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Case Report

YOLK SAC INFECTION IN A BROILER FLOCK: A CASE REPORT

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SUMMARY

A case of yolk sac infection is reported among 500 broiler chicks bought for National Root Crop Research Institute, Umudike, Poultry Project. From the day of receipt the birds were depressed, dull with distended abdomen. The next day and subsequent days the birds started dying, reached its peak on the 12th day with 8 deaths. Result of post mortem done on the dead chicks revealed a septicaemic carcass with the subcutaneous and yolk sac blood vessels enlarged and dilated. The striking feature was an inflamed unabsorbed yolk sac with the yolk abnormal in colour and consistency. Post mortem findings seen in chicks that survived into second, third and forth weeks were inspissated yolk sac which contained deeply pigmented caseous material. Bacteriological isolations revealed the presence of *Escherichia coli*. The outbreak was presumed to be as a result of *Escherichia coli* contaminating the hatching eggs and further penetrate the shell to infect the yolk. The source of infection was found to be from the hatchery contaminated with *Escherichia coli* where infection spread from chick to chick.

KEY WORDS: Yolk Sac Infection, Broiler Flocks, Septicaemic Carcass.

INTRODUCTION

Yolk sac infection is a bacterial infection of yolk resulting in chicken mortality during the first week of life. It occurs in all commercial flocks but its incidence has declined through good hygiene and husbandry practices. The most susceptible period is prior to hatchery and within 48 hours of hatching (Sainsbury, 1984). Variety of bacteria maybe isolated from infected yolk sac but *Escherichia coli* and staphylococci are the most common isolates (Bains, 1979). Transmission occurs when the eggs are laid and the shell is contaminated with various types of bacteria normally present in the intestine and oviduct, further contamination takes place in dirty nest boxes (Wray and Woodward, 1994). Bacteria penetrate the shell and infect the yolk. It is also considered that certain types of bacterial are essential for the initial breakdown of the yolk before the secondary infection establishes itself (Wray and Woodward. 1994)

In this diseased chicks or poults present swollen and distended abdomen. This is

due to unabsorbed yolk which under normal condition is usually absorbed completely within 3 days in chicks and up to 10 days in poults post-hatched (Coults, 1987). The umbilical region is still open with some discharge; hence the discharge is also called omphalitis (inflammation of umbilical cord). The presence of soft and friable viscera together with moist abdominal skin led to the condition being called 'mushy chicks disease' (Randall, 1998). The condition may lead to death but the survivors develop stunted growth with increased susceptibility to other infections (Gross, 1994). Other infectious agents may enter the body through an open umbilical cord (Gross, 1994).

This was the first report of such condition since the inception of poultry project in this institute. The high rate of mortality, stunted growth and failure of the bird to respond well to antibiotic therapy interested the scientist to report this case.

CASE REPORT

Five hundred (500) Anak breed broiler chicks were bought for the National Root Crop Institute (N.R.C.R.I.) Umudike Poultry Project for commercial purpose. The chicks arrived on Thursday morning of 18th October, 2001. Before their arrival the brooding house was washed fumigated and left unstocked for two weeks. Wood shavings were provided. The birds were started with standard prepared feed compounded by N.R.C.R.I feed Umudike, and drinking water was mixed with vita-stress (multivitamin) and given *ad libitum*. They were vaccinated against new castle disease at day old and three weeks old, and against infectious bursal disease at two weeks old.

On their second day of arrival, the chicks appeared depressed with distended abdomen and huddled together. They started dying from the second day with peak mortality of eight (8) on the 12th day (Table I). Although the mortality dropped from the 14th day, death persisted till the seventh week of life. The birds were anorexic, some of them had their beaks sunk into the feed. They appeared dull, weak and drowsy. The multivitamin drug given through water was not able to increase their appetite. The mortality rate rose to 15% at the 7th week of age irrespective of oxytetracycline antibiotic therapies. Some of the surviving older birds showed symptoms associated with synovitis, arthritis together with saddled legs.

TABLE I: Relationship between age and mortality

Age (days)	Mortality (number)	cumulative mortality	mortality rate (%)	cumulative mortality rate (%)
2	4	4	0.8	0.8
4	3	7	0.6	1.4
6	2	9	0.4	1.8
8	4	13	0.8	2.6
10	4	17	0.8	3.4
12	8	25	1.6	5.0
14	5	30	1.0	6.0
16	2	32	0.4	6.4

Samples were collected aseptically from the unabsorbed yolk sac, and cultured into MacConkey agar. The colonies appeared rose pink on account of lactose fermentation. When one of the colonies was gram stained, there appeared gram-

negative rod-shaped bacilli when viewed under the microscope. Biochemical testing was done which include Indole, methyl red, voges-proskauer and citrate (IMViC) tests. The result showed indol positive, methyl red positive, voges-proskauer negative and citrate negative indicating the isolate to be *E. coli.*

Post-mortem examination revealed distended abdomen and a septicaemic carcass (Fig. 1). The lungs were congested and the liver and kidneys dark and swollen. There was peritonitis with haemorrages in the serosal surfaces of the intestines. Post-mortem examination of birds that survived into the second and third week of life revealed inspissated yolk sac. The infected yolk sac remnants contained deeply pigmented caseous materials (Fig. 2). Histopathological examination revealed acute inflammation of yolk sac membrane. The diagnosis based on bacteriologic isolation and biochemical tests revealed a case of pathogenic *E. coli* infection of yolk sac.

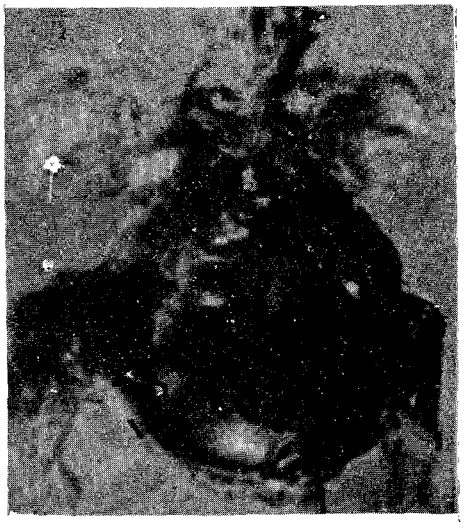

Fig. 1: Distended abdomen of infected chick

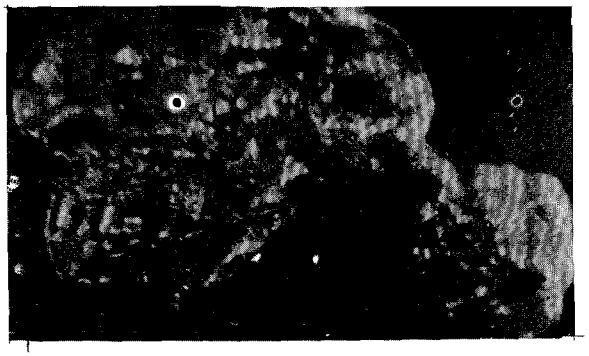

Fig. 2: Inspissated yolk sac containing caseous materials (arrow head)

DISCUSSION

Yolk sac infection is probably the commonest cause of mortality in chicks during the first week after hatching. *E. coli* is the usual causative agent for this infection (Randall, 1998). The chicks mortality from the second day could have been as a result of infection contracted from the hatchery since every precaution against disease outbreak was taken before the chicks arrived. The high mortality recorded from 2nd to 12th day of the chicks life could be as a result of *E. coli* contaminating the hatching eggs through faecal contamination of the shell. The bacteria may have multiplied in the intestine of these newly hatched chicks and could have resulted in wide spread infection from chick to chick in the hatchery and brooder house (Sojka and Carnaghan, 1961.

The unhealed navel and unabsorbed yolk sac may have resulted to the distended

abdomen and foul smelling septicaemic carcass observed. It also led to secondary contamination that possibly made it difficult for the chicks to respond to antibiotic therapy thereby causing the disease to persist till the 7th week of life. *E. coli* affects synovial fluid and joints (Jordan *et al*, 1999). This may be associated with the synovitis, arthritis and saddled legs seen in the older birds.

The changes seen in the visceral organs were as a result of the systemic involvement of the disease. The stunted growth observed in recovered chicks resulted to a grave economic loss from the venture.

CONTROL

There is need for microbial monitoring on hatching eggs and chicks. Besides mechanical control of the hatching system, the need for an effective hygiene and sanitation programme is of equal or even more important in views of the increase chances of hatchery borne-disease due to one or other micro-organisms. Frequent collection of eggs from the nest help in reducing bacterial contamination of shell because nest material carries numerous microorganisms. Fumigation of eggs at the breeding farm or in the hatchery is believed to reduce surface contamination, including *E. coli*. Hatching equipment, which provides an ideal site for bacterial multiplication, should be disinfected and sanitized (Qureshi, 1993). Control is best achieved by providing the best possible breeding conditions and ensuring that only healthy chicks from well managed breeding flocks and hatcheries are purchased (Jordan *et al*, 1999)

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