
Immunopathological Modulation in Bursa of Fabricius of W .L .H Chicks Immunized with Lymphoid Cells

Dr. Divya Singh

Associate Professor,
Department of Zoology,
Meerut College,
Meerut, U.P, India

Abstract

Newly hatched W .L .H chicks were infected with the A.galli eggs dose (800 eggs). Different groups of chickens consisting of the donor chickens and recipient chickens were kept separately. Infected chickens were sacrificed after 15 days . Cells from thymus , Bursa and spleen were given intra peritoneally to the recipient chickens within four hours. Pathological study of Bursa of fabricius in control chicks, chicks infected and immunized with lymphoid cells was done.

Keywords; Ascaridia Galli, W .L .H chicks, Bursa of Fabricius, Passive Immunization, Lymph.

Introduction

In India , the poultry industry is growing at an increasing rate. Poultry rearing is no longer considered a low

prestigious occupation fit for only a weaker section of society. It has developed into a honorable job . Man has always been dependent on his domesticated animals since prehistoric times . Both man and his domesticated animals have shared the same environmental condition for living and both are affected by the change in their environmental condition .

Nematodes are commonly referred to as roundworms. Nematodes occur in a diverse range of habitats including soil , ocean , fresh water and as internal parasites of vertebrates , invertebrates and plants . *A.galli* is the large round worm of poultry . Females are about 6 - 12 cm long while males are small and slender (5 - 8 cm) . Life cycle of this parasite is direct. *A.galli* leads to malnutrition in chickens which results in the decreased return of products derived from poultry (W .H .O , 1967).

Passive immunization is achieved by the transfer of antibodies from both primary and secondary lymphoid organs. Immediate protection against *A.galli* can be achieved by the passive immunization. Bursal dependent cells provide humoral immunity . Cooper *et al* (1966) made studies on functions of the thymus system and Bursa system in chickens . Shamoto . K and Yamauchi (2000) studied the histological changes in W .L .H chicks due to the nutritional deficiency of feed.

Aim of study

Humoral immune system and CMI or delayed hypersensitivity are less explored fields in case of ascaridiasis. These studies would be of great help in the

development of vaccines against the nematode infections. The Presence of parasites leads in various ways to induce disturbance in cellular and humoral immune response. In present investigation attempts have been made to study the immunopathology of Bursa of fabricius of control, infected and immunized groups of chicks .

Material , method and experimental design

Just hatched W .L .H chicks were kept in the spacious cages maintaining proper hygienic conditions. Female *A.galli* worms were separated and kept in the petri dish containing normal saline for egg laying at 37 degree Centigrade for 24 hours . Embryonated eggs were given with the help of the blunt ended syringe orally to the 10 day old chicks . Donor chickens and recipient chickens were kept separately. Donor chickens were sacrificed after 15 days . Thymus, spleen and Bursa were removed and kept separately in Ringer's solution at 4 degree Centigrade. These organs were teased and homogenized so as to release lymphoid cells in suspension . Cells from thymus , Bursa and spleen were given intra peritoneally to recipient chickens within 4 hours . Cells were transferred from the donors to the recipients after 15 days of post infection . Autopsy of the chicks was performed. Bursa was removed and kept in 10 % neutral buffered formalin. Eosin and hematoxylin were used for staining . Microphotography was done.

The following experimental groups (EG) were categorized as under :

EG – 1 : Control male chicks

8 male chicks

| | | |
|--|---|------|
| EG -2 : Chicks, infected with 800 chicks | 8 | male |
| Infective eggs of A.galli. | | |
| EG -3 : Chicks immunized with chicks | 8 | male |
| thymic cells. | | |
| EG -4 : Chicks immunized with chicks | 8 | male |
| Bursal chicks. | | |
| EG -5 : Chicks immunized with chicks | 8 | male |
| Splenic cells. | | |

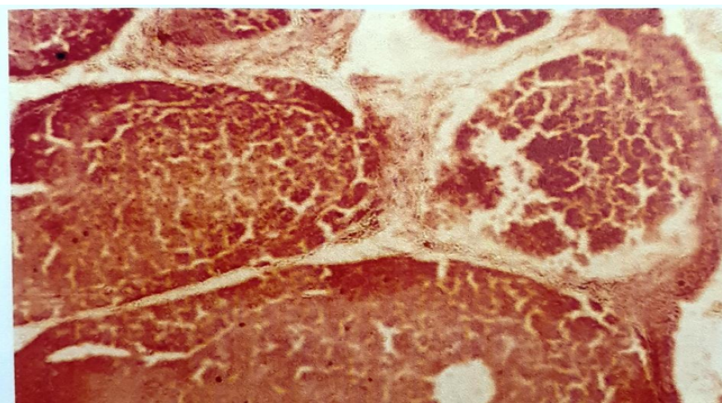


Figure 1 : T.S passing through bursa of control group

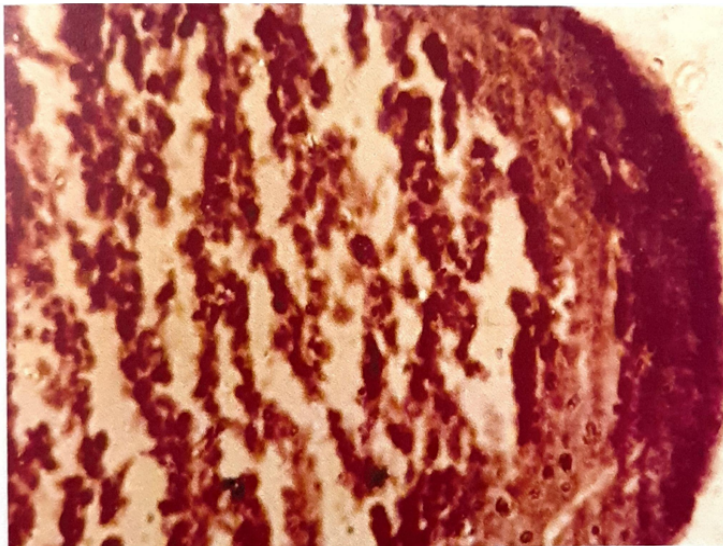


Figure 2 : T.S passing through bursa of infected group

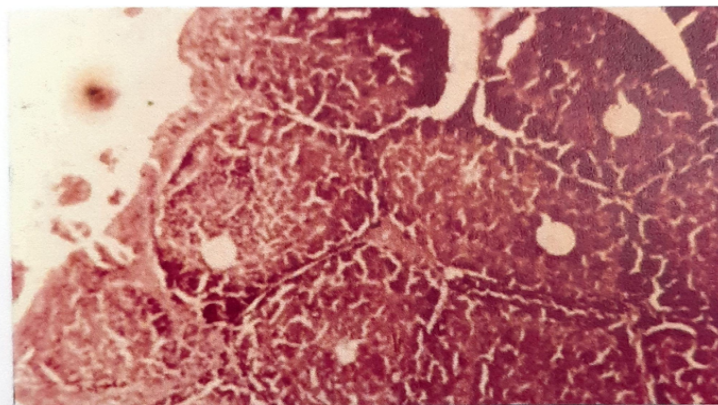


Figure 3 : T.S passing through bursa of chicks immunized with thymic cells.

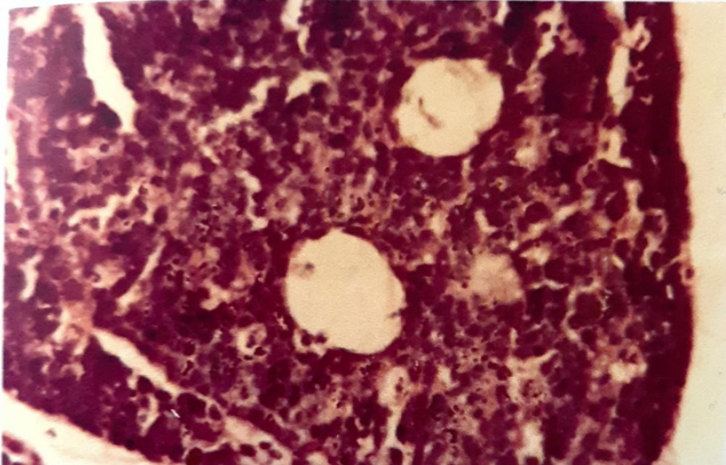


Figure 4 : T.S passing through bursa of chicks immunized with bursal cells.

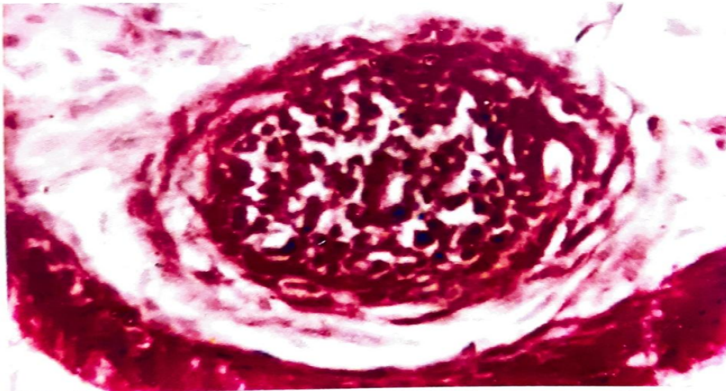


Figure 5 : T.S passing through bursa of chicks immunized with splenic cells.

Results and Discussion

EG - 1: Following structure was seen in T.S of bursa. Bursa was distinguished into 2 regions, capsule and sub-

capsule. Capsule was made of 2 layers- serosa and muscularis. Serosa was the outer layer and muscularis was the inner layer. Sub- capsule was made of mucosa and surface epithelium. There were many villous like projections coming out of the mucosa. Plicae (central lumen) had many follicles. Every follicle was made of cortex and medulla, which consisted of a network of endothelial cells. Lymphoid cells were present in their meshes.

EG -2 : Follicles were less in number. Inflammatory edema was also observed. Inter- follicular space of plicae seemed to be increased. Plicae wall was also seen to be ruptured. Bursal lumen had become irregular. Rupture of follicles were seen, while follicles showed presence of numerous lymphocyte cells. Akter *et al* in 2006 noticed pathological alterations in lymphoid tissue analyzed in broiler chicks.

EG -3 : Bursal capsule was seen to be normal and size of follicles, inter follicle space also appeared to be normal. Cortex and medulla contained a large number of lymphocyte cells. Some follicles revealed non-inflammatory edema. Size of the follicles seemed to be decreased. No demarcation between cortex and medulla was observed. Passively immune chicks do not induce *protection against bursal atrophy* (Lucio and Hitchner, 1979) whereas hypoplasia of bursa was seen by Bangust *et al* (2007).

EG -4 : At certain places follicles became elongated and inter follicle space of plicae was increased while bursal lumen was wider. Vacuolization was seen. Follicles revealed

rounded vacuoles numbering 2 - 4. Plicae were ruptured at some places. Inter follicular edema was associated with infiltration of lymphocytes. Non-inflammatory edema was observed. Depletion of lymphoid cells was seen in bursa of vaccinated broiler chickens (Jeurissen *et al* , 1998 , Stoev *et al*, 2000).

EG-5: Histopathologically , atrophy of follicles was seen. Inter follicular non- inflammatory edema was observed. Vacuolization and depletion of lymphoid cells was seen in most of the follicle. The Capsule wall appeared to be normal. Lymphoid follicle atrophy was probably due to out migration of lymphocytes to the site of infection . It is suggestive that there was a leakage of endotoxins into bursa , which may be released during antigen antibody interaction. Epithelial layer and lumen seemed to have disappeared . Follicular wall revealed invagination at different places .Grencis (1997) worked on immunopathology and resistance during intestinal nematode infections.

References

1. Akter , S .H ; Khan, M. Z. I , Islam, M. R (2006) . *Histological study of lymphoid tissue in broiler chicks.*
2. Cooper , M.D ; Peterson , R .D .A ; south M .A and Good , R. A (1966) *function of thymus system and bursa system in chicks . J . Exp Med 123 : 75 – 102 .*
3. El – Araby , I. I ; Badri , El – Din , M . K and Abdov , M (1984) . *A study on cell mediated immunity in children with ascariasis . Saudi medical journal 5 (1) : 37 – 40 .*

4. Egerton , J. R and Hansen , M .F (1955) *immunity tolerance of chicks due to roundworm ,A.galli . Exp parasitol 43 : 335 – 350 .*
5. Gamble , H. R and Zarlana , D . S (1986) . *Biotechnology in development of vaccines for animal parasites . Vit parasitol 20 , 237- 250.*
6. Grencis R.K (1997) *Th – 2 mediated host protective immunity to intestinal nematode infections. Philos trans R Soc B Biol Sci 352 – (1359) 1377 – 84 review.*
7. Kuscu B ; Gurel A (2008) - *lesions in bone marrow and thymus in chickens with chicken infectious anemia disease. J vet Sci 9 (1) , 15- 23.*
8. Shamoto K, Yamauchi K (2000) *recovery response of chicks intestinal villus morphology to different refeeding procedures. Poultry Sci 79 (5) , 718 - 23.*
9. Selivanova A .S ; Molodykh Z.H.V and Pavlov O.V (1977). *Pathogenesis of helminthiasis, Veterinarnarnogo institution , Nie Baumaona , 123- 2- 126.*
10. Singh , V; Pandey, B .B and Raj , P (1979). *Pathological changes in experimental ascariasis in piglets. India J parasitol 3 : 39 – 40.*
11. Vaziry A , Silim A, Bleauc , Lamontagne L (2011). *Chicken infectious anemia vaccinal strain persists in the spleen and thymus of chicks and induces thymic lymphoid cell disorder . Avian pathol 40 (4) 377 - 85.*
12. Von Brand , T (1973) . *The biochemistry of parasites. Academic press , New York , U .S .A .*

13. *W .H .O (1967) control of ascariasis . Report of W .H .O , expert committee . W .H .O technical report series . NO . 314 .*
14. *Zembruski K (1978) . The liver and lungs of guinea pigs experimentally infected with lethal doses of Ascaris lumbricoides eggs . Wiad Parazytol 24 (4) 413 – 7 .*