Infectious Bronchitis

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Etiology

- *Coronavirus*

Epidemiology

- Highly contagious respiratory disease infection
- Virus does not only affect the respiratory system, it affects the oviduct and the kidneys
- Growth retardation in broilers
- Decrease in egg yield
- Deterioration in internal and external quality of egg
- The severity of the infection increases when it is accompanied by other micrfoorganisms
- Death of kidney and respiratory failure
- This disease causes economic loss in both broilers and layer hen

Pathotypes of the Virus

- **Affecting the respiratory system**
  - Massachusetts
  - Connecticut

- **Affecting the kidneys**
  - Australian T
  - Gray
  - Holte

Subtypes of the Virus

- **Massachusetts**

Cause disease in the respiratory system
It has a high affinity to the hen reproductive system,
No effect on the kidneys,
Attenuated forms are used as vaccine

- **Beaudette**

No pathogenicity, but lethal on embryos
Used as antigen in virus neutralization (VN) test

- **Connecticut**

Causes light respiratory symptoms
There is no effect on the hen reproductive system
Not found in the kidneys

Subtypes of the Virus

- **Holland**

Pathogen in respiratory system
Affects hen reproductive system
Found in the kidneys

- **Arkansas**

Pathogen in respiratory system
Affects hen reproductive system
Not found in the kidneys
Attenues forms are used as vaccine

- **Australian T**

Causes severe nephritis
It also affects respiratory system and hen reproductive tract

Genotypic correlation of the IB Viruses

IBV Infection in Turkey

- Problem in both broiler and layer hens
- Immun response after vaccination
- Serotyping/genotyping studies are not enough
- Other respiratory tract infections
- Laboratory usage habits

IB Variants

- Serotype/Genotype=Variant
- Differences in the structure of spike proteins
- Serotyping
  - Virus neutralization test
  - Monoclonal antibodies
- Genotyping
  - RT-PCR
  - Sequence analysis
- Protectotype: Different variants with cross protection

Epidemiology

- In different countries: Massachusetts, 793B
- USA: Arkansas
- Australia: Nephropathic IB strains
- Netherlands: D274; D1466, D388
- France: 84084; 88121
- Italy: AZ20/97
- Belgium: B1648, D388
- Poland: D388
- Turkey: Different variants

IB Variant

- Antigenically different
- Poultry has been reported in every continent/region/country in the world
  - Europe
  - Asia
  - America (North-South)
  - Africa
  - Middle-East

IB Variant

Breeding- Layer hen

- Increased mortality
- Diarrhea
- Dark comb-beard
- Dyspnea
- Tremor in muscles
- Decrease in egg production

Broiler

- Respiratory findings
- Sneeze
- Increase in mortality
- Deterioration in carcass quality
- Increase in slaughterhouse rejection rate

Clinic- Necropsy Variant

General signs in flocks

- Stress and hypokinesia in animals
- Eyes are closed
- Swollen sinuses around the eyes
- Head shaking and runny nose
- Sitting and movement difficulties in animals

Necropsy

- Generally, death occurs in well-conditioned animals
- Pale carcass
- Inflammation in the trachea
- Mucus in the mouth
- Kidneys are swollen and pale
- Dark colored liver

Diagnosis

- Materiel
  - Trachea, kidney, caecal tonsil

- Laboratory examination
  - Tissue culture (TC) and EEC
  - RT-PCR
  - Serology

Protection and Control

- Laboratory diagnosis of IBV infections
- Typing of IB viruses in the region
- Vaccine selection
- Vaccination program
- Serological monitoring

Avian Metapneumovirus Infections

Etiology

- *Avian Pneumovirus* → *Avian Metapneumovirus*
- RNA
- Serotypes of the virus
  - Serotype A
  - Serotype B; most common serotype
  - Serotype C; USA-1996
  - Serotype D; duck isolate

AmPV Infections

- In Chickens
  - Swollen Head Syndrome (SHS)
- In Turkeys
  - Turkey Rhinotracheitis (TRT)

Clinical Signs

- AMPV infections are more severe in turkeys than chickens
- Swollen head disease is especially effective in broilers
- Chickens of all ages are susceptible to the disease
- Opistotonus, incoordination, and dizziness in animals
- Low morbidity and variable mortality
- Decrease in egg production
- Flock conditions (lack of ventilation, dust and ammonia) and secondary bacterial infections increase the severity of the infection

AmPV Infections

- SHS was first diagnosed in broiler breeders in 1993

- Akan et al. (2005) found 63.3% positivity in layers and broiler flocks with respiratory system problems

Diagnosis

- Clinic and necropsy
- Differential diagnosis
- Materiel
  - Sinus exudate, swab from upper respiratory tract
- **Laboratory diagnosis**
  - Virus isolation
  - RT-PCR
  - Serology (ELISA)
  - FAT

Protection

- Biosecurity
- Vaccination
  - live vaccines
  - Inactivated vaccines

Infectious Laryngotracheitis (ILT) Infection

ILT

- It is an important viral infection that causes serious respiratory system infection
- Common in the world
- Occurs in different breeding types
- Difficult to control

Etiology

- *Gallid herpesvirus type-1* (GaHV-1)
- DNA
- Live in carcass and exudate
- 20 days on litter

Host Distribution

- Chickens (natural host) >3 weeks
- There are reports in turkeys
- Subclinical in duck

- Müştak and Akan reported the first ILT infections in broiler breeders in Turkey (2018)

Transmission

- Direct contact with infected chickens
  - Aerosol
  - Eyelash
- Backyard chickens
- Indirect contamination
- Latent course

Incubation Period and Clinic

- 6-14 days
- Acute course
  - Serious form
  - Light form
- Latent course

Diagnosis

- Clinic and necropsy
- Materiel
- Laboratory diagnosis
  - Histopathology
  - Isolation and identification
  - Molecular diagnosis/typing
  - Serology

Protection and Control

- Biosecurity
- Vaccination
  - Live vaccines
  - Vector vaccines

Newcastle Disease

General Information

- It is on the list of OIE diseases
- Notifiable in our country
- An international problem

Etiology

- **Avian paramyxovirus**
  - **Avian paramyxovirus type 1**

  (APMV-1, Newcastle disease virus)
- **APMVs have 9 serotypes (APMV1-11)**
- APMV**-2, -3,** -6 and -7 cause infection in turkeys

  APMV-2/chicken/California/56

  APMV-3/turkey/Wisconsin/68

Etiology

5 Pathotypes

- Visserotropic velogenic ND viruses- **Dolye form**
- Neurotropic velogenic ND viruses- **Beach form**
- Mesogenic ND viruses- **Beaudette form**
- Lentogenic respiratory ND viruses- **Hitchner form**
- Asymptomatic enteric ND viruses- **Asymptomatic enteric form**

Etiology

- All ND viruses belong to a single serotype but are genetically different
- There are 18 different genotypes of virulent ND viruses circulating in the world
- Genotypes VII, XIII, XVII have been common in recent years

Epidemiology

- The disease has been detected in 236 poultry species
- The host spectrum is variable
  - from reptiles to humans
- It is highly contagious and can have a pandemic course
  - June 2009-December 2011, vNDV in 86 countries
  - Especially Middle East, Africa, Asia, Europe and America
- The disease was first described in 1926
- In the 1970s, on all continents and in most countries
- It was first reported in Turkey in 1944

Epidemiology

- **Significant ND outbreaks**
- 1926, Asia Europe, England, **genotypes II, III, IV**
- 1960-1973, Middle East-Multiple regions, **genotype V**, psittacins
- 1970-1984, -cont. North Africa, Middle East, many countries, **PPMV-1**
- 1990-ongoing South Asia, Middle East, Africa, Western Europe, South America (2008), **genotype VII**

Epidemiology

- **Movement of birds**
  - **Migratory birds**
  - **Free birds**
  - **Domestic poultry**
- **People and equipment movements**
- Movements of poultry products
- Feed and water
- Spread by aerosol
- Nonwinged carriers

Economic Importance

- **Backyard poultry**
  - **Direct losses**
  - **Socioeconomic effects**
- Potential contamination for commercial flocks
  - Production losses
  - Capacity usage losses
  - Producer losses
- National losses
  - Decrease in exports
  - Execution of effective monitoring/control programs

Diagnosis

- **Material:** The faeces, cloacal swabs, trachea, tracheal swabs
- **Virus isolation:** EEC, TC

Pathogenicity tests of isolated virus

- Mean death time (MDT), intracerebral pathogenicity index (ICPI), intravenous pathogenicity index (IVPI)
- **Molecular methods**
- **Virus direct diagnosis:** RT-PCR
- **Molecular epidemiology**

Protection and Control

- **Risk analysis/management**
  - Wetlands-free-fowl-domesticated poultry
  - Backyard poultry
  - Regional density / Bird density in the holding
  - Inadequate biosecurity/sanitation
- **Diagnosis**
- **Protection**
  - Biosecurity
  - Vaccination (for ND)

Protection and Control

Control

- **Active survey studies**
  - Free poultry
  - Backyard poultry
  - In commercial flocks
  - Dense poultry areas
- **To carry out studies for the diagnosis of the disease in suspicious cases**
- Provincial/District organizations
- Commercial business /manufacturer
- Poultry feeders

Protection and Control

Control

- **Backyard poultry**
  - Record and monitor
- **Control the movements of poultry**
- Increase the measures regarding backyard poultry and commercial flocks near the wetland
- Movements of human
- Free birds
- **Education and information activities**

Legislation

- Cordon /Quarantine
- Culling /destruction
- Control the movements of animals
- Cleaning/Disinfection
- Vaccination (for ND)

Result

- Fast/accurate diagnosis and sharing of the results
- Monitoring/epidemiological approach
- Effective biosecurity practices
- Training of the technical team
- Zoning/classification
  - International trade
  - Active control
- Increasing official authority-sector cooperation