A Comparative Study of Cattle and Sheep Amoebiasis in Selected Regions of Baghdad City

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ABSTRACT

Entamoeba histolytica (E. histolytica) infection is the third great parasitic disease responsible for death in the world. Cattle and Sheep harboring E. histolytica can be the possible reservoir hosts for human amoebiasis. This study was performed microscopically to detect the infection of E. histolytica in cattle and sheep fecal samples. Our data recorded a total E. histolytica infection rate of (54%) in cattle and (50%) in sheep without any significant differences between them. One hundred fecal samples were collected from cattle and sheep from three completely different areas in Baghdad city (Al-Tarmiyah, Al-Fudhaliyah, and Abu-Ghraib). Males showed higher infection rates than females in cattle and sheep (62.5%) and (57.14) respectively. The difference between age groups with significant difference (P<0.01) was obtained in ages <1 year (72.7%) and (68.75%) in cattle and sheep respectively. This study has demonstrated the widespread of Entamoeba parasite in cattle and sheep in Baghdad city.

Keywords: Entamoeba histolytica, cattle, sheep

INTRODUCTION

Amoebiasis is a disease caused by a protozoan parasite is called Entamoeba, that can infect human, primates and wide range of animals (1,2,3). There are up to 24 species of Entamoeba, including Entamoeba histolytica, E. coli, E. dispar, E. moshkovskii, E. hartmanni, and E. polecki, that are found in the human intestinal lumen (4, 5).

After malaria and schistosomiasis, E. histolytica infection is the world’s third-leading parasitic cause of death (6). It affects approximately 180 million people, of whom 40,000 to 110,000 die each year (7, 8). Infections with E. histolytica can be found all over the world, but they are higher widespread in the tropics and subtropics. Infection spreads by food and water that are contaminated with cyst-containing feces. The vast majority of cases are caused by human carriers, also known as cyst passers, who pass cysts in partially formed or fully formed stools (9). Monkeys, sheep, and possibly pigs are naturally infected with E. histolytica, although these animals do not have the disease (10).

Entamoeba infections can result in either harmless intestinal colonization, or invasion of the colonic wall that damages other tissues, such as liver, lung and brain. Most
Entamoeba infections are asymptomatic as the commensal parasites only colonize the human intestinal tract and not cause any disease (11). Although E. histolytica, E. dispar and E. moshkovskii are morphologically identical, the pathogenicity of E. dispar and E. moshkovskii remain unclear (12).

The domestic animals, living in intimate contact with man in rural areas, constitute a high risk for transmission of infection with these protozoal agents to man (13, 14). These protozoa are of public health concern as they may cause infection and severe illness in human. Infections are mostly self-limiting in people with normal immune system, but infection can be life threaten in people who have compromised immune system (15).

E. moshkovskii, E. histolytica, and E. dispar are morphologically indistinguishable; therefore, it is not possible to differentiate the three species based on traditional microscopic examination. In the identification of E. histolytica, novel approaches are used, based on detection of E. histolytica specific antigen and DNA in stool and other clinical samples Molecular diagnostic tests, including nested PCR, are developed for the detection and differentiation of E. histolytica, E. dispar, and E. moshkovskii in clinical samples (16). The aim of this study was to determine Entamoeba spp among cattle and sheep in Baghdad city, Iraq.

MATERIALS AND METHODS

Fecal Sample Collection

The procedures used in this study were reviewed and approved by the Scientific Committee at the University of Baghdad’s College of Veterinary Medicine in compliance with animal welfare ethical standards. A total of one hundred fecal samples were collected from cattle and sheep from different areas in the Baghdad city. Samples included 23 from sheep and 23 from cattle from Al Tarmiyah area, 16 sheep and cattle from Al- Fudhaliyah and 11 sheep and cattle from Abu Ghaib area during the 1/12/2019 to 30/11/2020. Fecal samples were collected in capped fecal containers and transported in cold box to the Parasitology laboratory, College of Veterinary Medicine, University of Baghdad.

Microscopic Examination

About ½ teaspoon from each fecal sample was used and examined by direct smear preparation, using iodine stain and concentration method, for the detection and identification of parasite cyst, as described by (17). Examination of smears was made by light microscope (Olympus) under low power 10× then higher power magnification 40×.

Statistical Analysis

Statistical analysis was performed using statistical package for the social science (SPSS) version 17 for windows software and Microsoft excel 2010. Difference between groups was analyzed using χ² (chi-square) test. All these statistical tests considered that P value less than the 0.05 level was statistically significant (18).

RESULTS AND DISCUSSION

The result of the microscopic examination of 50 cattle fecal samples was 27 (54%), while infection rate in 50 sheep fecal samples was 25 (50%) (Table 1). These results agreed with (19) when they recorded infection rate of 59.5% (25/42) in cattle and 58.1% (25/43) in sheep in Al-Diwania province. Nearly similar results were previously recorded by (20) in Egypt who detected Entamoeba spp. in cattle samples at a percentage of 55.42% (143 out of 258). Our data disagreed with (21), who recorded an infection rate of Entamoeba spp reached 39.44% (71/180) in sheep in Wasit province. All these differences in studies may be due to several factors such as environmental conditions, animals’ management, different areas, size of sample and immunity. In cattle, the highest infection rate recorded in males which was 62.5%, and the lowest recorded in females which was 46.15% without any significant differences between them (P>0.05). In sheep, the highest infection rate was 57.14% and recorded in males, while the lowest was 40.9%, and recorded in females, with significant differences (P<0.05) (Table 2). This may be due to the immunosuppressive activity of testosterone (20).

Table 1. Infection rate of Entamoeba spp in cattle and sheep as examined microscopically

| Livestock | No. examined | Positive cases |
|-----------|--------------|----------------|
| Cattle    | 50           | 27             | 54          |
| Sheep     | 50           | 25             | 50          |
| Total     | 100          | 52             | 52          |
| P-value   |              | 0.746 NS       |

NS=non-significant

The age groups of cattle showed a significant difference (P< 0.05), where the highest infection rate was 72.7% and recorded in the age group>1 year and the lowest rate was 40.9% and recorded in the age groups of 2-3 years (Table 3). In sheep the highest infection rate was 68.75% and recorded in age group>1 year and the lowest was 30% and recorded in the age group 2-3 years (Table 3).

Similar findings were recorded by (20) in Egypt who found that Entamoeba spp. was 74.8% in cattle less than 12 months old which was higher than the present findings. (22) has also recorded a highest prevalence of infection Entamoeba spp. (74.8%) in cattle less than 12 months, the adult ages are less susceptible to infection compared with youngers and that may be due to the fact that adult animals
were more resistant than younger ones. This might be related to the physiological status of the animal, and the acquired immunity, that have been formed after an old infection. Furthermore, the difference of sample number, various numbers of age group, mixed rearing, bad management; season and regions of collection sample which were all together influence the infection rate (23).

The study revealed that all Baghdad areas showed the presence of cattle and sheep amoebiasis. The infection rates of cattle amoebiasis were 57.89%, 46.15% and 55.55% in Al-Tarmiyah, Abu Ghrai and AL-Fudhaliyah, respectively (Table 4). Whereas infection rate of sheep amoebiasis were 52.17%, 54.54% and 43.75% in Al-Tarmiyah, Abu Ghrai and AL-Fudhaliyah, with significant differences of (p> 0.05) (Table 4). This variation depended on methods of animal husbandry and management, grazing in open farmyard, the difference in the number of samples, contamination the water, feed, and soil with mature cysts; insect also played an important role in the mechanical transmission of cysts (24).

### Table 2. Infection rate of *Entamoeba* spp in cattle and sheep according to sex

| Host   | Male | Female | Male | Female | % Positive cases |
|--------|------|--------|------|--------|------------------|
| Cattle | 24   | 26     | 15   | 12     | 62.5             |
| Sheep  | 28   | 22     | 16   | 9      | 57.14            |

*P<0.05

### Table 3. Infection rate of *Entamoeba* spp in cattle and sheep according to age

| Age    | No. examined | No. Positive | % Positive |
|--------|--------------|--------------|------------|
| > 1 year | 11           | 8            | 72.7       |
| 1-2 years | 17           | 10           | 58.8       |
| 2-3 years | 22           | 9            | 40.9       |
| Total   | 50           | 27           | 54         |

### Table 4. Infection rate of *Entamoeba* spp in cattle and sheep according to area of study

| Area    | No. examined | No. Positive | % Positive |
|---------|--------------|--------------|------------|
| Al-Tarmiyah | 19           | 11           | 57.89      |
| Al-Fudhaliyah | 18          | 10           | 55.55      |
| Abu-Ghrai | 13           | 6            | 46.15      |
| Total    | 50           | 27           | 54         |

*P<0.05. NS=non-significant

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N/A

### CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

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دراسة مقارنة داء الأميبيا في الأبقار والاغنام في مناطق مختارة من مدينة بغداد

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الخلاصة

الإصابة بطفيلي Entamoeba histolytica هي ثاني أكبر مرض طفيلي مسؤول عن الوفاة في العالم. يمكن أن تكون الأبقار والأغنام التي تورى Entamoeba histolytica في عينات البراز من الأبقار والأغنام في مدينة بغداد. في هذه الدراسة تُكشف عن Entamoeba histolytica في عينات البراز من الأبقار والأغنام، حيث تم جمع عينة براز من الأبقار والأغنام من 3 مناطق مختلفة في مدينة بغداد، بدءًا من الأبقار والأغنام (62.5٪) في الاشجار الزيتونية (P<0.01). أظهرت هذه الدراسة أن عدد البرازات المختارة من الأبقار والأغنام مع وجود فرق معنوي مع درجة الحرارة. في الأبقار والأغنام على التوالي، أظهرت هذه الدراسة أن Entamoeba histolytica يمكن أن تكون مسببة للإصابة في الأبقار والأغنام في مدينة بغداد.

الكلمات المفتاحية: الزحار الأميبي، الأبقار، الأغنام

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