DISTRIBUTION OF INFECTIOUS BURSAL DISEASE (IBD) DIAGNOSED IN NORTHERN REGION OF MALAYSIA FROM YEAR 2006 TO 2016

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ABSTRACT. Data over a period of eleven years was analysed for Infectious Bursal Disease (IBD) virus isolated from chicken samples submitted to the Regional Veterinary Laboratory at Bukit Tengah, Malaysia (RVLBT) for diagnosis. A total of 247 suspect IBD cases were tested by Virology Section, RVLBT between years of 2006 to 2016. IBD virus has been isolated by using Agar Gel Precipitation Test (AGPT), a bursal homogenate which has been used as an antigen against a known positive antiserum. About 27 cases (11%) from a total of 247 suspect cases in chickens were positive for the presence of IBD. The rate of IBD may be influenced by age of chickens with an increase in the possibility of IBD occurring in chicken older than 3 weeks. Apart from that, both broiler and local chickens are highly susceptible to this disease. Therefore, awareness on the existing IBD cases indicates the importance of strict management procedures, proper management programmes, vaccination and immunisation for chickens in Malaysia.

Keywords: infectious bursal disease (IBD), chicken, RVLBT

INTRODUCTION

Infectious bursal disease (IBD), also known as Gumboro, is a highly contagious acute viral disease of young chickens of 3-6 weeks old that causes fatality or immunosuppression by damaging bursa of Fabricius that affect chickens (Islam, 2005). The causal agent of IBD virus, a non-enveloped double stranded RNA (dsRNA) virus belonging to the genus *Avibirnavirus* within the family *Birnaviridae* (Jackwood *et al.,* 1984). This disease is one of the most economically important disease that impairs growth of young chickens which results in significant economic losses in the poultry industry (Hussain *et. al.,* 2004). The disease by itself usually causes mortality of 5-10% but this rate can reach up to 30-40% (OIE, 2004). In Malaysia, IBD has been a serious acute disease of the poultry industry since 1990, with high mortality being reported in several poultry farms (Hair-Bejo, 1993b). The effect of the IBD is largely dependent on the strain and the amount of the virus, age and the breed of chickens, the route of inoculation, the presence or absence of neutralizing antibodies, intercurrent primary and secondary pathogens and environmental and management factors (Muller *et. al.,* 2003). This study reports the distribution of IBD diagnosed at Virology

Section, Regional Veterinary Laboratory at Bukit Tengah, Malaysia (RVLBT) from year 2006 to 2016. Thus, the objective of this report is to elucidate the importance of this disease in poultry in northern region of Malaysia as these are cases diagnosed over a period of eleven years, thereby providing information for the practical control and management programmes in poultry farms.

MATERIALS AND METHODS

A total of 247 suspect IBD cases were received at the Virology Section, RVLBT for routine post-mortem and disease diagnosis. The confirmation of clinical disease or detection of subclinical disease was carried out in the laboratory using Agar Gel Precipitation Test (AGPT). The AGPT was used to detect IBD antigen in sera by using a pattern of one central well and several peripheral wells of diameter 5 mm with 2mm inter space by using 50% W/V bursal suspension as antigen. The Bursa of Fabricius was removed aseptically from the affected chickens was minced using two scalpels in scissor movement, and then small pieces were placed in the wells of AGPT plate against known positive serum (OIE Terrestrial Manual, 2016).

The data was summarized from laboratory information systems, SIMMAK with respect to the rate of IBD diagnosed according several factors, that is, year, age and type of chicken. The specific rate for each factor of infection for each factor was calculated to determine the existence of correlation between the factor and IBD (Tong *et. al.,* 1993).

RESULTS

Records over a period of eleven years from 2006 to 2016; of cases received by Virology

Table 1. Yearly distribution of Infectious Bursal Disease (IBD) cases received by Regional Veterinary Laboratory at Bukit Tengah, Malaysia (2006-2016).

Years	Suspect IBD cases	IBD positive cases	Year specific rate (%)
2006	13	3	23%
2007	26	8	31%
2008	27	2	7%
2009	12	1	8%
2010	12	2	17%
2011	6	1	17%
2012	6	0	0%
2013	17	3	18%
2014	25	3	12%
2015	36	3	8%
2016	67	1	1%
Total	247	27	11%

Table 2. Age distribution of Infectious Bursal Disease (IBD) cases received by Regional Veterinary Laboratory at Bukit Tengah, Malaysia (2006-2016).

Age (weeks)	Suspect IBD cases	IBD positive cases	Age specific rate (%)
0-2	18	0	0%
3	46	5	11%
4	54	11	20%
5	48	5	10%
6	19	2	11%
7	5	1	20%
8	3	1	33%
9-11	5	1	20%
12-14	3	0	0%
Above 14	13	1	8%
Unknown	33	0	0%
Total	**247**	**27**	**11%**

Table 3. Distribution of Infectious Bursal Disease (IBD) cases received by Regional Veterinary Laboratory at Bukit Tengah, Malaysia (2006-2016) based on type of chicken.

Type of chicken	Suspect IBD cases	IBD positive cases	Type of specific rate (%)
Broiler	171	16	9%
Layer	2	0	0%
Breeder	7	0	0%
Local Chicken	43	8	19%
Unknown	24	3	13%
Total	**247**	**27**	**11%**

Section, RVLBT was subjected to analyse as per Table 1. A total of 247 suspect IBD cases in chickens were documented with 27 cases (11%) diagnosed positive for IBD. In the year 2007, specific rate for IBD was the highest with 31%. The lower specific rate for IBD was in 2016 with 1%. However, IBD case was not found in the year 2012. From 2006 and 2007, higher positive cases with 23% and 31% respectively was observed. However, eventually the positive cases gradually declined in 2014 with 12%, 2015 with 8% and 2016 with 1%.

Table 2 shows the age distribution of Infectious Bursal Disease (IBD) cases received by RVLBT from 2006 to 2016. Age

specific rate for IBD was highest in chickens 8 weeks old (33%) followed by chickens 4, 7 and 9-11 weeks old with age specific rate of 20%. Meanwhile, less IBD was detected in chickens above 14 weeks old at 8%. Chickens of 0-2 and 12-14 weeks old were not affected with IBD.

The type of chicken specific rate showed that local chickens had the highest rate of 19% of IBD compared to other types of chicken. From the analysed data as showed in Table 3, a low rate was found in broiler chickens (9%) but IBD was not seen (0%) for both layer and breeder chickens.

DISCUSSION

Infectious Bursal Disease (IBD) is a major poultry disease in Malaysia which causes significant economic losses among poultry farm owners (Hair-Bejo, 1993b). This study found 11% (n=27/247) of IBD positive from cases received by Regional Veterinary Laboratory at Bukit Tengah, Malaysia. The annual distribution of IBD positive cases fluctuated with the highest rate in the year 2007. This could be due to the inability of poultry farmers to regulate biosecurity and hygienic condition of farms.

Commonly young chickens at 0-2 weeks old have a high level of maternally derived antibodies (MDA) hence resistance to IBD. Nevertheless, the MDA level declines within age and Bursa of Fibricus. Once the target organ reaches its maximum development between 3 to 6 weeks after hatch adapting the chickens highly susceptible to IBD (Muller *et. al.,* 2003). Chickens from 7-14 weeks are also susceptible to IBD. This may be due to decline in immunity against antigenic variant strains which is faster when compared to immunity to strains in pullet or ability of IBD break through the immunity provided by vaccine (Muller *et. al.,* 2003). Although IBD is a highly contagious immunosuppressive disease that affects young chickens; and rarely affects the chickens above 14 weeks (Berg, 2000) yet the resulting immunosuppression is probably due to lack of vaccination. There are cases reported positive for IBD in vaccinated flocks (Abdu, 1986). Chickens with poor vaccination history are more likely to suffer from the disease. This is due to farmers failing to revaccinate their chickens after the first vaccination.

In Malaysia, local chickens are reared in the backyards or free ranging and are most likely to interact with wild birds as they have a role in spreading the IBD virus throughout the country (Ramlah, A. H., 1996). Apart from that, local chickens are not protected by vaccination or lower antibody level; thus more prone to be infected with IBD. Meanwhile broiler chickens are protected with a single vaccination compared to layer and breeder chickens. Basically, both layer and breeder chickens will be reared longer and therefore farmers tend to protect continuously by revaccination but broiler chickens will be vaccinated at an early age or only prior to slaughter within age of 5-7 weeks. Consequently, the pullets are prone to IBD virus if their immunity level was low as shown by maternally derived antibodies (MDA) titre levels. This indicates that antibody alone is not adequate in inducing protection against IBD and that T cell involvement is critical for protection (Muller *et. al,* 2003).

The IBD virus transmission may occur for prolonged periods of time and from an infected premises to uninfected farms. Young chickens will be exposed to the virus at a very early age, when cleaning between broods is not thorough. Therefore, routine sanitary precautions must strictly be followed for this disease. An effective disinfection with appropriate disinfectants will decrease the virus load hence will reduce the risk of transmission. Besides that, eradication of mechanical vectors such as mosquitoes, mealworms, and smaller rodents must also be pursued (Lukert and Saif, 1991).

CONCLUSION

This study provides background information on current distribution status of Infectious Bursal Disease (IBD) in the northern region of Malaysia. The results indicate that IBD virus has high potential in lowering productivity besides increasing mortality. Consequently, farmers should be properly educated to improve the biosecurity with appropriate disinfectants as well as ensuring appropriate way of handling vaccine and vaccination to minimize transmission of disease in Malaysia.

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