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Coccidiosis in T x D pigs in an organized farm-case study

Asit Chakrabarti and Pankaj Kumar

Abstract
On a routine observation in an organized farm found that seven T x D piglets of 2 month age with 18 ± 1.14 kg body weights were suffering from watery diarrhoea and little blood in faeces. The symptoms, clinical findings and faecal sample examination confirmed that the piglets were affected with coccidiosis. After 5 days treatment with coccidiostat and fluid therapy the piglets were recovered gradually and started normal feeding on 7th day onwards. However, one animal died on 5th day. Post-mortem examination of diseased animal also confirmed presence of *Eimeria species in* intestine. To develop immunity colostrum feeding in early age is essential for piglets. The hygiene, sanitation, regular cleaning and fly control in shed may prevent coccidiosis in pigs.

Keywords: Coccidiosis, pig, T x D breed

Introduction
Diseases in pig are very common where unhygienic management and proper health care is not adopted. But, in an organized farm where pigs are maintained with proper care and attention the incidences of disease is very concerning [6]. Coccidiosis is one of the most pathogenic gastrointestinal parasitic diseases caused by the different species of Phylum-Apicomplexa [3]. The disease is more common and wide spread in suckling piglets but is seen occasionally in growing and finishing pigs and boars when they are moved or housed into continually populated and infected pens [30]. It can be caused by a wide range of infectious, environmental and management factors. Coccidiosis is a common problem of confined animals kept under intensive husbandry practices. The disease is characterized by scours, dehydration, rough hair coat, reduced growth rate, weakness, weight loss etc. According to Davies *et al*., 1963 [9] and Ruprah, 1985 [23] oocysts of coccidia are passed in feces and may not cause a significant mortality but can certainly cause a clinical disease or can at least retard the growth of pigs. The mortality and morbidity is variable and not responsive to most antibacterial therapy. It is caused by small parasites that multiply inside the host cell mainly in the intestinal tract *viz. Eimeria* spp., *Isospora suis* and *Cryptosporidium* spp. [25]. It is suspected in young pigs suffering from continuous diarrhoea which does not respond to antibiotic therapy. In early stage, diarrhoea is the main clinical signs and in later stage consistency of faeces and colour varies from yellow to grey green or bloody according to the severity of the condition [8]. Environmental factors play a pivotal role in the dissemination and prevalence of coccidia infections in susceptible animals. It is mostly transmitted by ingestion of contaminated feed and water with oocysts of coccidia. In piglets, coccidiosis causes poor performance during the fattening period as well as diarrhoea, and also predisposes the animal to secondary bacterial and viral infections [16, 19]. This is mainly due to disruption of small intestine villi and surface area which interrupts with normal absorption process of nutrients.

Etiology and Causal agents
Generally, coccidiosis is seen in late summer as well as in winter months in India but, it may occur throughout the year. The disease is sporadic in nature and usually causes either 'Summer Cocciodiosis' or 'Winter coccidiosis'. In winter months the disease may occur due to environmental stress and limitation of host and parasite concentration due to shortage of water in animal shed [5]. Das *et al*., 2019 [8] reported that coccidia infections in pigs are common and prevalent throughout the year in Meghalaya and was corroborated with the findings of Tsunda *et al*., 2013 [30]. Coccidiosis is transmitted by ingestion of sporulated oocysts. Infection is acquired from contaminated feed, water, and soiled pastures, or by licking a contaminated hair coat [12]. Oocysts are passed out in the faeces into the environment where they sporulate.

Oocysts can survive outside the pig for many months and are very difficult to kill. Sporulation occurs within 12 to 24 hours at temperatures between 77ºF to 95ºF. After ingestion oocysts are undergo developments in the wall of the small intestine to complete the cycle. The life cycle in the piglet takes 5 to10 days. Das *et al.*, 2019 [8] opined that this might be due to favourable environmental conditions for propagation and perpetuation of the parasites and non-administration of coccidiostat or coccidicidal drugs by the farmers. Other factors which might be responsible are constant exposure to infections, continuous deposit of infections by the adult carrier animals as well as poor animal husbandry practices. The presence of different species of coccidia in pigs were reported from various parts of India viz. Ahluwalia, 1959 [2], Gill, 1990 [13] and Mishra, 1963 [20] from Uttar Pradesh, Patnaik, 1963 [21] from Orissa, Shrivastava and Shah, 1968 [24] from Madhya Pradesh, Tayo *et al.*, 2011 [26] from Arunachal Pradesh and Das *et al*., 2019 [8] form Meghalaya. The disease also observed in different parts of the world. Viz. Azerbaijan (Hajiyeva *et al*., 2016) [14], China (Lai *et al*., 2011 and Yin *et al.*, 2011) [17], [30], Poland (Karamon *et al*., 2007) [15] and Nigeria (Tsunda *et al*., 2013) [29]. Leyton *et al.*, (2011) [18] from Canada reported high rate of *Isospora suis* (26.4%) infections in suckling pigs and Tomass *et al*. (2013) [28] from Ethiopia reported 7% and Yin *et al*., 2011 [30] 17% *Cryptosporidium* spp. from China.

History, Symptoms and Diagnosis

To cater the need of the tribal farmers of the region, ICAR Research Complex for Eastern Region, Ranchi was maintaining a pig research unit with about 80 pigs. The farm was following uniform standard management practices adopted throughout the year. Routine vaccination and deworming was done periodically. The animals were housed in a cemented floor with 3 feet high side wall. Washing of floor was done daily at 8.30 AM and excreta were removed twice daily both at morning and evening. After cleaning of the shed pigs were provided daily on-farm formulated water soaked concentrated feed morning at 9.30 AM and evening at 3.30 pm.

The weather parameters at Farming System Research Centre for Hill and Plateau Region, Ranchi for November 2019 was - Total Rainfall - Nil (Normal 10.8 mm), Rainy days 0, Temperature (°C) - Minimum 15.1 and Maximum 28.2, Relative humidity (%) – 90.6.

On November 21, 2019 during routine visit to the farm it was noticed that seven T x D piglets of 2 month age with 18 ± 1.14 kg body weight were suffering from watery diarrhoea and little blood in faeces. The piglets were reluctant to take feed and water. On clinical observation it was recorded that the piglets were unthrifty, discomfort, sunken eyes, depressed and the perineal area was found blood stained. Mucous membrane of eye was pale and anaemic. The animals were taking less feed and water consumption was reduced. The rectal temperature was 104.1^{O} F, respiration rate was 37 ± 7 breaths/ minute and pulse rate was 104 ± 9 beats/ minute. Faecal sample examination confirmed presence of oocyst of *Eimeria species.* Differential diagnosis and post-mortem of the diseased animal confirmed absence of other infection and parasitic diseases. On the basis of history, time, faecal sample test, clinical and post-mortem findings, it was diagnosed as a case of coccidiosis.

Treatment & Discussion

To prevent dehydration and electrolyte imbalance treatment was started with oral therapy. Amprolium @10mg per kg body weight per day for 5 days was given as a coccidiostat and Conciplex @3ml (Multivitamin) was given. Melonex plus injection@ 2ml intramuscularly was administered to prevent fever and other complications. The piglets has shown improvement from third day and started normal feeding from seventh day onwards. However, one piglet died on 5th day morning. For prevention and care of adult animals treated with Amprolium premix @ 100gm/ 100 kg of feed. All piglets of the farm were injected with long-acting sulphonamide.

Coccidia usually infect epithelial cells of the gut mucosa during the developmental stage [10]. Signs of the disease include anorexia, loss of weight, and hemorrhagic and mucoid diarrhoea [12]. In severe cases, faeces are liquid, bloody and may contain strands of intestinal mucosa [10]. Ahmed and Soad (2007) [1] observed that coccidiosis causes severe diarrhoea, dysentery, dehydration, depression, anorexia, weakness and recumbency in calves. Chakrabarti and Jha, 2016 [5] also reported similar finding in a calf during winter coccidiosis. Teankum *et al*., 2003 [27] reported nervous disorders in calves.

Coccidiosis causes mortality due to severe diarrhoea, which causes loss of electrolytes and dehydration. Blaxter and Wood [4] found that calves with diarrhoea lost 8 and 18 times more sodium and potassium respectively, than normal calves. They also opined that coccidia destroy intestinal cells, which results in loss of blood and other fluids into the small intestine. Denatured proteins cause shifts in osmotic pressure, and alter levels of intra- and extra-cellular ions [11], [22]. Blood and other fluid then pass in the faeces, which are usually watery. When schizonts are mature, intestinal cells are sloughed from membranes and either leave scattered epithelial cells to cover the lamina propria or expose lamina propria with engorged capillaries. If these exposed capillaries are severely damaged, blood and plasma may be lost [4]. Animals may become emaciated, dehydrated, weak, and listless. Rectal prolapsed may result from straining without defecation [10]. Chakrabarti and Kumar, 2017 [6] observed that in an organized farm 9.34 % pig suffer from diarrhoea or scour. Das *et al*., 2019 [8] reported that the prominent coccidia species that infected swine in Meghalaya were E. *debliecki*, *E. porci*, *E. suis*, *E. perminuta*, *E. cerdonis*, *E. spinosa* and *Cryptosporidium* spp. The present findings are in agreement with the finding of previous workers.

Conclusion

Coccidiosis reduces feed consumption, body weight, and feed efficiency and may cause mortality of pigs. To enhance the immunity, feeding of colostrums in newborn piglets and also hygiene and sanitation in farrowing houses is the paramount importance for prevention of coccidiosis in pig shed. When oocysts have become established in an environment the hygiene and insect like fly control are very important.

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