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Preeti

Department of Veterinary Public Health and Epidemiology, College of Veterinary Sciences, Lala Lajpat Rai University of Veterinary and Animal Sciences, Hisar, Haryana, India

Suresh Kumar

Department of Veterinary public health and epidemiology, College of Veterinary Sciences, Lala Lajpat Rai University of Veterinary and Animal Sciences, Hisar, Haryana, India

Ramkaran

Department of Veterinary Physiology and Biochemistry, College of Veterinary Sciences, Lala Lajpat Rai University of Veterinary and Animal Sciences, Hisar, Haryana, India

Laxmi Bai

Department of Veterinary Medicine, College of Veterinary Sciences, Lala Lajpat Rai University of Veterinary and Animal Sciences, Hisar, Haryana, India

Correspondence**Preeti**

Department of Veterinary Public Health and Epidemiology, College of Veterinary Sciences, Lala Lajpat Rai University of Veterinary and Animal Sciences, Hisar, Haryana, India

Histopathology of bursa of fabricius and post-mortem findings in infectious bursal disease affected broiler chickens in Haryana

Preeti, Suresh Kumar, Ramkaran and Laxmi Bai

Abstract

The aim of the present study was to diagnose infectious bursal disease (IBD) using gross and histopathological approaches. The study period was from January, 2015 to February, 2016. Gelatinous exudates around bursa, swollen and haemorrhagic bursa, atrophied bursa and haemorrhages on thigh and pectoral muscles were the major necropsy findings. During post-mortem bursae of fabricius were taken for histopathological study

Keywords: Infectious bursal disease, histopathology, post-mortem findings

Introduction

Infectious bursal disease (IBD), a highly contagious and immunosuppressive viral disease of chickens, was first described by Cosgrove in 1962 as "Avian Nephrosis" because of prominent lesions in kidneys. The disease is also known as 'Gumboro' disease because of an outbreak in Gumboro area of Southern Delaware, USA. Etiological agent of infectious bursal disease was first identified in 1962 (Winterfield and Hitchner, 1962) [29]. Later on due to pathognomonic lesions in bursa of fabricius, the disease was termed as infectious bursal disease (Hitchner, 1970) [9]. Infectious bursal disease virus (IBDV) mainly affects chicken at 3-6 weeks of age and has a predilection for the bursa of fabricius where the virus infects actively dividing and differentiating B-lymphocytes (Burkhardt and Muller, 1987; Li *et al.*, 2015) [1, 17]. The disease is clinically characterized by dullness, depression, loss of appetite, white watery diarrhoea, soiled vent, ruffled feathers, severe prostration, vent picking and subnormal temperature followed by death (Cui *et al.*, 2013) [6]. Infectious bursal disease virus (IBDV) belongs to the family Birnaviridae of the genus Avibirnavirus. The virus is double stranded RNA, bi-segmented (segments A and B), non-enveloped and icosahedral (Dobos *et al.*, 1979; Murphy *et al.*, 1995; Vera *et al.*, 2015) [7, 21, 28]. Two serotypes: serotype-1 and serotype-2 have been reported on the basis of virus neutralization test. Serotype-1 has variation in virulence and pathogenicity, causes disease and immunosuppression in chickens. On the basis of heterogenous antigenicity and sequence analysis, serotype-1 viruses are classified as attenuated, classical virulent, intermediate virulent, very virulent (vv) and antigenic variant strains (Kataria *et al.*, 2001) [16]. Viruses of serotype-2 were isolated from turkeys and are non-pathogenic to both turkeys and chickens. Serotype-2 viruses produce neither disease nor immunity against pathogenic strains of serotype-1 (Muller *et al.*, 2003; Cortey *et al.*, 2012; Vera *et al.*, 2015) [20, 4, 28].

In India, the disease was first reported by Mohanty *et al.* (1971) [19]. However, the virus, IBDV was isolated for the first time in the country by Jayaramaiah and Mallick (1974) [15]. Later on, the disease was recorded in different forms from all the states. In late 1980s very virulent (vv) IBD viruses were initially reported in Europe (Chettle *et al.*, 1989; Van den Berg *et al.*, 1991) [2, 27] and thereafter were reported around the world, except in North America and Australia (Sharma *et al.*, 2000; Van den Berg, 2000) [23, 26]. The vvIBD viruses are showing antigenetic similarity to the classical strains but differ in virulence and pathogenicity causing 60-100% mortality in infected flocks (Van den Berg, 2000) [26]. Classical virulent strains cause bursal inflammation and severe lymphoid necrosis in infected chickens, resulting in immunodeficiency and 20–30% mortality. Antigenic variant strains cause rapid atrophy of the bursa without inflammation, haemorrhage, or mortality (Snyder *et al.*, 1988; Jackwood and Jackwood, 1994; Jackwood *et al.*, 2008; Li *et al.*, 2015) [25, 12, 14, 17].

Due to the high mortality rates in acute infections, reduced growth, excessive condemnation of carcass and severe immunosuppression by subclinical infections; IBD is of major economic importance to the poultry industry (Choudhary *et al.*, 2012) [3]. Due to immunosuppressive effect of the IBD virus, incidence and severity of secondary and opportunistic infections increase, leading to vaccination failure (Dormitorio *et al.*, 1997; Jackwood and Sommer, 1998) [8, 13].

Materials and Methods

Postmortem examination on 85 carcasses of broiler chicken upto the age of 3-7 weeks brought to Department of Veterinary Public Health and Epidemiology, LUVAS, Hisar conducted during the period of one year (January, 2015 to February, 2016) from different regions of Haryana. Representative and appropriate bursa of fabricius showing post-mortem lesions were collected in 10% buffered formalin for histopathological studies. The formalin fixed tissues of bursa were processed for paraffin embedding technique. The

section were cut at the thickness of 3-4 μ and stained with H & E stain (Luna, 1968) [18].

Results and Discussion

In almost all IBD-affected birds, the post-mortem lesions were observed in bursa of fabricius. Haemorrhages on thigh (Fig. 1a) and pectoral muscles, presence of gelatinous exudates around bursa (Fig. 1b), oedematous and swollen bursa (Fig. 1c), haemorrhages in bursal follicles (Fig. 1d) were recorded. These changes were observed in acute form of the disease. However, in chronic form of the disease, the bursal changes comprised of atrophy and presence of cheesy core inside the bursa. The haemorrhages on thigh and pectoral muscles were of milder degree in sub-acute form of disease. In some of the flocks, haemorrhages at the junction of proventriculus and gizzard were also recorded. Besides these, swollen kidneys and enlargement of liver were also noticed during post-mortem examination of broiler chicks.

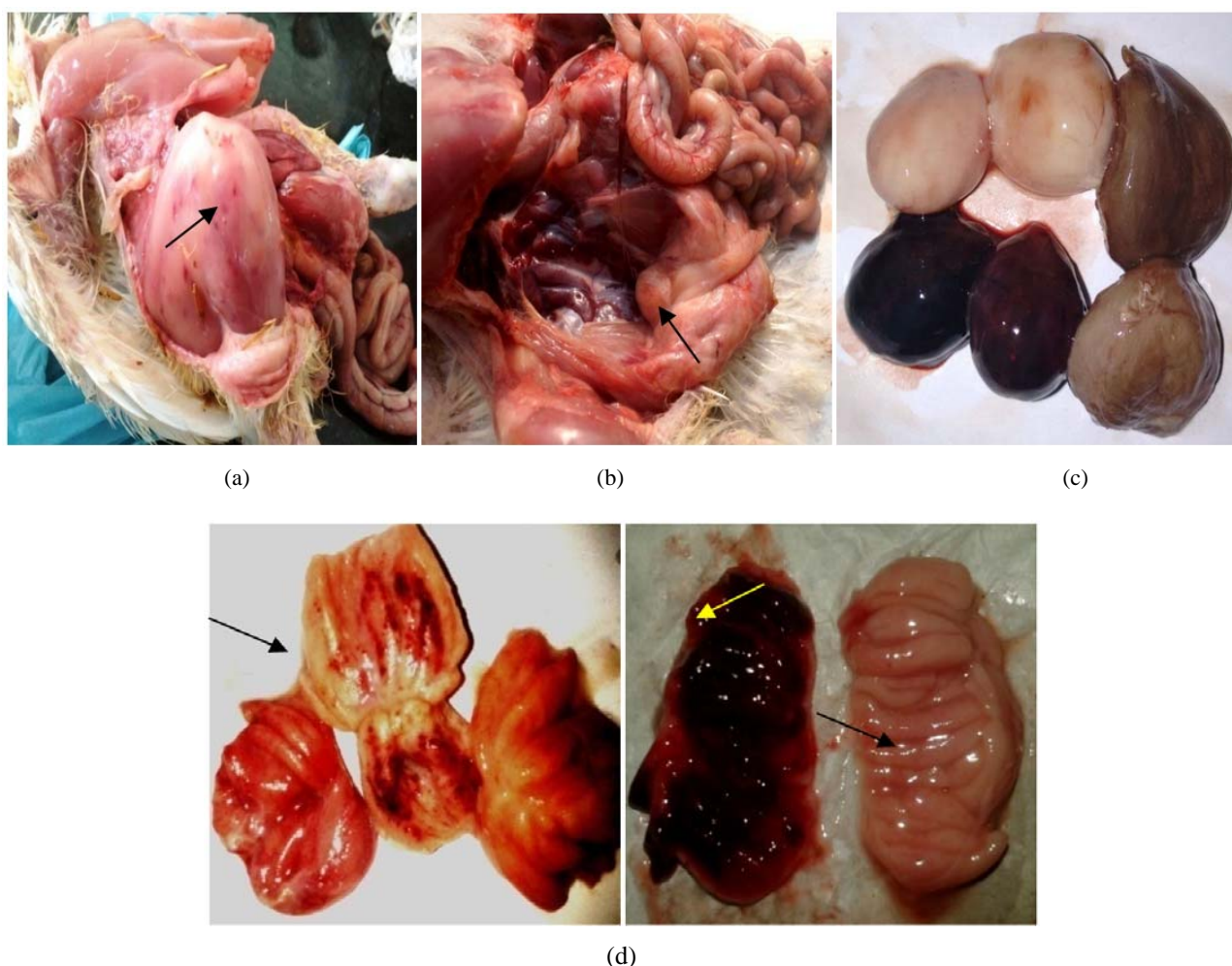


Fig 1: Photographs showing post-mortem lesions in infectious bursal disease affected broiler chickens
 a) Haemorrhages on thigh muscles
 b) Gelatinous exudate around bursa of fabricius
 c) Swollen, edematous and haemorrhagic bursa of fabricius
 d) Gelatinous exudates around bursa with haemorrhages in bursal follicles

The histopathological changes in the bursa of fabricius mainly showed the congestion and marked haemorrhages in bursa of fabricius (Figs. 2a, 2b). There was marked depletion of lymphocytes in bursal follicles and fibrous connective proliferation with mild lymphocytic infiltration in inter-follicular areas (Figs. 2c, 2d). Atrophic changes at

microscopic level, which were in the consonance with the gross observations. The cystic changes in which there was formation of cystic spaces were observed in bursal follicles (Fig. 2e). Similar pathological findings were reported by Hoque *et al.* (2001) [10], Rudd *et al.* (2001) [22], Islam *et al.* (2008) [11] and Singh *et al.* (2015) [24].

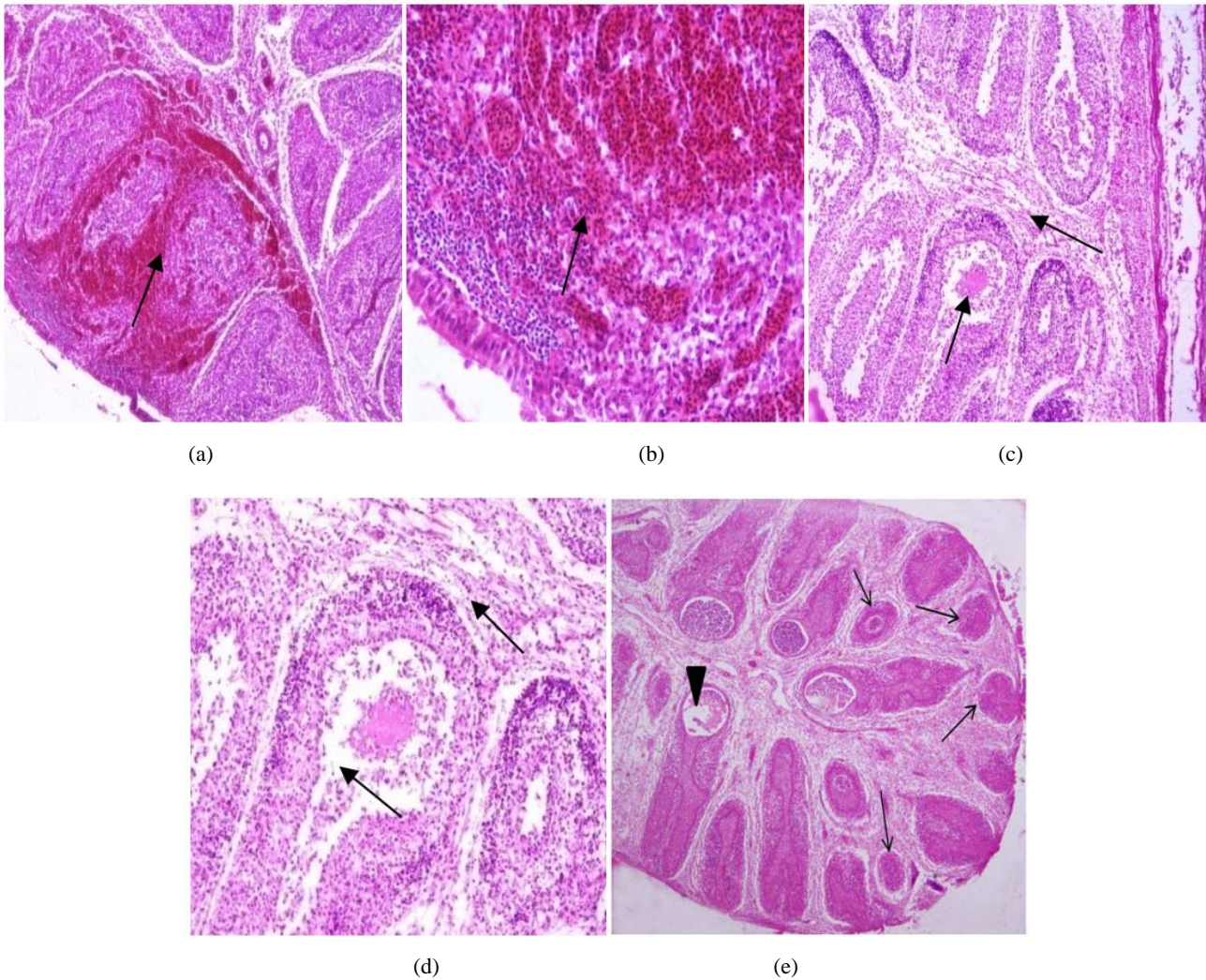


Fig 2: Photomicrographs showing histopathological changes in bursa of fabricius in infectious bursal disease affected broiler chickens
a) Congestion and marked haemorrhages in bursa of fabricius (H&E \times 400)
b) Congestion and marked haemorrhages in bursa of fabricius (H&E \times 100)
c) Depletion of lymphocytes in bursal follicles and fibrous connective tissue proliferation with mild lymphocytic infiltration in inter-follicular areas (H&E \times 100)
d) Cystic areas with accumulated necrotic debris in bursal follicle and fibrous connective proliferation with mild lymphocytic infiltration in inter-follicular areas (H&E \times 200)
e) Atrophy of bursal follicles (arrow) and formation of cystic spaces in bursal follicle with arrow head (H&E \times 40).

Conclusion

From the present study, it can be concluded that outbreaks of IBD occur throughout the year in broiler chicken flocks in Haryana state. Infectious bursal disease can be diagnosed on the basis of clinical signs, gross examination and histopathological studies. It is necessary to follow biosecurity measures and vaccinate birds regularly with appropriate strain of vaccine. Furthermore, regular surveillance and identifications of field strains would help in making effective control strategies.

References

- Burkhardt E, Muller H. Susceptibility of chicken blood lymphoblasts and monocytes to infectious bursal disease virus. *Arch. Virol.* 1987; 94:297-303.
- Chettle N, Stuart JC, Wyeth PJ. Outbreak of virulent infectious bursal disease in East Anglia. *Vet. Rec.* 1989; 125:271-272.
- Choudhary UK, Tiwary BK, Prasad A, Ganguly S. Study on incidence of infectious bursal disease in and around Ranchi. *Indian J Anim. Res.* 2012; 46(2):156-159.
- Cortey M, Bertran K, Toskano J, Majo N, Dolz R. Phylogeographic distribution of very virulent infectious bursal disease virus isolates in the Iberian Peninsula. *Avian Pathol.* 2012; 41:277-284.
- Cosgrove AS. An apparently new disease of chickens' avian nephrosis. *Avian Dis.* 1962; 9:385-389.
- Cui P, Ma J, Zhang G, Li S, Gao Y, Cui A *et al.* Genomic sequence analysis of a new reassortant infectious bursal disease virus from commercial broiler flocks in central China. *Arch. Virol.* 2013; 158:1973-1978.
- Dobos P, Hill BJ, Hallet R, Kells DTC, Becht H, Teninges D. Biophysical and biochemical characterization of five animal viruses with bisegmented double-stranded RNA genomes. *J Virol.* 1979; 32:593-605.
- Dormitorio TV, Giamborne JJ, Duck LW. Sequence comparison of the variable VP2 region of eight infectious bursal disease isolates. *Avian Dis.* 1997; 41:691-696.
- Hitchner SB. Infectivity of infectious bursal disease virus for embryonating eggs. *Poult. Sci.* 1970; 49:511-516.
- Hoque MM, Omar AR, Chong LK, Hair-Bejoand I.

- Pathogenicity of Sspl-positive infectious bursal disease virus and molecular characterization of the hypervariable region. *Avian Pathol.* 2001; 30:369-380.
11. Islam MN, Rashid SMH, Hoque MF, Juli MSB, Khatun M. Pathogenicity of IBDV related to outbreaks in the vaccinated flocks and the causes of vaccination failure. *J. Innov. Dev. Strategy* 2008; 2:22-30.
 12. Jackwood DJ, Jackwood RJ. Infectious bursal disease viruses: molecular differentiation of antigenic subtypes among serotype 1 viruses. *Avian Dis.* 1994; 38:531-537.
 13. Jackwood DJ, Sommer SE. Genetic heterogeneity in the VP2 gene of infectious bursal disease viruses detected in commercially reared chickens. *Avian Dis.* 1998; 42:321-339.
 14. Jackwood DJ, Sreedevi B, Le Fever LJ, Sommer-Wagner SE. Studies on naturally occurring infectious bursal disease viruses suggest that a single amino acid substitution at position 253 in VP2 increases pathogenicity. *Virol.* 2008; 377:110-116.
 15. Jayaramaiah B, Mallick BB. Identification of bursal disease virus in India. *Indian J. Anim. Hlth.* 1974; 13:99-103.
 16. Kataria RS, Tiwari AK, Nanthakumar T, Goswami PP. One-step RT-PCR for the detection of infectious bursal disease virus in clinical samples. *Vet. Res. Commun.* 2001; 25:429-436.
 17. Li Z, Qi XL, Ren XG, Cui L, Wang XM, Zhu P. Molecular characteristics and evolutionary analysis of a very virulent infectious bursal disease virus. *Sci China Life Sci.* 2015; 58:731-738.
 18. Luna LG. Manual of histologic staining methods of Armed Forces Institute of Pathology. 3rd Edition, McGraw-Hill, New York, 1968.
 19. Mohanty GC, Pandey AP, Rajya BS. Infectious bursal disease in chicken. *Curr. Sci.* 1971; 40:181-184.
 20. Muller H, Islam MR, Raue R. Research on infectious bursal disease-the past, the present and the future. *Vet. Microbiol.* 2003; 97:153-165.
 21. Murphy FA, Faugnet CM, Bishop DHL, Ghabrial SA, Jarvis AW, Martelli GP *et al.* Virus taxonomy, classification and nomenclature of viruses. Sixth Report of the International Committee on Taxonomy of Viruses. Springer, Wein, New York. *Arch. Virol. Suppl.* 1995; 10:240-244.
 22. Rudd M, Heine H, Parede L, Sapats SI, Ignjatovic J. Characterization of an Indonesian very virulent strain of infectious bursal disease virus (IBDV). Proceeding of the II International Symposium on infectious bursal disease and chicken infectious anaemia, held on 16-20 July, 2001, 40-50.
 23. Sharma JM, Kim IJ, Rautenschlein S, Yeh HY. Infectious bursal disease virus of chickens: pathogenesis and immunosuppression. *Dev. Comp. Immunol.* 2000; 24:223-235
 24. Singh J, Banga S, Brar S, Singh D, Sodhi S, Leishangthem D. Histopathological and immunohistochemical diagnosis of infectious bursal disease in poultry birds. *Vet. World.* 2015; 8(11):1331-1339.
 25. Snyder DB, Lana DP, Savage PK, Yancey FS, Mengel SA, Marquardt WW. Group and strain specific neutralization sites of infection bursal disease virus defined with monoclonal antibodies. *Avian Dis.* 1988; 32:527-534.
 26. Van den Berg TP. Acute infectious bursal disease in poultry: a review. *Avian Pathol.* 2000; 29:175-194.
 27. Van den Berg TP, Gonze M, Meulemans G. Acute infectious bursal disease in poultry: Isolation and characterization of a highly virulent strain. *Avian Pathol.* 1991; 20:133-143.
 28. Vera F, Craig M, Olivera V, Rojas F, Konig G, Pereda A, *et al.* Molecular characterization of infectious bursal disease virus (IBDV) isolated in Argentina indicates a regional lineage. *Arch. Virol.* 2015; 160:1909-1921.
 29. Winterfield RW, Hitchner SB. Etiology of an infectious nephritis-nephrosis syndrome of chickens. *Am. J Vet. Res.* 1962; 23:1273-1279.
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