

Infectious Bursal Disease (Gumboro) in Backyard Chickens



Infectious bursal disease (IBD) is an acute and highly contagious viral infection in young chickens that attacks the bursa of Fabricius that is located inside the vent area of the bird. IBD is also known as Gumboro disease because it was first identified in Gumboro, Delaware, in 1957. The “classic” form of IBD is found throughout the world (except New Zealand) and is endemic (commonly found) throughout the United States. Infectious bursal disease is caused by a virus called infectious bursal disease virus (IBDV). IBDV is the only species of virus under the Avibirnavirus genus in the Birnaviridae family of viruses. The virus is extremely hardy and can survive in a wide range of environmental conditions, making it difficult to eliminate or decontaminate.

Role of Bursa of Fabricius

The **bursa of Fabricius plays an important part** in the disease. The bursa is the “assembly plant” for the immune system. The bursa produces B cells which, in turn, produce antibodies to help the immune system fight off disease challenges. The B-cell system develops during embryogenesis (formation and development of an embryo after fertilization) and the first few weeks after hatch.

Between embryonic day 8 and 15, pre-bursal B-cell precursors migrate from the embryonic spleen and bone marrow into the bursa (Kaspers, 2014), where they receive signals from the bursa that trigger the maturation process to begin and allow these B cells to be programmed to become mature antibody-producing B lymphocytes. Once fully mature, the B-lymphocyte cells leave the bursa and populate secondary lymphatic tissues, where they may come in contact with pathogens or perhaps antigens delivered through vaccination.

If the bursa is damaged by IBD, it can no longer assemble enough lymphocytes to protect the bird from disease challenges. The disease **targets the lymphocytes in the bursa of Fabricius, compromising the immune system**, resulting in immunosuppression and susceptibility to other secondary infections. The bursa of chicks infected with IBD may triple in size as the disease progresses but will then shrink as the disease runs its course. Unfortunately, during the disease, the bursal tissues are often damaged or destroyed, leaving surviving chickens with reduced immune system capabilities. Especially for backyard or commercial birds raised without antibiotics, once the birds become immune-suppressed, other **opportunistic pathogens begin to overwhelm the weakened immune system**, and this can lead to a variety of secondary infections such as *E. coli*, airsacculitis, *Clostridium*, and *Mycoplasma*. In

most cases, if the bird can remain IBD free until 3 weeks of age, enough lymphocytes can be instructed to become antibody-producing cells to minimize the immunosuppressive effects of an IBD challenge.

As mentioned above, there is a classic form of the disease, which is common throughout the world with the exception of New Zealand. There is also a very virulent form of the disease that is less common. During the late 1980s, very virulent infectious bursal disease (vvIBDV) was reported in both England and the Netherlands. Later, vvIBDV appeared in Asia, Africa, and South America; and more recently, cases of vvIBDV have appeared in California in 2008 and Washington State in 2014.

Clinical and Subclinical Versions

Infectious bursal disease can manifest itself in one of two forms, depending on the age of the chicken when it becomes infected. The subclinical version occurs in chickens less than 3 weeks of age, and there are usually no clinical signs of disease at this time. However, **affected chickens are left with permanent and severe immunosuppression**. Most infections that occur in the field are of the subclinical variety, and this is the more economically important form of the disease.

However, there is also a clinical form of the disease that affects chickens in the 3- to 6-week-old range. The clinical disease often occurs quite suddenly with a rapid increase in mortality rate. Clinical symptoms may include trembling, ruffled feathers, poor appetite, dehydration, huddling, vent pecking, and depression. The majority of the lesions are found in the bursa of Fabricius when birds are necropsied. In the beginning, the bursa is swollen and/or inflamed; may be edematous (excessive fluid present) and hyperemic (excessive blood present); and may have a gelatinous, yellowish fluid inside. In severe cases, hemorrhages or necrosis (death of tissue) may be present. A few days after the initial infection, the bursa will begin to atrophy (waste away) and shrink rapidly in size.

Often, the kidneys may appear swollen in birds that are necropsied. However, this is likely related to severe dehydration and not directly related to the IBD virus itself. In addition, hemorrhages may also be present in the breast and thigh muscles because the IBD virus interferes with normal blood clotting.



Diagnosis

Diagnosis of IBD in the field is not always easy. It involves taking into consideration flock history and any clinical signs or lesions that may be present. Again, chickens less than 3 weeks old generally show no clinical signs, while those older than 3 weeks may show the clinical signs listed above. Upon necropsy, clinical IBD can be confirmed, if in the early stages, by examining the bursa of Fabricius and looking for characteristic gross lesions. However, in the later stages of the disease, it is difficult to confirm a diagnosis of IBD by looking at only a shrunken bursa because other diseases (Marek's, for one) can cause similar results. It may be necessary to submit tissue samples to a laboratory for histopathological work, serological studies, or virus isolation to obtain a definite confirmation.

Disease Transmission

Transmission is primarily through the fecal-oral route. **Chickens infected with IBD virus shed the virus in the feces.** Feed, water, litter/bedding material, and equipment can become contaminated with the virus. Other chickens become infected by ingesting the virus. In commercial settings, litter beetles (or the lesser mealworm, *Alphitobus diaperinus*) have been shown to carry the virus. The IBD virus is very stable and is capable of remaining viable outside a host for several months. **The virus is not transmitted from the egg to the chick.** However, because of the resistant nature of the IBD virus, it is easily transmitted mechanically to different locations by equipment, vehicles, and people unless adequate biosecurity practices are in place.

Prevention

Biosecurity should be a primary focus when it comes to prevention and control of IBD. However, experience with the IBD virus has shown that biosecurity alone is not an effective control. Commercial broiler breeder flocks are vaccinated to produce maternal immunity that is passed on to the chick for IBD control. Unfortunately, many people with backyard flocks do not vaccinate their birds for the IBD virus. **Movement of backyard birds to exhibits, fairs, shows, etc., increases the risk of an outbreak.**

New birds brought on the property or birds returning home after a fair or show should be quarantined from the rest of your birds for 30 days. If the quarantined birds have been exposed to something, they will start to show symptoms within 30 days. If they do show symptoms, at least you have not infected your entire flock and only the birds that left the farm are at risk. During those 30 days, do not wear the same boots or use the same equipment around your original flock as around your quarantined birds. You don't want to track whatever the quarantined birds may have been exposed to over to the rest of your flock.

Treatment

Unfortunately, there is **no known treatment** for the IBD virus.

Public Health

Infectious bursal disease virus does not appear to be zoonotic. There is **no evidence** that IBD virus can infect people or other animals.

Sources of Help

Here are some sources of help if you are concerned about infectious bursal disease in your backyard flock or need assistance with disease diagnosis:

- Your local county Extension agent
- Your local veterinarian
- Mississippi Board of Animal Health (601-359-1170)
- Mississippi Veterinary Research and Diagnostic Laboratory (601-420-4700)
- Mississippi State University Poultry Science Department (662-325-3416); ask for an Extension poultry specialist

Reference

Kaspers, B. 2014. The bursa of Fabricius and its essential role in B-cell development and antibody production. *Merial Avian Science Review*. April.

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