxic effects have produced atrophy and inflammatory infiltration while the traumatic effects are obvious by tissue destruction of the intestinal wall.

Histological changes are closely related to changes caused by stress due to parasites like cestodes, nematodes, trematodes as well as acanthocephalan (Amin & Heckmann, 1991; Jones *et al.*, 1996; Abdal-Razak, 1998).

The mechanism of action of several parasitic infections could initiate the formation of a specific enzyme that may cause changes in the metabolism leading to cellular death called necrosis and sometimes also manifest degenerative alterations to which the organism respond with an inflammatory, defensive reaction.

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