

COCCIDIOSIS IN SHEEP AND GOATS (REVIEW)

NADIA HAMID MOHAMMED; WASAN AMJAD ALOBAIDII
AND MANAL HAMMADI HASAN

Department of Microbiology, College of Veterinary Medicine University of Mosul, Mosul, Iraq

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ABSTRACT

Coccidiosis is an important diseases with economic impact to the small ruminants in the world, the main problem occurs in the young's animals. Species of *Eimeria* including *Eimeria ovinoidalis*, *Eimeria ahsata* and *Eimeria bakuensis* in sheep, and *Eimeria arloingi*, *Eimeria ninakohlyaki* movae and *Eimeria christenseni* in goats. Clinical coccidiosis occurs mainly in the age 4-6 months, the main symptom is dehydration, as result of diarrhea, abdominal pain and weight loss, listlessness. Degree the tissue effect depend on the infection dose of oocysts, stress, species of *Eimeria* and factors related to the host such as age, genetic susceptibility and physical condition and degree of immune status of host, the most common gross lesions are thick in wall of the intestin and nodules formation. Therefore the aims of the review was to show the *Eimeria species* in sheep and goats and demonstrated history, classification, pathogenesis, life cycle, Epidemiology of parasite, clinical signs, diagnosis and treatment of coccidiosis.

Keywords: *Eimeria* species, coccidiosis in sheep, goats.

INTRODUCTION

Eimeria spp is protozoan parasites infects the small animals develop in the intestines of animals (Chartier and Paraud, 2012).

Eimeria is a serious disease of small animals and in different animal species in Iraq (Al-Amery and Hasso, 2002) and in the world (Foreyt 1990). Coccidian are obligat disease that development in the cytoplasm epithelial cells caused the hyperplasia and death of that cell parasitized. (Koudela and Bokova, 1998).

The effects degree of tissue depends on size the infective dose of oocysts, species of *Eimeria* stress, and factors related to the host such as genetic susceptibility, age, degree of immunity of the host and physical condition. (Zhao *et al.*, 2012).

Coccidia can damage intestinal cells of the host causing anemia and electrolytes loss (Callaghan *et al.*, 1987). Several studies have found that the prevalence of coccidiosis in the sheep and goats were 85% or more, the high prevalence at time show the serious problem that this parasite poses and calls the need to its management proper (Woji *et al.*,1994) (Yun *et al.*, 2000).

There are fifteen species of coccidian, Identified in sheep but three of them are serious pathogens and include *E.bakuensis* *E.ovinoidalis* and *E.ahsata* and while there

Corresponding author: Wasan Amjad Alobaidii
E-mail address: wasenamjad@yahoo.com
Present address: Department of Microbiology,
College of Veterinary Medicine University of Mosul,
Mosul, Iraq

16 type of coccidia in goats and most type pathogenic such as *E.arloingi* *E.christenseni*, *E.caprina* and *E.ninakohlyakimovae* (Catchpole *et al.*, 1993) (Soulsby, 1982) (Constable *et al.*, 2012) (khodakaram and hashemia, 2017).

History

Eimeria is a wide spread intestinal parasite in the world. Antony van leevween hook, he noticed the first oocysts of *E. stiedai* in the yellow channels of rabbit in 1674 (Clark and colwell., 1974).

The name Coccidia recorded in the first time in 1879 by lenckart. Researchers Moussu and Marotel in 1902 described the first species of *Eimeria* in the sheep it is *E. faurei* (Constable *et al.*, 2012). In 1903, Minchin was able to classify coccidia by the number of sporocyst in the oocyst (Chhabra and Pandey., 1991).

The use of the electron microscopy by Grasse in 1953 has helped to add new information about the classification and life cycle of parasites (Wang *et al.*, 2010).

Classification of Parasite

Coccidiosis is caused by small organisms belonging to the *Eimeria* species and has been classified as parasite based on (Taylor *et al.*, 2007) reported as follows:

Kingdom: *Protista*

Phylum: *Apicomplexa*

Class: *Sporozoa*

Order: *Eucoccidiorida*

Suborder: *Eimeriorina*

Family: *Eimeriidae*

Genus: *Eimeria*

Life cycle of *Eimeria spp.*

Several studies have indicated that the *Eimeria* is an obligatory parasite that needs one host to complete its life cycle (Chhabra and Pandey, 1991). The parasite's life cycle begins when the animal eats food or water contaminated with the sporulated oocysts and when this reaches the small intestine

(Chartier and Paraud, 2012). The oocyst membrane ruptures the sporozoites escape to invade the epithelial cells of intestines and transfers into trophozoite and then to shizont (Clark and Colwell., 1974).

The schizonts consist of merozoites, which invade other epithelium of intestine result in secondary schizont and produce second merozoites by a sexual reproduction and the second generation merozoites intervention of epithelial cell of intestine to produce sexual reproduction to produce macro and microgamonts (gamogony) (Kusiluka and Kambarage, 1996).

The microgamete fertilize the macrogamete to produce the zygote (Lima *et al.*, 1981). The zygote is surrounded by a wall to produce an oocyst. The oocyst is excreted with faeces of the host (Kusiluka *et al.*, 1996).

The stages of parasite development in various intestinal regions, the prepatent period is 2-3 weeks when the suitable conditions are available under moisture, temperature (23-34°C) (Lee *et al.*, 2001).

Epidemiology of parasite

Several factors play an important role in the spread of the coccidiosis which cause economic losses in animals herds (Platzer *et al.*, 2005) these include:

1- Animal factors:

Age is considered a major factor in severity of the infection. (Razavi and Hassanvand, 2007), severity and prevalence of the disease is high in the young ages and gradually decreases with the age of the animal (Reeg *et al.*, 2005). (Arslan *et al.*, 1999) reported that the prevalence of coccidia in Mosul city in small age sheep (71.4%) while the prevalence of *Eimeria* in adult ages reaching (40%) (Ali *et al.*, 2005).

While the sex results showe no relationship between the sex of the sheep

and the number of *Eimeria* oocyst with faeces (Ruiz *et al.*, 2006).

(shmaon, 2005) showed that there are no difference in the incidence of female and male infestation (84% and 90% respectively).

Also (Ali *et al.*, 2005) in the Mosul city recorded 61.29%, 58.33% in male and female respectively. The state of pregnancy in the animal is one of the important in the incidence of disease epidemiology leads to the weakness of immunity in pregnant ewes thus increases the number of oocysts in the stool (Soe and pomroy 1992) (Faizal and Rajapakse, 2001).

2- Factors affecting epidemiology are the dose size of parasite oocysts taken by the animal and the parasite species (Altaf and Hidayatu, 2014).

3- Factors related to the environment such as temperature, oxygen tension, humidity (Hashemia *et al.*, 2014) (Ruiz *et al.*, 2012).

(27-32°C) it is considered the ideal degree of sporulation of parasite (Silva *et al.*, 2014).

4- Factors related to parasite transmission (Morrison *et al.*, 2004).

Prevalence of Coccidiosis

Prevalence of coccidian has been reported in all world wide coccidia infected herds has been estimated at 50% in world throughout Europe, Asia, the middle South and East America (Koudela and Bokova, 1998).

The prevalence rate of coccidiosis is higher during the rainy season because it is positively influenced by the warm and humid weather in the literature review various percentages of *Eimeria spp* have been recorded of sheep and goats in Iraq, There are 63.3% and 55.07 in Mosul province (Alani *et al.*, 1989) (sullaman

2005). 72% in Sulaimaniya province (Kareem and Yuce 2015). 3.25 in Erbil province (Ahmed *et al.*, 2015), 69.6% in Baghdad (Kalef *et al.*, 2013), 50% and 57.5% in Wasit (Al-Rubaie and qaAl-Saadon 2018), 86.09% in Diyala (Minnat, 2014), 67.5% in Al-Muthana (Mohammed 2013).

Recent studies in some countries such as Jordan (Abo-shehada and Abo-fareha 2003), Turkey (Arslan *et al.*, 1999), China (Wang *et al.*, 2010), Iran (Kheirandish *et al.*, 2014), Brazil (Amarante and Barbosa, 1992) have indicated that coccidiosis in sheep and goats are an important clinical and subclinical disease (Kumar *et al.*, 2016).

Pathogenesis:

Eimeria spp parasites that obligate development in epithelial cells for the cytoplasm and produce cell death that infection with parasite and hyperplasia (Hatamnahavandi *et al.*, 2016).

The severity infection has a relation with number of oocyst take by the animal and on the location of the parasite in the epithelial lining of the intestines *Eimeria* species Immune status and age of host and the stages of development in the various intestinal regions. (Mohamaden *et al.*, 2018).

coccidia causes changes in the intestinal mucosa of infected animals causing localized hemorrhage and atrophy which results in decreased intestinal absorption (Kheirandish *et al.*, 2014).

The development of non-sexual stages lead to the destruction of epithelial cells, destroy of capillaries of the mucosa in intestinal produce anaemia and hypoproteinaemia (Mohamaden *et al.*, 2018).

The damage of mucosa in intestine causes diarrhea and dehydration. (Silva and lima, 1998).

Clinical signs

The incidence of *Eimeria* parasites is either

acute or chronic, the case of acute the signs are diarrhea, which is a common symptom which may last for three days as well as weakness, loss of appetite abdominal pain, and weight loss, abdominal pain, diarrhea, tenesmus (Levine *et al.*, 1985) (Sharma *et al.*, 2017).

While in chronic infection the signs are general weakness weight loss and poor growth of the lambs (Deger *et al.*, 2003).

The appearance of clinical signs depends on the type of *coccidia* and its location in the intestine, Genetic susceptibility, stress factors (Khodakaram and hashemnia, 2017) (Silva and lima, 1998).

Diagnosis

There are many laboratory tests that can be performed to confirm the diagnosis of coccidiosis (taylor 2007):

- 1- Microscopy of faeces:
Identify of *coccidia spp* depends on size and shape of oocysts and morphology of sporocyst (Watson and Gill., 1991)
- 2- The development stages of *Eimerai spp.* demonstrated by Giemsa-stained and haematoxylin eosin stain (Mohammed 2012).
- 3- Post mortem examination (Altaf and Hidayatu, 2014)
- 4- Molecular diagnosis
Polymerase Chain Reaction is mutual molecular diagnostic method used to detection of *Eimerai spp* (Al-Rubaie and Al-Saadoon, 2018)

Treatment and prevention of coccidiosis

Researchers have found many preventive and curative measures to reduce the spread of coccidiosis in animals herds, the successful and economical prevention depends on avoiding animal overcrowding. (Balick and Ramisz, 1999).

The lambing and kidding grounds must as clean and dry in case of outbreaks in the herds, the infected animals should be isolated and given the anticoccidial drugs

(Cox 1998).

For treatment, there are many veterinary preparations used to treat the disease including decoquinate 0.5 mg/kg B.W, sulfonamides (Dominguez *et al.*, 2001).

Diclozuril adose 1 mg/kg a mixed with sulfonamide and chlorlet racycline have give protection in lambs (Dai *et al.*, 2006).

Also used the Amprolium in feed to treat the disease 100 mg/kg BW for 21 days (Constable *et al.*, 2012).

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داء الاكريات في الضان والماعز (دراسة مرجعية)

نادية حامد محمد ، وسن أمجد العبيدي ، منال حمادى حسن

E-mail: wasenamjad@yahoo.com Assiut University web-site: www.aun.edu.eg

يعد داء الاكريات من الأمراض المهمة ذات التأثير الاقتصادي على المجترات الصغيرة في العالم اذ يشكل هذا الداء مشكلة كبيرة في الحيوانات صغيرة السن. ومن أنواع الاكريات التي تصيب المجترات الصغيرة : *Eimeria ovinoidalis* و *Eimeria ahsata* و *Eimeria bakuensis* في الضان و *Eimeria arloingi* و *Eimeria ninakohlyaki* و *Eimeria christenseni* في الماعز.

يحدث داء الاكريات بشكله السريري بصورة رئيسية في الحيوانات التي تبلغ اعمارها 4-6 أشهر ، ومن أهم أعراضه هو الجفاف نتيجة الإسهال والم في منطقة البطن ، واذ تحدد درجة اذى النسيج بعدة عوامل منها العوامل المتعلقة بالمضيف مثل العمر بالجرعة الطفيلية من البويضات ، والإجهاد ، والقابلية الوراثية والحالة المناعية للمضيف ، تتمثل الافات العيانية للاصابة بالاكريات بسمك في جدار تكوين الأمعاء وتكون العقيدات ، لذلك كانت أهداف هذه الدراسة المرجعية هو اظهار أنواع الاكريات في الضان والماعز ، تاريخ حدوثها ، تصنيفها ، امراضيتها، الوبائية ، ودورة الحياة ، العلامات السريرية فضلا عن تشخيصا وعلاجها.

الكلمات المفتاحية : انواع الاكريات ، داء الاكريات ، الضان ، الماعز.