

## SEROLOGICAL INVESTIGATION ON SWOLLEN HEAD SYNDROME IN INDONESIA

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### SUMMARY

Clinical signs indicated that Swollen Head Syndrome (SHS) was suspected to be present in Indonesia. Serological investigation was carried out by collecting a number of 242 serum samples from Tangerang, Bogor, Cianjur, Ciawi, Cicurug and Magelang, tested using serum neutralization (SN) test. The results of SN test indicated that SHS has been identified in these investigation areas. Based on the fact that these areas are the center for parent stock breeders it could be suspected that the disease might have been spread to several areas of chicken farms in this country.

It would be wise if a control program be formulated since this time, to ensure that everything is well prepared in case SHS situation develops into unfavorable condition.

### INTRODUCTION

The first report on Swollen Head Syndrome (SHS) in broiler was from South Africa, started from 1971 which was then increased in 1975 (Morley and Thomson,

1983). The first symptom was a nasal sneeze. Within one day this progressed to a reddening of the conjunctivae with swelling of the head, starting around the eyes, progressing over the head and descending to the intermandibular

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tissue and wattles. The disease was later reported in broiler, broiler breeders and layers from many countries in Western Europe including United Kingdom (Valle *et al.*, 1986).

In 1985 a respiratory disease of turkey was reported from United Kingdom and named Rhinotracheitis (O' Brien, 1985). The virus was then isolated, as the causative agent which has the same morphology and biological characteristics as Pneumovirus (Weyth *et al.*, 1986). It was later shown that the virus was of the genus Pneumovirus (Collins and Gough, 1988).

At about the same time that turkey rhinotracheitis occurred a disease appeared in broiler breeder chickens (1985). Using the ELISA test it was found that serum collected from broiler breeder chickens recovering from SHS showing a rise in antibody to turkey rhinotracheitis virus (Chettle and Wyeth, 1988, Wyeth *et al.*, 1987).

In Indonesia the incidence of a disease clinically looks like SHS oftenly told by veterinary practitioners in the areas around Bogor, Tangerang, Bekasi, Jakarta and Magelang. The purpose of this study was to identify wheather or not SHS is found here by testing a number of serum samples collected from several areas of poultry farms using serum neutralization test (SN).

## MATERIAL AND METHODS

**Serum samples :** 24 serum samples were collected from a number of chicken farms in the areas of Bogor, Cianjur, Cicurug, Ciawi, Tangerang, Jakarta and Magelang.

**Reference serum :** Positive and negative reference sera were from Rhone Merieux, Lyon, France.

**SHS antigen for Serum Neutralization :** The antigen for SN test was also from Rhone Merieux, Lyon France, titrated in VERO Cells.

### Serum Neutralization Test (SN) :

Serum samples were first heated at 56°C for 30 minutes for de complementation. SN tests were conducted using Vero cell culture in 96-well microplates.

**Serum dilution in MEM medium:** Place 10 µl serum in the first well of each row, using the plate widthwise. Fill 50 µl medium in all the wells, except in the first well which receives 90 µl medium (hence, a 1/10 th serum dilution). Then dilute two-fold by transferring 50 µl of each dilution in the next well (12 dilutions).

### Preparation of viral suspension :

Prepare a viral suspension containing  $10^2$  CCID<sub>50</sub>/25 ul in MEM medium without calf serum, distribute 25 ul of this suspension in all wells.

**Neutralization :** Plates are incubated at 37°C for 30 minutes.  
**Cell addition :** add 25 ul VERO cell suspension in MEM medium containing 1 – 3% calf serum in each well. The suspension is adjusted to 720.000 cells/ml, i.e. 18.000 cells/well. Plates are covered with coverslide.

**Judgement :** reading was carried out 9 days after incubation at 37°C. Neutralization was assessed by the total absence of cytopathic effect (CPE) in the well.

**Refence sera :** positive and negative sera were used in the same way as the serum samples.

## RESULTS

Before presenting the results of

the SN tests, the parameters used in reading the results should be mentioned first.

The results of the tests were judged based on the following criteria :

- a. reference negative serum producing CPE generalized to all
- b. reference positive serum producing no CPE in several first wells. The titer was obtained from the last dilution which has not shown any CPE. The titer of the positive serum was  $10^{2.5}$

A serum sample being regarded positive if the antibody titer was at least 1/20 above (Rhone-Merieux, Lyon, France).

### Results of Serum Neutralization Test

The origin of sample serums	Number of samples	Number of positive	% positive
Tangerang	57	33	64.9
Bogor	54	13	24
Magelang	20	0	0
Cicurug	20	0	0
Cianjur	21	2	9.5
Ciawi	70	65	92.5

## DISCUSSION

First it should be mentioned that serum samples were collected from farms that were suspected of being clinically positive to SHS, including those originated from Magelang. The results of SN test indicated that most serum samples originated from Tangerang and Ciawi having serum antibody titers  $> 20$ , more over many of them having titers up to 2560. This condition probably was due to the fact that in the two areas the density of chicken population is high, the environmental condition of the farms are not promising, particularly in Tangerang area, which will enhance the spreading and the incidence of SHS (Pattison *et al.*, 1989).

Serum samples taken from Magelang area originating from a farm showing clinical signs typical for SHS. The results of SN tests, however, were not as high as expected. The highest titers were only 80. Perhaps this low positive titers indicated the acute phase of the infection.

On the other hand, one most important thing of the result of this investigation indicated that SHS has been identified and found in Indonesia, particularly in the areas where investigation was conducted, i.e. Tangerang, Bogor, Cianjur, Cicurug, Ciawi and Magelang. However, based on the fact that central areas of breeding farms supplying chickens for almost all

areas of this country, it is very likely that the disease has been disseminated in several or greater part of chicken farm areas of Indonesia.

SHS spread very rapidly, and in broiler the cases are found between 4 – 6 weeks of age, but mostly between 5 – 6 weeks of age. SHS cases and its spread have been accelerated by poor environmental condition, for example high density population in chicken house, dusty air, high humidity which help increase ammonia concentration, which in turn enhance the incidence of facial cellulitis and airsacculitis. The mortality in broiler is between 1 – 20% depend on environmental condition (Morley and Thomson, 1983).

In broiler breeder SHS can be found at any age, but usually at onset of lay (Steenhuisen, 1989) or around peak of lay (30 weeks) but could be as late as 52 weeks of age (Pattison *et al.*, 1989). The affected broiler breeder sat with their head rested on their back (opisthotonus). The morbidity vary from 1 – 90%, a drop in egg production of 5 – 40% may be found, and sometimes also a drop in hatchability. The clinical signs was between 5 – 10 days, but recently more chronic cases are found, while mortality usually ranging between 1 – 20% (Steenhuisen, 1989, Pattison *et al.*, 1989).

The first clinical sign was nasal sneeze, within one day followed by reddening of conjunctivae with



swelling of lacrimal glands. These were followed 12 – 24 hours later by subcutaneous oedema of the head, starting around the eyes, progressing over the head and descending to the intermandibular tissue and wattles (Steenhuisen, 1989).

From all references mentioned above it could be concluded clearly that SHS is an infectious disease which is very potential for producing an economic loss in poultry farms, either in broiler breeder or broiler farms. Based on these informations it would be wise if we start to plan a control program since this time, so that in case SHS develop into unfavorable situation, both in spreading and in intensity, we will have been well prepared to face the problem.

### CONCLUSION

1. SHS has been identified in Indonesia, particularly in Tangerang, Bogor, Cicurug, Cianjur and Magelang. Broiler, broiler breeder and layers are susceptible to the disease.
2. Based on the fact that these areas are the center for both grand parents and parent stock farms for almost whole farm areas of this country, it is very possible that the disease might have been spread to several farm areas in Indonesia.
3. SHS is an infectious disease, spread horizontally and rapidly, morbidity ranging from 1 – 90%, mortality between 1 – 20%, drop in egg production between 5 – 40%, and the hatchability is sometimes affected.
4. SHS has high potential in producing an economic loss to poultry farms, so it would be very wise if a control program be formulated from now.

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for by subcutaneous oedema of the head, starting around the eyes, progressing over the head and descending to the intermandibular tissue and wattle (Steenhuis 1989).

From all references mentioned above it could be concluded that TRT is an infectious disease which is very potential for poultry farms either in broiler production or broiler farms based on these information it would be wise if we start to plan a control program since this time so far in case TRT develop into a serious situation both in spreading and in intensity we will have been well prepared to face the problem.

**CONCLUSION**

TRT has been identified in Indonesia, particularly in Tanggulangin, Bogor, Cikarang, Karawang and Cikarang broiler production belt and layer and broiler farms to the disease.

Based on the fact that these areas are the center for both grand parents and parent stock farms in almost whole large areas of this country it is very possible that the disease might have been spread to several farm areas in Indonesia.

It is followed by one within 2 weeks by