Assessment of an immune-complex infectious bursal disease vaccine in “low” maternally-immune commercial broiler chicks

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Introduction: Infectious bursal disease (IBD) is a major virus disease in chickens worldwide. It is due to infectious bursal disease virus (IBDV), a birnavirus. Only one serotype is pathogenic in chickens (serotype 1), however several antigenic types and pathotypes are circulating in various parts of the world (Eterradossi & Saif 2013). Prevention is mainly done by vaccination. A global trend of the poultry industry is to move towards hatchery vaccination for convenience reasons. Immune-complex IBD vaccine is addressing the needs for hatchery vaccination, consistent immunization, and progressive displacement of field IBD virus by the attenuated vacinal IBDV strain (Kelemen et al., 2000). Concerns have been raised about the performance of such vaccine type in chicks (or embryos) in “low” maternal immunity flocks at hatch. Field scale trials were implemented in a commercial operation in the Netherlands in three rounds of broilers. Indeed, countrywise routine breeder vaccination does not include any killed IBD vaccine, and the subsequent passive immunity is minimal.

Materials and Methods: The study was run for three consecutive production cycles; it focused on two similar broiler houses in each cycle. A total of nearly 200,000 Ross 308 commercial broilers were included in the study. All of them were vaccinated using Ceva® Transmune vaccine (Ceva Animal Health, France) by in ovo route in the hatchery (Egginject®, E-CAT, France). In each house and each cycle, ten birds were randomly sampled for bursa weight and Gumboro serology. Antibody titres were assessed using virus neutralization test, and using two commercial ELISA kits (Idexx, BioChek). Results are displayed by gathering all cycles and houses together on the same graph, since they were very similar to each other. For logistics reasons, no serology could be done prior to 10 days of age.

Results:

After vaccination, bursas showed reduced mean weight from 24 days of age onwards. This is consistent with histopathology and PCR results which detected the onset of bursa colonization by the vaccine virus from 18 days of age onwards (data not shown). Recent bursectomy trials confirmed the safety of these events towards immune functions (Palva et al., 2015).

Average IBD immunity at hatch was around 3000 by Elisa, which is rather low in Europe (data not shown). Serology monitoring using Elisa showed similar trends, regardless of the kit used: following a period of time where none of the two kits was able to detect any antibody response, a clear active immunity was recorded. On the contrary, virus neutralization test showed that serum samples remained high, and seropositive all study long: there was a continuous transition from passive (MDA) to active immunity without any gap.

Conclusion:

In field conditions, commercial broilers with “low” maternal immunity at hatch were successfully immunized against IBD. Bursa changes did not happen as early as previously thought. Antibody monitoring provided extensive information on the serology pattern by ELISA test, which significantly differs from the "gold standard", namely the virus neutralization test. However, the latter is less often used in field conditions because more cumbersome and expensive. The continuous detection of antibodies by VN warrants to be compared with histopathology and molecular techniques.

References:


Palva V. et al., 2015. Assessment of humoral immune response to live Newcastle disease (ND) vaccination in surgically bursectomized broiler chickens. Proc. XIXth World Veterinary Poultry Association Congress, September 7-11, Cape Town, South Africa.