

Hematological and Biochemical changes of stunting syndrome in Broiler chicken

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Abstract

An experiment was carried out to study the hematological and biochemical changes of stunting syndrome in broiler chicken from day old (group I) and 3 weeks (group III) of age to 8 weeks of age in two phases along with group II and group IV as control. Birds were slaughtered at 3, 5, 7 and 8 weeks of age and the blood samples were collected and analyzed. The mean PCV, Hb, TEC values were reduced significantly ($P<0.01$) in stunted birds. Increased AHC, AMC and ABC values along with decreased ALC values were obtained. Significantly ($P<0.01$) lower serum total protein values and increased serum Amylase ALP, AST and ALT activity were observed in stunted groups (I and III) whereas blood glucose values among the groups were not significant. The decreased hematological and biochemical parameters in the present study indicates a decrease in the absorption and digestion of protein and damage to liver and intestines in stunting syndrome of broiler chicken.

Keywords: Stunting syndrome, Chicken, Haematological change, Biochemical Change.

Introduction

Stunting syndrome is a disease of poultry industry causing considerable economic losses to the farmers. It is a disease of young chicks primarily affecting broiler chicken. There are reports of the disease in layer strains of domestic fowl, guinea fowl and turkeys. The disease was first described by Kouwenhoven et.al. (1978). A number of descriptive terms have been coined to describe the disease viz. Helicopter disease, brittle bone disease, pale bird syndrome, malabsorption syndrome and infectious stunting syndrome.

Material and Methods

The experiment was carried out on broiler chicken in two phases consisting of experiment I and II. In experiment I, 50 day old underweight culled From the same hatchery another 25 chicks with normal weights were taken as control birds (group II). In experiment II 50 stunted broiler chicks (group III) and 25 healthy broiler chicks were obtained at 3 weeks of age from different commercial poultry farms around the local area to act as control (group IV). All the groups were maintained for 8 weeks on broiler mash and were sacrificed regularly at the end of 3, 5, 7 and 8 weeks of age. Blood samples were collected from the sacrificed birds for hematological parameters and serum samples were obtained for other biochemical estimations. In both the experiments, the chicks were sacrificed at different weeks of age as detailed in the table I.

Results and discussion

The overall mean packed cell volume (PCV) , Hemoglobin (Hb) , total Erythrocyte count (TEC) , total leukocyte count (TLC) were given in table 2. The mean PCV, Hb, TEC values were reduced significantly ($P<0.01$) in stunted birds suggesting anemic changes due to malabsorption. In contrary, Ruff (1982) reported no change in PCV values in birds affected with malabsorption syndrome. The TLC values did not differed significantly in stunted birds.

Increased AHC, AMC and ABC values along with decreased ALC values obtained in the present study are suggestive of infectious nature of the stunting syndrome.

Different biochemical parameters like total serum protein , albumin , globulin , A:G ratio , glucose, amylase, ALP, AST, ALT, calcium and phosphorous values were given in the table 3. The total serum protein values were decreased significantly throughout the experimental period in stunted birds. Serum protein fractions showed a significant increase in globulin and decrease in albumin content which is suggestive of infection and is accordance with the results of Ruff (1982) and Joshi and Gowda (1992). The increase in globulin fraction may be a reflection of increased immunoglobulin synthesis in response to the variety of pathogens. However further studies on immunological parameters in stunting syndrome of chicken is needed. Decreased A:G ratio in the study was also noted in the findings of Ruff (1982) and Joshi

Table-1. Schedule of sacrifice of birds in the experiment:

Age in weeks	Experiment I		Experiment II	
	Group I	Group II	Group III	Group IV
3	6	5	12	5
5	6	5	12	5
7	6	5	12	5
8	8	5	12	5

Table-2 : hematological parameters (mean and SE) of stunted and control broiler groups

Parameters	Experiment I		Experiment II		F ratio
	Group I	Group II	Group III	Group IV	
Hb (g%)	8.61± 0.25	11.12± 0.20	8.50± 0.24	0.57± 0.51	16.49**
TEC (millions/cumm)	2.28± 0.1	3.19± 0.12	2.28± 0.09	3.21± 0.13	22.4**
PCV (%)	28.49± 0.63	32.82± 0.58	28.94± 0.68	32.96± 0.56	23.12**
TLC thousands/cumm	29.92± 3.97	28.70± 0.80	29.39± 3.16	28.14± 3.16	0.09NS
ALC (thousands/cumm)	6.21± 1.23	17.74± 0.20	6.22± 1.27	17.26± 0.99	65.71 **
AEC (thousands/cumm)	1.29± 0.21	1.23± 0.11	1.00± 0.19	1.23± 0.12	0.56NS
AMC (thousands/cumm)	6.64± 0.54	1.52± 0.03	6.40± 0.30	1.49± 0.02	86.36**
ABC (thousands/cumm)	1.24± 0.30	0.44± 0.08	1.53± 0.21	0.62± 0.08	6.93**

Table-3. Biochemical Parameters (Mean and SE) of Stunted and Control broiler groups

Parameters	Experiment I		Experiment II		F ratio
	Group I	Group II	Group III	Group IV	
Total serum protein (g%)	3.06 ± 0.03	3.19± 0.05	3.21± 0.03	3.27± 0.03	3.62*
Albumin (g%)	1.23± 0.05	1.77± 0.05	1.32± 0.05	1.78± 0.02	45.33**
Globulins (g%)	1.83± 0.06	1.42± 0.02	1.80± 0.05	1.43± 0.03	50.83**
A:G Ratio	0.68± 0.03	1.25± 0.03	0.73± 0.04	1.24± 0.02	58.72**
Glucose (g%)	173.31± 5.36	186.58± 5.58	185.57± 5.80	197.46± 5.679	3.09NS
Amylase U/100ml	94.64± 2.06	71.49 ±1.29	92.35± 2.19	70.11± 1.89	52.34**
ALP U/L	63.13± 3.02	55.9± 2.94	67.8± 3.00	55.08± 2.72	6.91**
AST U/L	85.58± 4.50	72.08± 3.88	86.16± 3.12	72.66± 2.84	4.58*
ALT U/L	20.96± 0.82	12.30± 0.73	20.10± 0.82	12.32 ± 0.56	40.98**
Calcium (g%)	9.43± 0.38	10.58± 0.56	10.02± 0.42	10.92± 0.40	2.90NS
Phosphorus (g%)	4.79± 0.18	5.17± 0.20	4.92± 0.14	5.41± 0.13	2.64NS

and Gowda (1992). Glucose concentrations were not altered in the serum of stunted birds as reported by Ruff (1982). Normal glucose levels in serum recorded in this study might be due to mobilization of glycogen reserves even though the absorption was impaired or might be due to normal absorption of simple sugars like glucose. Significantly ($P < 0.01$) increased amylase activity in the stunted birds is suggestive of pancreatic damage. Increased activity of ALP, AST and ALT in stunted bird groups are suggestive of liver and intestinal damage and similar results were reported by Joshi and Gowda (1992) for ALP and Sinclair et al. (1984) for AST and ALT. Changes in Serum calcium and phosphorous levels in the present study are not significant. However, Madelli, et. al. (1986) recorded decreased calcium and phosphorous levels in the early life of stunted birds.

In the stunting syndrome of broiler chicken the decreased hematological and Biochemical parameters like PCV, Hb, TEC values, serum total protein values and increased serum Amylase ALP, AST and ALT

activity suggest a decrease in the absorption and digestion of protein and damage to liver and intestines.

Acknowledgements

The authors are thankful to the College of Veterinary Science, Tirupati for providing facilities to carryout the present research work.

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