



Infectious Bursal Disease: A case compilation study in commercial broiler farms at Mirsarai, Chittagong, Bangladesh.

Sharmin Akter¹, Zamila Bueaza Bupasha², Mahabub Alam³, Md Samun Sarker^{2*}

¹Department of Medicine and Surgery, Chittagong Veterinary and Animal Sciences University, Chittagong, Khulshi-4225, Bangladesh

²Department of Microbiology and Veterinary Public Health, Chittagong Veterinary and Animal Sciences University, Chittagong, Khulshi-4225, Bangladesh

³Department of Animal Science and Nutrition, Chittagong Veterinary and Animal Sciences University, Chittagong, Khulshi-4225, Bangladesh.

Corresponding author: Md Samun Sarker

Department of Microbiology and Veterinary Public Health, Chittagong Veterinary and Animal Sciences University, Chittagong, Khulshi-4225, Bangladesh

E- mail: samuncvasu@gmail.com

Abstract

A case compilation study was conducted to assess the clinical signs, gross and histopathology, and hematological changes in Infectious Bursal Disease (IBD) affected broiler during the period of May to June, 2013 in commercial broiler farms at Mirsarai, Chittagong, Bangladesh. A total of 42 sick birds showing characteristics clinical signs of IBD and 8 death birds that were brought to hospital were considered as target study cases. All of the birds were subjected to postmortem examination. Confirmation of cases was performed by detection of gross and histopathology of the organs after dissection. Among the sick and death birds 30 were confirmed as IBD worked out from gross and histopathology. The blood samples from fifteen randomly selected sick birds were tested to routine hematology. Among the different clinical signs depression, reluctant to move, watery diarrhea and dehydration were detected 100% of the cases. Other clinical signs like ruffled feather, trembling, gasping and vent picking were observed in 71.4%, 23.8%, 16.7% and 47.6%, respectively. Among the different gross lesions the highest percentages of birds showed swollen bursa and gelatinous fluid around the bursa (85.7% for each), and lowest percentages showed hemorrhage in the junction of proventriculus and gizzard (14.3%). In histopathology the highest frequencies of changes were found as destruction of lymphatic follicles (80%) and congestion (57.1%), respectively in bursa of Fabricius and kidney. The Hb, PCV, ESR (in 1st hour) and TEC were 9.05 ± 0.60 mg/dl, 26.33 ± 1.27 %, 1.13 ± 0.23 mm and $2.44 \pm 0.06 \times 10^6$ / ml, respectively in IBD suspected birds. The birds also showed lymphocytes were highest and basophils were lowest percentages in IBD suspected broiler chicken among the different white blood cells.

Keywords: Broiler, IBD, Histopathology, Hematology.

Introduction

Poultry is one of the vibrant sub-sectors of agriculture that plays a significant role in the development of agro-based economy of Bangladesh. The poultry population in Bangladesh comprises of 160 million chickens and 38 million ducks (Das et al., 2008). However, with increasing population and decreasing landholdings, the number of poultry is increasing at an annual rate of 5.9% (Renata, 2005). The total number of commercial farms is about 150000 and about 200 commercial broiler farms have established in Mirsarai upazilla (Upazila Livestock Office).

Poultry farming in the Bangladesh is now considered as a growing industry. But one of the major constraints in the development of poultry in Bangladesh is the outbreak of diseases, which cause about 30% mortality of chickens (Ali, 1994). Among them infectious bursal disease (IBD) is one of the major viral diseases which cause 80% mortality in field outbreak (Chowdhury et al., 1996).

Infectious bursal disease, popularly known as Gumboro disease, is a contagious disease of young chickens which cause damage to the lymphoid tissue with special predilection site for the bursa of fabricius. The etiological agent of IBD is infectious bursal disease virus (IBDV), is a non-enveloped virus, belonging to the family Birnaviridae, with a bisegmented double stranded RNA genome (Kibeng et al., 1988). Since 1992, the poultry farms of Bangladesh have been experiencing the outbreaks of a disease resembling acute IBD. Now a day, IBDV has a worldwide distribution, occurring in all major poultry producing areas (Wit and Baxendale, 2004). The prevalence of IBD in broiler chicken varies across Bangladesh: 8.42 % in Nilphamari region (Uddin et al., 2011), 10%, 16% in Dhaka and Mymensingh respectively Giasuddin et al., 2002; Talha et al., 2001). Considering the above facts the present study was conducted assess the clinical signs, gross and histopathology, and hematological changes in Infectious Bursal Disease (IBD) affected broiler.

Materials and Methods

Study area and study period

The study was conducted at Mirsarai Upazila Livestock Hospital in Chittagong, Bangladesh, during the period of May-June, 2013.

Selection of the cases

A total of 42 sick birds showing characteristics clinical signs of IBD and 8 death birds that were brought to hospital were considered as target study cases. All of the birds were subjected to postmortem examination. Confirmation of cases was performed by detection of gross and histopathology of the organs after dissection. Among the sick and death birds 30 were confirmed as IBD worked out from gross and histopathology.

Postmortem and Histological examination

Post mortem examination was performed according to protocol described by Calnek (1997) and lesions were recorded. Among the different cases 35 samples of bursa of Fabricius, and 35 samples of kidney with typical lesions of IBD were taken for histopathology. Collected samples were then fixed in 10% neutral buffered formalin. Tissue processing, fixation, washing, dehydration, cleaning, impregnation, sectioning, drying and staining with haematoxylin and eosin were performed according to protocol described by Jones et al. (1997).

Hematological examinations of sick birds

Fifteen blood samples were randomly collected from the 42 suspected sick birds to evaluate the hematological parameters during IBD. Blood samples were kept in sterile vials with anticoagulant (EDTA). The blood samples collected with anticoagulant were analyzed for routine examination of blood within 24 hours as per Weiss and Wardrop (Weiss and Wardrop, 2011).

Study area and study period

The study was conducted at Mirsarai Upazila Livestock Hospital in Chittagong, Bangladesh, during the period of May-June, 2013.

Selection of the cases

A total of 42 sick birds showing characteristics clinical signs of IBD and 8 death birds that were brought to hospital were considered as target study cases. All of the birds were subjected to postmortem examination. Confirmation of cases was performed by detection of gross and histopathology of the organs after dissection. Among the sick and death birds 30 were confirmed as IBD worked out from gross and histopathology.

Postmortem and Histological examination

Post mortem examination was performed according to protocol described by Calnek (1997) and lesions were recorded. Among the different cases 35 samples of bursa of Fabricius, and 35 samples of kidney with typical lesions of IBD were taken for histopathology. Collected samples were then fixed in 10% neutral buffered formalin. Tissue processing, fixation, washing, dehydration, cleaning, impregnation, sectioning, drying and staining with haematoxylin and eosin were performed according to protocol described by Jones et al. (1997).

Hematological examinations of sick birds

Fifteen blood samples were randomly collected from the 42 suspected sick birds to evaluate the

hematological parameters during IBD. Blood samples were kept in sterile vials with anticoagulant (EDTA). The blood samples collected with anticoagulant were analyzed for routine examination of blood within 24 hours as per Weiss and Wardrop (Weiss and Wardrop, 2011).

Results

Clinical signs and symptoms

Among the different clinical signs that were observed in current study depression, reluctant to move, watery diarrhea and dehydration were detected 100% of the cases. Other clinical signs like ruffled feather, trembling, gasping and vent picking were observed in 71.4%, 23.8%, 16.7% and 47.6%, respectively (Table 1).

TABLE 1. Frequency of different clinical signs and symptoms observed in sick birds (N= 42).

Clinical signs	Percentage (Number of bird)
Depression	100 (42)
Reluctant to move	100 (42)
Ruffled feather	71.4 (30)
Watery diarrhea	100 (42)
Dehydration	100 (42)
Trembling	23.8 (10)
Gasping	16.7 (7)
Vent picking	47.6 (20)

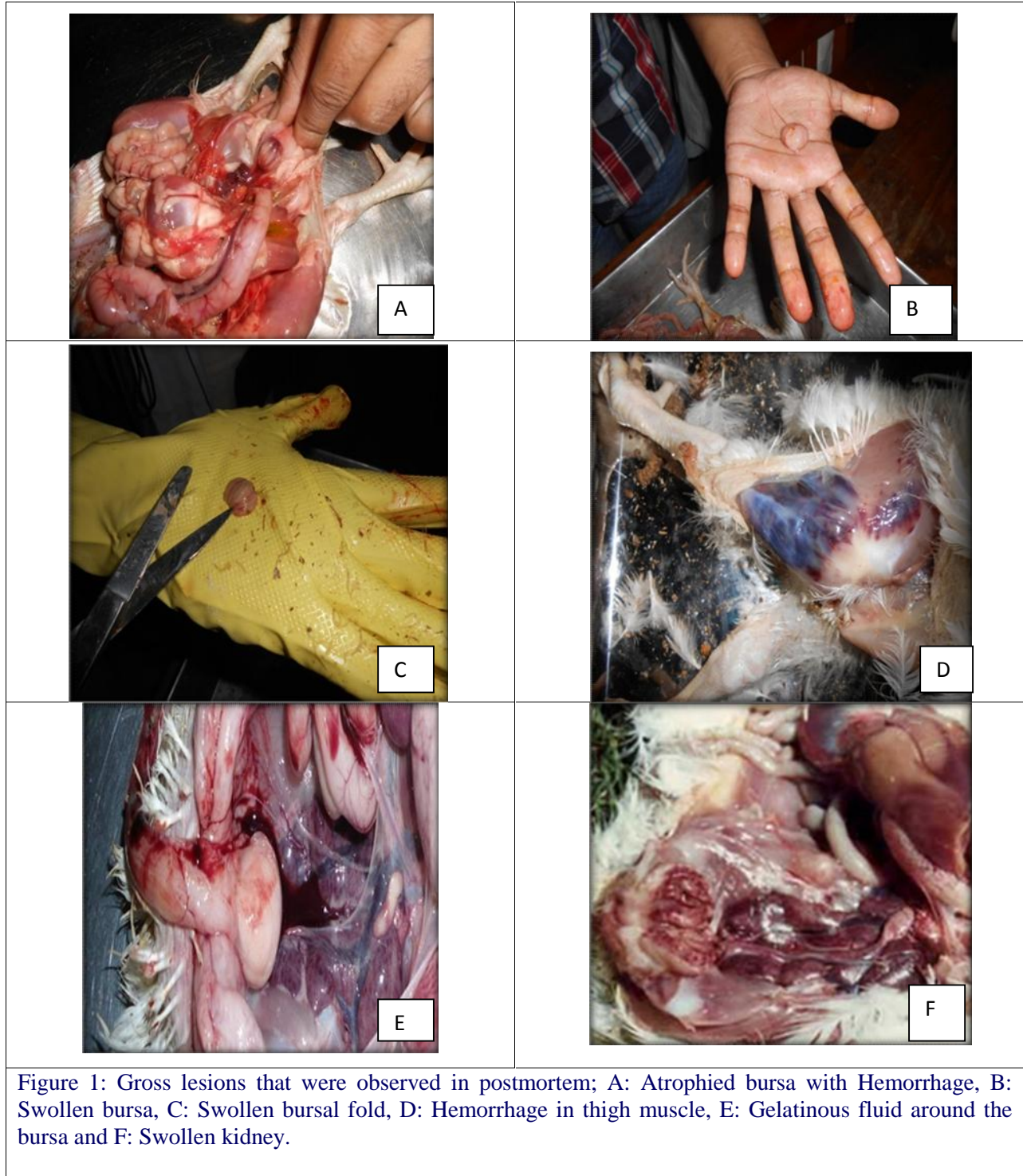
Gross pathological lesions

Characteristics gross lesions for IBD were observed in 35 birds. Among the different gross lesions the highest percentages of birds showed swollen bursa and

gelatinous fluid around the bursa (85.7% for each), and lowest percentages showed hemorrhage in the junction of proventriculus and gizzard (14.3%) (Figure 1) (Table 2).

TABLE.2 Frequencies of observed gross lesions of commercial broiler chickens (N=35)

Lesions	Percentages (Number of birds)
Swollen bursa	85.7 (30)
Gelatinous fluid around bursa	85.7 (30)
Pus in bursa	42.9 (15)
Haemorrhagic bursa	17.1 (6)
Caseous mass in bursa	45.7 (16)
Atrophied bursa	22.9 (8)
Haemorrhage in the junction of proventriculus and gizzard	14.3 (5)
Mucous exudates in upper intestine	80 (28)
Haemorrhagic lesions in breast and thigh muscle	57.1 (20)



Histological changes

Among the different histological changes the higher frequencies of changes were found as destruction of

lymphatic follicles (80%) and congestion (57.1%), respectively in bursa of Fabricius and kidney (Figure 2) (Table 3).

TABLE 3: Frequency of different histopathology observed in commercial broiler chickens

Organ	Histological changes	Percentages (Number)
Bursa of Fabricius (N=35)	Destruction of lymphatic follicle	80 (28)
	Vaculation in bursa of fabricius	14.3 (5)
Kidney (N=35)	Congestion in kidney	57.1 (20)
	Hemorrhage in the kidney	28.6 (10)

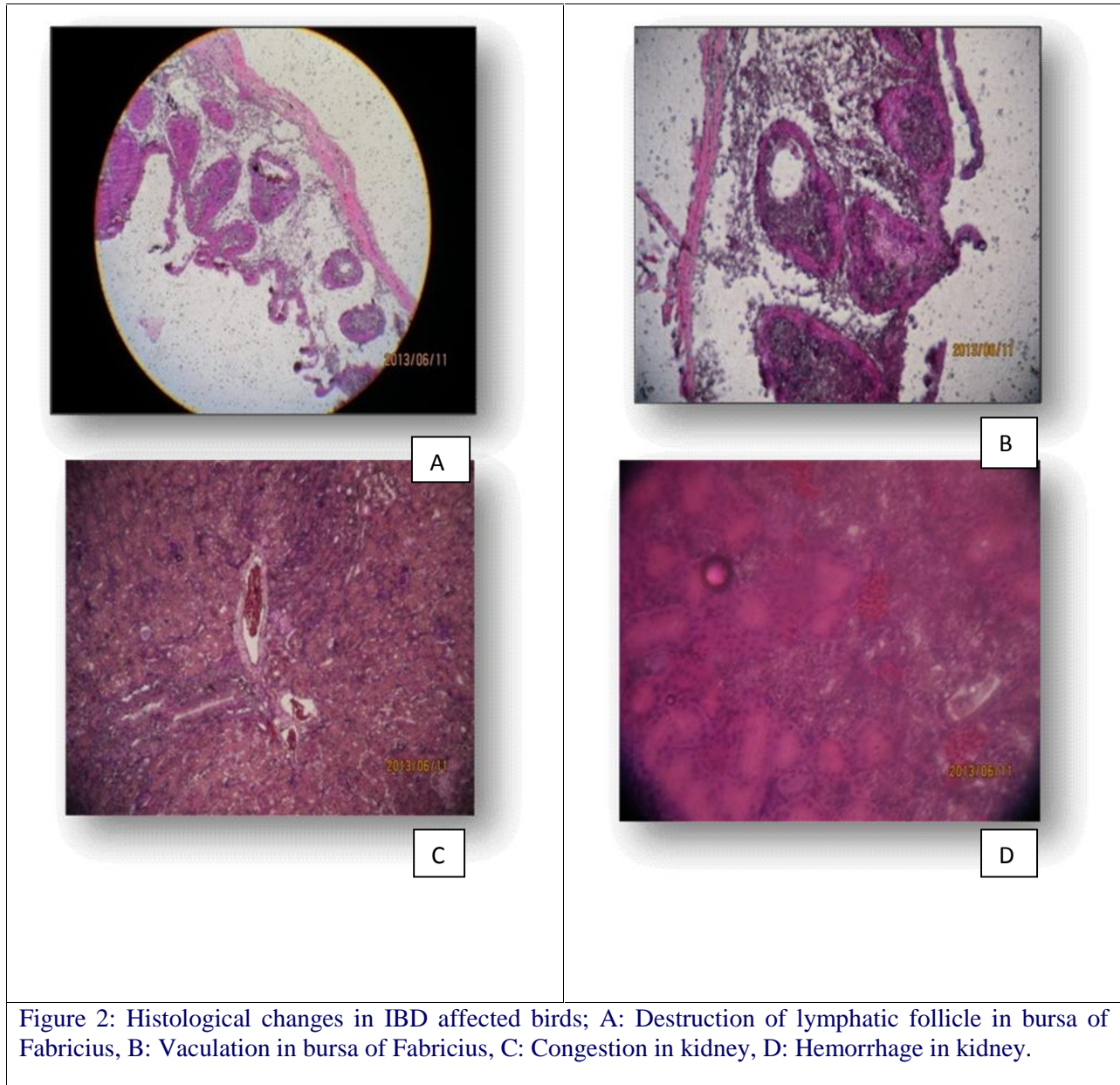


Figure 2: Histological changes in IBD affected birds; A: Destruction of lymphatic follicle in bursa of Fabricius, B: Vaculation in bursa of Fabricius, C: Congestion in kidney, D: Hemorrhage in kidney.

Haematological indices of IBD suspected sick broiler chickens

1st hour) and TEC were 9.05 ± 0.60 mg/dl, 26.33 ± 1.27 %, 1.13 ± 0.23 mm and $2.44 \pm 0.06 \times 10^6$ / ml, respectively in the current study.

Table 4 shows the different hematological indices of IBD suspected broiler chicken. The Hb, PCV, ESR (in

TABLE 4: Hematological indices of IBD suspected sick broiler chickens (N=15)

Parameters	Mean \pm SE	Range (Minimum - Maximum)
Hb (mg/dl)	9.05 ± 0.60	5.00 - 14.00
PCV (%)	26.33 ± 1.27	18.00 - 32.00
ESR (mm in 1 st hour)	1.13 ± 0.23	0.00 - 2.00
TEC ($\times 10^6$ / ml)	2.44 ± 0.06	2.02 - 2.69

Differential leukocyte count (DLC) suspected sick broiler chickens

highest and basophils were lowest percentages in IBD suspected broiler chicken (Figure 3).

The present study revealed that among the different white blood cells (WBCs) the Lymphocytes were

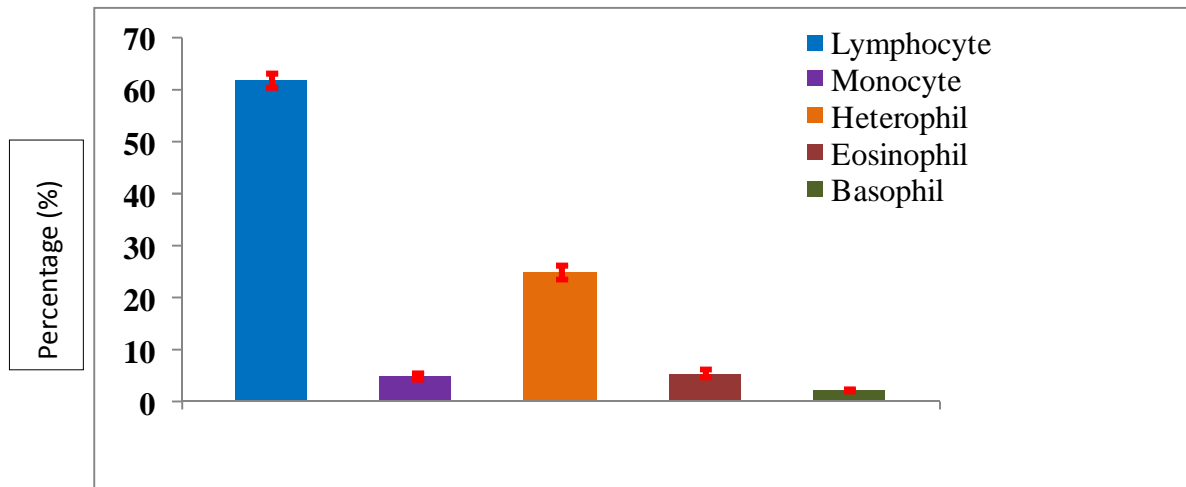


Figure 3: Differential leukocyte count (DLC) of IBD suspected broiler chickens

Discussion

The present work was performed to assess the clinical signs, gross and histopathology, and hematological changes of IBD affected broiler chicken. The findings of different clinical signs, like depression, reluctant to move, watery diarrhea, dehydration, ruffled feather, trembling, gasping and vent picking are also mentioned by Calnek (1997) in IBD affected birds.

Those were hemorrhage in the thigh and pectoral muscles, increased mucous in intestine and swollen kidney. These changes found during necropsy come in agreement with Cosgrove Cosgrove, (1962). Enlargement of the bursa of fabricius that is one of the common lesions seen at post mortem by Lukert and Saif (1997). Hemorrhagic lesions in the bursa, atrophied bursa and thickening of bursal folds agree

with Cheville (1967). Hemorrhage in the junction between proventriculus and gizzard, extensive hemorrhage throughout the bursa and dehydrated birds are closely related to the finding of Calnek (1997).

In this study, the histopathology of the IBD affected samples revealed that congestion and hemorrhage in kidney, and lymphocytic destruction and vaculation in bursa of Fabricius. These lesions have agreement with those described by Sun et al. (2001).

The Hb, PCV, ESR (in 1st hour) and TEC were 9.05 ± 0.60 mg/dl, 26.33 ± 1.27 %, 1.13 ± 0.23 mm and $2.44 \pm 0.06 \times 10^6$ / ml, respectively in current study, which is accompanied with work of Panigrahy et al. (1986). The present study revealed that among the different white blood cells (WBCs) the Lymphocyte were highest and basophils were lowest percentages in IBD suspected broiler chicken which is agree with the work of Oladele et al. (2005).

Conclusion

IBD is one of the highly prevalent diseases in commercial broiler farm. The current study was designed to assess the different clinical signs, gross and histopathology, and some hematological parameters of IBD affected broilers. Various characteristics clinical signs were observed in this disease that includes depression, reluctant to move, watery diarrhea, dehydration, ruffled feather, trembling, gasping and Vent picking. Among the different gross lesions the highest percentages of birds showed swollen bursa and gelatinous fluid around the bursa. Among the different histological changes the higher frequencies of changes were found as destruction of lymphatic follicles and congestion, respectively in bursa of Fabricius and kidney. There also observed alterations of blood parameters of IBD affected birds.

Acknowledgments

The authors are grateful to the respected farm members for their welcoming attitude during the study.

References

Ali, M.J. 1994. Current status of veterinary biologics production in Bangladesh and their quality control proceeding of BSVER symposium held on July 28, 1994 at NIPSOM auditorium, Mohakhali, Dhaka, Bangladesh.

- Calnek, B.W. 1997. Infectious bursal disease of poultry, 10th ed. International publisher limited, 721-733.
- Cheville, N.F. 1967. Studies on the pathogenesis of Gumboro disease in the bursa of Fabricius, spleen and thymus of the chicken. American Journal of Pathology. 51: 527.
- Chowdhury, E.H., Islam, M.R., Das, P.M., Dewan, M.L., Khan, M.S.R. 1996. Acute infectious bursal diseases in Chickens: Pathological observation and virus isolation. Asian Australasian Journal of Animal Science. 9(4): 465-469.
- Cosgrove, 1962. An apparently new disease of chicken avian nephritis. Avian Disease. 6: 385-389.
- Das, S.C., Chowdhury, S.D., Khatun, M.A., Nishibori, M., Isobe, N., Yoshimura, Y. 2008. Poultry production profile and expected future projection in Bangladesh. World Poultry Science Journal. 64: 99-118.
- Giasuddin, M., Sil, B.K., Alam, J., Koike, I., Islam, M.R., Rahman, M.M. 2002. Prevalence of Poultry Diseases in Bangladesh. Indian Journal of Poultry Science. 4 (1): 99-101.
- Jones, T.C., Hunt, R.D., King, N.W. 1997. Veterinary Pathology, 6th ed. Wiley publisher. 56- 80.
- Kibenge, F.S., Dhillon, A.S., Russell, R.G. 1988. Biochemistry and immunology of infectious bursal disease virus. Journal of General Virology. 69: 1757-1775.
- Lukert, P.D., Saif, Y.M. 1997. Infectious bursal disease: Disease of poultry 9th ed. Wolfe publishing limited. Pp. 684-663.
- Oladele, S.B., Ayo, J.O., Ogundipe, S.O., Esievo, K.A.N. 2005. Seasonal and sex variations in packed cell volume, haemoglobin and total protein of the guinea fowl (*Numida meleagris*) in Zaria, Northern Guinea Savannah zone of Nigeria. Journal of Tropical Bioscience. 5 (2): 67- 71.
- Panigrahy, B., Rowe, L.D., Corrier, D.E. 1986. Haematological values and changes in blood chemistry in chickens with infectious bursal disease. Research journal of Veterinary Science. 40: 86-88.
- Reneta Statistical Year Book, 2005.
- Sun, M., Li, H.W., Gao, X. 2001. Establishment of single PCR for JEV, PPV, PRRSV and PRV. Journal of Veterinary Science. 21(1): 10 -13.
- Talha, A.F.S.M., Hossain, M.M., Chowdhury, E.H., Bari, A.S.M., Islam, M.R., Das, P.M. 2001. Poultry Diseases Occurring in Mymensingh District of Bangladesh. Bangladesh Veterinary Journal. 18: 20-23.

- Uddin, M.B., Alam, N., Atikuzzaman, M., Hossain, M.M. 2011. Status of infectious bursal diseases in broilers. Eurasian Journal of Veterinary Science. 27(4): 223-226.
- Weiss, D.J., Wardrop, K.J. 2011. Schalm's Veterinary Hematology. John Wiley and Sons Publication. pp. 140-160.
- Wit, D.J.J., Baxendale, W. 2004. The infectious bursal disease. Website: www.gumboro.com. © Intervet.

Access this Article in Online	
	Website: www.ijarbs.com
	Subject: Veterinary and Animal Sciences
Quick Response Code	
DOI: 10.22192/ijarbs.2018.05.04.018	

How to cite this article:

Sharmin Akter, Zamila Bueaza Bupasha, Mahabub Alam, Md Samun Sarker. (2018). Infectious Bursal Disease: A case compilation study in commercial broiler farms at Mirsarai, Chittagong, Bangladesh. Int. J. Adv. Res. Biol. Sci. 5(4): 178-185.

DOI: <http://dx.doi.org/10.22192/ijarbs.2018.05.04.018>