Serological Detection and Differentiation of *Entamoeba Histolytica* from Non-Pathogenic Species of *Entamoeba* Parasite

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Abstract

Background*: Entamoeba histolytica* is one of the important protozoan parasite which infect human and cause amebiasis, this parasite is worldwide distributed parasite. **Materials and Methods**: This study carried out in parasitology Lab. In Science college of University of Duhok and all stool samples were collected from Duhok (42 Samples) and Erbil (35 Samples) hospital laboratory. All stool samples (77 Samples) were examined in laboratory by microscopic and serologic (ELISA) examination.
Results: By microscopic examination detected 11 positive persons which infection rate of *Entamoeba spp.*in Duhok city were 26.1% and in Erbil city detected 8 infected persons by *Entamoeba spp*.,with 22.8% infection rate, but in serological test detected 2 positive persons with infection rate of 4.7% in Duhok city and 2 positive persons with infection rate of 5.7% in Erbil city with *Entamoeba histolytica* parasite. The current study showed that the microscopic examination for detection of *E. histolytica* wasn't exact and true method for diagnosis and the serological test (ELISA) is high sensitive to detection and differentiation between pathogenic and non-pathogenic *Entamoeba* parasite.

Keywords: *Entamoeba histolytica*, *Entamoeba species*, Parasite, Serology.

Introduction

Amebiasis is one of the important disease which caused by *Entamoeba histolytica* parasite which considered as protozoan parasite. [1]. Entamoeba histolytica is a protozoan parasite that causes amebic dysentery and liver abscess. The disease is common in tropical regions of the world, where hygiene and sanitation is often approximate. The Entamoeba parasite contains several species, the important species are: Entamoeba histolytica, Entamoeba dispar, Entamoeba moshkovskii, Entamoeba polecki, Entamoeba coli and Entamoeba Hartmanni which live in human intestinal lumen. Entamoeba histolytica is only species of this parasite which considered as pathogen parasite and infect human and other species of this parasite are nonpathogenic parasite in human body [2]. Amebiasis is one of the important gastrointestinal infection through the world and its worldwide distribution and about 50 million persons infected by this parasite which the large number of infected persons die in many countries per year. [3, 4]. There are several species of *Entamoeba* parasite, but *E. histolytica* is pathogenic species and other species of *Entamoeba* parasite are non-pathogenic parasite. In *Entamoeba spp.* parasite the *Entamoeba dispar* is morphologically identical

to *E. histolytica* but its non-pathogenic parasite. *E. dispar* infects gastrointestinal tracts in human but it's asymptomatic parasite [5]. Among amoeba parasite *E. histolytica* considered as unique parasite as results of its distribution in human intestinal mucosa which produce several diseases such as abdominal pain, intestinal damage, amoebic dysentery, and sometimes cause to extra intestinal infection in other body organs [3, 5, 6]. In developing countries there are high percentage of this parasite and cause big health problems which recorded in many researches [7]. Human infected by this parasite via ingestion of contaminated food and water with *E. histolytica* mature cysts [8, 9] and in poor sanitation areas there is high prevalence of this parasite. [10] There are several detection method in amebiasis such as microscopic, serologic and molecular methods. Fecal examination by microscope is very easy but cannot differentiate between pathogenic *E. histolytica* and non-pathogenic *E. dispar* parasite, but serological diagnosis method is one of the more sensitive detection methods which can differentiate *E. histolytica* from other species. The aims of this study were the detection and differentiation between *E. histolytica* and other non-pathogenic species of *Entamoeba* parasite. [11, 12].

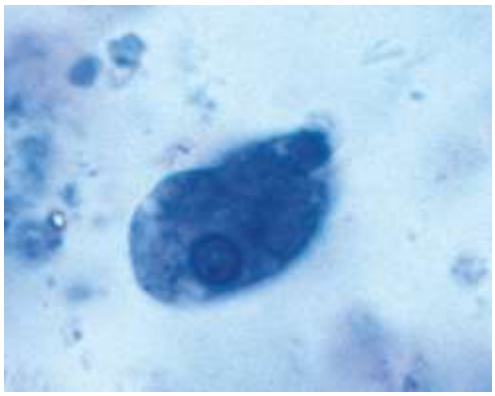

Fig. 1. *Entamoeba histolytica* trophozoites

Materials and Methods

Stool samples collected from Hospital laboratory in Duhok and Erbil cites through 3 months from the June to the August 2018. Total number of collected samples was 77 stool samples, these samples collected in Lab. stool tubes and then stored in laboratory in Lab. deep freezer of College of Science/ University of Duhok. In Lab. all stool samples were examined by microscopy in direct wet smear and Iodine staining method to detection of *Entamoeba spp.* parasite. In other stage all positive stool samples which detected in microscopic examination method, were examined by serological test (ELISA test) to detect of *Entamoeba histolytica* parasite (Pathogenic *Entamoeba species*). In ELISA test was used *E. histolytica* II kits and the working procedure was according to the manufacturer instructions of ELISA kits (bonier company) [13].

Results and Discussion

Entamoeba histolytica parasite is one of the important protozoan parasite which caused diarrhea special in children and sometimes produce other health problems in man. *E. histolytica* parasite morphologically is similar to *Entamoeba dispar* (Non-pathogenic species) parasite, and microscopically it's very difficult to differentiate between this two *Entamoeba species* parasite, therefore used serological examination for differentiation between these two pathogenic and non-pathogenic *Entamoeba* parasite. In this study the total number of collected stool samples were 77 from both

Duhok and Erbil cities (Table 1.), 42 stool samples were collected from Duhok city and detected 11 (26.1%) positive persons via microscopic examination which infected by *Entamoeba spp.* and in Erbil city by microscopic test detected 8 (22.8%) persons which were infected by *Entamoeba species*.

Table1. Prevalence of *Entamoeba species* detected by microscopic and ELISA test

City	No.of sample	Microscopy	ELISA test
Duhok	42	11 (26.1%)	2 (4.7%)
Erbil	35	8 (22.8%)	2 (5.7%)
Total number	77	19 (24.6%)	4 (5.1%)

In this study, microscopic detection rate of *Entamoeba spp*. in Duhok city is higher than Erbil city but it's not so much (Fig. 2.). The same results were recorded by Hussein [14] which she reported 10.15% of infection by *Entamoeba spp*., also in Duhok city, Omer and Bamarni, [15] recorded 15% of infection by *Entamoeba spp.* parasite, in Erbil city reported 18.6% of infection by *Entamoeba* species. Then all microscopic positive stool samples were examined by ELISA test (Table 1.) which 2 (4.7%) stool samples were positive for *Entamoeba histolytic* in Duhok city and 2 (5.7%) positive stool samples with *Entamoeba histolytica* in Erbil city. In current study in both Duhok and Erbil cities the same infected number by *Entamoeba histolytica* was recorded.

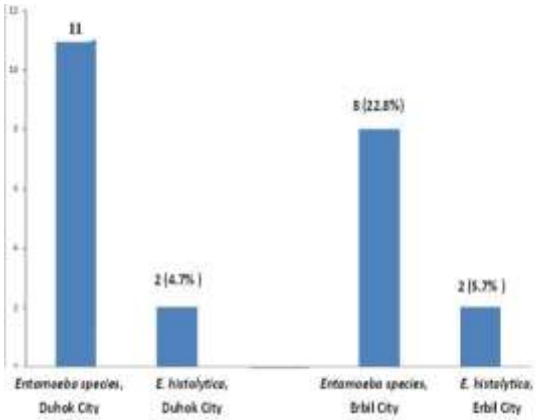

Fig. 2. Entamoeba infection in Duhok and Erbil City

Also Omer and Bamarni [15], reported serological study about *Entamoeba histolytica* infection but their findings was higher than this study records, which they recorded 10.8% of infection rate by *E. histolytica*. In another serological study [16,17] reported 14.6% of *Entamoeba histolytica* infection, which his findings were higher than our records. The total number of infected persons by *Entamoeba histolytica* parasite were 4 (5.1%) persons in both Duhok and Erbil Cities.

Conclusions

Following points concluded from current study:

1. In this study were recorded that the prevalence of non-pathogenic *Entamoeba* parasite are higher than pathogenic *Entamoeba histolytica*.
2. There are morphologically similarity between *Entamoeba histolytica* and other non-pathogenic *Entamoeba spp*. and can't differentiate between pathogenic *Entamoeba* than non-pathogenic *Entamoeba spp*. by microscopic examination.
3. Serological examination (ELISA test) is more sensitive, simple and rapid method in detection and differentiation between pathogenic and non-pathogenic *Entamoeba spp*. parasite.

Conflict of Interests.

There are non-conflicts of interest .

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الخلاصة

المقدمة: يعد *Entamoeba histolytica* واحد من هم الطفيليات البدائية والتي تصيب الانسان وتسبب داء الأميبات , حيث يعتبر هذا الطفيلي من الطفيليات العالمية الأنتشار.

المواد وطرق العمل: تمت هذه الدراسة في مختبر الطفيليات في كلية العلوم في جامعة دهوك, حيث تم جمع عينات البراز في كل من مدينة دهوك (42) عينة وفي مدينة اربيل (35) عينة في مختبر المستشفيات. جميع عينات البراز (77) عينة تم تشخيصها في المختبر بالطريقة المجهرية والسيرولوجية (الأيليزا).

النتائج: نتائج التشخيص المجهري اظهرت 11 عينة موجبة وكانت نسبة الأصابة ب*Entamoeba spp.* في مدينة دهوك وبنسبة 21.1% وفي مدينة اربيل تم تشخيص 8 حالات مصابة ب *Entamoeba spp.* وبنسبة 22.8%, من جهة اخرى بينت نتائج التشخيص السيرولوجي 2 عينة موجبة بنسبة 4.7% في مدينة دهوك و 2 عينة موجبة وبنسبة 5.7% في مدينة اربيل بالطفيلي *Entamoeba histolytica*. اظهرت هذه الدراسة ان التشخيص المجهري ليس كافيا ولايظهر النتائج المعتمدة في التشخيص في حين ان التشخيص السيروجي وخاصة فحص الأيليزا اكثر حساسية في التشخيص والتمايز بين الطفيليات الأميبية الممرضة وغير الممرضة.

الكلمات الدالة: *Entamoeba histolytica*,انواع الأميبات,الطفيليات,سيرولوجي.