Vertically Transmitted Diseases (POD 3457)

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Types of diseases transmission

• Horizontal
• Vertical
• Mechanical
• Venereal
Economic importance

• Persistent chronic infection.
• Life long carriers.
• Decreasing in hatchability.
• High mortalities in baby chicks.
• Difficult treatment.
• Costs of prevention, control and eradication programs.
• Public health significance.
Vertically Transmitted Diseases

Types

True
Diseases transmitted from infected or chronic carrier breeders to their offspring through infected ovaries or oviducts during embryogenesis

False
Diseases transmitted through contamination of the egg shell by the droppings of infected breeders. After cooling of laid eggs (negative pressure), increased porosity of egg shell and then motile organisms can penetrate the egg pores.
Vertically Transmitted Diseases

Infectious causes

Bacterial
1. Salmonellosis (S.gallinarum pullorum, Paratyphoid)
2. Mycolasmosis
3. Colibacillosis

Viral
1. Avian encephalomyelitis
2. Avian Leucosis complex
3. Adenovirus (Egg drop syndrome)
4. Reo virus
5. Chicken infectious anaemia
Mycoplasmosis

• The most common vertically transmitted disease.
• Mainly M. gallisepticum (MG) and M. synoviae (MS).
• The shedding rate varies from 5-30%.
• Transmitted horizontal (air borne) and vertical through infected ovaries in breeders.
MG (infectious sinusitis in turkeys and CRD in chickens)

• **In breeders and layers:**
  Cause mainly respiratory manifestations (upper and later on, lower).
  Drop in egg production.
  Decrease in fertility and hatchability.

• **In broilers:**
  Chronic Respiratory Disease (CRD) or complicated CRD (CCRD).
Sinusitis, Facial oedema, nasal discharge & severe conjunctivitis
MG (infectious sinusitis in turkeys and CRD in chickens)

- The lesions mainly in the respiratory tract varies from serous to serofibrinous and fibrinous pericarditis, perihepatitis, airsacculitis and peritonitis.
- Pneumonia.
- Oovoritis (severe inflammation of the ovaries and degeneration of the ovarian follicles).
Sero-fibrinous airsacculitis with foamy exudate
Fibrinous (Caseous) perihepatitis and pericarditis (CCRD)
MS (Infectious synovitis)

- Severe inflammation of synovial membrane and tendon sheath causing lameness and recumbancy.
- Mild respiratory signs and lesions.
- Mild drop in egg production.
- Sternal bursitis or breast blisters (turkeys).
Prevention and control

• Regular monitoring of the breeder flocks (every 3-4 weeks) using serological tests as serum plate agglutination (SPA) test, HI test and ELISA test.
• Serologically positive birds should be confirmed using PCR.
• Application of strict biosecurity measures.
• Vaccination (live and inactivated vaccines).
• Treatment by specific drugs (Macrolides or floroquoinolones).
• Egg treatment (inoculation, dipping, pressure vacuum, Heat forced incubators).
Salmonellosis

• Salmonella gallinarum pullorum (SGP) (non-motile salmonellae).
• Paratyphoid infection (Any type of salmonella species rather than SGP) motile types (zoonotic importance).
• Transmit vertically either true or false (especially paratyphoid).
Salmonellosis

• SGP causes acute and subacute disease in chicks characterized by high mortality in the 1st week of life with pasty vent, omphalitis and sometimes respiratory symptoms and artheritis, while in adult causes drop in egg production, reduced fertility and hatchability.
• In young's, lesions showed septicaemia, unabsorbed yolk sac, nodules in heart, lungs and liver, caecal core and nephrosis.
• In adults hens showed miss-shaped and discoloured ova that attached to ovaries with a long stalk, salpingitis and egg peritonitis. Males showed micro abscess in the testicles with atrophy.
Salmonellosis

• Paratyphoid infection induce different clinical pictures in different birds species.
• In pigeons (Nervous, arthritic, intestinal and eye forms).
• In ducks (nervous signs or keel disease, arthritis and diarrhea).
• Serological tests are of limited values due to presence of multiple serotypes.
• Control of rodents, insects, dogs, cats and other mechanical means of transmission.
• Good heat treatment of protein ration supplements (bone, meat or fish meal).
Omphalitis

Caecal core

Lung nodules
Bronzy liver

Multiple nodules on the heart

Severe nephrosis and distended ureters
Misshaped, discoulored ova and attached with ovary with long stalk

Microabscess in testicles
Prevention and control

• Continuous monitoring of breeders and layers in the field using rapid whole blood agglutination (Pullorum) test or tube agglutination test, ELSA, etc....
• Regular sampling and culturing techniques.
• Selection of free breeders for eggs.
• Chicks taken from Salmonellae free sources.
• Incubators, eggs and hatcheries sanitations.
• Strict biosecurity measures in the farm.
• Treatment of the infected flocks (sensitivity test).
• Vaccination (inactivated and living).
Colibacillosis

It is a part of the disease complex rather than a disease itself. (E.coli is either the primary or secondary pathogen).

• Transmitted vertically (True or false).

Forms:
1. Colisepticaemia
2. Air sac disease (CRD).
3. Panothalmitis.
5. Salpingitis.
6. Omphalitis.
7. Coligranuloma.
8. Swollen head syndrome.
Prevention and control

• Incubators, eggs and hatcheries sanitations.
• Strict biosecurity measures in the farm.
• Regular culturing and serotyping of the flocks.
• Treatment (antibiogram).
• Competitive exclusion compounds, acids,…
• Local inactivated vaccines.
Avian encephalomyelitis (AE)
Epidemic tremor

- Caused by picorna (entero) virus.
- Causes very high mortalities in hatched chicks from infected breeders.
- Induces drop in egg production 5-10% and hatchability (late embryonic deaths).
- Tremors, ataxia and leg paralysis in baby chicks prior to death.
- There is no post-mortem lesions in affected chicks.
- Diagnosed mainly through histopathology (pre-vascular cuffing and gliosis).
- Prevention through vaccination of breeders at 34 weeks old using 1143 strain or live vaccine 4 weeks before egg production (Drinking water or wing web).
Brain: Focal lymphoplasmacytic perivascular cuff
Chicken infectious anaemia (CIA)  
(Chicken anaemia virus, Blue wing disease  
Haemorrhagic syndrome  
Anaemia dermatitis syndrome)

• It is vertically transmitted disease in non-seroconverted flocks.
• Potent immuno-suppressive disease (Cell mediate immune response).
• Caused by circovirus.
• All ages are susceptible, but the disease susceptibility is rapidly decreased in immunogencally intact chicks during the first 1-3 weeks of age.
Signs and lesions

• Pale and aneaemic birds and mucous membranes.
• Paleness of the muscles with haemorrhages.
• Atrophy of immune organs (thymus, bursae and spleen).
• Pale and gelatinous bone marrow.
• Proventriculus haemorrhages.
• PCV (less than 27%).
• Watery blood.
• Increase susceptibility to injuries and bruising of skin, causing secondary infection by bacteria (Clostridia) (gangrenous dermatitis or blue wing disease).
Prevention and control

- Biosecurity measures.
- Vaccination (live at 8-12 weeks).
- Prevention of other concomitant viral diseases as IBD, MD, etc...
- Regular serological monitoring (NT or ELISA).
- Chicks with maternal derived antibodies could be protected up to 2-3 weeks.
Reo-virus infection
(Arthritis, Tenosynovitis)

1. Rupture of gastrocnemius tendon above the hock joint

   Rupture of:

   A) If unilateral, the affected leg can’t be extended and the bird can’ be bear weight on this leg (lameness)

   B) If bilateral, the bird become immobilized.

1. Inflammatory exudates in the hock joints and tendon sheath.

2. Erosion and necrosis of articular cartilage of the hock joint.

3. Haemorrhages in synovial membrane above the hock joint and tendons.

4. Femur head necrosis.
Mal digestion & Mal absorption syndrome
Stunting and runting syndrome
Helicopter disease (feathering)
Pale bird disease, Brittle bone disease, Femur head necrosis, Infectious proventriculitis

1. Uneven growth (Runting and stunting).
2. Poor pigmentation especially of the shank (pale bird disease).
3. Abnormal feathering and run in different directions (Helicopter feathering).
4. Skeletal abnormalities as weak bone (Femur head necrosis).
5. Undigested food in the droppings (Mal-absorption syndrome).
7. The pancreas is atrophied and fibrosed leading to shrinkage of the duodenum.
8. Proventriculitis.
9. The intestine is pale, ballooned, shows catarrhal enteritis, orange colour contents, undigested and poorly digested food especially at the rectum.
10. Atrophy of the bursa and thymus glands.
Prevention and control

1. Biosecurity measures.
2. Active immunization can be achieved by vaccination with viable attenuated (S1133)-derived reovirus S/C.
   • The inactivated vaccines are more efficacious if preceded by vaccination with live vaccine.
   • If a live vaccine is used, it should be administered prior to the onset of egg production to prevent transovarian transmission of the vaccine virus.
   • The advantage of this program of vaccination is immediate protection of 1-day-old progeny provided by maternal antibody and a limitation of the potential for vertical transmission.
Adeno virus groups

**Group 1:** AV isolates share a common group antigen from chicken, turkey, geese and other avian species.

A. Quail bronchitis or Chicken Embryo Lethal Orphan virus (CELO).

B. Inclusion body hepatitis (IBH).

**Group 2:** These viruses share a common group antigen distinct from group I.


**Group 3:** Viruses of this group partially share a common antigen with group I.

A. Egg drop syndrome (EDS).

B. Similar viruses from ducks.
Adeno virus

Vertical transmission is important in the spread of adenoviruses.

- AVs are transmitted through the embryonated egg and are often reactivated in cell cultures prepared from embryos and young chicks taken from infected flocks. AV infections can remain latent and undetected for at least one generation in an SPF flock.
- Viruses are excreted from week 3 onward.
- In broilers, peak excretion occurred between 4 and 6 weeks of age.
- In layer replacements, virus excretion was at a maximum level from 5-9 weeks following infection but was still at 70% of cases after 14 weeks and there is a second period around peak of egg production due to reactivation of the virus by stress associated with egg production or the increased levels of sex hormones. This would ensure maximum egg transmission to the next generation.
Inclusion body hepatitis

Quail bronchitis

Quail bronchitis & Marble spleen disease
Turkey haemorrhagic enteritis

Egg drop syndrome (oviduct)
Avian leucosis Complex

• Avian leucosis virus is a serious problem in broiler breeders.
• ALV-J is known to have evolved as recombinant virus.
• Testing and elimination of the virus—shredders in the primary breeding stocks is the permanent solution.
• The shredding virus of all strains in vaginal or rectal swabs are detected by the Elisa test.
• Progeny testing of the new crosses for the presence of the disease is essential before commercialization.
• Lot of screening at primary breeder level is being done to eradicate this problem.
• Field cases of ALV are getting rarer.
Assignments

- False reactors in SPAT of mycoplasma.
- Mycoplasma vaccines.
- Give an account about whole blood agglutination test.
- Incubator and hatchery sanitizations?
- Write on competitive exclusion for prevention of some vertically transmitted bacterial diseases.
- Egg susceptibility test for diagnosis of AE.
- Prevention of egg drop syndrome.
Thank You