GOOSE PARVOVIRUS INFECTION (GPV) (Derzsy’s disease, goose influenza)

Dr./ Wafaa Abd El-ghany
Assistant Professor of poultry dis., Fac. Vet. Med., Cairo Univ.
Definition

• It is a highly contagious viral disease affecting young geese and Muscovy ducks. Depending on the age of affected goslings, the disease may be present in acute, subacute, or chronic forms.

• The acute form of the disease can result in 100% mortality in goslings less than 10 days of age. Apart from geese and Muscovy ducks.
Economic importance

• Losses are due to high mortality in geese and Muscovy ducks.

• There is a high cost of vaccination and prevention.
Cause

• The causative agent is a parvovirus belonging to the family Parvoviridae.
• Un-enveloped and hexagonal single-stranded DNA, no hemagglutination activity, replicates in the nuclei of cells from the heart and bursae of infected goslings.
• GPV is very resistant to chemical and physical inactive-action.
• GPV has been isolated only in embryonated goose or Muscovy duck eggs, embryo mortality occurs 5-10 days post-inoculation with haemorrhages and ochre-colored livers or primary cell cultures prepared from the embryos.
Cause

• Isolated virus has been cultivated in an embryonic goose fibroblast cell line (CGBQ).
• Goose parvovirus is more closely related to the human Dependovirus genus.
• No antigenic relationship with chicken or mammalian parvovirus has been demonstrated.
• Parvovirus from both geese and Muscovy ducks were antigenically related.
• Significant differences between the genomes of Muscovy duck parvovirus and goose parvovirus are detected.
Susceptibility

• Geese, Muscovy ducks, and some hybrid breeds are the affected only species.
• All breeds of domestic geese are susceptible.
• Other breeds of domestic poultry and ducks appear refractory.
• The disease is strictly age dependant; thus, 100% mortality may occur in goslings under 1 week of age, with negligible losses occurring in 4-5 week old birds.
• Older geese do not show clinical signs but developed a latent infection and transmit virus in feces and eggs.
• They respond immunologically.
• Similar findings apply to the clinical disease in Muscovy ducks.
Transmission

- Infected birds excrete large amounts of virus in their feces, resulting in a rapid spread of infection by direct and indirect contact.
- The most serious outbreaks occur in susceptible goslings following vertical transmission of the virus.
- In older geese that become sub-clinically infected. Old infected birds may act as carriers of the disease and transmit the virus through their eggs to susceptible goslings in the hatchery.
Clinical signs

• **SIGNS:**
  - The clinical signs in susceptible goslings vary according to the age of the birds.
  - *In goslings under 1 week of age (Acute):*
  - the course of the disease may be very rapid.
  - Anorexia, prostration, and death occurring within 2-5 days.
  - Mortality can reaches 100% in goslings infected in the hatchers. Mortality in 2-3 week-old goslings, may be below 10%, although morbidity levels may be high.
  - Complicating factors such as poor management and secondary bacterial, fungal, or viral infections may influence the final mortality levels.
Clinical signs

- **In older birds or those with variable levels of maternally derived antibody (Sub-acute):**
  - The disease follows a more protracted course with the appearance of clinical signs.
  - Initially, affected birds exhibit anorexia, polydipsia, and weakness with a reluctance to move.
  - There is a nasal and ocular discharge in many birds with associated headshaking. The uropygial glands and eyelids are often red and swollen.
  - Profuse white diarrhea is evident in many birds.
  - Fibrinous pseudomembrane covering the tongue and oral cavity.
  - Goslings that survive the acute phase may develop a more prolonged disease.
Clinical signs

**Chronic:**
- Birds passed the acute form of the disease show signs of growth retardation.
- Loss of down (feathers) around the back and neck, and marked reddening of the exposed skin.
- Ascitic fluid may be accumulated in the abdomen, causing the goslings to stand in a “penguin-like” posture.

**Latent form:**
- Goslings more than 4 weeks of age rarely show clinical signs, but pass in latency.
- Geese of all ages respond immunologically to goose parvovirus infection without necessarily showing clinical signs.
PARVOVIRUS IN GOOSE DERZSY'S DIS.

SIGNS

LESION

VIRUS

SAMPLES
Post-mortem lesions

**Acute cases with a short clinical course.**
- The heart shows pale myocardium and rounded apex.
- The liver, spleen, kidneys and pancreas may be swollen and congested.

**Cases with the more prolonged clinical course (sub-acute and chronic):**
- Sero-fibrinous perihepatitis and pericarditis.
- Large volumes of straw-colored fluid in the abdominal cavity (Ascitis).
- Pulmonary edema.
- Liver dystrophy.
- Catarrhal enteritis.
- Hemorrhages can be seen in the thigh and pectoral muscles.
- Diphtheritic and ulcerative lesions may be observed in the mouth, pharynx and oesophagus.
Diagnosis

- Clinical signs and lesions.
- Isolation and Identification of Goose Parvovirus from a variety of suitable lesion and inoculation of 10-15 day-old embryonated goose or Muscovy duck eggs via the allantoic cavity or duck cell cultures.
- The virus can be detected by electron microscopic examination or Immunofluorescence, neutralization with specific goose parvovirus antiserum.
- Serologically, the presence or absence of parvovirus antibody in breeder geese will determine the susceptibility of their progeny and as a diagnostic tool in confirming recent outbreaks of the disease in goslings and Muscovy ducklings.
Diagnosis

- The most widely used method is the VN test in embryonated goose or Muscovy duck eggs or primary cell cultures. Titers of 1/16 or greater are considered positive for goose parvovirus antibodies.
- Agar gel diffusion test can be used with rabbit anti goose parvovirus serum to precipitate parvovirus in the allantoic fluid of infected goose embryos.
- ELISA has been developed to detect goose parvovirus antibodies in both geese and Muscovy ducks.
Differential diagnosis

- Disease with high mortality in geese and ducks as DVE and DHV.
- Pasteurella anatispestifer and Pasteurella multocida must be differentiated from this condition.
Immunity

- Adult breeding geese that have been naturally infected with parvovirus, either as goslings or adults, were developed IgM and then IgG-type immunoglobulin detected for up to 80 months after infection.
- The breeder transfer maternal antibody of the IgG type via the egg yolk to their progeny.
- This passively acquired antibody may persist at a relatively high level until about 2 weeks of age.
- The progeny of these geese were also found to be fully resistant to experimental challenge up to 4 weeks of age.
Prevention

• Good farm and hatchery hygiene should be carried out due to many outbreaks of goose parvovirus are directly attributed to transmission of the disease by congenitally infected goslings during hatching.

• Only eggs from known parvovirus-free flocks should be incubated together.

• All contact goslings or adults, should be serologically tested to identify which birds have been infected horizontally. Positive reactors should be removed from the flock as these birds may become carriers to the virus.
Vaccination

- Active immunization of adult breeding geese and Muscovy ducks with virulent virus to transferred antibodies to the progeny via the egg yolk.
- The attenuated vaccines have been developed by attenuation of the virus in goose or Muscovy duck embryo cell cultures, for use in breeding geese and goslings.
- Duck embryo-adapted goose parvovirus vaccines have also been shown to induce a good immune response in goslings and breeder geese.
- Inactivated vaccines have been used in flocks of breeding geese and Muscovy ducks, inducing high levels of immunity.
- Recombinant vaccines formulated in oil emulsion have been evaluated in goose and Muscovy duck laying flocks.
Treatment

• Hyper immune serum therapy was widely used when the disease subsequently appeared using serum produced in geese.
• However, passive immunization of geese and Muscovy ducks was found to be expensive and time consuming, particularly as two doses of serum (0.5-1ml per bird S/C or I/M) were often required to produce adequate immunity.
• Hyper immune serum could be used as prophylactic measures.
• Antibiotic is required to suppress secondary bacteria.
THANK YOU