

Infectious Bursal Disease: The Hidden Threat to Poultry Immunity

¹Neeraj K. Pawaskar, ²Jadhav Ameya Anand

¹Ph.D- Animal Biotechnology, Mumbai, India.

²Ph.D- Veterinary Surgery & Radiology, Mumbai, India

*Corresponding e-mail address: nrj7121993@gmail.com
doi.org/10.5281/ScienceWorld.22829602

Abstract

Infectious bursal disease (IBD), commonly known as Gumboro disease, is a highly contagious viral disease of young chickens. The disease attacks the bursa of Fabricius, an important organ of the chicken's immune system. As a result, affected birds can become immunosuppressed and more vulnerable to other infections. Although vaccination is widely used for control, the emergence of new and very virulent strains continues to challenge poultry production.

Keywords: Infectious bursal disease, Gumboro disease, IBDV, poultry, immunosuppression, vaccination

What Is Infectious Bursal Disease?

IBD is caused by infectious bursal disease virus (IBDV), a virus belonging to the family Birnaviridae. Young chickens, particularly those around 3–6 weeks of age, are most susceptible to clinical disease. The most important target of the [1] virus is the bursa of Fabricius. This organ plays an important role in the development of B lymphocytes, which are essential for producing antibodies. When IBDV damages the bursa, the bird's immune system can become weakened. This is why IBD is more than just another poultry disease—it can leave affected birds poorly equipped to fight other infections and may [1,3] reduce their response to vaccination.

What Happens to an Infected Bird?

IBDV spreads rapidly through susceptible flocks. The virus is also remarkably resistant in the poultry environment, making it difficult to eliminate completely through routine cleaning and disinfection. After infection, the virus reaches the bursa of Fabricius [1,4] and damages developing B lymphocytes. Severe damage to this organ can result in immunosuppression. This



creates a dangerous situation: the bird may recover from IBD but remain more susceptible to other diseases.

What Are the Signs of IBD?

Clinical disease is most commonly seen in young chickens.

Affected birds may show:

- Depression and weakness
- Loss of appetite
- Ruffled feathers
- Watery diarrhoea
- Dehydration
- Soiled feathers around the vent
- Trembling and reduced activity

In severe outbreaks, haemorrhages may appear in the thigh and breast muscles, while the bursa of Fabricius can become enlarged, swollen and sometimes haemorrhagic. [1,4] Very virulent IBDV strains can cause particularly severe disease and high mortality. Recent investigations in India have continued to [5] detect very virulent strains associated with poultry outbreaks.

Why Is Immunosuppression the Biggest Problem?

The most important feature of IBD is not simply the death of infected birds. It is the damage to the immune system. Destruction of B lymphocytes can make birds more vulnerable to secondary bacterial and viral infections. It can also interfere with their ability to develop an adequate immune response following vaccination. Thus, an outbreak can have [1,3] consequences that extend beyond the initial disease. Poor growth, increased susceptibility to other infections and reduced production can all add to the economic burden on poultry farmers.

Why Is IBD Difficult to Control?

Vaccination is the main method used to control IBD, but several factors make vaccination challenging. One important factor is maternal immunity. Chicks receive antibodies from their vaccinated mothers, which can protect them during their early life. However, these maternal antibodies gradually decline. If vaccination is given too early, maternal antibodies may neutralize the vaccine virus. If vaccination is delayed too long, the chicks may become susceptible to field IBDV before developing active immunity. The emergence of antigenically different and very virulent [1] viruses adds another challenge. Recent studies have shown that novel IBDV variants can differ from strains against which [6,7] existing vaccines were developed.



How Is IBD Diagnosed?

Clinical signs and postmortem lesions can raise suspicion of IBD, particularly when the bursa of Fabricius is affected. Laboratory confirmation can be performed using ELISA, virus-neutralisation tests and molecular techniques such as RT-PCR. RT-PCR can detect viral RNA directly from infected tissues and is particularly useful for identifying and characterising field strains. Recent diagnostic research has also focused on [1,8] real-time PCR methods capable of distinguishing very virulent IBDV from other circulating forms, including emerging variants.

IBD in India

IBD remains an important poultry disease in India. Recent investigations in central and western India identified very virulent IBDV strains associated with outbreaks in poultry flocks. More recently, molecular and pathological investigations in Kashmir detected genotype A3 very virulent IBDV strains that were [5] genetically distinct from commonly used vaccine strains, highlighting the need for continued surveillance and periodic evaluation of vaccine effectiveness. These findings show that IBD is not [9] a problem of the past. The virus continues to evolve, and poultry farms must remain prepared for changing field strains.

Conclusion

Infectious bursal disease is a good example of how a virus can cause damage far beyond the initial infection. By attacking the bursa of Fabricius, IBDV can weaken the immune system of young chickens and increase their vulnerability to other diseases. Vaccination remains the cornerstone of control, but the emergence of new viral variants means that surveillance, biosecurity and regular evaluation of vaccination strategies must continue. For the poultry industry, controlling IBD is not only about preventing mortality it is about protecting the immune health and productivity of the entire flock.

References

- Muneeb JM, Pawaskar DK, Rafiqui M, Siddiqui R, Shabir N, Pawaskar NK, Rasool A. A comprehensive overview of infectious bursal disease, a major threat to poultry health and production. *International Journal of Advanced Biochemistry Research*. 2024;8(Special Issue 12):154–163. DOI: 10.33545/26174693.2024.v8.i12Sc.3092.
- Huang Y, He X, Wei P, Chen H. Advances in Infectious Bursal Disease Virus Vaccines—A Review. *Microorganisms*. 2025;13(12):2801. DOI: 10.3390/microorganisms13122801.
- Advances on adaptive immune responses affected by infectious bursal disease virus in chicken. 2024.
- Department of Animal Husbandry & Dairying, Government of India. Poultry Disease Action Plan 2024. Government of India.
- Agnihotri AA, Awandkar SP, Kulkarni RC, et al. Isolation and molecular characterization of infectious bursal disease virus circulating in western and central India. *Iranian Journal*



of Veterinary Research. 2023;24(4):345–350. DOI: 10.22099/IJVR.2023.47037.6774.

The booster immunization using commercial vaccines effectively protects chickens against novel variants of infectious bursal disease virus (genotype A2dB1). 2024.

Q221K mutation in VP2 drives antigenic shift of infectious bursal disease virus. *Frontiers in Immunology*. 2025.

Development of a multiplex real-time qRT-PCR for discriminating the predominant epidemic variant IBDV and very virulent IBDV. *Frontiers in Veterinary Science*. 2026.

Yaqub M, et al. Molecular and pathological characterization of very virulent infectious bursal disease virus (vvIBDV) strains in Kashmir, India. *Veterinary Research Communications*. 2026;50:95. DOI: 10.1007/s11259-025-11048-5.

