

Pathological Alteration in Thymus of White Leg Horn Chicks during experimental Ascariasis

Divya Singh

Asstt. Prof, Deptt. of Zoology, Meerut College, Meerut (India)

email: divyasingh134@gmail.com

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Abstract

W.L.H. chicks were infected with A galli eggs dose (1000 eggs) and cadmium acetate treatment (5 mg. /Kg. body wt) was given. Pathological study of thymus was done after 30days of post infection and treatment. Mild depletion of lymphocytes was observed in cortex region. Inflammatory edema was due to infiltration of red blood cells. Medullary region revealed marked array of pathology.

Keywords : *Thymus, W.L.H. chicks, ascariasis, A galli, lymphocytes, Inflammatory edema, Cadmium acetate*

Introduction :-

Indian poultry has shown spectacular progress transforming itself from backyard farming to a dynamic and sophisticated agro-based industry. Eggs and chicken meat are one of the cheapest sources of protein available to Indians and as such can be immense help in fighting protein malnutrition in India. Parasitic infections account for hundred millions of dollars in annual losses and medicated costs in livestock and poultry industry throughout the world. The most costly parasites in terms of production losses are gastrointestinal nematodes in ruminants and poultry. (Gamble and Zarlenga, 1986).

Ascariasis is a gastro intestinal disease and is caused by an enteric nematode parasite, *Ascaridia galli*. (Schrank, 1788 and Freeborn, 1923). Kusc and Gurel (2008) described about lesions in thymus and bone marrow in chicks with experimentally induced chicken infectious anemia disease.

Cadmium (Cd) in an environmental pollutant and is non-degradable at environmental levels. Cadmium is toxic to a number of organs such as liver, Kidney, bone, blood, thymus, spleen and immune system (Friborget *al.*, 1986; Goering *et al.* 1995). Combined effects of Parasitic infections and metal toxicity have been studied by few workers. (Long and Kougut; 1981; Bafundo *et al* 1984; Southern and Stewart, 1984 and Brown and Southern, 1985).

Materials and Methods

Newly hatched W.L.H. chicks were

kept in clean cages in animal house. They were provided with feeding and water properly in morning and evening. To avoid metabolic variations, feeding was stopped 24 hours before commencement of experiments.

Culturing of Eggs :- Female parasites were kept in petri dish containing saline water for egg laying at 37°C in incubator. Eggs were kept in sterile solution at 32 - 37°C for embryo nation for 20 days. Dilution method was used for counting of eggs. The inocula with desired number of embryonated eggs (1000 embryonated eggs). were administered orally to WLH chicks Thymic tissues were got for pathological studies.

Administration of 5 mg/ Kg body Wt dose of cadmium acetate to WLH chicks.

Dose with desired amount of Cadmium acetate was administered orally with help of 18 gauge feeding needle, mounted on graduated syringe.

Chicks were divided into 3 groups.

Group 'A' - Control group which was uninfected - 8 chicks

Group 'B' - Chicks given infection with 1000 embryonated eggs of *Ascaridia galli* - 8 Chicks.

Group 'C' - Chicks given infection with 1000 embryonated eggs of *A galli* and treatment of Cadmium acetate given - 8 Chicks

Thymus was removed and kept in 10% neutral buffer formalin. Eosin and Hematoxylin were used for staining of sections.

Microphotography of sections was performed.

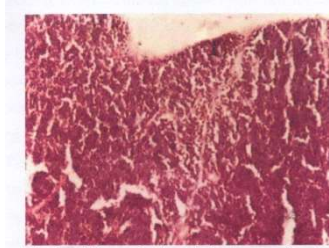


Fig. 1 T.S. passing through the thymus of control group showing capsular wall, septa and cortex and medulla. X200



Fig. 2 T.S. passing through the thymus gland of control group showing septa. X200

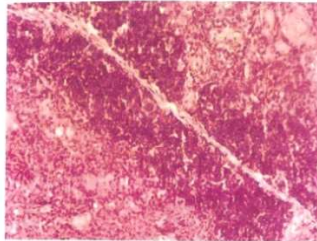


Fig. 3 T.S. passing through the thymus gland of infected chicks showing mild degenerative changes in cortex and medulla. X200

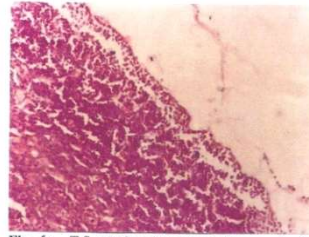


Fig. 4 T.S. passing through the thymus gland of infected chicks showing irregular capsular wall and cortex has less number of lymphocytes. X200

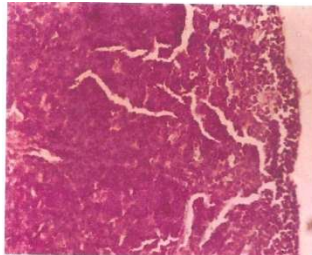


Fig. 5 T.S. passing through the thymus gland of treated chicks showing irregular capsular wall. Inflammatory edema due to infiltration of red blood cells in cortex region and in medulla. X200

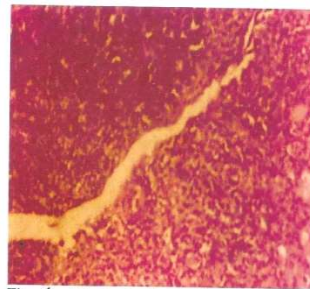


Fig. 6 T.S. passing through the thymus gland of treated chicks showing thickened septa. X200

Results :

Group A - (Fig. 1,2) Structure of Thymus of (Control) Chicks.

Thymus gland is considered as primary lymphoid organ. The gland was encapsulated in a thin connective tissue. The mass of gland was divided into lobules by septa. Each lobe was divided into 2 region cortex and medulla.

Cortex - The Outermost region of each thymic lobule constituted cortex and was in continuation with capsule. The dense population of small lymphocytes predominated the other type of cells including reticular cell in cortex.

Medulla - The central region of thymic lobe comprised the medulla. It showed small population of lymphocytes. Thymic corpuscles

were infrequently observed along with degenerating reticular cells.

Group 'B' - (Fig. 3, 4) - Structure of Thymus of infected chicks with embryonated eggs. Capsular wall was observed to be irregular. Cortex has less number of lymphocytes and showed thymic atrophy. There were gap at certain places and inflammatory edema due to infiltration of lymphocytes was observed. Mild degenerative changes in cortex and medulla were observed. Degeneration of reticular cells was found to be prominent.

Group 'C' - (Fig. 5, 6) - Structure of thymus of chicks infected with embryonated eggs and treatment of Cadmium acetate given.

Capsular wall was found to be irregular, septa which divides thymus in lobes were thickened. Distribution of small and medium sized lymphocytes was seen. In medulla region, some vacuole type structures, were observed which contained degenerating lymphocytes.

Inflammatory edema due to infiltration of red blood cells in cortex and in medulla was seen.

Discussion

In the present study, it has been observed that *A. galli*. infection and heavy metal exposure in WLH chicks induced pathological alterations in thymus gland. The capsular wall and cortical region of thymus of all experimental groups did not show much pathological changes, but in medullary region, the lymphocytic population were found to be depleted and reticular cells were degenerated. These changes may be due to Vaso active amines and chemotoxins related during antigen

antibody interactions. The chemotoxins reach into medulla and cause degeneration of thymic medulla. Thymic follicle hyperplasia and proliferation of mononuclear thymus dependent cells in Paracortical area were indicative of both cell mediated and humoral responses. Vaziry *et al* (2011) studied that chicken infectious anaemia vaccinal strain persist in thymus of young chicks and induces thymic lymphoid cell disorders. Selivanova *et al* (1977) reported pathological changes caused by *Ascaris suum* in a non specific host, the chicks. Zembraszki (1978) studied the effect of lethal dose of *Ascaris suum* eggs on liver, lungs, spleen of guinea pigs during experimental infection. Clayton *et al* (1980) reported pathophysiological changes associated with *Parascaris equorum*.

Pazyjalkowski and Watson (1980) studied pathological changes in small intestine of mice infected with *Trichinella spiralis*.

Atrophic changes displayed by prominent reduction of lymphocytes, were recognized in thymus. Thymus also shows infiltration of plasma cells and macrophages. (Massfield, 1979). It is evident from present investigation, the variety of histopathological changes in lymphoid organ of WLH host induced by *A. galli* infection and cadmium acetate treatment, depend upon severity of degree of infection.

In addition of being heavy metal, cadmium is a toxic metal, chronic exposure to which has been involved in variety of pathological alteration.

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