Exotic Newcastle Disease Backgrounder

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Causative agent

Newcastle disease virus (NDV), also called avian paramyxovirus type 1, is a member of the paramyxoviridae family of viruses. These viruses are 150 to 300 nanometer (nm), enveloped, pleomorphic (have two or more shapes or forms), single-stranded, negative-sense RNA viruses. The paramyxoviridae family is subdivided into two subfamilies: paramyxovirinae and pneumovirinae. There are seven to eight closely related antigenic varieties of NDV. Other members of the paramyxovirinae subfamily include the causative agents of canine distemper, rinderpest, and canine parainfluenza type 2. Most viruses in this family are susceptible to heat, drying, lipid solvents, and most disinfectants.

Pathotypes of NDV have been recognized based on the virulence and pathogenicity of NDV infection in chickens. The pathotypes are, in order of decreasing virulence, velogenic, mesogenic, and lentogenic. Pathotypes are further subdivided into clinical syndromes: viscerotropic velogenic NDV, neurotropic velogenic NDV, mesogenic NDV, lentogenic NDV, and asymptomatic enteric NDV. Velogenic Newcastle disease is the most virulent form of the disease; the viscerotropic and neurotropic velogenic pathotypes of NDV are considered together as exotic Newcastle disease (END). Newcastle disease is attributed to the mesogenic and lentogenic pathotypes. Asymptomatic enteric NDV produces infection without clinical signs of disease. These pathotypes are not clearly separate, and overlapping of pathotypes can occur.

Natural distribution

Although the first outbreaks recognized as Newcas

Diagnosis

Exotic Newcastle disease produces clinical signs similar to those observed with avian influenza, fowl cholera, and other infectious diseases; therefore, a final diagnosis of END must be made based on virus isolation and identification. Virus isolation and virulence testing involves the inoculation of embryonating chicken eggs and testing the chorioallantoic fluid for hemagglutination activity; if positive, the hemagglutination-inhibition test is performed to confirm the presence of NDV.

A full diagnosis of Newcastle disease requires the assessment of virulence. Once the presence of NDV infection is confirmed, virulence can be assessed using the intracerebral pathogenicity index in one-day-old chicks, the mean death time in chicken embr

strains of NDV. Live viral vaccines, such as the Hitchner-B1 (L), La Sota (L), V4 (L), NDW (L), I2 (L), Roakin (M), Mukteswar (M), and Komarov (M) strains are administered in drinking water, as a coarse spray, with intranasal or intraocular inoculation, or wing-web intradermal injection. Killed virus vaccines are recommended for flocks with concurrent disease, such as Mycoplasmosis; these vaccines are associated with higher expense, and administration requires the handling of individual birds. Use of vaccines can make detection and/or eradication of NDV more difficult; the antibodies produced in reaction to the vaccine can interfere with serologic testing, and vaccination may reduce disease detection by increasing resistance to infection and reducing, but not eliminating, viral shedding.