Infectious bursal disease - diagnosis, treatment and control

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Infectious Bursal Disease (IBD) or Gumboro disease is a highly contagious acute viral infection of young chicken resulting in heavy economic loss to the poultry industry. In India, Mohanty reported the disease for the first time in 1971. The virus was isolated in 1974 for the first time in India.

Etiology

IBD virus is a member of family Birna viridae. Virus has got double stranded RNA genome encoding two structural (VP2 and VP3) and three non-structural proteins (VP1, Vp4 and VP5). VP2 is the major structural protein having both conformational and non-conformational viral neutralizing epitopes. There are two serotypes. Serotype I is pathogenic to chicken where as serotype II is isolated from turkeys and is antigenically different from serotype I. IBDV is very stable even at peak summer. Formaline 4%, Cresol 2% and Phenol 2% kill the virus in few minutes. Ether, chloroform and chlorine are also effective against this virus. This virus being very resistant, survive under ordinary condition for weeks together.

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Morbidity rate approaching 100%. Mortality usually begins on 3-day post- infection and will peak and recede in a period of 5 – 7 days. Striking features of this disease are sudden and high mortality rate, spiking death curve and rapid flock recovery. Mortality usually ranges from 15 –70%.

Transmission

Mainly through the ingestion of contamination of feed and water. This virus is also isolated from mosquitoes, worms and other ectoparasites. Hence the role of vectors should be considered while planning control measures.

Diagnosis

RT-PCR is highly sensitive for detection of IBDV in early stages of infection, within 24 hours of infection in bursa of fabricius.

Conventional diagnostic methods of IBD include,

1. From the clinical symptoms – whitish diarrhoea ruffled feathers, dehydration, vent pecking, reluctant to move, morbidity of 80 – 90% and mortality 15-70%.
2. Post- mortem findings – severe muscular haemorrhages, especially on breast and thigh muscles, linear haemorrhages between pro-ventriculus and gizzard, oedematous and haemorrhagic bursa of Fabricius in early stages, which become shrunken as the disease advances. Sub clinical infection can be diagnosed on the basis of microscopic and histological bursal atrophy mainly in adult chicken.
3. Bursa - body weight ratio
4. Serological tests - AGID,QAGID, FAT, Latex Agglutination Test, ELISA
5. Virus isolation in tissue culture and embryonated eggs
6. Electron microscopic demonstration
7. RT-PCR which is highly sensitive for detection of IBDV in early stage of infection, within 24 hours of infection in bursa of Fabricius.
8. DNA probe

9. The immunorheophoresis (IR) technique has been developed for the detection of IBD antigen from bursa collected from field in 3-5 hours ,whereas AGID requires 14-24 hours.

Clinical Materials to be collected:

1. Bursa of fabricius and spleen
2. Bursal tissue in 1% buffered Formaline
3. Pooled serum samples at least from five birds

Treatment

No therapeutic or supportive treatment has been found to change the course of IBDV infection. It has been reported that the following homoeopathic medicines had given good results in reducing the loss due to IBD infection.

LACHESIS 200 – 10 ml/100 birds followed by a combination of

GALSEMIUM 30 – 5 ml and CHINA 30 – 5 ml/ 100 birds, after a gap of 12 hours

A single dose of medication is advised. Rarely a second dose is indicated. It has been reported that Ascorbic acid supplementation at 1000ppm in the ration providing beneficial effect on antibody response to IBD vaccination and body weight gain.

Control

The effective control of IBD is based on the bio security measures and the application of an effective vaccination programme.

Cleaning and disinfection of the contaminated areas is of prime importance..

The interval between stocks have to be increased.

1. All the dead birds, contaminated droppings, feed, litter and other organic waste materials should be disposed off by burning or by deep burial.
2. Floor, wall and all other surfaces should be sprayed with 2-4% Formaline or "Attack" 4% or "Virkon-S" 20 ml/ litre or "Disinfect-S" 20 ml/ litre or "Qualitrol" 4 ml/ litre or "Pursue" 8 ml/ litre
3. Footbath for visitors with any of the above disinfectant. Replace the solution in footbath every 72 hours.
4. Fumigation of shed with 20g $KMnO_4$ and 40 ml Formaline per 100 cu ft area.

Vaccination

Immuno prophylaxis is the best method of prevention of IBD in chicks. The usual problem before the farmer is when to vaccinate? And which vaccine should be used?

The most important factor is the presence of maternal antibodies. Chicks coming from various sources are having various levels of maternal antibody.

In India, mainly three types of vaccines are used:

1. Mild strain 'Lukert type'- low invasiveness and may be neutralized by maternal antibody
2. Intermediate type –e.g., 'Georgie' strain, 'IV 95' strain
3. Inactivated oil emulsion vaccine.

A typical vaccination programme in breeders would consist of two live vaccinations at an early age followed by inactivated vaccine before onset of egg production. In broilers two vaccination at high-risk area and single vaccination at low risk area is common advice given to farmers.

The live vaccines can be administered either through drinking water or by eye drop where as the inactivated oil emulsion vaccines are given either by intra muscular or subcutaneous route.

If the live vaccines are given through drinking water, the drinking water has to be withdrawn for at least 2 hours prior to administration of vaccine. Add 3-5 g of skim milk powder or 50 ml of milk to each litre of water before adding the vaccine. This helps the stabilization of the virus thus helping to persist in water for a prolonged time. Use 8 liters of water for every 1000 doses at 4-7 days of age, 10 liters of water at 17-18 days of age. Do not use chlorinated water.

Instill a drop of live vaccine into the eye of the chick for eye drop method.

Inactivated oil emulsion IBDV are used for replacement laying and breeding pullets at 6-10 weeks of age and at point of lay by sub- cutaneous or intramuscular route.

In an experiment to test the efficacy of a novel IBD virus vaccine in chicken with maternal antibody, IBDV vaccine was formulated by mixing IBDV strain 2512 with Bursal Disease Antibodies (BDA) to produce the IBDV-BDA complex vaccine. The study concluded that at one day of age this vaccine provided sufficient immunity to protect the chicks with different levels of maternal antibody against the challenge.