PATHOMORPHOLOGICAL ALTERATIONS IN GASTROINTESTINAL TRACT OF SHEEP AFFECTED WITH *HEMONCHUS CONTORTUS*

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SUMMARY

The present study was envisaged to elucidate the pathomorphological alterations in gastrointestinal tract (GIT) of sheep affected by *Hemonchus contortus*. Visceral organs such as abomasum, intestine, liver and abomasal contents were collected for pathomorphological and parasitological studies from six sheep died with a history of diarrhoea, which were brought for post-mortem examination. Parasitological examination revealed heavy infestation by *Hemonchus contortus* in all the six cases. Gross lesions observed were presence of worms in abomasum, congestion and hemorrhages in intestine; necrotic foci on liver surface; enlarged, hard, indurated mesenteric lymph nodes and hydropericardium. Histopathological lesions were catarrhal abomasitis, hemorrhagic entertiis and lymphadenitis with depletion of lymphocytes. From the present study, it is reasonable to conclude that the *Hemonchus contortus* found responsible for the mortality in sheep due to severe gastroenteritis, anemia and immunosuppression.

Keywords: Anemia, Gastrointestinal tract, Hemonchus contortus, Immunosuppression

Animal husbandry and dairying plays an important role in the Indian economy. Small ruminants are generally called as poor man's cows because contribution by small ruminants plays an important role. However, there are various bacterial, viral and parasitic diseases which are responsible for the detrimental effect on the health and production of small ruminants. Among the parasitic infestation, Hemonchosis is one of the important disease condition leading to severe anemia, gastrointestinal tract disturbances and immunosuppression. Therefore, the present study was conducted to elucidate the gastrointestinal tract alterations in dead sheep affected with Hemonchosis upon postmortem examination.

Post mortem examination of six ovine carcasses with history of clinical signs such as diarrohea, anorexia and weakness was conducted in the postmortem hall of the Department of Veterinary Pathology, LUVAS, Hisar. Internal and external examination of dead animals was done in systematic manner and gross lesions were recorded. Collection and preservation of parasites was done in 70% ethyl alcohol for further identifications, if any. Representative tissue samples of affected organs such as liver, spleen, abomasum, intestine and mesenteric lymph nodes were collected in 10% buffered formalin for histopathological examination. The fixed tissues were washed in running tap water overnight, dehydrated in acetone, cleared in benzene, and embedded in paraffin wax (melting point 60-62 °C). Paraffin sections were cut at the thickness of 4-5 µ and staining was done using Lily Mayer's hematoxylin and 2% water soluble eosin.

Gross lesions: Visible mucus membranes were pale in all the carcasses. Further gross pathological changes

observed in different organs were congestion in liver and pale discoloration of lung, heart and kidney. In abomasum, congestion and presence of wire like thin parasites in bunches were noticed (Fig. 1). There were petechial hemorrhages on mucosa and button like ulcers were also observed. In intestine, congestion, petechial hemorrhage and presence of mucus like fluid in lumen were characteristic findings. In four cases, worms were also observed in intestine which were migratory larvae. Some cases showed formation of small nodules on the mucosa of intestine (Fig. 2). Major gross changes in the lymph node were enlargement, firmness and marked edema. Parasites were identified as female (25-30 mm in length) with thick cuticle and red to white in appearance showing coiling of tail and confirmed as *Haemonchus contortus*.

Histopathological lesions: Edema, hemorrhages and inflammatory changes were characteristic lesions seen in various organs. In abomasum, moderate infiltration of eosinophils and goblet cell hyperplasia was observed (Fig. 3). In the small intestine, major microscopic lesions were edema, mild congestion in mucosa and submucosa, and hemorrhages in the mucosa (Fig. 4). Other changes were goblet cell hyperplasia, necrosis and replacement of glands of Leiberkuhn's by mononuclear cells and desquamation of mucosal epithelium. There was also depletion of lymphocytes in Payer's patches in ileum. In the liver, major microscopic lesions were congestion in portal triad area, leukocytic infiltration, and mild bile duct hyperplasia. Congestion of central vein with cloudy swelling and fatty changes in hepatocytes were also observed. Mesenteric lymph nodes when examined microscopically which revealed edema, congestion and mild leukocytic infiltration in the capsule. There was

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Fig. 1. Thin wire like worms-*Hemonchus contortus* in bunches tightly adhered to mucosa of abomasums leading to swelling of mucosal folds and congestion in one case; Fig. 2. Formation of white calcified nodules on mucosa of small intestine due to *Hemonchus contortus* infection in other case; Fig. 3. Moderate infiltration of eosinophils (arrow) and goblet cell hyperplasia in mucosa of abomasum (H & E stain X 100); Fig. 4. Hemorrhages at the tip of villi in the mucosa and infiltration of mononuclear cells in small intestine (H & E stain X 100)

depletion of lymphocytes in germinal centers of cortex and excess of mononuclear cells in medullary sinuses of the medulla. Spleen revealed mild to severe depletion of lymphocytes in white pulp area.

In the present study, characteristic catarrhal to hemorrhagic abomasitis and hemorrhagic enteritis were important findings. Similar findings were also reported by Kumar *et al.* (2013) and Kumar *et al.* (2015). Hemorrhagic enteritis may be because of severity of parasitic infection and migration of parasites in the mucosa. Anemia is attributed to blood sucking ability of parasite resulting into decreased haemoglobin (Das and Singh, 2010). Swelling and edematous changes in lymph nodes grossly and lymphocytic depletion as microscopic lesions justified the cause for marked immunosuppression which may further make animal more susceptible for the secondary bacterial and viral infections.

Haemonchus contortus was one of the most important causative agents for GIT disorders in sheep, which was found responsible for weight loss, anemia and hemorrhagic enteritis which ultimately resulted in to death. In order to prevent untoward effects of parasite and heavy economic losses, regular deworming should be followed in field condition.

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REFERENCES

- Das, M. and Singh, S. (2010). Effect of with drawl of anthelmintics on fenbendazole and morantel resistance status of Haemonchus contortus in sheep and goats. *Haryana Vet.*, **49**: 22-24.
- Kumar, S., Jakhar, K.K., Mishra, S.K. and Purohit, B.S.R. (2013). Pathology of digestive and respiratory tracts disorders in sheep. *Indian J. Vet. Pathol.* **37(2)**: 124-127.
- Kumar, S., Jakhar, K.K., Singh, S., Potliya, S., Kumar, K. and Pal, M. (2015). Clinico-pathological studies of gastrointestinal tract disorders in sheep with parasitic infection. *Vet. World.* 8(1): 29-32.