

Intestinal Coccidiosis in Angora Rabbits (*Oryctolagus cuniculus*) Caused by *Eimeria intestinalis*, *Eimeria perforans* and *Eimeria coecicola*

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SUMMARY

Ten dead Angora rabbits from a commercial rabbit farm in Kocaeli were necropsied. Intestinal mucosa was seen hyperemic and oedematose. Macroscopic lesions were not observed in the livers. Oocysts of *Eimeria intestinalis*, *Eimeria perforans* and *Eimeria coecicola* were detected in the faeces of all rabbits. Faecal samples were examined by modified McMaster technique to determine oocyst counts. Oocyst counts per gram of faeces ranged from 15.000 to 17.500.

Key Words

Angora Rabbit, *Eimeria*, Intestinal Coccidiosis

Angora Tavşanlarında (*Oryctolagus cuniculus*) *Eimeria intestinalis*, *Eimeria perforans* ve *Eimeria coecicola*'nın Neden Olduğu İntestinal Koksidiyoz

ÖZET

Kocaeli'nde ticari bir tavşan işletmesinde ölen on adet Angora tavşanına otopsi yapılmıştır. İntestinal mukozanın hiperemik ve ödematöz olduğu görülmüştür. Karaciğerlerde makroskopik lezyonlar gözlenmemiştir. Tavşan dışkılarının tümünde *Eimeria intestinalis*, *Eimeria perforans* ve *Eimeria coecicola* oocistleri saptanmıştır. Oocist sayılarını belirlemek amacıyla dışkı örnekleri McMaster yöntemiyle muayene edilmiştir. Gram dışkıdaki oocist sayıları 15.000 ile 17.500 arasında bulunmuştur.

Anahtar Kelimeler

Angora Tavşanı, *Eimeria*, İntestinal Koksidiyoz

INTRODUCTION

Coccidiosis is caused by intracellular protozoon parasites of the genus *Eimeria* and causes significant mortality in domestic rabbits. Kids are most susceptible; however, infected adults become carriers of the disease and are source of infection. The disease is seen most often in rearing establishments where sanitation is poor. Two types of coccidiosis, intestinal and hepatic, are described in rabbits. Hepatic coccidiosis is caused by *Eimeria stiedae*. Affected livers are enlarged, and bile ducts are dilated. The primary macroscopic lesions of livers are white nodules seen on the surface area (Pellerdy 1965; Soulsby 1968; Levine 1985; Coudert et al. 1995). The intestinal coccidial species can be classified into three types when clinical parameters like weight gain, diarrhoea and mortality are taken into consideration (Lebas et al. 1986). These are non-pathogenic to slightly pathogenic (*Eimeria media*, *Eimeria exigua*, *Eimeria perforans*, *Eimeria coecicola*), moderately pathogenic (*Eimeria irresidua*, *Eimeria magna*, *Eimeria piriformis*) and very pathogenic (*Eimeria intestinalis*, *Eimeria flavescens*) (Jithendran 1995; Jithendran et al. 1996). Induced villi atrophy will lead to malabsorption of nutrients, electrolyte disbalance, anaemia, hypoproteinemia and dehydration. All these problem result in economic losses for commercial rabbits (Pellerdy 1965; Karaer 2001).

A few studies have been published regarding the prevalence of coccidiosis in rabbits in Turkey (Merdivenci 1963; Taşan and Özer 1989; Çetindağ and Bıyıkoglu 1997).

In this studies *E. coecicola*, *Eimeria europaea*, *Eimeria leporis*, *E. magna*, *E. media*, *E. irresidua*, *E. perforans*, *E. intestinalis*, *E. piriformis*, *Eimeria robertsoni*, *Eimeria septentrionalis*, *E. stidea* has been reported in domestic or wild rabbits.

In this research, we aimed to present intestinal coccidiosis in Angora Rabbits (*Oryctolagus cuniculus*) caused by *Eimeria intestinalis*, *E. perforans* and *E. coecicola*.

MATERIALS and METHODS

Ten kids (2-3 months) which were died due to exhibiting the symptoms of diarrhoea and weakness from a commercial rabbit farm in Kocaeli were submitted to the Parasitology department. Necropsies were carried out on rabbits and primary gross pathologic changes were examined in the small intestines. Faecal samples were collected from the rectum of each rabbit, and examined for the presence of *Eimeria* oocysts by centrifugal flotation technique using saturated salt solution (specific gravity: 1.20). A modified McMaster technique was used to determine oocyst counts per gram of faeces (OPG) in samples. The coccidia oocysts were sporulated in 2.5% (w/v) potassium dichromate solution (K₂Cr₂O₇) in petri dishes at 27°C for 2 days. They were identified on the basis of the morphological characteristics using a light microscope (Pellerdy 1965; Soulsby 1968; Coudert et al. 1995).

RESULTS

The rabbits were thin with reduced fat stores and muscle wasting. The hair coat was rough and faecal material was adherent to the hair on the perineum. Primary gross pathologic changes were observed in small intestines which found to be distended and filled with gray-green semisolid ingesta. The intestinal mucosa was severely hyperemic and oedematose (Figure 1). Macroscopic lesions were observed neither in the liver nor in the other organs.

Faecal samples were examined and all animals were found as positive for the presence of *Eimeria* spp. Three species were detected from Angora rabbits including *E. intestinalis*, *E. perforans* and *E. coecicola*. Characteristics of sporulated oocysts of these *Eimeria* species are shown in Table 1 (Measurements are based on 25 oocysts of each species and expressed as means). The OPG ranged from 15.000 to 17.500.



Figure 1. Intestinal coccidiosis in Angora rabbits

Şekil 1. Angora tavşanlarında intestinal coccidiosis

Table 1. Characteristics of sporulated oocysts of *E. intestinalis*, *E. perforans* and *E. coecicola* from Angora Rabbits

Tablo 1. Angora tavşanlarında *E. intestinalis*, *E. perforans* and *E. coecicola*'nın sporlanmış ookistlerinin özellikleri

Species	Oocyst						Micropyle	Residuum	Shape
	Length (µm)			Width (µm)					
	Min.	Max.	Mean	Min.	Max.	Mean			
<i>E. coecicola</i> (Kheisin, 1947)	32.89	37.95	34.30	15.18	17.71	17.40	+	+	Elipsoid
<i>E. intestinalis</i> (Kheisin, 1948)	27.83	32.89	29.44	15.18	20.24	17.50	+	+	Pyriform
<i>E. perforans</i> (Leuckart, 1879)	17.71	27.83	23.15	12.65	17.71	15.78	-	+	Elipsoid, Asymmetrical

DISCUSSION

Coccidiosis is considered to be a major parasitic disease that causes considerable economic losses in rabbit farming (Peeters et al. 1988; Gonzalez- Redondo et al. 2008). This disease occurs in two forms, hepatic and intestinal, the latter being more common than the former (Bhat et al. 1996). *E. flavescens* and *E. intestinalis* are the most pathogenic species involved in intestinal coccidiosis of rabbits (Coudert et al 1995). In necropsy, inflammation and oedema can be seen in the ileum and jejunum of infected rabbits. It is sometimes accompanied by bleedings and mucosal ulcerations (Soulsby 1968; Levine 1985; Coudert et al. 1995).

Coccidial infection is affected by the host age; The highest incidence are in 2-months rabbits and then the infection rate decrease as the age increased. The high level of susceptibility of infection in young rabbits may be due to their immune, feeding and reproductive status (Ebtesam 2008). Our observation is consistent with the previously results of Hobbs et al. (1999) and Erdogmus and Eroksuz (2006).

The incidence of this disease in European countries in 21-60% and in India 13-64% (Catchpole and Norton 1979; Chandra and Ghosh 1990; Gonzalez- Redondo et al. 2008).

Different prevalence rate (from 13.3% to 80%) of *Eimeria* infection was reported in various regions of Turkey (Merdivenci 1963; Taşan and Özer 1989; Çetindağ ve Bıykoğlu 1997; Karaer 2001).

Clinical coccidiosis has been reported in Angora rabbits from India (Jithendran 1995; Jithendran et al. 1996). The present study reported that the most important intestinal coccidian parasites, *E. intestinalis*, *E. perforans* and *E. coecicola* of Angora rabbits in Turkey. Oocysts of these parasites were identified in the faeces of all dead rabbits. Since no other lesion was observed in the rabbits, it can be concluded that intestinal coccidiosis might be the cause of the deaths. This may imply that commercial rabbits are under potential risk of developing clinical coccidiosis.

In conclusion it is necessary to carry out further studies on epidemiology of coccidiosis in commercial rabbitries and to develop the appropriate control strategy for this disease in rabbits of economic importance.

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