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Epidemiological Study on Infectious Bursal Disease in Broilers

Terrance S. Macwan*, C.J. Dave, B.P. Joshi and D.J. Ghodasara

Department of Veterinary Pathology,

College of Veterinary Science & Animal Husbandry, AAU, Anand, Gujarat, India

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Corresponding author:

terry.macwan@gmail.com

Abstract

The present study was carried out to know the epidemiology of Infectious bursal disease (IBD) in and around Anand district of Gujarat state. The study comprised of autopsy incidences of mortality from the retrospective data of the Department of Veterinary Pathology, Anand and farm wise mortality data from 25 affected farms with IBD selected for detailed study, irrespective of their vaccination status. The retrospective year wise autopsy incidence of last five years (January 2013 to December 2017) ranged between 1.42 and 8.38% with an overall average of 4.93%. The highest incidence was seen during the months of monsoon season (July-October; 57%, absolute mortality 8.28-10.72%) followed by summer (27%) and winter (16%), and also in the age groups of 3rd and 4th week of age (39.46 and 37.57%). The flock wise mortality among 25 affected broiler flocks varied from 0.29 to 9.44 % with an average of 1.36% (1953/143400). It was also more in non-vaccinated than vaccinated population (1.76 vs. 0.94%). Findings of the present work confirmed an increasing trend of IBD infections in the commercial broiler farms despite of vaccination.

Introduction

The poultry industry of India has emerged as the most dynamic and fast expanding segment of agro-animal based industry. Infectious bursal disease (IBD) is a global, highly contagious and immunosuppressive disease of commercial poultry causing heavy economic losses to the commercial poultry farms. Infectious bursal disease virus (IBDV) affects 3-6 week of age and has predilection for bursa of Fabricius and causes prolonged immuno-suppression leading to concurrent viral and bacterial infections along with vaccination failures (Saif, 1991). The disease is a major problem in concentrated poultry farming areas like Anand, Gujarat. Since last few years, major IBD outbreaks have been occurring in this region even in properly vaccinated farms with IBDV intermediate or intermediate plus strains. Therefore, this study comprised of retrospective analysis of epidemiological data in commercial broiler chicken flocks of last five years and detailed epidemiological study on 25 farms during the current year 2017-18 in central Gujarat.

Materials and Methods

Based on the available necropsy data of last five years spanning from January, 2013 to

December, 2017 at the Department of Veterinary Pathology of the College, the necropsy records on IBD were classified year wise, month wise, age wise and season wise to ascertain the susceptibility and incidence of the disease.

Additional 25 Farms were selected for in-depth epidemiological study, carcasses of which were received at the Department of Veterinary Pathology for necropsy purpose during the period of July, 2017 to Jan, 2018. Information like name and location of farms, age, system of management, size of flock, its morbidity and mortality due to IBD, clinical signs and status of vaccination were noted. The disease was confirmed histopathologically of the carcasses.

Results and Discussion

Epidemiological study

The number of broiler birds received for autopsy and the month and year-wise autopsy incidence of IBD in broiler birds over last five years has been summarized in Table 1. The year wise autopsy incidence of IBD during last five years ranged from 1.42 to 8.38% with an overall average of 4.93%. Data showed that each year the post-mortem incidences of IBD have increased dramatically. During the years 2016 and 2017 the incidence of IBD was as high as 7.15% and 8.38 %, respectively. This rise in the incidence is quite alarming.

Table 1: Month- and year-wise autopsy incidences of Infectious bursal disease in commercial broiler flocks

Sr. No.	Year	2013		2014		2015		2016		2017		Total		% Incidence
	Month	Birds received	Birds affected	Birds received	Birds affected	Birds received	Birds affected	Birds received	Birds affected	Birds received	Birds affected	Birds received	Birds affected	
1	Nov	315	5	440	10	500	15	810	40	505	30	2570	100	3.89
2	Dec	695	10	620	0	665	20	605	40	440	35	3025	105	3.47
3	Jan	905	5	635	30	665	10	695	0	375	0	3275	45	1.37
4	Feb	940	5	695	15	730	30	935	5	610	25	3910	80	2.05
Winter		**2855**	**25**	**2390**	**55**	**2560**	**75**	**3045**	**85**	**1930**	**90**	**12780**	**330**	**2.58%**
5	March	830	10	865	15	765	25	820	10	594	30	3874	90	2.32
6	April	815	10	655	10	600	35	660	65	574	5	3304	125	3.78
7	May	1995	0	620	10	815	120	760	95	525	35	4715	260	5.51
8	June	595	10	690	5	555	55	415	25	280	30	2535	125	4.93
Summer		**4235**	**30**	**2830**	**40**	**2735**	**235**	**2655**	**195**	**1973**	**100**	**14428**	**600**	**4.16%**
9	July	585	40	505	5	380	45	305	20	370	120	2145	230	10.72
10	Aug	530	25	540	5	320	45	1505	140	485	65	3380	280	8.28
11	Sept	455	0	390	25	415	55	465	45	595	70	2320	195	8.41
12	Oct	490	10	330	10	440	15	770	140	435	40	2465	215	8.72
Monsoon		**2060**	**75**	**1765**	**45**	**1555**	**160**	**3045**	**345**	**1885**	**295**	**10310**	**920**	**8.92%**
Gross Total		9150	130	6985	140	6850	470	8745	625	5788	485	37518	1850	**4.93%**
% Incidence		1.42		2.00		**6.86**		**7.15**		**8.38**		4.93		

Table 2: Age-wise autopsy incidences of Infectious bursal disease infection in broiler flocks

Sr. No.	Year	Number of birds died (%)					
		1-7 days	8-14 days	15-21 days	22-28 days	29-35 days	36-42 days
1	2013	0	0	40	55	35	5
2	2014	0	5	70	50	5	10
3	2015	5	25	170	175	85	10
4	2016	0	40	255	240	75	20
5	2017	0	30	195	175	65	20
	Total	5 (0.27%)	100 (5.39%)	730 (39.46%)	695 (37.57%)	265 (14.32%)	65 (3.51%)

Incidences were seen year round, but the highest incidences occurred in month of July (10.72%) followed by August to October (8.28 to 8.72%). As per season, the highest incidence was seen in monsoon season (July to October, 8.92%) followed by summer season (March to June, 4.16%) and winter season (November to February, 2.58%, Table 1). Of the total mortality, 57, 27 and 16% mortality occurred during monsoon, summer and winter season, respectively (Fig. 1). Choudhary *et al.* (2012)

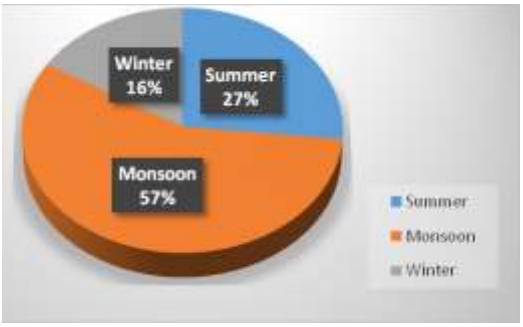

Fig. 1: Season wise incidence of IBD in commercial broiler birds.

Table 3: Flock wise mortality of 25 flocks used for detailed pathological studies

Sample/Flock ID	Age of affected flock (days)	Strength of flock	Total mortality No.	Mortality %
1	15	7500	160	2.13
2	20	3,000	130	4.33
3	22	4900	27	0.55
4	15	1800	170	9.44
5	18	4,000	133	3.32
6	32	1,500	108	7.20
7	16	5,000	103	2.06
8	33	2,600	45	1.73
9	38	10,000	157	1.57
10	22	4900	36	0.73
11	31	7,500	43	0.57
12	14	9,000	56	0.62
13	22	10,500	41	0.39
14	25	2,400	80	3.33
15	26	2,000	50	2.50
16	25	2,500	50	2.00
17	28	6,500	47	0.72
18	15	21,800	63	0.29
19	21	5,500	146	2.65
20	25	6,000	99	1.65
21	35	7,000	75	1.07
22	16	2,000	12	0.60
23	13	3,000	67	2.23
24	13	5,500	27	0.49
25	21	7,000	28	0.40
Gross Total		**1,43,400**	**1953**	**1.36**

Table 4: Mortality in vaccinated and non-vaccinated flocks used for detailed pathological study

Sr. No.	**Vaccination**	Flock size	Total mortality	**Mortality %**
1	**Non-vaccinated**	73,500	1296	**1.76**
2	**Vaccinated**	69,900	657	**0.94**

found the highest incidence in monsoon season with 36.73% of total cases. Higher incidence of IBD in monsoon season in the present study can be explained by hot and humid climate formed during early monsoon (July) immediately after summer months creating stress for the birds. Charotar region consisting of Anand and Kheda districts of Gujarat forms a hub for poultry entrepreneurs resulting in consistently increasing density of birds which might explain the higher incidence of IBD infection especially during the monsoon months.

With respect to age of susceptibility, incidences were seen in birds of age ranging from 2 to 6 weeks. Highest mortality was seen in age group of 3 weeks with mortality of 730 (39.46%) birds, followed by age group of 4 weeks with mortality of 695 (37.57%) birds from 1850 total dead birds (Table 2). Similar to the present findings, Jindal *et al.* (2004) and Mor *et al.* (2010) reported highest incidence in the age group of 21 to 30 days with 49.81% and 52.8% of the total cases, respectively, followed by the age group of 31 to 40 days. However, Choudhary *et al*. (2012) reported highest incidence in the age group of 4 to 7 week. The experimental studies revealed that maternally derived antibody (MDA) titers are maintained in chicks for 22 days and may protect birds from natural infection for up to 2 weeks which might explain higher incidence of IBD in age groups of 3 and 4 weeks (Moraes *et al.*, 2005).

Flock-wise mortality

The study comprised of the mortality due to IBD observed in 25 flocks of different commercial broiler farms with birds of age ranging from 2 to 6 weeks. Total population of 25 flocks was 1,43,400 birds with flock sizes varying from 1,500 to 21,800 birds. Overall mortality was calculated to be 1.36% with 1953 deaths, and it varied between flocks from 0.29 to 9.44% (Table 3). In accordance with the present findings, Afrin *et al.* (2016) reported overall mortality rate of 2.07% in 41 commercial broiler farms in Bangladesh, whereas Khan *et al.* (2009) reported 6.38% overall mortality in 50 different commercial broiler farms in District of Peshawar. Out of 25 flocks perceived in the present study, the non-vaccinated flocks (n=16) had higher mortality than vaccinated flocks (n=9) with overall mortality incidence of 1.76% and 0.94%, respectively (Table 4).

Higher prevalence of IBDV infection in non-vaccinated flocks is clearly supported by the increased antibody titers against the virus after vaccination. Although many vaccine schedules have been recommended, vaccination at 14th day after which the protection by maternal derived antibody (MDA) seems to diminish has been in practice in this area which seems to provide at least a better protection against the virus compared to non-vaccinated flock.

Conclusion

The flock wise mortality due to IBD from 25 flocks varied from 0.29 to 9.44% with an average of 1.36%. Non-vaccinated broiler flocks showed higher mortality (1.76%) compared to the IBD vaccinated flocks (0.94%).

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Conflict of Interest:

All authors declare that they have no conflict of interest.

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