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A report on intestinal coccidiosis in a Kairali Desi chicken farm in Ramanathapuram district

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Abstract

A Kairali chicken farm with the total strength of 300 birds of 7 weeks old at Peikkarumbu near Rameswaram, Ramanathapuram district, Tamil Nadu, was reported to have continuous mortality. The affected stock was said to be suffered with dullness, inanition, reduction in bodily condition, diarrhoeic stools mixed with muco sanguineous material and death. The stock was maintained under deep litter system. On field investigation, the affected birds showed ruffled feathers, dullness, anorexia and blood stained whitish to brownish diarrhoea with soiling of feathers around the vent. Post mortem examination revealed blanched skin and muscles, ballooning of intestine with salt and pepper appearance of the serosa. The intestinal lumen contained scanty, partially digested content mixed with muco sanguineous viscid material. The mucosa was found to be eroded. The microscopic examination of the intestinal scrapings confirmed the presence of *Eimeria necatrix*. The flock was treated with amprolium hydrochloride (Amprolium Soluble Powder 20%) in drinking water for a period of 5 days and was advised to change the bedding material. Although the affected birds recovered from the condition, recurrence was noticed due to the unremoval of the contaminated bedding materials. Then, the similar treatment with amprolium hydrochloride (20%) for a continuous period of 7 days with supportive herbal therapy with inclusion of turmeric, cumin powder and *Aloe vera* followed by strict hygienic measures with replacement of new fresh bedding material was found to be highly effective and the birds recovered completely. The farmer was advised to give chopped onion and garlic in the regular diet.

Keywords: Kairali chicken, *Eimeria necatrix*, mortality, amprolium

1. Introduction

Avian coccidiosis is recognized as the parasitic disease with the greatest economic impact on poultry industries worldwide. It is a form of protozoan diseases characterized by dysentery, enteritis, emaciation, drooping wings and poor growth. Feed and water consumption are depressed. Weight loss, development of culls, decreased egg production, and increased morbidity and mortality may accompany outbreaks (Sharma *et al.*, 2013) [14]. The coccidial parasites belong to the genus *Eimeria* develop within the intestines of most domestic and wild animals and birds. Coccidiosis spreads by direct and indirect contact with the droppings of infected birds and contaminated feed and bedding materials. In chickens seven species of *Eimeria* are reported of which *E. tenella*, *E. maxima*, *E. necatrix* and *E. brunetti* are highly pathogenic, unlike *E. Acervulina*, *E. mitis* and *E. praecox* which are less pathogenic (Shirley, 1986) [16]. Mortality and economic losses are very high in young chicks because most of the *Eimeria* species affect the birds of age between 3 to 18 weeks (Nematollahi *et al.*, 2009) [9]. In non-immune young birds (3-8 weeks), occurrence of sudden outbreak was noticed following ingestion of high doses of the sporulated oocyst over a short period of time (David, 2000) [2]. The species could be identified by nature and location of lesions caused during multiplication, since, different species tend to develop in different parts of intestine (Long *et al.*, 1976) [6]. Kairali, an egg type desi chicken breed, native of Kerala is the Country chicken of the entire world. It is also called as Gramalakshmi. It is good in meat and egg production. Kairali is known to have high resisting power amongst all the chicken breeds. The breed will attain sexual maturity at 160 days. It will lay 180-200 eggs during its laying period (23 – 72 weeks) and their egg size is small as that of traditional country chicken. The average weight gain at 72 weeks old bird is around 1.7 kg [5].

2. Materials and Methods

A poultry farmer from Rameswaram visited Veterinary University Training and Research centre, Ramanathapuram for post mortem examination on the carcasses of young Kairali desi

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chicken (Fig.1). The history revealed that, the farm was holding 300 chicks of 7 weeks old and was succumbed with continuous mortality (10%) of the total birds housed in the farm for the past one week of period. On farm investigation (Fig.2) revealed the clinical signs of ruffled feathers, weakness, anorexia and blood stained whitish to brownish diarrhoea. Post-mortem examination conducted in 12 carcasses. The peculiar lesions of coccidiosis could be observed. The microscopic examination of intestinal scrapings confirmed the case and helped in the formulation of therapeutic measures to control the condition.

3. Results and Discussion

Post mortem examination of the affected carcasses revealed paleness of the skin, viscera and muscles (Fig.3). Liver appeared pale coloured (Fig.4). Intestine was distended with salt and pepper appearance of the serosa (Fig.5). The intestinal lumen contained scanty, partially digested content mixed with muco sanguineous viscid material (Fig.6). The mucosa was found to be eroded. The microscopic examination of the intestinal scrapings showed the presence of *Eimeria necatrix* (Fig.7). The confirmation of the *Eimeria necatrix* was made by oocyst morphology viz., size, shape, colour, appearance of the wall, presence or absence of micropyle and micropylar cap and its shape as described by Smith and Sherman (1994), Soulsby (1982) [18, 19].

The gross lesions observed (Gharekhani *et al.*, 2014; Long and Reid, 1982) [3,7] and the microscopic examination of deep scrapings from small intestine and wet smears at Veterinary University Training and Research centre, Ramanathapuram confirmed the condition as intestinal coccidiosis.

Amprolium hydrochloride (Powder 20%) was administered at the dose rate of 1 gram per litre in drinking water for 5 days to the flock to control mortality. The flock were recovered and showed good signs of health. After ten days of treatment the infection relapsed exhibiting similar signs for coccidiosis. The farm was investigated again and the autopsy was carried out in 3 dead birds and confirmed as intestinal coccidiosis. The farmer was strictly insisted to replace all soiled and contaminated litter materials with new, fresh litter material, which was not followed in the earlier outbreak. The flock were treated again with Amprolium hydrochloride (20%) for 7 days period with supportive addition of *Aloe vera*, Turmeric and cumin powder in drinking water after the removal of old contaminated bedding materials. The flock was also given chopped Garlic and onion in addition to their normal feed regime. This resulted in the effective stoppage of mortality and enhancement health and growth rates of birds. Presently, the birds are in production and the farmer sold about 50 cocks from the flock for a good rate.

The incidence occurred during the winter period (December) and the flock was newly introduced in Rameswaram (adjacent to coastal region), procured from Kanyakumari District at the age group of 5 weeks. The infection flared up due to heavy rainfall in this region for a period of 2 to 3 days. The presence of contaminated litter materials and bedding surface soiled with the faecal material, stress factors *etc.*, might be the contributing factors for the recurrence of the condition in the same flock.

Higher prevalence of coccidiosis in the age group of 4-7 weeks might be associated with the presence of high number of oocysts in the litter and lesser immune status in these age groups. However in the age group of 0-2 weeks old birds were protected by the maternal immunity. Similar findings of high

prevalence of coccidiosis in chickens of age group ranging from 4-7 weeks has been reported by Nematollahi *et al.* (2009), Sharma *et al.*, (2015) [9, 15]. Hirani *et al.*, (2011) [4] stated prevalence of coccidiosis in chickens was highest in monsoon and lowest in summer. The present finding is in commensuration with the study of Hirani *et al.*, (2011) [4] notified that monsoon period, falls with increased rainfall with subsequent high humidity and drop in temperature which is conducive for sporulation of oocysts for easy dispersion and transmission. The warmth and moisture in such environment favours greater transmission and contamination of oocysts. The higher prevalence rate of coccidiosis during the rainy season also agrees with earlier reports of Alawa *et al.*, (2001) [1]. It was a fact that sporulation of coccidian oocysts requires moisture and optimum temperature, 30 °C (Pellerdy, 1974) [10]. In this report, the temperature of the study area was above 35 °C in summer with a relative low humidity which is unfavourable for development of oocysts. These observations are in agreement with those of Senthilvel *et al.*, (2004), Sisodia *et al.*, (1997) [13, 17] who reported a similar pattern of intensity of *Eimeria* species at Rajasthan and Tamil Nadu, respectively.

In the present case, newly introduced flock, stress, adjacent coastal region, recent rainfall, environmental weather condition and housing pattern might be the additional contributing factors for the severity of disease condition.

The lesion of distended small intestine with white and red focal lesions on the serosal surface particularly in midgut is associated with necrosis and sloughing of intestinal mucosa occurred due to *E. necatrix* infection, similar to the study of David (2000), Saravanajayam *et al.*, (2016) [2, 12]. Ruff *et al.*, (1993) [11] reported that Amprolium could reduce the number of oocysts shed by *Eimeria acervulina*, *E. maxima*, *E. necatrix* and *E. tenella* in chicken thereby prevent the spread and mortality which showed similarity in current study. In the present study reinfection occurs due to lacunae in disposal of bedding materials. Coccidial infection once noticed in a poultry farm; if not properly controlled will be increasing at an alarming rate. The tremendous increase in coccidiosis infection may be due to degree of or high precipitation in this area. This is because, the oocyst that causes the coccidiosis thriving well in wet and moisture environment. It was advised to change the bedding materials with paddy husk as replacement for saw dust which were moist in condition. The moist nature of bedding materials might be attributed due to recent rainfall in the region. The farmer was also advised to continue treatment with amprolium powder for 5 days. It was advised to give combination of turmeric and cumin powder along with *Aloe vera* gel in drinking water as supportive treatment. Chopped garlic and onion were advised in the feed as antioxidants.

Muthamilselvan *et al.*, (2016) [8] reviewed on the herbal remedies for coccidiosis control and their mechanism, compound principles and action. It was suggested garlic and its sulphur compounds, allicin, alliin, ajoene, diallyl sulfide, dithiin, and allylcysteine, are reported to have broad antimicrobial activities and also inhibits sporulation of oocyst effectively. The anticoccidial mechanism of garlic and its sulfur compounds remains elusive. Similarly *Aloe vera* exerts anticoccidial activity in chickens and can elicit cell mediated immune response as well as a humoral response against coccidiosis in chickens. Turmeric (*Curcuma Longa*) has long been used as a spice and medicinal herb showed anticoccidial activity due to its active principle curcumin

(diferuloylmethane), consistently destroy sporozoites of *Eimeria sp.* In the present study the flock were suggested to give combination of herbal therapy with turmeric and cumin powder with *Aloe vera* gel in drinking water and were effective and opined the review of [8].



Fig 1: Infected flock of Kairali desi chicken farm



Fig 2: Field investigation of affected flock



Fig 3: Pale and anaemic muscle

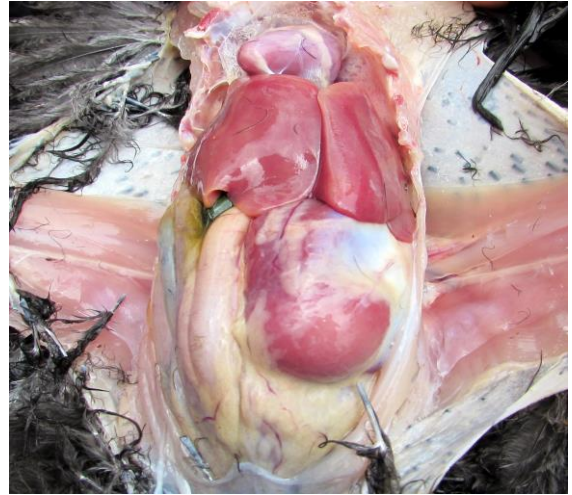


Fig 4: Mild Pale liver



Fig 5: Ballooning of intestine with salt and pepper appearance of serosa



Fig 6: Blood mixed mucosanguineous viscid material in intestine

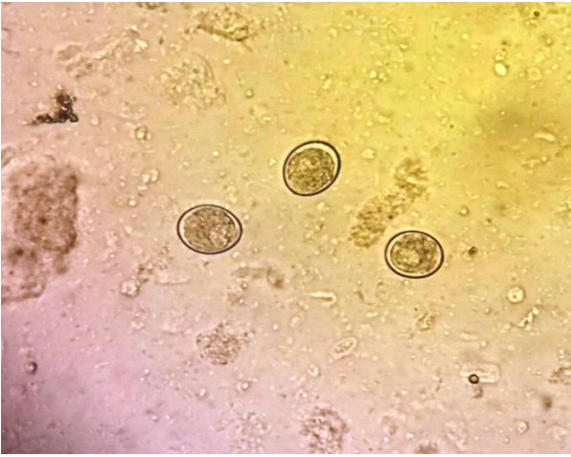


Fig 7: *Eimeria necatrix* oocyst in intestinal scrapings

4. Conclusion

Present study revealed that the reinfection occurred due to poor managerial practices, malnutrition, stress, prevailing environmental condition, recent rainfall and non-inclusion of herbal coccidiostats as supportive therapy in addition to treatment with amprolium. Warmth and moisture environment favoured greater transmission and contamination of oocysts. However the flock recovered completely after 7 days of relapsed infection after strictly following the supportive therapy, removal of bedding materials, introduction of paddy husk as new bedding materials and inclusion of garlic and onion in the diet.

Though, the desi chicken is deemed to be resistant to coccidiosis, the breed upgradation, wet deep litter condition and poor ventilation might have played the important role in the coccidiosis outbreak among desi chickens.

5. Acknowledgments

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6. Conflict of Interests

The authors declare that there is no conflict of interests regarding the publication of this paper.

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