

Outbreak of infectious bursal disease associated with acute septicaemic colibacillosis in adult prelayer hens

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Key words

Chicken - Avian infectious bursitis - Bacteriosis - Septicaemia - *Escherichia coli* - Lesion - Vaccination - Epidemics - Nigeria.

Summary

An outbreak of infectious bursal disease (IBD) occurred concurrently with acute septicaemic colibacillosis in 15 week old prelayer hens. The septicaemia was preceded by a subclinical IBD. Mortality in the outbreak began with lesions of septicaemia and *Escherichia coli* was isolated from the heart blood of the birds. After antibiotic treatment of the bacteraemia, mortality continued, spiked, declined and then ceased. IBD was confirmed by bursal lesions characterized by severe lymphocytolysis and cystic degeneration of the lymphoid follicles. Out of 253 birds, 42 (16.60 %) died within eight days. The circumstances of the outbreak suggested that lack of IBD booster vaccination favoured the establishment of subclinical IBD, which suppressed immunity to predispose the birds to colisepticaemia.

■ INTRODUCTION

Infectious bursal disease (IBD) is an acute contagious viral disease of chickens occurring in all parts of Nigeria (1, 7). The disease has been reported in chickens aged 9 days to 20 weeks (8, 12, 14, 15, 16) but it is most common between the ages of 3 and 7 weeks (1, 2). The disease was reported to suppress the immune response of the birds and increase their susceptibility to natural coccidiosis (9, 13), experimental salmonellosis and colibacillosis (18) and some viral diseases (11). Recently, an outbreak of IBD occurred concurrently with acute septicaemic colibacillosis in adult prelayer hens. The circumstances of the outbreak were investigated and presented in this report with a critical assessment of the control measures.

■ MATERIALS AND METHODS

Case history

The birds were obtained at a day old from ECWA, Jos and housed at the University of Maiduguri commercial farm. They were reared under standard conditions and transferred to cages as growers. They were vaccinated against IBD and Newcastle disease (with NDV Lasota) at the ages of 2 and 4 weeks respectively without boosters.

An isolated mortality of a bird due to typical IBD lesions was diagnosed by necropsy at the age of 12 weeks. Mortality resumed

again at the age of 15 weeks and typical lesions of septicaemia and IBD were observed. Treatment of the septicaemia was successfully carried out with Neoceryl® (Animal Care Konsult, Lagos) containing erythromycin, oxytetracycline, streptomycin, furaltadone and multivitamins.

Necropsy

The dead birds were opened and examined for lesions. The heart, liver and lungs were collected and examined for bacterial culture. The bursa of Fabricius (BF) and lungs were preserved in 10 % buffered formalin.

Histopathology

The BF and lungs were washed, processed, embedded, cut at 5 microns and sections were stained with haematoxylin and eosin stains (6).

Bacteriology

The bacteriological samples were inoculated in blood and MacConkey agar and incubated at 37°C for 24 h. The growth was examined and after Gram stain the pure colony of Gram negative bacilli was subcultured on eosin methylene blue agar (5).

■ RESULTS

Clinical signs

Most of the birds died suddenly without obvious clinical signs. However, a few birds in the later period of the outbreak presented matted vents indicating some diarrhoea.

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Mortality

The mortality pattern during the outbreak is presented in table I. Out of 253 birds at the beginning of the outbreak, 42 (16.60 %) had died by the 8th day. The peak mortality of 10 birds (3.95 %) was on the 6th day, but was preceded by an earlier modal mortality of 8 birds (3.16 %) on the 3rd day. It was not possible to assess the morbidity associated with the mortality.

TABLE I

Pattern of mortality in 15 week old prelayer hens affected by infectious bursal disease and colibacillosis

Day of mortality	Number of deaths	Mortality %	Days of treatment*
1	4	1.58	
2	1	0.40	1
3	8	3.16	2
4	5	1.97	3
5	6	2.37	
6	10	3.95	
7	7	2.77	
8	1	0.40	
9	0	0.00	
Total	42	16.6	

* Treatment with Neoceryl® (Animal Care Konsult, Lagos) containing erythromycin, thiocyanate, oxytetracycline HCL, streptomycin sulphate, neomycin sulphate, furaltadone HCl and multivitamins

Gross lesions

The bird that died at the age of 12 weeks in the pre-outbreak period presented an enlarged haemorrhagic BF and haemorrhages on the thigh muscles suggesting IBD. At the beginning of the outbreak at 15 weeks of age, the lesions observed on the first day of mortality were basically related to acute septicaemia. The lesions were multiple ecchymotic haemorrhages on the coronary and abdominal fat, congestion and focal consolidation of the lungs and fibrin deposits on the pleura.

The BF was only slightly enlarged. From the 2nd day of mortality, the BF became greatly enlarged measuring 1.5-2.2 cm in diameter and the ecchymotic haemorrhages were extended to the thigh and breast muscles. The mucosa of the BF was wet and had fine petechial haemorrhages. By the 4th day of mortality, lesions of catarrhal enteritis had emerged with a hyperaemic intestinal mucous membrane, covered with excess mucus which, when removed, revealed some areas of mucosal erosions.

Histopathological lesions

Bursa of Fabricius: there was severe lymphocytolysis, which started at the centre of the lymphoid follicles, spreading

centrifugally and, in some follicles, only a peripheral rim of lymphocytes was remaining. The follicles were infiltrated by heterophils. A few follicles contained small to large cysts at the centre (figure 1) from the 2nd day of mortality. The cysts contained necrotic debris, heterophils and oedema fluid. There was interfollicular oedema.

Lung: there was marked infiltration of heterophils and fluid into the lumina of the alveoli, interalveolar septa and bronchioles. The epithelial cells of the bronchioles and alveoli were desquamated. Bronchiolar epithelial hyperplasia was observed. There was a moderate fibrin deposit in the interalveolar septa.

Bacterial culture

The lung, liver and heart blood cultures yielded pure *Escherichia coli*. The growth on eosin methylene blue agar had greenish metallic sheen with purple black centres. Culture of the heart blood after antibiotic treatment did not yield any bacterial growth.

DISCUSSION

Acute septicaemic colibacillosis was confirmed by the isolation of *E. coli* from the heart blood of the birds. A diagnosis of IBD was established by the gross and histopathological lesions in the BF.

The colisepticaemia was successfully controlled by antibiotic therapy, but mortality continued due to a probable upsurge of frank clinical IBD suggested by diarrhoea, muscular haemorrhages and bursal lesions. An arrested mortality caused by IBD was reported to relapse a day after deworming (8).

Stress factors associated with intercurrent infections and medication may be important in eliciting clinical IBD in birds with a subclinical form of the disease.

Nigerian poultry breeder farms were reported to vaccinate their birds with live IBD vaccines at the age of 2 weeks only or at 2 weeks followed by a booster at 5 weeks (3). The chicks from some of the breeders were reported to have negative prevaccination IBD antibodies at age 5-22 days and the earliest seroconversion after vaccination occurred 25 days post-vaccination (3). Although the birds were vaccinated against IBD at 2 weeks, they might possibly have been infected with IBD during any period of IBD



Figure 1: cystic degeneration of the lymphoid follicles of the bursa of Fabricius in adult hens affected by IBD and colibacillosis.

seronegativity early in life with the establishment of a subclinical infection which, when associated with immunosuppression, would preclude age-related build-up of immunity against bacterial infections like colibacillosis (19).

Immunization failures against IBD were reported in birds vaccinated at 2 weeks of age with onset of outbreaks of IBD at 5-6 weeks, when IBD antibodies were negative in the sera of the birds (1). An outbreak of IBD in 20 week old birds was attributed to failure to administer the booster vaccine at 5 weeks (8) in order to improve antibody levels and immunity (7). The birds involved in the present outbreak had not received the booster vaccine. Therefore, a subclinical IBD infection might have occurred with the decline of antibody levels earlier developed after vaccination at 2 weeks of age (4).

An intact BF has been shown to be important for resistance to *E. coli* infections at 12 weeks of age (17, 18). The extensive destruction of lymphocytes in the BF (figure 1) was an indication of a possible fall in the immunity of the birds elicited by a persistent subclinical IBD infection. Acute septicaemia and airsacculitis without pneumonia were associated with colibacillosis in chickens (10), but the fibrinopurulent bronchopneumonia, in the present case, seemed to reflect a greater virulence and intensity of infection.

■ CONCLUSION

The outbreak reported in this paper is an indication of the apparent risk of IBD and bacterial infections in poultry farms without adequate IBD immunization.

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Résumé

Igbokwe I.O., Salako M.A., Rabo J.S., Hassan S.U. Foyer de bursite infectieuse liée à une colibacillose septicémique aiguë chez des poulettes adultes

Un foyer de bursite infectieuse (IBD) est apparu en même temps qu'une colibacillose septicémique aiguë chez des poulettes âgées de 15 semaines. La septicémie a été précédée par une IBD subclinique. Dans ce foyer, la mortalité a commencé par des cas de septicémie et *Escherichia coli* a été isolé du sang du cœur des oiseaux. Après traitement antibiotique, les mortalités se sont poursuivies en augmentant, puis, après un pic, ont décliné et enfin ont cessé. L'IBD a été confirmée par des lésions des bourses caractérisées par une lymphocytose importante et une dégénération cystique des follicules lymphoïdes. Sur les 253 volailles, 42 (16,60 p. 100) sont mortes dans une période de huit jours. Les éléments liés à ce foyer laissent à penser que l'absence de vaccination de rappel contre IBD a favorisé l'établissement d'IBD subclinique, diminuant fortement l'immunité et prédisposant les volailles à la septicémie colibacillaire.

Mots-clés : Poulet - Maladie de Gumboro - Bactériose - Septicémie - *Escherichia coli* - Lésion - Vaccination - Epidémie - Nigeria.

Resumen

Igbokwe I.O., Salako M.A., Rabo J.S., Hassan S.U. Brote de enfermedad infecciosa de la bursa asociada con colibacilosis septicémica aguda en gallinas pre ponedoras adultas

Un brote de enfermedad infecciosa de la bursa (IBD) se observó concomitantemente con una colibacilosis septicémica aguda, en gallinas pre ponedoras de 15 semanas. La septicemia fue precedida por una IBD sub clínica. La mortalidad del brote comenzó con lesiones de septicemia, aislándose *Escherichia coli* en sangre del corazón de las aves. Después del tratamiento antibiótico de la bacteremia, la mortalidad continuó, alcanzó un pico, disminuyó y luego cesó. La IBD se confirmó por lesiones de la bursa, caracterizadas por linfocitólisis severa y degeneración quística de los folículos linfoides. De las 253 aves, 42 (16,60 p. 100) murieron en ocho días. Las circunstancias del brote sugieren una ausencia de vacunación de soporte contra IBD, favoreciendo el cuadro de IBD sub clínica, el cual suprime la inmunidad, predisponiendo las aves a la colisepticemia.

Palabras clave : Pollo - Enfermedad de Gumboro - Bacteriosis - Septicemia - *Escherichia coli* - Lesión - Vacunación - Epidemia - Nigeria.