

SEROEPIDEMIOLOGY OF GUMBORO DISEASE (IBD) IN GAZIPUR DISTRICT

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The present study was conducted to investigate the status of infectious bursal disease (IBD) in poultry reared in fully intensive system for meat purpose. The study area was all five (05) upazillas of Gazipur district & study period was from June 27, 2012 to August 26, 2012 (60 days). Total 70 farms rearing 500 to 4000 birds were randomly selected from the study area. Birds were examined by clinical signs & postmortem lesions to diagnose IBD. IBD positive cases were defined by any sort of lesions in bursa of fabricius i.e. inflammation, haemorrhage, caseous necrosis or atrophy of the bursa. For confirmation 20 bursal samples were randomly selected (16 from suspected positive & 04 from suspected negative) for serological test, ELISA (Enzyme Linked Immunosorbent Assay). Through serological test it was revealed that, the post mortem lesions of 100 birds of which 43 farms with only IBD & 27 farms with IBD mixed infection i.e. total 70 farms were infected with IBD. Maximum numbers of farms were infected between the ages of 03 to 05 weeks. The highest percentage of morbidity, mortality & prevalence were 75.71, 22 & 46.76 & the lowest of those were 19.38, 3.8 & 32.7 whereas average percentage of morbidity, mortality & prevalence were 41.89, 9.50 & 41.89. The risk factors were identified mainly wrong vaccination, overcrowding, poor ventilation heat stress and lack of biosecurity. Proper vaccination was proved as the key to prevent the disease.

Keywords: Poultry, IBD, Diagnosis, prevalence, morbidity, mortality, prevention.

Poultry industries play an important role in poverty alleviation and economic development of Bangladesh. Poultry meat contributes approximately 37% of total animal protein supplied in the country (Rahman *et al*, 1998). There are 89.48 million poultry population in Bangladesh (Samad, 1996). Normal requirement of animal protein as meat for a man is about 62.5 gm per day while people of our country get only 6.90 gm per day (Jabber, 1983). Poultry meat contributes approximately 38.10 of the total animal protein supplied in Bangladesh (FAO, 1999) where broiler meat plays a vital role to meet the deficit. The total contribution of livestock sector to GDP in Bangladesh is approximately 6.5% (DLS, 2003) which generate 13% of the foreign exchange and provides full-time employment of about 20% and partial employment of 50% of the rural population (Ali, 1994). Poultry farming in Bangladesh is now considered as a growing industry. But one of the major constraints in the development of poultry industry in Bangladesh is the outbreak of diseases, which cause about 30% mortality of chickens (Ali, 1994). Spatial and temporal distribution of diseases that would be found authentic in the results of the project does carry little relevance for the coastal belt areas of Bangladesh. Rigorous climatic condition with more humid atmosphere and saline water may have got different influence on the occurrence of those diseases (Biswas, 2004).

Infectious bursal disease in one of the important diseases of poultry, an acute, highly contagious viral disease of young poultry. At first the disease was described as

a specific new disease by Cosgrove in 1962 and was referred to as “Avian nephrosis” because of the extreme kidney damage found in birds that succumbed to infection. Infectious bursal disease is also known as gumboro disease since outbreaks were first observed on farms in the neighborhood of gumboro, Delaware, USA. It is most often found in highly concentrated poultry producing areas. It causes highly morbidity and mortality in affected flocks. In the classical form of outbreaks, the mortality rate may range from 1 to 50 % in broilers, infection may result up to 50% morbidity, but mortality is seldom more than 3% in flocks aged 3-6 weeks. The disease causes severe economic losses and most of the economic devastation associated with IBD is due to its immunosuppressive effects that lead to poor vaccination response, secondary bacterial, viral and protozoan infections and poor performance.

The outbreak of the disease is directly and or indirectly related to the management status of the farm. It is remembered that vaccination and treatment are not the substitution of the proper management. A thorough knowledge about the epidemiology, pathogenesis and pathology of a particular disease is a pre-requisite for proper diagnosis of a malady as well as the prevention and control of the disease. Among the various diagnostic procedure necropsy remains in the key position. Considering all the above mentioned points the present study was designed

MATERIALS AND METHODS

Duration of the study:

The study was conducted at June 27, 2012 to August 26, 2012 (Total 60 days).

Study areas:

The experiment was conducted in 14 villages of Gazipur sadar upazillas in Gazipur district of Bangladesh. Among these villages 05 farms from each village i.e. total 70 farms were again randomly selected. In all selected farms, the number of birds was ranged from 500-4000.

Study population:

Farms having at least 500 birds and at best 4000 birds were included in the study.

Data collection:

Information about the management system and clinical signs exhibited by individual bird during illness were recorded in detail as provided by respective poultry farm owners and attendant through questionnaire. Beside these, name of the hatchery from where the day old chicks were collected, rearing system, immunization records, types of supplied feeds date of outbreak occurred, number of birds affected, number of birds died and treatment measures if taken were also recorded.

Case definition:

Cases were defined on the basis of clinical signs and post mortem findings but post mortem findings especially bursal lesions were considered as identifying criteria.

Sample collection:

During post-mortem examination birds suspected with IBD, were considered for sample collection. Samples (Blood, Bursa, and proventriculus) were taken from these birds & were separately kept in a polythene bag, which were then tagged with sample number. Then each and every sample was kept in -20°C at the placements.

Diagnosis of the disease:

Primarily the disease was diagnosed on the basis of history and clinical signs. The pathological studies were carried out in, BAU, Mymensingh-2202. The post mortem examination in all cases was performed as soon as the dead birds were collected. At necropsy gross tissue alterations were observed and recorded carefully. The representative tissue samples containing lesions were fixed with 10% neutral buffered formalin for histopathological studies

Gross lesions found in the dead birds:

Frequently petechial hemorrhages were present in the thigh and breast muscles due to the impairment of the clotting mechanism. Hemorrhages and erosions were present at the junction of the proventriculus and gizzard. The bursa of fabricius is the main organ affected. Bursal lesions were variable depending on the progress of the disease. Bursas were edematous and hemorrhagic with caseous and purulent exudates. Prolonged longitudinal striation and more

necrosed tissue in the bursa and bursa finally become atrophied. IBDV Infected bursa: Enlarged and covered in gelatinous exudates.

Statistical analysis: Simple statistical measures like arithmetic mean, percentage etc. were used in this study. For descriptive analysis MS-Excel were used.

RESULTS

Farms covered under respective areas (Gazipur district):

During study 14 villages were taken as the target area. The Percentage of IBD affected farms are shown in the Fig.1. The graphical presentation of the percentage of highest and lowest prevalence of Gazipur sadar thana are shown in Fig. 1.

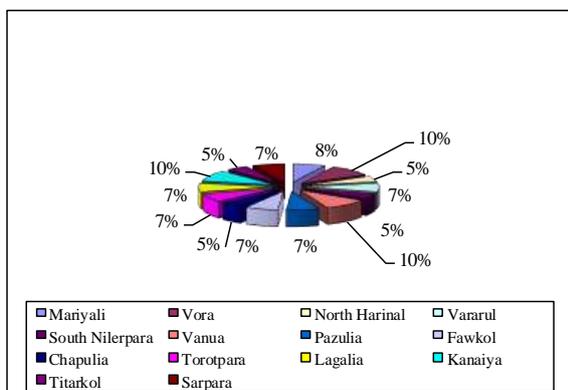


Fig.1. Graphical representation of the percentage of affected farms in different villages of Gazipur sadar

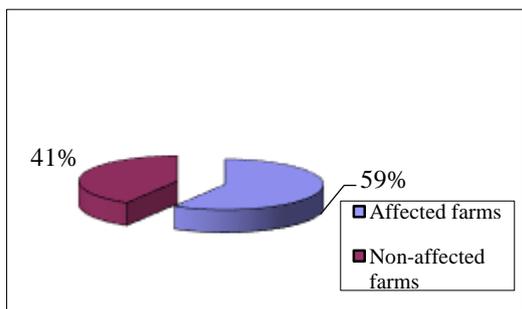


Fig.2. Graphical presentation of percentage of affected and non-affected farms

The morbidity and mortality of Poultry with IBD:

Morbidity and mortality of poultry were varied in different age groups. The Highest percentage of morbidity was found in the age group of 2-3 weeks old which was 15%

and the highest percentage of mortality was also found in the age group of 4-5 weeks old which was 6.88%. The lowest Percentage of morbidity & mortality was 2.08% & 0.47% in the age group of 5-6 weeks & 2-3 weeks old respectively.

Age wise distribution of disease with morbidity and mortality:

The total birds were classified into 4 groups those were 2-3 weeks, 3-4 weeks & 4-5 weeks & 5-6 weeks old and morbidity & mortality were both varied in different age groups.

Average morbidity and mortality of poultry:

During study of IBD it was found that out of 70 visited farms, 41 farms were affected by Gumboro disease in where total no. of birds were 52470 and among these cumulative morbidity & mortality were 5.58% and 2.07%.

Percentage of affected and non-affected farms

Among 70 farms, 41 farms were positive for IBD and rest 29 farms were negative for IBD. In percentage positive for IBD negative for IBD were 58.57% and 41.43% respectively (Fig. 2).

Comparison of percentage of IBD affected farms based on vaccination status:

It was found that the Gumboro disease was occurred both in vaccinated and non-vaccinated flocks and in percentage Gumboro affected farms were 46.81% and 82.61% for vaccinated and non-vaccinated flocks respectively which is showed in the Fig. 3. The percentage of Gumboro disease based on sex is shown in the Fig. 4

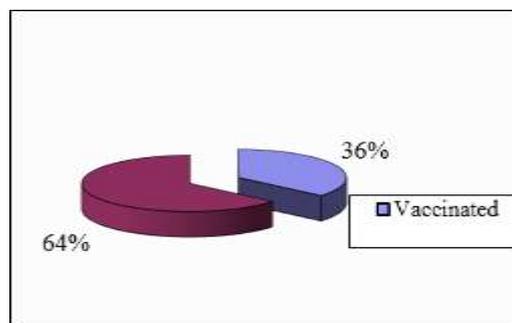


Fig. 3. Graphical presentation of the percentage of Gumboro disease based on vaccination

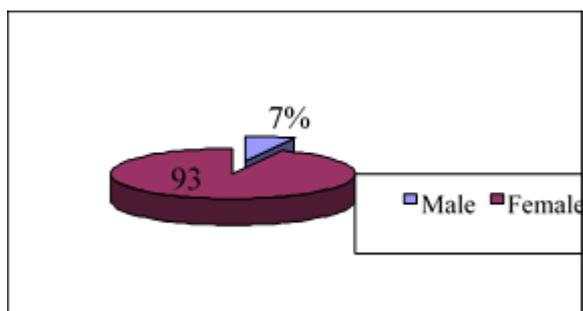


Fig. 4. Graphical presentation of the percentage of Gumboro disease based on sex

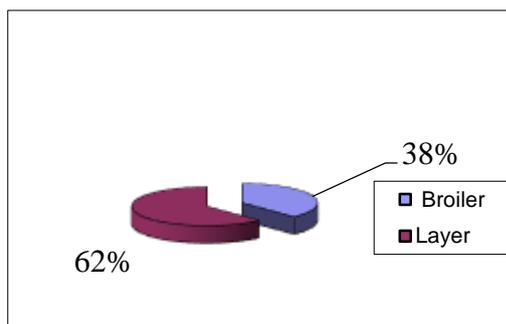


Fig. 5. Graphical presentation of Gumboro disease based on type of bird

Occurrence of IBD in different types of poultry (Broiler/Layer):

Among the affected birds, it was seen that both the broiler and layer were affected in which affection percentage in layer was high 62.04% than broiler poultry birds 37.96%. The occurrence of Gumboro disease based on type of poultry is showed in the graph (Fig-5)



Fig. 6 (A-B). IBID affected bird (right one, moribund stage) showing drowsiness, closed eyes and ruffled feathers

DISCUSSION

This study was conducted for a period of 60 days on 70 farms from 14 Upazillas of Gazipur district. Maximum numbers of farms were infected between ages 03 to 05 weeks. The total affected farms of the

Gazipur District is 58.57% and 41.43% non-affected which was also in 3-5 weeks of age. The results indicate that the prevalence of gumboro disease is more frequent in 3-5 weeks of age. Highest percentage of morbidity, mortality & prevalence were 9.93 in Pazulia, 8.99 in Lagalia & 8.00 in Chapulia and lowest of those were 3.09 in Fawkol, 3.93 in Nilerpara & 4.44 in Vararul, whereas average percentage of morbidity, mortality were 5.58% & 2.07% which supported the earlier reports made by Rodriguez-Chavez *et al.*, (2002), Chettle *et al.*, (1989), Wyeth (1980) and Sharma *et al.* (1977). This was somewhat deviated from earlier reports made by Dalgaard *et al.*, (2002), Butcher and Miles (2001), Wyeth (1980), Hitchner (1970) and Cosgrove (1962). It may be due to variation in geographical location, cross-bred bird & management.

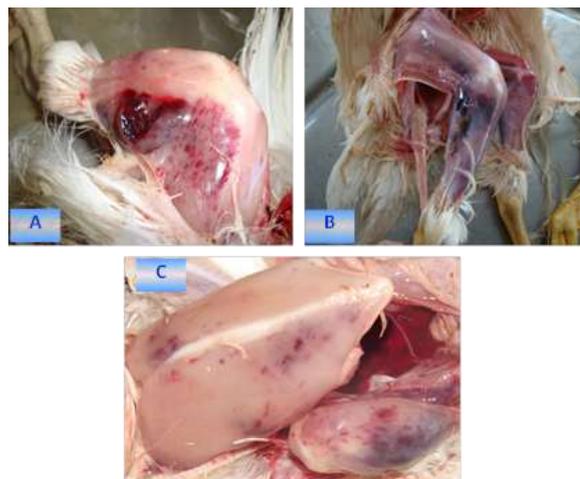


Fig. 7 (A-B-C). Haemorrhagic lesions present in thigh and breast muscle



Fig. 8 (A-B). Haemorrhagic bursa

In this study, the common clinical signs of IBID were found depression, stunted growth, severe prostration, dehydration, reluctance to move, vent picking etc. these results were same as to the earlier reports made by Anku (2003) and Rodriguez Chavez *et al.*, (2002).

The main clinical signs were recorded as ruffled feathers, soiled vents, white watery diarrhea, trembling and closed eyes, which were also indicated as important signs by Butcher and Miles (2001), Wyeth (1980) and Sharma et al (1977). But Hitchner (1970) reported that the ruffled feathers and droopy appearance were the predominant sign of acute coccidiosis.



Fig. 9 (A-B). Oedematous bursa



Fig 10. Haemorrhagic, gelatinous lesion with caseous exudates in the bursa

The main gross lesions were found as the dark, swollen and hemorrhagic bursa, petechial hemorrhages on the breast, sub mucosa and thigh muscles and the junction between the proventriculus and gizzard. These gross lesions were supported in earlier reports made by Anku (2003), Rodriguez Chavez *et al.*, (2002), Butcher and Miles (2001), Saif *et al.*, (2000), Saif *et al.*, (2001), Cullen and Wyeth (1978) and Sharma et al (1977). It was interesting to note that the clinico-pathological manifestations of acute IBD varied with the course of the disease. Death of poultry's after day 2 and 3 P.I resulted in disease which was associated with hemorrhages in the bursa and in the thigh muscle, edematous swollen bursa, mucus in the intestine. However, such lesions were not apparent in the birds, which survived for more than 4 days; similar findings have been observed by others (Lukert and Saif, 1997, Baxendale 2002, Islam *et al.*, 1998 and Kurade *et al.*, 2000). The birds, which died after day 4 P.I. showed severe dehydration and caseous mass in the bursa. This had also been reported by Lukert and Saif (1994) and

Baxendaie (1981). Atrophy of the bursa was observed at day 10 P.I. Swollen kidneys filled with white urate deposits. This is in accordance with previous findings (Singh *et al.*, 1994).

Ureters filled with the white substance and further accumulation of white stony substance in cloaca. The expected lesions of swollen and hemorrhagic or atrophied bursas were less frequent. In some cases bursa was found filled with serous fluid and in some cases it was hemorrhagic. Hepatomegaly and splenomegaly were observed in most cases. A few chicks with swollen and pale kidneys were observed. The clinical manifestations and gross lesions observed in the present study are in generally in accordance to those documented earlier and reviewed by Lasner and Shane (1994) and Van den Berg (2000). The factors responsible for the outbreaks were grouped as managerial factors and rise factor. In this study, overcrowding and debeaking, badly constructed brooder houses, poor ventilation were found as the managerial factors and the risk factors were found as the various heat stress, temperature, vaccination failures, lack of biosecurity etc. These results were in conformity with the earlier reports of Anku (2003), Flensburg (2000) and Butcher and Miles (2001). Diagnosis of the disease was done mainly on the basis of flock history, clinical signs, post-mortem findings and serological test (ELISA).

CONCLUSION

Finally, it is suggested that specific and sensitive diagnostic tools should be developed and vaccine should be produced from existing strains of infectious bursal disease virus so that effective vaccines can be produced and level of maternal antibody should be known for successful immunization. As faulty management is the principle cause of the disease, the farmers should be given proper understanding about improved poultry management by suitable extension program. The company should test vaccine efficacy before releasing to the market for sale. Before vaccination the following points should be considered to prevent vaccination failure:

Use of quality vaccine and cool chain should be maintained properly.

In vivo vaccination should be confirmed at the hatchery level.

Vaccination schedule and dose should be maintained properly.

Diseased or sick birds should not be vaccinated.

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