Asian Journal of Poultry Science

ISSN 1819-3609

Academic Journals Inc.

www.academicjournals.com

Asian Journal of Poultry Science 5 (3): 130-134, 2011
ISSN 1819-3609 / DOI: 10.3923/ajpsaj.2011.130.134
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A Case Report: Jejunal Intussusceptions Associated with Necrotic Enteritis in a Flock of Pullets in Nigeria

[1]G.O. Olasemi and [2]A.O. Olatunji-Akioye

[1]Chi Ltd., Ajanla Farms, P.O. Box 18531, Dugbe, Ibadan, Nigeria

[2]Department of Surgery and Reproduction, Faculty of Veterinary Medicine, University of Ibadan, Ibadan, Nigeria

Corresponding Author: Olasemi Supo, Chi Ltd., Ajanla Farms, P.O. Box 18531, Dugbe, Ibadan, Nigeria

ABSTRACT

This is a case report of jejunal intussusceptions in a flock of pullets associated with necrotic enteritis of unconfirmed origin. The aetiology is a shift in gut micro flora. This is unlike the previously studied cases in commercial broiler flocks which have been associated with coccidiosis, ulcerative enteritis and anorexia. Imbalanced use of anticoccidial vaccines, anticoccidial drugs and Antibiotic Growth Promoters (AGPs) are the main cause of the gut micro flora shift. This is also the main cause of necrotic enteritis. The condition was successfully controlled with Augmentin (Amoxicilline+Clavulinic acid) at the dose rate of 25 mg kg^{-1} body weight for three days. To limit losses associated with this type of condition, there is need for research based legislative control on the concurrent use of anticoccidial drugs, anticoccidial vaccines and AGPs in developing countries.

Key words: Intussusceptions, necrotic enteritis, coccidiosis, gut flora, layers

INTRODUCTION

Intussusceptions which is an invagination of a segment of the gastro-intestinal tract into its immediately distal portion, occurs in chickens and is associated with increased intestinal motility (Ahmad, 2010). Coccidiosis (Ahmad, 2010), worms and various forms of enteritis are predisposing factors (Jordan, 2007). Although, the disease is often seen in other animals such as dog (Applewhite and Daly, 2006), sheep (Radostits *et al*., 2000) and horses (Bell and Textor, 2010), it rarely occurs in poultry as reflected by the scanty literature about the condition. An increasing incidence around the world is being reported (Williams, 2005).

NE is a globally important welfare and economic problem (Van Der, 2000), it is an enterotoxaemia caused by types A and C of the enteric Gram positive bacterium *Clostridium perfringens* (Kohler, 2000; Wages and Opengart, 2003). Factors which predispose to clostridial enterotoxaemia include incorporation of more than 10% wheat or barley in diets, acute changes in the form or composition of diets, starvation or climatic and environmental stress including saturation of litter. Mild coccidiosis may also be a trigger factor (Shane, 2005). Chickens are most commonly affected at 2-6 weeks old (Williams, 1986), it may occur in birds 7-16 weeks old.

Wilson *et al*. (2005) or even up to 6 months (Wages and Opengart, 2003). Islam *et al*. (2003) reported an increased incidence rate of necrotic enteritis and other major diseases when birds are between 8-21 days old. Sudden onset gross lesions occur in the jejunum, sometimes extending into the duodenum or the ileum (McDevitt *et al*., 2006). A diphtheritic membrane of dead

mucosal enterocytes trapped in fibrin (McDevitt *et al.*, 2006) coloured yellow or green (Wages and Opengart, 2003) or brownish orange may cover the mucosa (The 'Turkish towel' effect) (Williams, 2005). The gut is friable, dilated and gas filled, with foul smelling brown liquid contents (Williams, 2005). In some studied cases in broilers, there is massive necrosis and complete villi destruction in *C. Perfringes* type A infected intestine (Das *et al.*, 2008). The objective of the study was to determine the prevalence of intussusceptions in a laying flock and its causes.

CASE REPORT

The black Nera flock which consists of 5270 females and 717 males were 13 weeks when there were sudden deaths of five pullets. The following day, three mortalities were recorded while on the third day the mortalities were four and only females were affected. Vaccinations against coccidiosis had been successfully done at five days old using Livacox vaccine and there had been no history of clinical coccidiosis in the flock. The birds were fed standard grower feed which contains Aluminium bacitracin at the recommended prophylactic level. There was no feed intake restriction while growth pattern was according to the specified breed standards.

Visual examination of the flock and the pen houses revealed voluminous reddish-orange faeces and contained undigested feed stuffs mainly soya bean products. About a third had brownish grey liquid faeces with numerous gas bubbles. There had been no report of anorexia in the flock.

Post mortem lesions: Birds died in good body condition. All dead fowls showed telescoping at the posterior end of the jejunal segment (Fig. 1a, b).

The intestine was ballooned and a putrefying odour was perceived when the intestine was opened up. Longitudinal cut on the caudal aspect of the evaginating segments reveal yellowish grey membrane which sloughed off readily revealing multifocal haemorrhagic and necrotic ulcers underneath. The content of the intestine was brownish grey (Fig. 2). No other lesion was visible on post mortem examination apart from the rapid autolysis that occurred. The condition was effectively controlled with Augmentin (Amoxicilline+Clavulinic acid) at the dose of 25 mg kg^{-1} for three days while the level of Aluminium bacitracin (Albac) in the feed was increased from 50 to 200 g ton^{-1}. After 5 days the faeces returned to normal-black base with white cap.

Fig. 1 (a-b): Telescoping of Intestinal segment

Fig. 2: Diphtheritic membrane on the mucosal of telescoped segment

DISCUSSION

Intestinal intussusceptions, involving severe congestion and necrosis are occasionally misdiagnosed as coccidiosis, particularly when concomitant with coccidiosis (Catchpole, 2000). However, there is no evidence that coccidiosis causes intussusceptions. Among commercial hybrids, layers are frequently more susceptible to coccidiosis than are broilers (Marshall *et al*., 1995; Williams and Catchpole, 2000). The peculiarity of intussusceptions to affect females alone correlate with the findings of Williams (1986) who recorded 18 cases of female and 2 cases of male. This case study intussusceptions in a flock of pullets. Williams (2005) reports that birds dying of NE may sometimes have intussusceptions, though, he attributed the intussusceptions to dysperistalsis due to hunger. Intussusceptions observed in this case were not associated with anorexia as previously reported by Okoye (1985), ulcerative enteritis (Williams, 1986) or coccidiosis (Parihar and Shukla, 1964; Sharma, 1971; Peckham, 1984).

The sensitivity of the condition to amoxicillin and clavulinic acid suggests that the cause may be related to dysbacteriosis (non-specific bacterial enteritis) or Small Intestine Bacteria Overgrowth (SIBO). The use of anticoccidial vaccine and an Antibiotic Growth Promoter (AGP) may have caused a shift in gut flora. Williams (2002) also reports that when live anticoccidial vaccines are administered to chickens, anticoccidial drugs are not usually used concomitantly. This is because they may kill some of the vaccinal parasites. However, Oladoja and Olusanya (2007) campaign about the need to increase awareness on coccidiosis vaccines in Nigeria by extension agents. There is strong indication that shift in microbial population had clinical effect on the structure and motility of the intestines hence leading to enteritis (necrotic) which is a major predisposing factor to intestinal intussusceptions.

Worldwide control of in-feed AGPs has led to a new awareness of the delicate balance between anticoccidial vaccines and anticoccidial drugs and the predisposition to NE by changing the delicate balance of gut flora from which NE results. It is therefore imperative that legislation that will take cognisance of current research on this issue be enacted to empower and protect the poultry industry from unnecessary losses which may result otherwise. Removal of AGPs will cause an increased rate of Necrotic Enteritis and Coccidiosis in poultry. Future ban on the use of coccidiostats and anticoccidial vaccines will make the situation further complicated. However, the poultry industry

will learn to cope with the new conditions, as they are learning to handle welfare demands (Karimi, 2008). There is need to ensure survival and domination of normal gut microbial flora using balance between effective feed management system, probiotics and prophylactic vaccination system to ensure elimination of pathogenic microbes (Cos, 2010).

CONCLUSION

The delicate balance of gut flora and the interrelationship that exists between AGPs, coccidiostats and a vaccination program to effectively curtail the development of NE and the attendant losses in the huge Nigerian poultry industry and the world in general may very well depend on the characterization of the type of imbalances which produce disease conditions in commercial birds. Legislation may stem the tide of irresponsible use of feed additives but proven research will aid to dissuade the farmer by encouraging compliance that can be seen in survivability and economic returns which is after all, the bottom-line.

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