

Velogenic Viscerotropic Newcastle Disease

Velogenic viscerotropic Newcastle disease (VVND) is also known as exotic Newcastle disease. It is sometimes referred to as Asiatic or Doyle's form of Newcastle disease.

Definition: VVND is the most virulent strain of the Newcastle disease virus and is probably the most serious disease of chickens throughout the world. This pathotype of Newcastle disease is characterized by the lesions it produces in the gastrointestinal tract. In susceptible chickens, morbidity rates approach 100% and mortality rates may exceed 95%.

Etiology: Caused by a virus of the Paramyxoviridae family, it is very resistant and it will remain viable at a pH of between 2 and 12, and for 3 hours at 56 degrees centigrade, or for 30 minutes at 60 degrees centigrade. Antigenically similar strains differ in pathogenicity and are classified as lentogenic, mesogenic, and velogenic on that basis.



Excessive fluids are commonly seen in the respiratory tract (VVND).



Normal appearing chicken with a pale comb (VVND).

Geographic Distribution:

Canada, Australia, Denmark, Finland, Iceland, New Zealand, Northern Ireland, Republic of Ireland, Norway, Sweden, and the United States. Commercial poultry have not been involved in the United States since 1974. However, new outbreaks continue to occur in the pet bird industry. These outbreaks are mainly due to illegally imported psittacine birds. A limited number of outbreaks have occurred in small "backyard" flocks, containing fighting game cocks, and have been caused by the illegal importation of this type of chicken.

Host: All birds, both domestic and wild, are susceptible to VVND. The mortality and morbidity rates vary drastically between species and with the strain of virus. Chickens are the most susceptible, ducks and geese are the least susceptible poultry. Mortality rates in psittacine birds have ranged from zero up to 75% prior to depopulation. These higher rates may be the result of additional stress factors. Most importantly, certain psittacine birds, especially Amazon parrots, have been demonstrated to shed VVND virus intermittently in excess of 1 year.



Conjunctivitis and edema of the eyelids (VVND).



Hemorrhage and erosions in the esophagus (VVND).



Hemorrhage in the mucosa of the trachea in a chicken (VVND).



Hemorrhage is commonly seen in the proventriculus and especially at the junction between the esophagus and proventriculus (VVND).



Areas of hemorrhage such as this may be

Hemorrhage in the lining of the proventriculus (VVND).

seen throughout the gastrointestinal tract, and may change to ulcerated areas and then to necrotic areas as the disease progresses (VVND).

Transmission: Within an infected flock, VVND is transmitted by direct contact, contaminated feeding and watering equipment, and by aerosols produced by coughing, gasping, and other disturbances of respiration. Dissemination between flocks over long distances have been due to movement of contaminated equipment and service personnel such as vaccination crews. Movement of carrier birds and those in an incubating stage account for most of the outbreaks in the pet bird industry.

Clinical Signs: There may be considerable variation in the severity of clinical signs, depending on species, age, vaccination, and natural resistance of the birds, as well as the virulence of the VVND strain. Most species demonstrate a period of depression, diarrhea, and loss of appetite. Clinical signs are more pronounced in susceptible chickens. Edema of the tissues around the eye, especially of the lower eyelid, are common. Straw colored exudate may flow from the mouth or nasal openings. Respiratory distress may vary from mild to severe. Clinical signs in turkeys and pet birds are usually mild. Torticollis, paralyzed wings and/or legs are commonly seen 10-20 days following onset of clinical signs.



Hemorrhage in the small intestine (VVND).

Gross Lesions: Hemorrhage may be seen throughout the G.I. tract. These hemorrhagic areas tend to ulcerate and then become areas of necrosis as the disease progresses. These areas are most commonly seen at the junction of the esophagus and proventriculus, Peyer's patches, and cecal tonsils. Edema is present in the subcutaneous tissues of the face and neck. The tracheal lesions are usually hemorrhagic without free blood in the lumen of the trachea. Postmortem examinations of the pet birds many times fail to exhibit any of these lesions or are not as pronounced as those seen in chickens.

Differential Diagnosis: The clinical signs and course of VVND closely resemble those of a number of other avian diseases including fowl plague, laryngo-tracheitis, the diphtheritic form of fowl pox in poultry, psittacosis, and Pacheco's disease in parrots. This makes laboratory confirmation of a presumptive field diagnosis mandatory.

Laboratory Confirmation: The surest method for confirmation of VVND is the isolation and identification of the causative virus. Specimens for attempting viral isolation should be selected from cases in the early or even the prodromal stages of the disease. The VVND viral strains are widely distributed in the avian body, and can be isolated from lung, trachea, spleen, terminal gut, and brain. Tissue triturates or media from cloacal and tracheal swabs are inoculated into 8-11 day embryonated chicken eggs, and after a variable period of

incubation, depending on the virulence of the strain, the virus will be found in the amnionic-allantoic fluids, which are then tested for avian erythrocyte agglutinating activity. Subsequently, it is determined if the hemagglutination reaction is inhibited by known ND antiserums. The Newcastle disease virus isolates are characterized by determining the time necessary to kill chicken embryos and the lesions produced in chickens inoculated with the virus.