

Serological detection for *Entamoeba histolytica* among cancer patients suffering from diarrhea in Thi-Qar province/ Southern Iraq

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Abstract

Cancer is a state in which cell proliferation occurs abnormally when it becomes uncontrollable and able to invade other cells. Additionally, the number of cancer patients has been clearly rising in recent years. Therefore, it is necessary to study the incidence of intestinal parasites infections in people with this disease and understand how harmful that is. Cancer patients with parasitic infections were a targets in the current study. The present study was carried out during the period of July through December 2022 in Thi-Qar province. The total number of samples was 70 cancer patients, blood samples were collected from them and examined via the ELISA system to detect the infection with intestinal parasites (*Entamoeba histolytica*). Total number of a positive patients for intestinal parasite *E.histolytica* were 11(15.7%) , analysis of serum samples for anti-amebic antibodies revealed that (15.7% and 2.85% of samples) were positive for IgG and IgM respectively, while negative for IgA. According to the ELISA findings, *E. histolytica* was the most common intestinal parasite that caused diarrhea that was reported among patients with cancer.

Key words: Amoebiasis, *E. histolytica* , cancer, serology

i. Introduction

Nearly 7.6 million people die from cancer each year, which is a significant portion of all deaths worldwide from common diseases in 2008. This makes cancer one of leading causes of death worldwide. as well as more than 70% of cancer-related fatalities take place in underdeveloped and third-world nations. It's anticipated that there will be 11 million cancer deaths worldwide by 2030 (1). Amebiasis is a disease that affects people everywhere, particularly in developing nations (2). It is spread by the oral-fecal pathway (3). The invasive *E. histolytica* is the main human zoonotic amoeba. The parasite must stick to the intestinal epithelium, which is caused degradation, then penetrate the tissue and spread to other organs (4). Children who live in developing countries, diarrhea is the biggest killer, accounting for 9% of all deaths in children under the age of five (5). One single cyst of *E. histolytica* sufficient to result in an infection (6). The most serious infection is asymptomatic, in which

trophozoites, an amoeboid parasite type, live in the lumen of the colon and eventually develop into cysts that are eventually discharged in the faeces (7). According to research, amoebiasis is the third most common that causes parasitic disease-related deaths (8). Each year, this parasite results in 40,000–100,000 fatalities (9). *E. histolytica* is more frequently associated with gastrointestinal illness in children with compromised immune systems (10). Invasive amebiasis has been identified using a variety of immunological techniques, including the enzyme-linked immunosorbent test (ELISA) and antigen kits (11).

ii. Methods:

The total number of cancer patients that were included in the current study was (70) those who entered Al-Haboubi Teaching Hospital in Nasiriya City-Thi-Qar province during the period extended from July 2022 to September 2022. The present study also included 20 healthy individuals as a control group.

Three mL of blood were obtained from each individual. It was collected under sterile conditions through vein puncture using 3 mL plastic disposable syringes. The blood was collected in a gel tube, where it was allowed to coagulate for one hour at room temperature. It was centrifuged for 10 minutes at 4000 rpm after the blood had coagulated. Subsequently, the serum was split evenly into two portions and put into Eppendorf tubes for use in immunological testing. Then store it at -20 C. (12,13).

All components, including reagents and sera, were permitted to sit at room temperature prior to use and detection of intestinal parasites infection (*E.histolytica* IgA, IgG, and IgM) via ELISA method.

iii. Results

The results of the present study showed a significant difference between the cancer patients and *E. histolytica* during the chronic phase of amoebiasis, where the patients with cancer (15.7 %) were positive for *E. histolytica* IgG in comparison with (84.2%) of patients were negative for *E. histolytica* IgG. The statistical analysis explains a significant differences between the infection with and without *E. histolytica* –IgG among cancer patients. As listed in table (1)

Table (1): Infection with *E. histolytica* -IgG among cancer patients.

<i>E.histolytica</i> IgG	Case	patients (%)	Mean
Patient	Positive	11 (15.7)	1.72
	Negative	59 (84.2)	0.63
Control	-----	20	0.15
Total NO. of patients = 70			

$$\chi^2 = 46.24 \quad df = 1.0 \quad P\text{-value} = 0.00$$

S: significant differences $P \leq 0.05$

The current study were found a significant difference between cancer patients and amoebiasis during the acute phase, when (2.85%) of cancer patients having a positive IgM result compared to (97.1%) of cancer patients having a negative IgM result for *E. histolytica*. The differences between *E. histolytica* infection in the acute phase and cancer patients were shown in table (2).

Table (2): Infection with *E. histolytica*-IgM among cancer patients.

<i>E. histolytica</i> IgM	Case	patients (%)	Mean
Patient	Positive	2 (2.85)	1.06
	Negative	68 (97.1)	0.35
Control	-----	20	0.15
Total NO. of patients = 70			

$$\chi^2 = 88.36 \quad df = 1.0 \quad P\text{-value} = 0.00$$

S: significant differences $P \leq 0.05$

E. histolytica-IgA revealed a negative result were it was not reported infection with *E. histolytica* among the target patients during the following study, as shown in table (3).

Table (3): Distribution of *E. histolytica* (IgA) among cancer patients

<i>E.histolytica</i> IgA	Case	patients (%)	Mean
Patient	Positive	Zero	-----
	Negative	70(100)	0.35
Control	-----	20	0.15
Total NO. of patients = 70			

The age of cancer patients who has parasitic infection with *E. histolytica* that were also checked based on the requirements of the current study and the statistical analysis showed a significant difference as explained in table (4), where the high rate of parasitic infection was reported among cancer patients with (51-60) age group while the low rate of parasitic infection was reported among (21-30) age groups of cancer patients .

Table (4): Age of cancer patients with parasitic infection.

Age group	patients (%)
10 - 20	1 (9.09)
21 - 30	0.00
31 - 40	1 (9.09)
41 - 50	2 (18.18)
51 - 60	3 (27.2)
61 - 70	2 (18.18)
71 - 80	2 (18.18)

$$\chi^2 = 135.58 \quad df = 6 \quad P\text{-value} = 0.00$$

S: significant differences $P \leq 0.05$

There was a significant difference based on the sex of cancer patients with (*E. histolytica*). Table (5) explains the statistical analysis and the distribution of parasitic infection among cancer patients based on their sex where it was reported the rate of infection with parasites among male with cancer were (18.1%) of *E.histolytica* .

Table (5): sex of cancer patients with *E. histolytica* infection.

$$\chi^2 = 73.17 \quad df = 1.0 \quad P\text{-value} = 0.00$$

S: significant differences $P \leq 0.05$

The following table (6) provides a statistical analysis of the findings, which did not reveal a significant difference between the residency of cancer patients and parasitic infections. Cancer patients whom are lived in rural cities showed that the rate of infection with *E.histolytica* were (36.3%).

Table (6): Residency of the cancer patients with parasitic infection.

Residency	patients (%)
Urban	4 (36.3)
Rural	7 (63.6)
Total	11

$$\chi^2 = 3.99 \quad df = 1.0 \quad P\text{-value} = 0.13$$

N.S: Non-Significant differences $P > 0.05$

iv. Discussion.

¹ *E. histolytica*, a parasitic protozoan that causes amebiasis and responsible for 100,000 of fatalities annually, which is consider a second after malaria in terms of mortality that brought by protozoan parasites. It is spread by the oral-fecal pathway and, to a much lesser extent, during sexual contact (Humans are susceptible to developing liver abscesses and amebic colitis from the enteric tissue-invasive protozoan parasite *E. histolytica* (2) (7).

The total number of a positive patients for intestinal parasite *E.histolytica* in the current study were 11(15.7%) . The results of the analyzing specimens by ELISA test revealed 11/70 from diarrheic and non-diarrheic cancer patients with *E.histolytica* . Consequently, analysis of serum samples for anti-amebic antibodies from diarrheic and non-diarrheic cancer patients revealed that (15.7%) of them were positive for IgG. The level of IgM were (2.85%) of the rate of infection with *E. histolytica*, This could be related to the recent of a pathogen infection because the IgM its first antibody is produced by the adaptive immunity of an individual in response to a foreign antigen (14). This study is dissimilar to another study that was conducted on the forty samples that were collected from hospitals in Babylon province in /Iraq to detect immunoglobulin IgG and IgM for *E. histolytica* and *E. dispar* by using the ELISA method. (15). The current study were disagree with study was conducted to in Kirkuk Teaching Hospital, Al-Najaf cities in Iraq and Philippines (16), (17),(18). The present study was supported by another study that accomplished in Iran and Saudi Arabia (19). (20).

ELISA results showed that both the diarrheic and non-diarrheic patients studied in the current investigation had absent anti-amebic IgA levels. This study is inconsistent with

a study conducted in Baghdad / Iraq (21). The following study was incompatible with other studies in the Philippines (17). According to the findings of the current study, 51 to 60

Sex	patients (%)
Male	2 (18.1)
Female	9 (81.8)
Total	11

years old is the most afflicted age group with *E. histolytica* infection (19).

Several studies have supported the present result, for instance, a study of 50 samples taken from patients in Najaf City /Iraq (22). The current study is dissimilar to the study conducted in Kirkuk Teaching Hospital in Iraq (23). The results of the following study indicated that female patients had an 81.8 % higher risk of *E. histolytica* infection than male patients (18.1%)This . could be due to a variety of factors such as a lower quality of life from living in poor conditions, varying occupations, education levels, family sizes, and socioeconomic status. This finding of current research is supported by another research conducted in Erbil, Iraq (24). Furthermore, the current study is dissimilar to the study conducted at Kirkuk Teaching Hospital (23).

The distribution of *E. histolytica* infection according to their residency in the current study were higher by recording 63.6 % in rural areas compared to urban areas, due to several factors, including incorrect hand washing, contamination of drinking water with *E. histolytica*, socioeconomic status, family size, educational background, and open-air feces. (25). A research project were conducted in Iraq's Thi-Qar Province showed that The bulk of *E.histolytica*-infected individuals were high whom lived in rural areas, while it was low among them whom lived in urban areas (26). Another study were achieved on cancer patients whom entered the unit of oncology Kirkuk Teaching Hospital, Iraq were dissimilar with the present study (16).

Conclusions: Patients with cancer had chronic infections with *E. histolytica* and the most common intestinal parasite causes diarrhea that was reported among patients with cancer was *E. histolytica*.

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