Lecture title: infectious bursal disease

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Infectious Bursal Disease (IBD, Gumboro Disease)

- **IBD:** is a highly contagious disease of young chickens caused by infectious bursal disease virus (IBDV).
- **Cause**
- The disease is caused by a birna virus of serotype 1. Virus strains can be divided in classical and variant strains. The virus is very stable and is difficult to eradicate from an infected farm.
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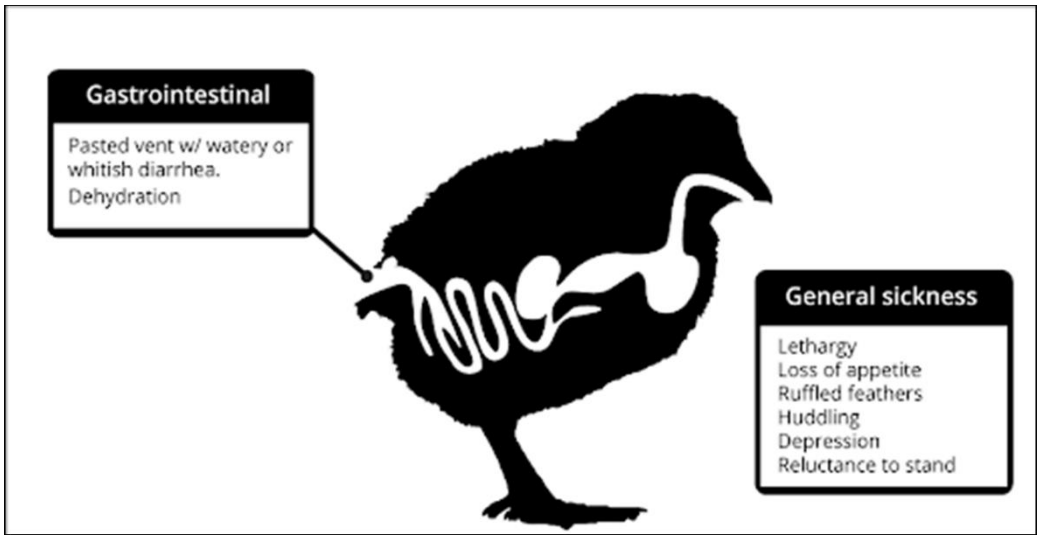
- **Transmission**
- IBD virus is very infectious and spreads easily from bird to bird by way of droppings. Infected clothing and equipment are means of transmission between farms.
- **Species affected**
- Chickens and turkeys appear to be natural hosts.
- **Incubation Period and Clinical Signs**

The incubation period is short, and clinical signs of the disease are seen within 2–3 days after exposure

- **The economic importance** of this disease is manifested in two ways. **First,** some virus strains may cause up to 60% mortality in chickens 3-weeks-of-age and older. **The second**, and more important, manifestation is a severe, prolonged immunosuppression of chickens when infected at an early age. Sequelae that have been associated with immunosuppression induced by the virus include , inclusion body hepatitis, *Escherichia coli* infections, and vaccination failures

- **Clinical signs**

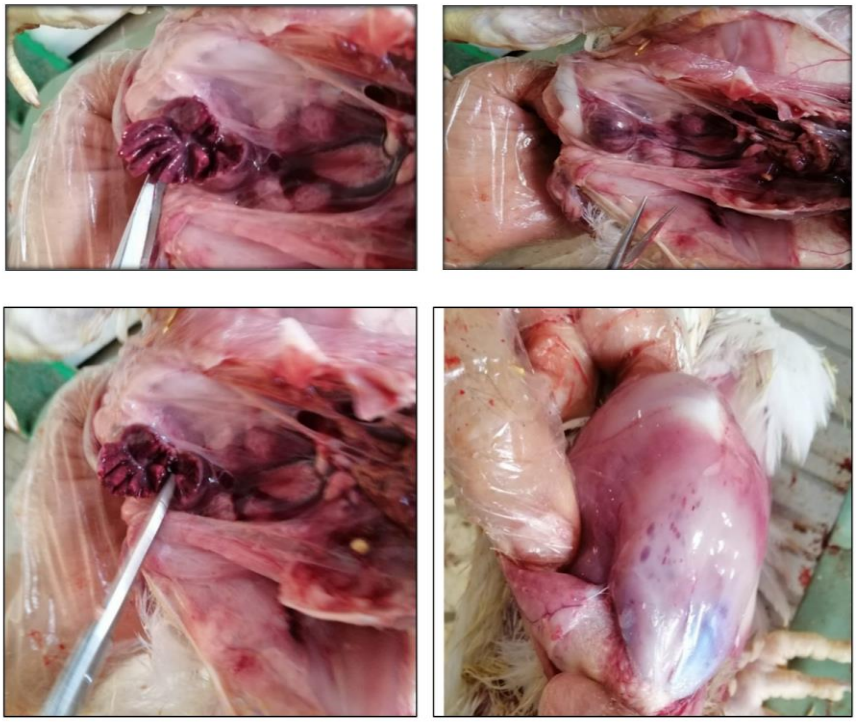
Clinical IBD occurs usually between 4 and 8 weeks of age. Affected birds are listless and depressed, pale and huddling. Mortality varies. Usually new cases of IBD have a mortality rate of about 5 to10% but can be as high as 60% depending on the pathogenicity of the strain involved. In subsequent infection on the same farm, mortality is lower and eventually, with successive attacks, there is no mortality noted.



Symptoms of subclinical IBD

- The subclinical form of Infectious Bursal Disease usually appears when birds are early infected, before 3 weeks of age and these symptoms include:
- atrophy of the bursa
- immunosuppression
- growth retardation
- poor FCR
- Chicks not respond properly to vaccination and are more susceptible to other infectious diseases.

- **Pathology**
- **Gross Lesions**
- Birds that succumb to the infection are dehydrated, with darkened discoloration of pectoral muscles. Frequently, hemorrhages are present in the thigh and pectoral muscles because the IBD virus interferes with the normal blood clotting mechanism. There is increased mucus in the intestine, and renal changes may be prominent in birds that die or are in advanced stages of the disease. Such lesions are most probably a consequence of severe dehydration. In birds killed and examined during the course of infection, the kidneys appear normal.



- **Effect of IBDV on lymphoid tissues**
- **bursal tissue**
- The cloacal bursa is the primary target organ of the virus. In a detailed study of bursal weights for 12 days PI, the sequence of changes should be understood when examining birds for diagnosis.
- On day 3 PI, the bursa begins to increase in size and weight because of edema and hyperemia .
- By day 4 PI, it usually is double its normal weight, and the size then begins to recede. By day 5 PI, the bursa returns to normal weight, but it continues to atrophy
- From day 8 PI forward, it is approximately one-third its original weight, or even less.
- **The spleen** may be slightly enlarged and often has small gray foci uniformly dispersed on the surface .
- Occasionally, **hemorrhages are observed in the mucosa at the juncture of the proventriculus and ventriculus (gizzard)** and may cause melena (digestive content stained black with digested blood).

- **Immunosuppression**

suppression of the bird's immune system, is a problem for the poultry industry worldwide. Often thought to be caused by infectious diseases such as Gumboro and mycotoxins, immunosuppression can actually be provoked by suboptimal environmental conditions, poor management practices, "overkill" vaccination and nutritional stress, alone, or in combination with infections.
Suppression of the antibody response to Newcastle disease virus was greatest in chicks infected at 1-day-of-age . There was moderate suppression when chicks were infected at 7 days, and negligible effects when infection was at 14 or 21 days , with decreased humoral antibody response to other vaccines as well

- **Diagnosis**
- In acute cases the bursa of Fabricius is enlarged and gelatinous, sometimes even bloody.
- Muscle haemorrhages and pale kidneys can be seen. Infection by variant strains is usually accompanied by a fast bursal atrophy (in 24-48 hours) without the typical signs of Gumboro disease.
- In chronic cases the bursa is smaller than normal (atrophy). The bursa destruction is apparent on histologic examination.
- The lack of white blood cells (lymphocytes) results in a reduction in the development of immunity and decreased resistance of the birds to other infections. Typical signs and lesions are diagnostic of IBD.
- Histopathological examination, serology and/or virus isolation are helpful tools. IBD can be confused with sulfonamide poisoning, aflatoxicosis

- **Treatment and control**
- No treatment is available for IBD. Vaccination of parent breeders and/or young chicks is the best means of control. The induction of a high maternal immunity in the progeny of vaccinated breeders, together with the vaccination of the offspring is the most effective approach to successful IBD control.

How can we control IBD?

CONTROL OF GUMBORO DISEASE

1. What type of vaccine to use?

Conventional Live Vaccines

- Mild
- Intermediate
- Intermediate Plus
- Hot

- Replicate at the bursa
- Cause bursal lesions and lymphoid depletion
- Cause post vaccine reactions

What is the challenge level in my area/farm?

Intermediate Plus & Hot strains used in outbreaks or high challenge

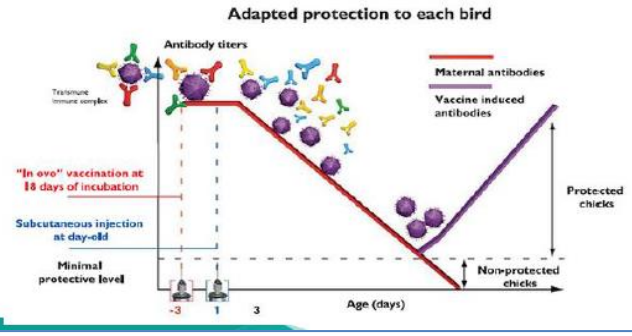
How can we control IBD?

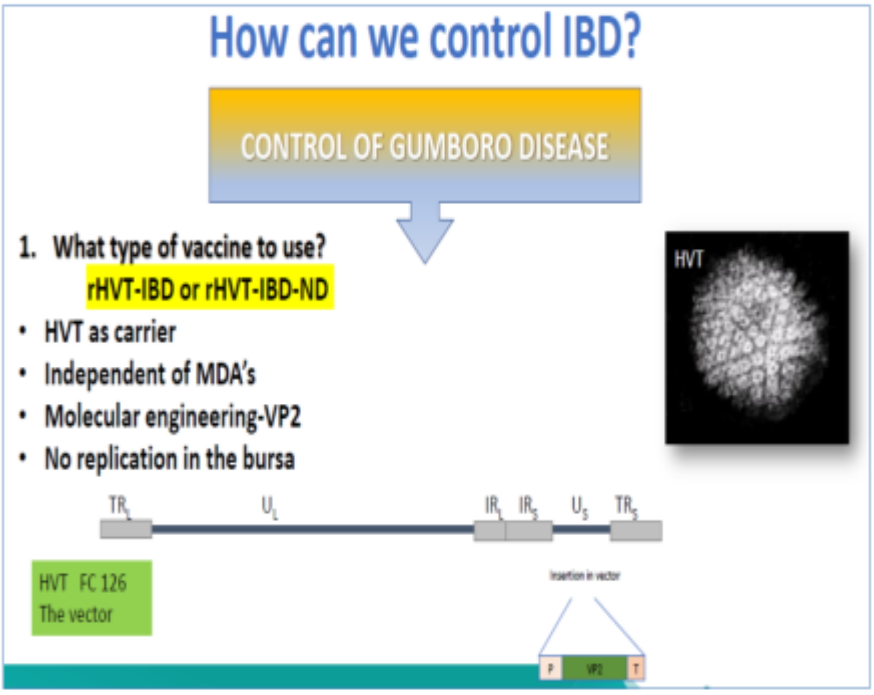
CONTROL OF GUMBORO DISEASE

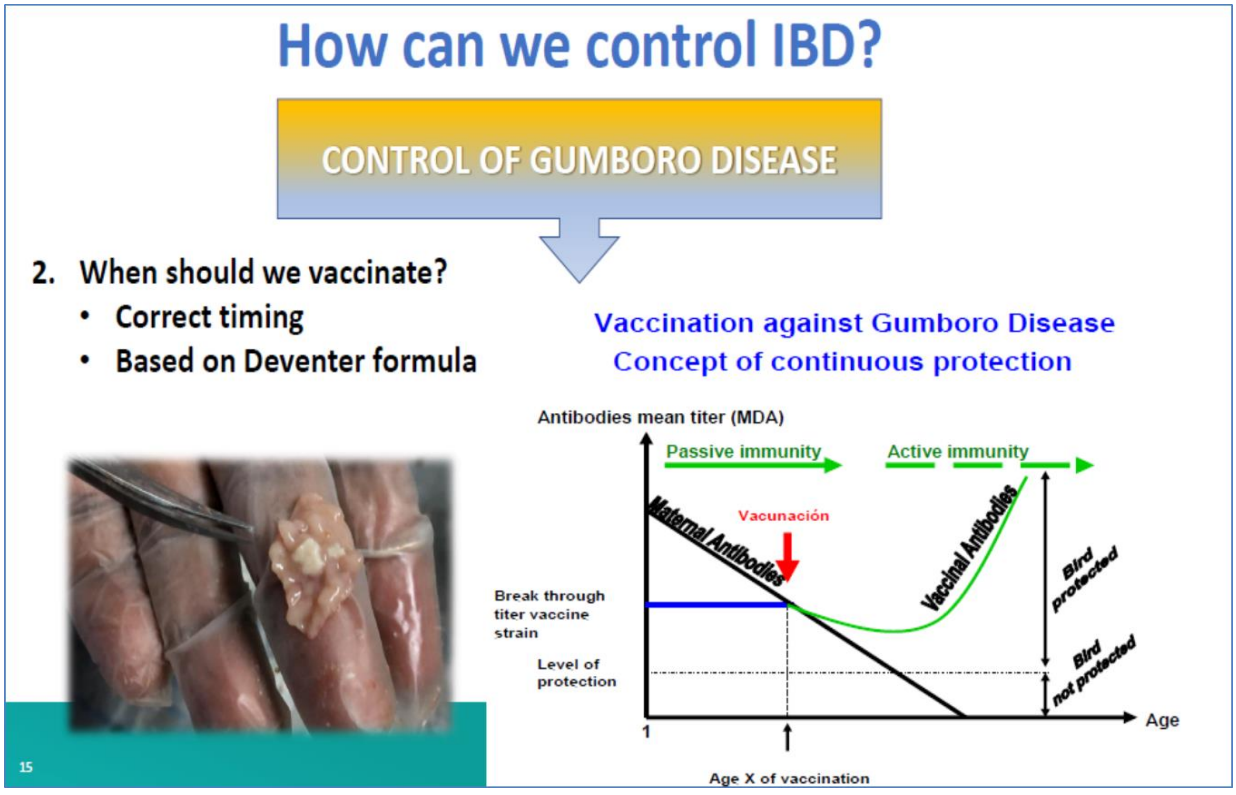
1. What type of vaccine to use?

Immunocomplex Vaccines

- Virus-Antibodies Complex
- Hot-strain based
- Induce severe bursal lesions




How can we control IBD?
CONTROL OF GUMBORO DISEASE
1. What type of vaccine to use?
rHVT-IBD or rHVT-IBD-ND
• HVT as carrier
• Independent of MDA's
• Molecular engineering-VP2
• No replication in the bursa
HVT
HVT FC 126
The vector


How can we control IBD?
CONTROL OF GUMBORO DISEASE
2. When should we vaccinate?
• Correct timing
• Based on Deventer formula
Vaccination against Gumboro Disease
Concept of continuous protection
Antibodies mean titer (MDA)
Passive immunity
Active immunity
Vacunación
Maternal Antibodies
Vaccinal Antibodies
Break through titer vaccine strain
Level of protection
Bird protected
Bird not protected
Age
1
Age X of vaccination
15

Vaccination program of choice

- Depends on many factors
  - Costs (vaccines, equipment)
  - Reliability of application
  - Field pressure: low, high, early, late, strains
  - Variability and level of MDA
  - Other vaccinations (suitability of combinations)

What is the outcome? What is the risk?

- Early exposure to IBDV and disease will cause permanent immunosuppression

Key points for successful IBD control

- Vaccination of parents → uniform high MDA's
- Biosecurity: cleaning & disinfection
- Select the vaccine that matches with field challenge
- Timing of vaccination based on MDA "Deventer formula" for live vaccines
- Optimize drinking water vaccination: Vac safe dechlor
- Prevent disease
- Safeguard Performance

→ Monitoring
Innovative products