Newcastle Disease

Newcastle is the most important disease in the poultry industry due to the enormous global economic impact. Newcastle disease (ND) virus varies widely in the type and severity of the disease it produces. With extremely virulent viruses, the disease may appear suddenly; with high mortality occurring in the absence of other clinical signs. In outbreaks of chickens due to the Viscerotrophic Velogenic Newcastle disease (VVND) pathotype, clinical signs often begin with listlessness, increased respiration, and weakness, ending with prostration and death. Green diarrhoea is frequently seen in birds that do not die early in infection, and prior to death, muscular tremors, torticollis, paralysis of legs and wings may be apparent. Mortality frequently reaches 100% of flocks of fully susceptible chickens. The Neurotropic Velogenic form of ND in chickens is marked by sudden onset of severe respiratory disease followed a day or two later by neurologic signs. Egg production falls dramatically. Morbidity may reach 100%. Mortality is generally considerably lower. Mesogenic strains of NDV usually cause respiratory disease. In adult birds, there may be a marked drop in egg production that may last for several weeks. Mortality in the birds is usually low, except in very young and susceptible birds. Lentogenic viruses do not usually cause disease in adults. In young, fully susceptible birds, serious respiratory disease problems can be seen, often resulting in mortality.

Epidemiology and Transmission

The almost universal use of ND vaccines in commercial poultry throughout the world makes assessment of the true geographic distribution of Newcastle Disease difficult. No doubt exists that virulent ND is either enzootic or a cause of regular epizootics in poultry throughout most of Africa, Asia, Central America, and parts of South America. In more developed areas, such as Western Europe, sporadic epizootics occur on a fairly regular basis despite the widespread use of vaccination. In reviewing the modes of transmission of NDV between birds, it can be concluded that infection may take place through either inhalation or ingestion and that spread from one bird to another depends on the availability of the virus in an infectious form. The incubation period of Newcastle Disease after natural exposure has been reported to vary from 2 to 15 days (average 5-6). Vertical transmission (i.e. passing of virus from parent to progeny via the embryo) remains controversial.

Prevention and Control

The objective is either to prevent susceptible birds from becoming infected or to reduce the number of susceptible birds by vaccination. ND vaccines protects birds from the more serious consequences of disease, but virus replication and shedding may still occur, albeit at a reduced level. It should be emphasized that there are no circumstances in which vaccination can be regarded as an alternative to good management practice, biosecurity or good hygiene in rearing domestic poultry.

a.) Live vaccines: Are divided in two groups, lentogenic and mesogenic. Mesogenic strains are suitable only for secondary vaccination of birds due to their greater virulence. The immune response increases as the pathogenicity of the live vaccine increases. In the case of mass application of live vaccines, drinking water and spray routes are very popular for ND vaccination around the world.

b.) Inactivated vaccines: Are usually produced from infective allantoic fluid treated with β−propiolactone or formalin to kill the virus and mixed with a carrier adjuvant. Inactivated vaccines are administered by injection, either intramuscularly or subcutaneously. The major advantages of inactivated vaccine are the very low level of adverse reaction (depends of the quality) in vaccinated birds, the ability to use them if complicating pathogens are present, and the extremely high levels of protective antibodies of long duration that can be achieved.