IMPORTANT VIRAL DISEASES ASSOCIATED WITH MORTALITY OF LAYER CHICKENS IN COMMERCIAL POULTRY FARMS IN BANGLADESH

M. A. Rahman1 and M. A. Samad

Department of Medicine, Faculty of Veterinary Science, Bangladesh Agricultural University, Mymensingh 2202, Bangladesh

ABSTRACT

Disease profile investigation on 751 dead chickens supplied from about 100 commercial large or small scale poultry farms of Gazipur district and surrounding area in Bangladesh during one year period from January to December 2002 at the BRAC Poultry Disease Diagnostic Center, Nalipara. Twenty seven out of 227,719 (n = 390) cases with five different viral diseases of which Infectious bursal disease (IBD) (n = 196) and Newcastle disease (ND) (n = 18) showed significantly (p < 0.01) higher rate of occurrence than infectious bronchitis (IB) (n = 6), avian leukosis (AL) (n = 6) and fowl pox (FP) (n = 4). Age-wise occurrence of IBD showed highest infection rate in growing stage (82.6%) in comparison to breeding 14 (6%), prep 6 (12%) and adult layer (3.1%) chickens. Although more or less all age group of chickens were affected by ND (15.46% at 30.83%) but it was found significantly (p < 0.01) highest in adult (50.83%) chickens. Infectious bronchitis was recorded only in adult chickens. Avian leukosis was found higher in pullet (66.67%) than the adult (33.33%) layer birds. Fowl pox also recorded only in pullet stage of chickens. Seasonal influence showed significantly (p < 0.01) highest frequency of IBD during summer (44.39%) in comparison to rainy (26.16%) and winter (25.06%) seasons. Similarly ND was recorded more or less uniformly in all the three seasons of the year with significantly (p < 0.01) highest rate during summer (41.99%) season. Newcastle bronchitis was recorded significantly (p < 0.01) higher in summer (63.66%) season while avian leukosis was recorded in winter (66.67%). Fowl pox was found highest in winter and summer seasons (50%). Although IBD was found with other concurrent infections e.g. IBD (28.98%) and triple (5.29%) type of infection its highest occurrence was recorded as a single type (73.47%) of infection. ND was found with dual (44.76%), triple (17.16%) and fourth (1.08%) type of infection but specially single infection (46.96%) were associated with high mortality. IB was recorded highest in single infection (54.53%) in comparison to dual (9.99%) and triple (44.18%) and fourth type (8.18%) of infection. Avian leukosis was recorded highest as a single infection (63.37%) than dual (65.78%) type of infection. Fowl pox was recorded lowest (10%) as simple and triple types of infections. It may be concluded that both the single and concurrent infection of viral diseases, greatly affected by season and age associated with high mortality, should be considered during vaccination programme, diagnosis, prevention and control.

Key words: Mortality, viral diseases, layer chickens

INTRODUCTION

Viral diseases have been reported to be the major problem in poultry industry worldwide including Bangladesh (Caneck et al., 1997; Samad, 2000). In overall single and concurrent diseases associated with mortality in commercial chickens in Bangladesh has already been reported (Rahman and Samad, 2005). Although some research works on ND and IBD have been done from Bangladesh but published reports on the viral diseases are limited. This paper describes an overall important viral disease profile with age and seasonal influences of the diseases.

MATERIALS AND METHODS

This study was conducted to determine the occurrence of viruses as etiological agents associated with mortality in 751 commercial dead chickens which were submitted for diagnosis at the BRAC Poultry Disease Diagnostic Centre (PDDC), Nalipara, Gazipur during one year period from January to December 2002. This poultry disease diagnostic centre has been established with modern diagnostic facilities for commercial services in the diagnosis of poultry diseases. Disease profile of each of these recorded disease in chickens was made on the clinical history and characteristic post mortem lesions described by Caneck et al. (1997). To assess the influence of age on the occurrence of diseases, birds were grouped into brooding (up to 2 weeks), grower (2 to 8 weeks), pullets (9 to 20 weeks) and adult layer (20 weeks). The seasonal influence on the occurrence of diseases was assessed by dividing the year into three main seasons viz. summer (March to June), rainy (July to October) and winter (November to February). Results of single and concurrent diseases with age and seasons were analyzed by using the Chi-square test for significance (Gupta, 1982).

Present address: 1Department of Medicine and Surgery, Baital Government Veterinary College, Khulna. Bangladesh. Baital.

Copyright © 2005 Bangladesh Society for Veterinary Medicine

All rights reserved 1729-7893/00/0405-05
RESULTS AND DISCUSSION

The 1751 data were examined, of which 398 (22.71%) cases diagnosed as viral diseases. Of the 398 cases, the IBD (n = 396), ND (n = 118), AL (n = 6) and fowl pox (n = 4) were diagnosed (Table 1). Thus, the occurrence of IBD and ND were found significantly (p < 0.01) higher in comparison to other viral diseases. Accordingly disease profile with age and seasonal influences of these most important viral diseases were studied. Age-wise analysis showed that significantly (p < 0.01) highest (45.98%) occurrence of viral diseases was recorded in grower (Table 2). Season-wise analysis revealed that significantly (p < 0.01) highest (43.47%) cases of viral diseases was in summer season (Table 3).

<table>
<thead>
<tr>
<th>S/N</th>
<th>Diseases</th>
<th>Number of cases (%)</th>
<th>Single type</th>
<th>Two type</th>
<th>Three type</th>
<th>Four type</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Infectious bursal disease</td>
<td>144 (73.47)</td>
<td>47 (23.98)</td>
<td>05 (2.55)</td>
<td>–</td>
<td>*96 (11.20)</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Newcastle disease</td>
<td>85 (76.96)</td>
<td>81 (44.75)</td>
<td>13 (7.18)</td>
<td>02 (1.10)</td>
<td>181 (10.34)</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Infectious bronchitis</td>
<td>06 (54.55)</td>
<td>01 (9.09)</td>
<td>02 (18.18)</td>
<td>02 (18.18)</td>
<td>21 (6.63)</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Avian leucosis</td>
<td>05 (83.33)</td>
<td>01 (16.67)</td>
<td>–</td>
<td>–</td>
<td>06 (0.34)</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Fowl pox</td>
<td>02 (50.00)</td>
<td>–</td>
<td>02 (50.00)</td>
<td>–</td>
<td>04 (0.33)</td>
<td></td>
</tr>
</tbody>
</table>

Viral diseases (Total) 242 (60.80) 150 (32.66) 22 (5.53) 04 (1.00) 398 (72.73) * differed significantly (p ≤ 0.01).

**Table 2.** Age-wise clinical occurrence of viral diseases in commercial chickens

<table>
<thead>
<tr>
<th>S/N</th>
<th>Diseases</th>
<th>Number of cases (%)</th>
<th>Brooding</th>
<th>Growing</th>
<th>Pullet</th>
<th>Layer</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Infectious bursal disease</td>
<td>06 (3.06)</td>
<td>162 (82.65)</td>
<td>12 (6.12)</td>
<td>16 (8.16)</td>
<td>196 (11.20)</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Newcastle disease</td>
<td>03 (1.66)</td>
<td>21 (11.06)</td>
<td>65 (35.91)</td>
<td>92 (50.83)</td>
<td>181 (10.34)</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Infectious bronchitis</td>
<td>–</td>
<td>–</td>
<td>11 (100.00)</td>
<td>11 (100.00)</td>
<td>11 (0.63)</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Avian leucosis</td>
<td>–</td>
<td>–</td>
<td>04 (66.67)</td>
<td>02 (33.33)</td>
<td>06 (0.34)</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Fowl pox</td>
<td>–</td>
<td>–</td>
<td>04 (100.00)</td>
<td>–</td>
<td>04 (0.23)</td>
<td></td>
</tr>
</tbody>
</table>

Viral diseases (Total) 09 (2.26) 183 (45.98) 85 (21.36) 121 (30.40) 398 (72.73) * differed significantly (p ≤ 0.01).

**Table 3.** Season-wise occurrence of viral diseases in commercial chickens

**INFECTION Bursal Disease (IBD)**

IBD, called Gumboro disease, caused by IBDV is the most important viral disease of poultry causing heavy losses through mortality and reduced production (Rahman et al., 1996). IBD was found in 196 (11.20%) chickens, of which highest cases noticed as single disease (75.47%) as compared to dual (23.98%) and triple (2.55%) occurrence of mixed infection (Table 1). This concurrent infection recorded in IBD supports the earlier reports of Rajapakse et al. (1995), Kim et al. (1996) and Restle et al. (1998). Significantly (p < 0.01) highest infection rate was recorded in growing (82.65%) chickens in comparison to brooding (3.06%), pullet (12%) and layers (8.16%) chickens (Table 2). The 11.20% occurrence of IBD recorded in this study supports the earlier inland results of Bhattacharjee et al. (1996a) who reported 10.99% of IBD in poultry in Bangladesh. However, Talata et al. (2001) reported 19.16% Gumboro disease (2002) reported 12% and Islam and Samad (2003) reported 29.2-75% mortality of chickens due to IBD in Bangladesh. Significantly (p < 0.01) highest occurrence of IBD was recorded during summer (44.39%) in comparison...
Viral diseases of layer chickens

Table 3. Season-wise clinical occurrence of viral diseases in commercial chickens

<table>
<thead>
<tr>
<th>S/N Diseases</th>
<th>Number of cases (%)</th>
<th>Summer (March-June)</th>
<th>Rainy (July-October)</th>
<th>Winter (November-February)</th>
<th>Total (n = 1751)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Infectious bursal disease</td>
<td></td>
<td>87 (44.79)*</td>
<td>60 (38.61)</td>
<td>49 (25.00)</td>
<td>196 (11.29)</td>
</tr>
<tr>
<td>2. Newcastle disease</td>
<td></td>
<td>76 (41.99)*</td>
<td>59 (32.60)</td>
<td>46 (25.41)</td>
<td>181 (10.34)</td>
</tr>
<tr>
<td>3. Infectious bronchitis</td>
<td>70 (63.66)*</td>
<td>64 (56.36)</td>
<td>34 (66.67)</td>
<td>40 (60.00)</td>
<td>188 (10.34)</td>
</tr>
<tr>
<td>4. Avian leukosis</td>
<td>02 (50.00)</td>
<td>–</td>
<td>–</td>
<td>2 (4.00)</td>
<td>04 (2.37)</td>
</tr>
<tr>
<td>Fowl pox</td>
<td>175 (43.47)*</td>
<td>120 (30.15)</td>
<td>105 (26.38)</td>
<td>398 (22.72)</td>
<td></td>
</tr>
</tbody>
</table>

*Differs significantly (p < 0.01).

NEWCASTLE DISEASE (ND)

ND is an acute viral disease of poult\textsubscript{y}, a killer disease of chickens in Bangladesh, found all over the year causing serious damage to the farms due to high mortality. ND was recorded in 181 (10.34%) chickens of which 46.96% as single, 44.75% as dual, 7.16% as triple and 1.10% as four types of mixed infection (Table 1). The 10.34% occurrence of ND observed in this study supports the earlier reports of Talha et al. (2001) who reported 10.24% of ND in Bangladesh. Bhattacharjee et al. (1996a) reported 4.80% and Giasuddin et al. (2002) reported 8.0% incidence of ND in chickens. Although the ND was recorded in all the age groups of chickens but this study showed significantly (p < 0.01) highest infection rate in chickens of age >20 weeks (50.83%) (Table 2). This finding supports the report of Parimal and Balasubramaniam (1992) who reported highest incidence of ND in 2 to 6 months old chickens with highest mortality in 24 weeks of age. However, Pal et al. (1999) reported highest incidence of ND occur in >7 weeks of old chickens. ND was recorded in all the three seasons of the years with significantly (p < 0.01) highest d\textsuperscript{r}ing summer (41.99%) in comparison to rainy (32.60%) and winter (25.41%) seasons (Table 3).

Neckropathy examination of chickens died of ND showed dark red or purple red button shaped hemorrhagic lesions associated with necrosis in the intestinal wall. Hemorrhages in the mucosal (glanderous) surface of the proventriculus and sometimes in the gizzard were noticed. Severe inflammation of the trachea and air sacs were also observed. The necropy lesions observed in this study of ND are in conformity with the earlier reports of Bhattacharjee et al. (1996a), and Talha et al. (2001).

INFECTIOUS BRONCHITIS (IB)

IB is an acute highly contagious viral disease of chickens. This study recorded 0.63% cases of IB in chickens, of which 54.55% recorded as single, 9.09% as dual, 18.18% both as triple and four types of mixed infection (Table 1). The occurrence of IB (0.63%) in chickens recorded in this study supports the report of Al-Sadi et al. (2000) who reported 0.48% incidence rate of IB. All the cases of IB were recorded in chickens of >20 weeks of age (Table 2) which is supported by Bhattacharjee et al. (1996a) who reported highest incidence of IB in >20 to 45 weeks age group. However, Christopher et al. (1996) reported highest incidence of IB in 25 to 45 weeks age group of chickens. The IB was recorded significantly (p < 0.01) highest in summer (63.66%) and lowest in winter (36.36%) seasons (Table 3).

Neckropathy examination of dead chickens, caused by IB showed serous, catarrhal or caseous exudation at trachea, nasal passage, sinus, cloudy and yellow caseous exudates in air sac and caseous plug in lower oesophagus. Pne and swollen kidneys in some cases and lesions on oviduct and laying hens. The necropy lesions observed in this study of IB are in conformity with the earlier reports of Bhattacharjee et al. (1996a) and Talha et al. (2001).
AVIAN LEUKOSIS (AL)

The avian leukosis virus is an important retrovirus causing neoplastic disease of seminiferous and mature chickens. AL was recorded in only 0.34% chicken, of which 5 (83.33%) are single etiology and 0 (16.67%) as concurrent infections with ND (Table 1). The 6 cases of AL recorded in this study support the earlier isolated reports of Moslimian et al. (1972) who reported 12 cases of AL in chickens. Kamal and Hosain (1992) reported 1.33%, Bhatarchar et al. (1996a) reports 6.92% and Talha et al.(2001) reported 1.57% incidence of AL in chickens. Of the 6 cases, 4 (66.67%) cases recorded in pullet (< 8 to 20 weeks) and 2 (33.33%) cases in adult layer (>20 weeks old) chickens (Table 2). This study supports the earlier report of Talha et al. (2001) who reported 01 case in 8 to 20 weeks and 5 in >50 weeks of old chickens. Highest occurrence was recorded during winter (66.67%) in comparison to summer (16.67%) and rainy (16.67%) seasons (Table 3).

 Necropsy examination of dead chickens containing history of encephalitis and age is ≥ 16 weeks old showed grossly viable, soft, smooth, and grayish to creamy white opaqued on liver and spleen. The necropsy lesions observed in this study of AL are in conformity with the earlier reports of Bhatarcharie et al. (1996a) and Talha et al. (2001).

FOWL POX (FP)

Fowl pox is a slow spreading viral disease of chickens. This disease was recorded only in 4.25% pullet (8 to 20 weeks) chickens (Table 2), of which 0.50% cases as a single etiology and remaining (50.09%) cases as three type of mixed infection (Table 1). Only 2 cases were recorded both in winter and summer seasons (Table 3). Although some works on fowl pox vaccine and vaccination strategy of the disease have been carried out from Bangladesh (Samad, 2000) on epidemiology and clinical-pathological aspects of the disease are lacking in inland literatures (Bhatarcharie et al., 1996a, Kamal and Hosain 1992, Talha et al., 2001). This indicates that fowl pox might be the main problem of scavenging chickens and occasionally in commercial poultry farms. Necropsy examination of dead chickens caused by fowl pox showed typical skin regions which included ruffled, gray or dark brown or necrotic nodular lesions on the comb, wattles and eyelid as reported by Calk et al. (1997).

ACKNOWLEDGEMENTS

The authors would like to thank Dr. M. A. Saleque, Programme Co-ordinator, BRCAC Centre, Moifukali, Dhaka for permission and Dr. Tasnim Rahman and Dr. Bepul Chandra Adhikary, Pathologist for cooperation during conducting this research at the BRCAC Poultry Disease Diagnostic Centre, Nagrapara, Dinajpur, Bagerhat, Bangladesh.

REFERENCES
