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كلية الطب البيطري
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الكشف التقليدي والجزيئي لانواع طفيلي الكربتوسبورديم في الانسان والحملان وصغار الماعز في محافظه ديالى

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من قبل

ضحى فيصل عناد

بأشراف

أ.م.د. طارق رفعت منت

أ.م.د. حليم حمزة حسين

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Republic of Iraq
Ministry of Higher Education & Scientific Research
University of Diyala
College of Veterinary Medicine
Department of Internal and Preventive Medicine

Traditional and Molecular Detection of Cryptosporidium Spp in Human, Lambs and Goat Kids in Diyala Governorate

A Thesis

Submitted to the Council of the College of Veterinary Medicine/University of Diyala in Partial Fulfilment of Requirements for The Degree of Master of Science in Veterinary Medicine/ Zoonosis

By

Duha Faisal Enaad

Supervised by

Assist. Prof. Dr.

Tareq Rifaaht. Minnat

Assist. Prof. Dr

Haleem Hamza Hussian

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Chapter One

Introduction

1. Introduction

Cryptosporidiosis is an emerging; intestinal and extra-intestinal disease are caused by zoonotic disease and intracellular protozoal parasites in both humans and animals. Although the disease is well-known in veterinary medicine, Animal handlers, children visiting daycare facilities, people receiving immunosuppressive medication, and those suffering from chronic illnesses are all at risk (Fereig *et al*., 2016; Certad *et al*., 2017).

They often cause diarrheal disease in immunocompetent and immunocompromised individuals worldwide, which has a serious detrimental impact on morbidity and mortality, particularly in poor countries and in children under the age of five (Saneian *et al.*, 2010; Kattula *et al*., 2016; Fereig *et al*., 2016; Certad *et al*., 2017). According to Hill and Dubey, (2018), the Cryptosporidium protozoan causes diarrhea in both humans and animals. The Cryptosporidium is able to tolerate the harsh components of the environment, including disinfectants like chlorine, since it has a robust outer shell (Suler *et al*., 2016).

There are 26 species and over 50 genotypes of Cryptosporidium (Abu Samra *et al*., 2013; Xiao and Cama, 2018).

At least 10 species of Cryptosporidium, including four genotypes, infected humans, predominantly C. parvum and C. hominis (Abu Samra *et al*., 2013; Stensvold *et al*., 2015). According to Roellig *et al*. (2017), human either the zoonotic C. parvum or the human-specific C. hominis can cause cryptosporidiosis. Other species of Cryptosporidium are less frequently transmitted to humans, with C. parvum being the most prevalent infectious agent in outbreaks of diarrhea in sheep and goats in the USA (Xiao and Cama, 2018). According to Robertson *et al.* (2010) and Grothen *et al.* (2017), the majority of zoonotic Cryptosporidium that people get from tainted food and water or close contact with animals comes from ruminants. Through tainted food and water, intimate contact with animals, or both.

Humans can acquire cryptosporidium infections involves a variety of transmission channels, including zoonotic transmission, waterborne transmission, foodborne transmission, and person-to-person transmission (Xiao, 2010). Infection and sickness can be brought on by just one oocyst (Food and Drug Administration Kothavade, 2012). When expelle, oocysts can survive for up to 6 months in a cold, damp environment and are instantly infectious. Oocysts have a 140-day lifespan in water (Ramirez *et al.,* 2004).

In developing countries, 45% of children under the age of two years infected with (Mor and Tzipori, 2008; Certad *et al.,* 2017). The basic using for detecting the Cryptosporidium prtozoal parasite are based on oocyst sizes and shape.

Studied cryptosporidiosis in goat kids in Iraq found a prevalence of Baghdad region (Rasheed, 1997), while (Abdulla, 2005) reported the prevalence rate in sheep in various localities of Ninevah province, and distribution of positive Cryptosporidium infection among animal and non-animal handlers were in Ninevah province. In addition, because was no research on the prevalent diseases in sheep and goats in the province of Diyala, this study was created to.

1.1. Aims of the Study

1. Identification and morphological characterization of Cryptosporidium spp from human,lambs and goat kids and study the effects of age and sex on infection rate in Diyala province, Iraq.
2. Detection of Cryptosporidium spp from fecal sample by conventional PCR by using (18SrRNAgene).
3. Study the genotyping related of Cryptosporidium spp in human and lambs and goat kids by sequencing.

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Abstract

An developing zoonotic diseases and intracellular protozoal parasite It is transmitted from animals to humans via the transmission of diseases., cryptosporidiosis causes intestinal ailments in both people and animals. despite the fact that the disease is long known in the of veterinary medicine, Only lately it has been identified as prominent protozoal results in diarrhea in humans. A total of two hundred fecal samples were collected from one hundred children, sixty-five lambs, and thirty-five goat kids from various regions in the Diyala governorate between the first of September 2022 to the last of May 2023.

The ages of the lambs and goat kids ranged from less than three months to five months, and the age of children ranged from less than one to two years Using traditional methods, (Sheather's method for flotation, staining by modified ziehl-neelsen as well as the microscopic testing) and Molecular methods were used to check for Cryptosporidium spp. infection. Clinical signs of cryptosporidium infection appeared in fifty three lambs and fifteen goat kids, manifestoed by watery diarrhea, anorexia, depression, weight loss and abdominal discomfort. As a result, it was determined that the total infection rate was 44.5% which was made up of 81.5% in lambs, 42.9% in goat kids, and 21% in children, manifested clinically by gastroenteritis, nausea, fever, vomiting, headaches, cramps in the abdomen and watery diarrhea in children .

The infection rate of cryptosporidiosis between sex represented by high infection in male than female, age groups as a high infection in less than 3 months than more than three months in (lambs and goat kids) respectively. Regarding the area, the majority of infection rate of cryptosporidiosis different between region.

The relationship between study months and infection rates revealed that the highest infection rates were seen in November, while the lowest infection rates were observed in Septemer, in children, lambs, and kids, respectively.

Abstract

Fortieth positive samples (20 children, 10 lambs and 10 goat kids) examined by PCR . the results revealed 32 postive (16 children,8 lambs ,8 goat kids).

Twelve isolate included four from each (children ,lambs, goat kids) used for create Phylogenic tree of *cryptosporidium* spp.

These results imply that a significant source of the zoonotic *C. parvum* and *C. scrofarum* for humans, sheep and goats .It was The first study in Iraq Identified *Cryptospordium Scrofarum* .