SEROLOGICAL INVESTIGATIONS OF AVIAN ENCEPHALOMYELITIS IN LITHUANIA

PUTNU ENCEFALOMIELĪTA SEROLOĢISKIE PĒTĪJUMI LIETUVĀ

Aleksėjūnas Almontas, Aleksėjūnienė Ilona
Lietuvos veterinarijos akademijos veterinarijos institutas, Kaišiadorys, Lietuva
Veterinary Institute of Lithuanian Veterinary Academy, Kaisiadorys, Lithuania
aleksejuniene@yahoo.com

ABSTRACT

The analysis results of blood sera prove that most poultry farms have chosen the appropriate vaccines against AEV and optimal vaccination time. ELISA tests of blood sera show that 73.75% of one-day-old chicken had passive immunity, but some part of tested poultry (26.25%) had no immunity against AE. Antibodies were found in all blood sera samples after vaccination.

KEY WORDS: avian encephalomyelitis, serology, antibodies.

INTRODUCTION

Avian encephalomyelitis (AE) is a viral infection primarily affecting young birds, laying hens or breeder hens. The disease is characterized by a variety of neurological signs, including incoordination, ataxia and tremors of the head and neck (7). Older chickens are more resistant to disease, such that it is almost impossible to produce clinical disease by natural routes of infection after about 6 weeks of age (3). Infection of non-immune laying hens with AE virus may result in a transient drop in egg production, but more importantly, the virus will be egg transmitted resulting in congenital infection of the offspring, which develop classical encephalomyelitis. Control of AE is achieved by vaccination of flocks during the growing period and depending on the vaccine type, vaccines are administered either orally or by wing-web inoculation (2). But Smyth's J. A. et. al. investigations showed, that following AE vaccination by the oral route, in contrast to general belief, vaccine virus can spread to the brain and spinal cord, and produce lesions (5). It is important that poultry diagnosticians investigating disease outbreaks in birds, which have been AE-vaccinated are aware, that vaccination can result in mild CNS lesions (5).

An assessment of immune status, as well as serologic identification of AE, requires a measurement of antibody to AE in serum. Enzyme-linked immunosorbent assays have proven efficacious in the quantification of antibody levels to AE, and facilitate the monitoring of immune status in large flocks. ELISA have the combined advantages of being sensitive and specific, as well as being rapid, relatively cheap and amenable to large-scale screening for antibody in flocks and for assessing the effectiveness of vaccination programmes (6).

This paper describes the results of laboratory investigation of the effects of AE vaccination.

MATERIAL AND METHODS

The blood sera were collected from poultry farm. In total 1362 samples were tested. The serum samples were classified into these groups: one-day-old chicken, 15, 17, 19, 21, 25, 30, 32, 33, 34, 39, 41, 45, 54, 59, 61 and 63 week old chicken.

Diagnostic reagent kit manufactured by IDEXX firm was used in blood sera tests. FlockChek AE is IDEXX's enzyme immunoassay for the detection of the relative level of antibody to AE in chicken serum. Viral antigen is coated on 96-well plates. Upon incubation of the test sample in the coated well, antibody specific to AE forms a complex with the coated viral antigens. After washing away unbound material from the wells, a conjugate is added

which binds to any attached chicken antibody in the wells. Unbound conjugate is washed away and enzyme substrate is added. Subsequent colour development is directly related to the amount of antibody to AE present in the sample. The presence or absence of antibody to AE is determined by relating the A (650) value of the unknown to the positive control mean. The positive control is standardized and represents significant antibody levels to AE in chicken serum. The relative level of antibody in the unknown is determined by calculating the sample to positive [S/P] ratio. Serum samples with S/P ratios of less than or equal to 0,2 should be considered negative. S/P ratios greater than 0,2 (titer greater than 396) should be considered positive.

RESULTS

We analysed the results of blood sera serological investigation carried out during the three years of the experiment. The blood sera of layers and breeders chickens from one-day-old to 63-week-old were tested for AE. In total 1362 samples were tested

240 samples were tested of one-day-old breed broilers. The blood sera test results obtained are presented in Fig. 1.

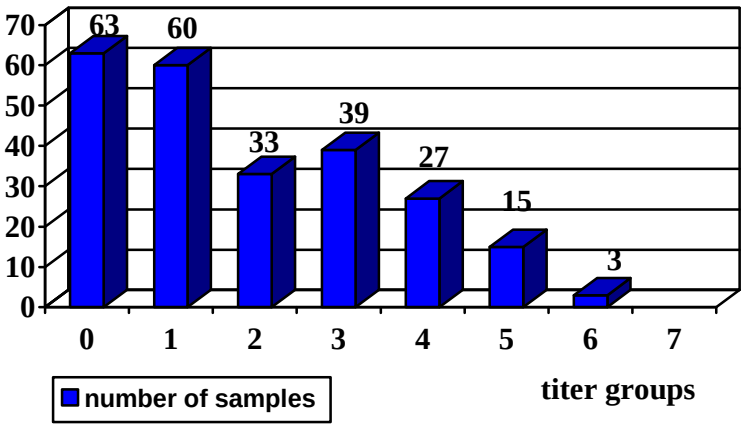

Figure 1 **Antibody to AE titers at the age of one day**

The test results of one-day-old chicken blood sera show that 26.25% of the tested samples contained no AE antibodies. The great part of titers was spread in the first (25%) and the third (16.25%) groups. The mean titers ranged from 1917 to 2212 in the separate poultry farms. The coefficient of variation (CV) ranged from 62.9% to 111.9%.

The birds were vaccinated against AE in the 11-13-week-old. The blood sera samples were taken from 15, 17, 19, 21, 25, 30, 32, 33, 34, 39, 41, 45, 54, 59, 61 and 63 week old chickens. The dynamics of antibody mean titers is presented in Fig. 2.

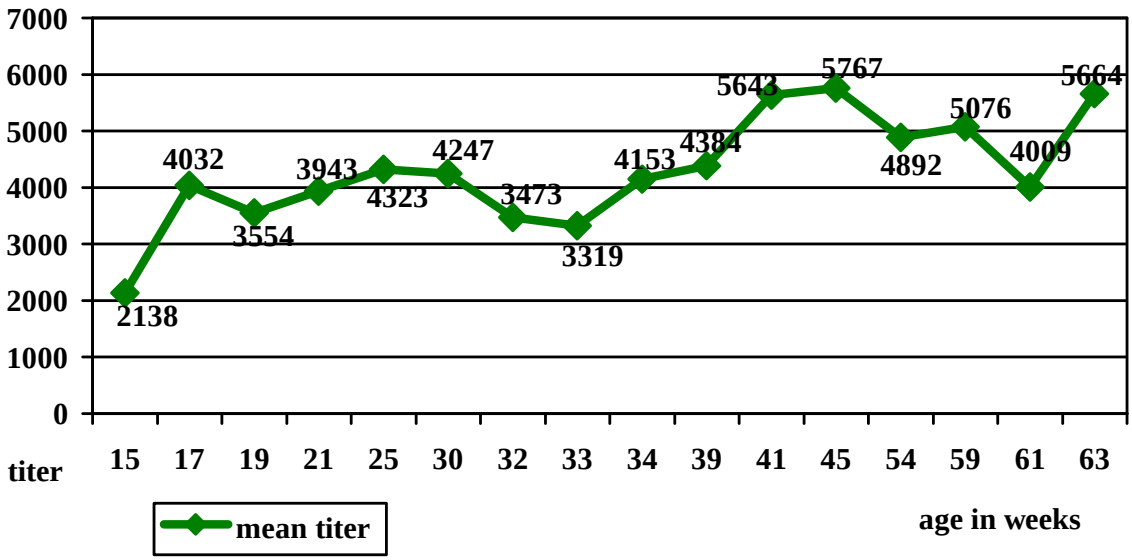

Figure 2 **Distribution of antibody mean titers**

Antibodies were found in all blood sera samples after vaccination. The mean titers ranged from 2138 to 5767.

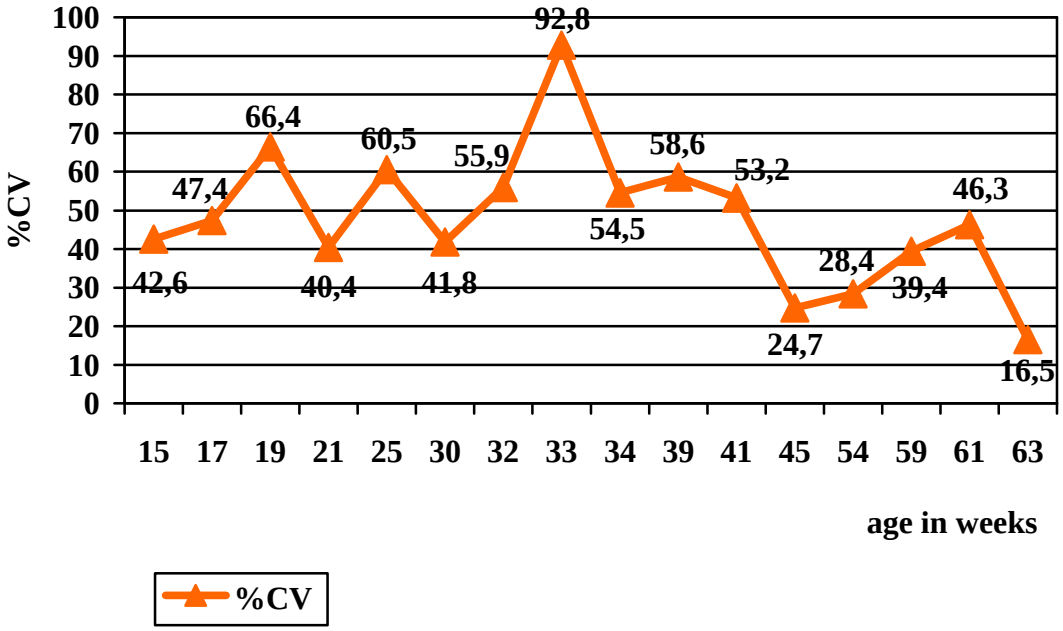

Figure 3 **Distribution of CV**

We determined the uniform distribution of the titers. CV was from 16,5% to 92,8% (Fig. 3).

DISCUSSION

Monitoring and recording antibody titers in representative samples as a function of time best assess the immune status of flock. The resulting flock profiles an assessment of the distribution of antibody titers and an analysis of changes in titer over time (10).

Vaccination of flocks with live vaccines is usually carried out at 11 to 13 weeks and the flock monitored for immunity to AEV by an antibody ELISA after 2 to 4 weeks. If antibody levels are unsatisfactory, there is usually sufficient time for revaccination before the time of lay (1, 4, 6).

The one-day-old broiler blood sera test results analysis shows that just 73.75% of the tested chicken had passive immunity. The maternal antibodies passed on by the vaccinated breeder hen provide protection for about 4 weeks and interfere with the vaccination against encephalomyelitis for about 8 weeks (2).

At the 11-13th week the birds were vaccinated and a marked antibody increase was observed (Fig. 2). The CV indicates that acquired immunity is of a different level. According to the FlockChek recommendations (1993) only a smaller than 40% CV proves that the vaccination against AEV is effective and the immunity is even (8).

At present it is recognized that vaccination is the most reliable way of AE prevention. It is essential that the vaccination be most effective and useful, therefore vaccination programs (vaccination frequency, choice of vaccines and virus strains, methods) based on experimental data should be created to quarantee adequate immunal protection inline with the local requirements and conditions (9).

CONCLUSION

1. The results of this study indicate that 73.75% of the tested one-day-old chicken had passive immunity.
2. The analysis results of blood sera prove that most poultry farms have chosen the appropriate vaccines against AEV and optimal vaccination time.

REFERENCES

1. Borne P.-M., Comte S. Vaccines and vaccination in poultry production. Ceva sante animale, 2004. 137 p.
2. Calnek B. W., Luganbuhl R. E., Helmboldt C. F. Avian encephalomyelitis. In: Calnek, B. W., Barnes H. J., Beard C. W., Reid W. M., Yoder H. W. Diseases of poultry, 10th edn. Ames, Iowa State University Press. 1997. P. 571-582.
3. Jordan F. T. W., Gooderham K. R., McFerran J. B. Diseases associated with the Picornaviridae. In: Jordan F. T. W. (Ed.) Poultry Diseases, 3rd edn. 1990. P. 167-171.
4. Shafren D. R., Tannock G. A., Groves P. J. Antibody responses to avian encephalomyelitis virus vaccines when administered by different routes. Australian veterinary journal. 1992. Vol. 69. P. 272-275.
5. Smyth J. A., McNeilly F., Reilly G. A. C., McKillop E. R., Cassidy J. P. Avian encephalomyelitis following oral vaccination. Avian Pathology. 1994. Vol. 23. P. 435-445.
6. Tannock G. A., Shafren D. R. Avian encephalomyelitis: a review. Avian Pathology. 1994. Vol. 23. P. 603-620.
7. Whiteman C. E. And Bickford A. A. Avian disease manual, 3th edn. American Associating of Avian Pathologist. P. 14-17.
8. FlockChek Poultry Production Guide. Version 2.20. 1997. P.16.
9. Pieškus J., Šiaurys A. Paukščių imunitetas. Vilnius: Kalendorius, 2000. p. 139.
10. Ирза В. Н., Лобанов В. А., Борисов А. В. и др. Диагностика инфекционного энцефаломиелита птиц. Ветеринария, 2002. №10. С. 19-23.