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Infectious Bursal Disease (Gumboro Disease)

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Outline

- Introduction
- Etiology
- Source of infection
- Route of infection
- Pathogenesis
- Clinical signs
- Post mortem lesions
- Diagnosis
- Treatment
- Vaccination
- Control

Introduction

- **Synonym:** Gumboro disease, Infectious bursitis, Infectious avian nephrosis
- An acute contagious viral disease of young chickens, caused by infectious bursal disease virus (IBDV)
- Characterized by diarrhea, vent pecking, trembling, incoordination, inflammation followed by atrophy of the bursa of fabricius
- Affect young chick usually 3-6 weeks of age

Economic Importance

- Causes heavy mortality in chickens at 3 to 6 weeks of age
- Causes immunosuppression which leads to vaccination failure, *E.coli* infection, gangrenous dermatitis and inclusion body hepatitis

Etiology

- IBDV is a double stranded RNA virus
- Member of the Birnaviridae family is a single shelled non enveloped virion

Serotypes

- **Serotype 1: Pathogenic**
 - Classical virulent strains
 - US antigenic variant strains
 - Very virulent strains
- **Serotype 2: Non pathogenic**
- Many vaccine strains derived from classical virulent strains
- Very virulent IBDV is prevalent in Bangladesh since 1992

Source of Infection

- Infected houses remain infected for 122 days
- Water, feed and dropping from infected pen remain infected for 52 days
- Litter, mites and meals worms are infected up to 8 weeks
- Mechanical vector such as wild birds and humans also transmit the disease
- Litter used as manure spread disease in particular area

Route of Infection

- Oro-pharynx
- Oral route
- Via conjunctiva
- Respiratory tract

Pathogenesis

IBDV



Enter through oro-nasal route



Replication in oro-pharynx



Viremia



Target organ



Bursa Fabricius

Contd...

<3 weeks old chicks



Lack of sufficient complement in early life (up to 2 weeks old) of chicks



No clotting defects in 17 day-old-chicks



No Arthrus type of reaction develop



Reaction as subclinical infection

Contd...

3 to 6 weeks old chicks

Formation of immune complex



Produced localized immunologic injury



Arthrus type of reaction



Necrosis, hemorrhage and polymorphonuclear leukocytes infiltration

Increased clotting times



Such coagulopathies would contribute to the hemorrhagic lesions



Destruction of B cells



Immunosuppression with impaired ab response



Consequences



Sub-optimal responses to vaccine and lowered resistance to disease

Mortality Pattern

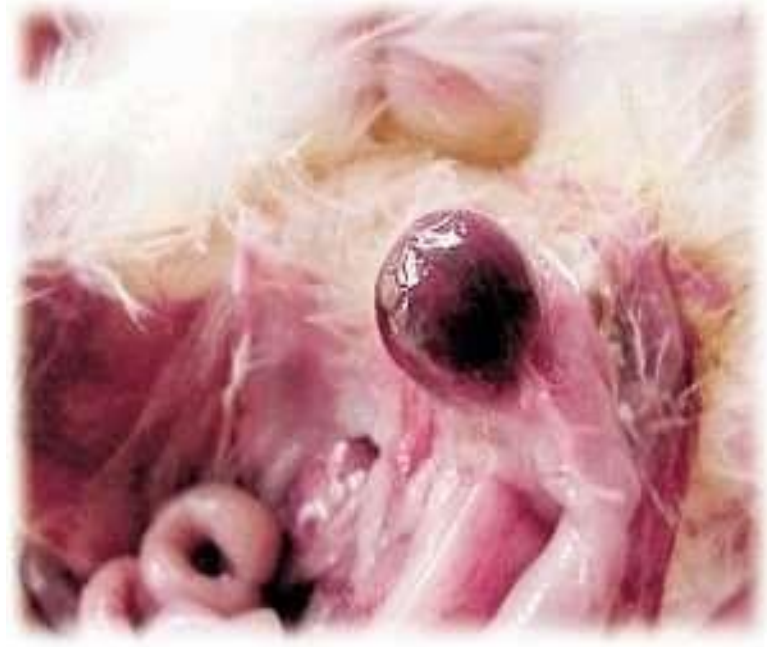
- In broiler, Mortality between 3-6 weeks
 - Generally 2-5% mortality, rarely goes beyond 10%
 - Peak on 2nd and 3rd day
 - No mortality on 5th day
- In layer, Mortality between 7-12 weeks
 - Generally 30-70% mortality, mortality runs from 7 to 14 days
 - Two peak mortality (at 3-4th days and 7-8th day)
- In unvaccinated flock 90% mortality
- In cage layer high mortality

Clinical Signs

- Sudden death
- Tremor or unsteadiness
- Depression and Anorexia
- Ruffled feathers
- Droopy appearance
- Vent pecking
- Diarrhea and dehydration
- Straining during defecation
- Sometimes voiding blood in feces

Post Mortem Lesions

- Bursa of Fabricius – enlarged and hemorrhagic



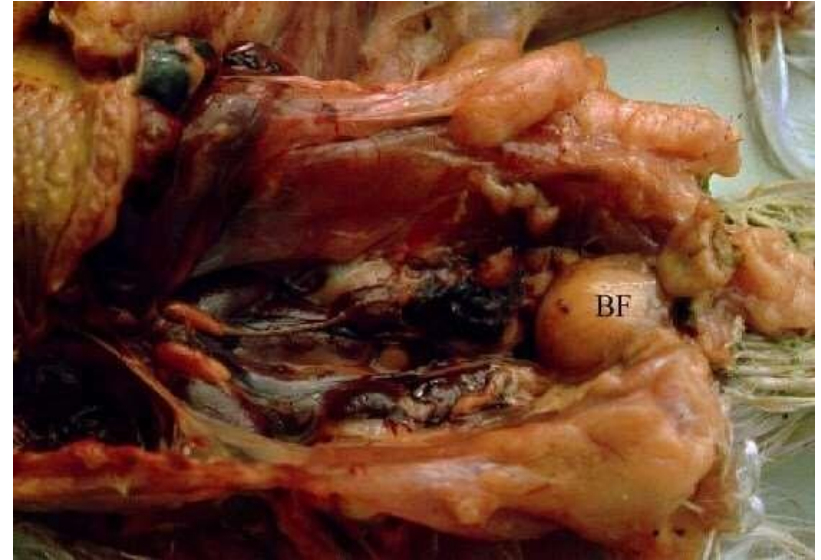
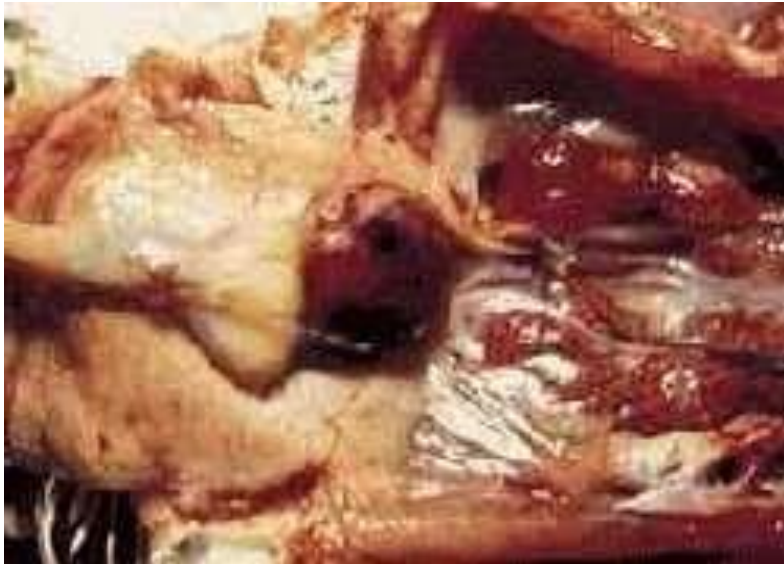
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- Hemorrhages in the skeletal muscle (especially in thighs)



Contd...

- Dehydration
- Swollen Kidneys with urates



Contd...

- Hemorrhage in the junction between the proventriculus and gizzard



Diagnosis

- History
- Clinical signs
- Post mortem findings
- Differential Diagnosis: Coccidiosis, ND, Vitamin A deficiency, Fatty liver, Kidney syndrome and hemorrhage syndrome in muscles
- Confirmatory diagnosis
 - Isolation and identification of the causal agent
 - ELISA

Treatment

- No specific treatment
- Supportive measures: increasing heat, ventilation and water consumption are beneficial
- Vitamin and electrolyte therapy
- Multivitamin supplement
- Antibiotic
- High levels of tetracyclines are contraindicated because they tie up Ca therapy producing rickets

Vaccination

Two types of IBD vaccines are used

- Live vaccines
 - Mild vaccine
 - Standard intermediate vaccine
 - Intermediate plus vaccine
 - Hot strain vaccine

- Killed vaccine

Contd...

Vaccination schedule

| Poultry | Age of vaccination | | | Method of administration |
|----------|----------------------|----------------------|---------------|--------------------------|
| | Primary | Booster | Revaccination | |
| Broilers | 7 th day | 21 st day | - | Eye drop or with water |
| Layers | 14 th day | 21 st day | 16-20 weeks | Eye drop or with water |

Contd...

- **For Breeder Hen:**

Traditionally at prelay stage and midlay stage IBD inactivated vaccine is given to get high antibody titer

- **Some Commercial Vaccines:**

- Nobilis Gumboro D78 (Intervet)
- Nobilis Gumboro 228E (Intervet)
- Cevac IBD L (Ceva limited)
- Gumbomed vet (Incepta)
- Izovac Gumboro 2 (Renata)

Resistance

- Birds with maternal antibody are resistant due to high antibody titer
- When ab titer drops birds become susceptible
- Very virulent strain can break the ab barrier at young age
- Other birds in which bursa is reduced in size and disappears are more resistant

Immunity

- **Active Immunity**

- Natural Infection
- Vaccination with either live or killed vaccines

- **Passive Immunity**

- Ab transmitted through yolk of the egg
- Passive immunity protects chicks against early infection
- Half life of maternal antibody is between 3 and 5 days, Thus, if the ab titer of the progeny is known, the time when chick will become susceptible can be said

Control

- Strict Biosecurity
- Thorough cleaning and disinfectant of the houses between the flocks and the practice “All in, All out“ management
- It delays infection and also provide time for vaccines to produce immunity
- Hygiene and sanitary precautions: Formaldehyde and Iodophores are found to be effective disinfectants
- Removal of vectors like mealworms and rats
- Proper vaccination of birds and flock

THANK YOU

