Short Communication

Impact of Entamoeba histolytica on the human body

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Abstract

Background: Entamoeba histolytica is a unicellular, protozoon parasite of humans. It moves by a jelly-like tongue-like protrusion of the cytoplasm "pseudopodium". Infections by this parasite lead to distinct clinical manifestations, including diarrhea, mild abdominal pain, loss of appetite, fatigue, dysentery, and hepatic liver abscess.
Methods: In this paper, we discussed about Entamoeba histolytica disease, its epidemiology**,** pathophysiology**,** hygiene, causes, risk factors, clinical manifestation and complications, method of transmission, diagnosis, treatment, and incubation period in human body.
Results: It is the second leading cause of death. It was diagnosed by taking a complete history and testing stool samples for the presence of E. histolytica cysts. It was treated pharmacologically and surgically.
Conclusion: We have concluded that the Entamoeba histolytica is an infection mostly related to fecal-oral transmission due to poor hand hygiene, defecation into water sources such as rivers, and being near animals, and gay or bisexual males due to the risk of fecal-oral contamination through oral and anal sex. It is the second leading cause of death from parasitic intestinal disease worldwide.

Key Words: Entamoeba histolytica, epidemiology**,** pathophysiology, hygiene, incubation period, human body

Article Summary: Submitted:13-October-2022 **Revised:**12-November-2022 **Accepted:**16-December-2022 **Published:**31-December-2022

Quick Response Code:

Web Site

http://ijmsnr.com/

DOI

10.55349/ijmsnr.20222458

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Introduction

Entamoeba histolytica is a unicellular, protozoon parasite of humans. It moves by a jelly-like tongue-like protrusion of the cytoplasm "pseudopodium" [1] Infections by this parasite lead to distinct clinical manifestations, including diarrhea, mild abdominal pain, loss of appetite, fatigue, dysentery, and hepatic liver abscess. [2]. In this paper, we discussed about Entamoeba histolytica disease, its epidemiology**,** pathophysiology**,** hygiene, causes, risk factors, etc.

Epidemiology:

It is the second leading cause of death from the parasitic intestinal disease worldwide, following cryptosporidiosis. The exact extent of morbidity and mortality is currently a point of contention. Yearly estimates suggest that it infects approximately 50 million people worldwide and killing 40,000–100000 people approximately. In fact, amebiasis was responsible for 55,500 deaths worldwide in 2010. Worldwide the Infection occurs, with a higher prevalence in countries of low socioeconomic status and poor public health.

Pathophysiology:

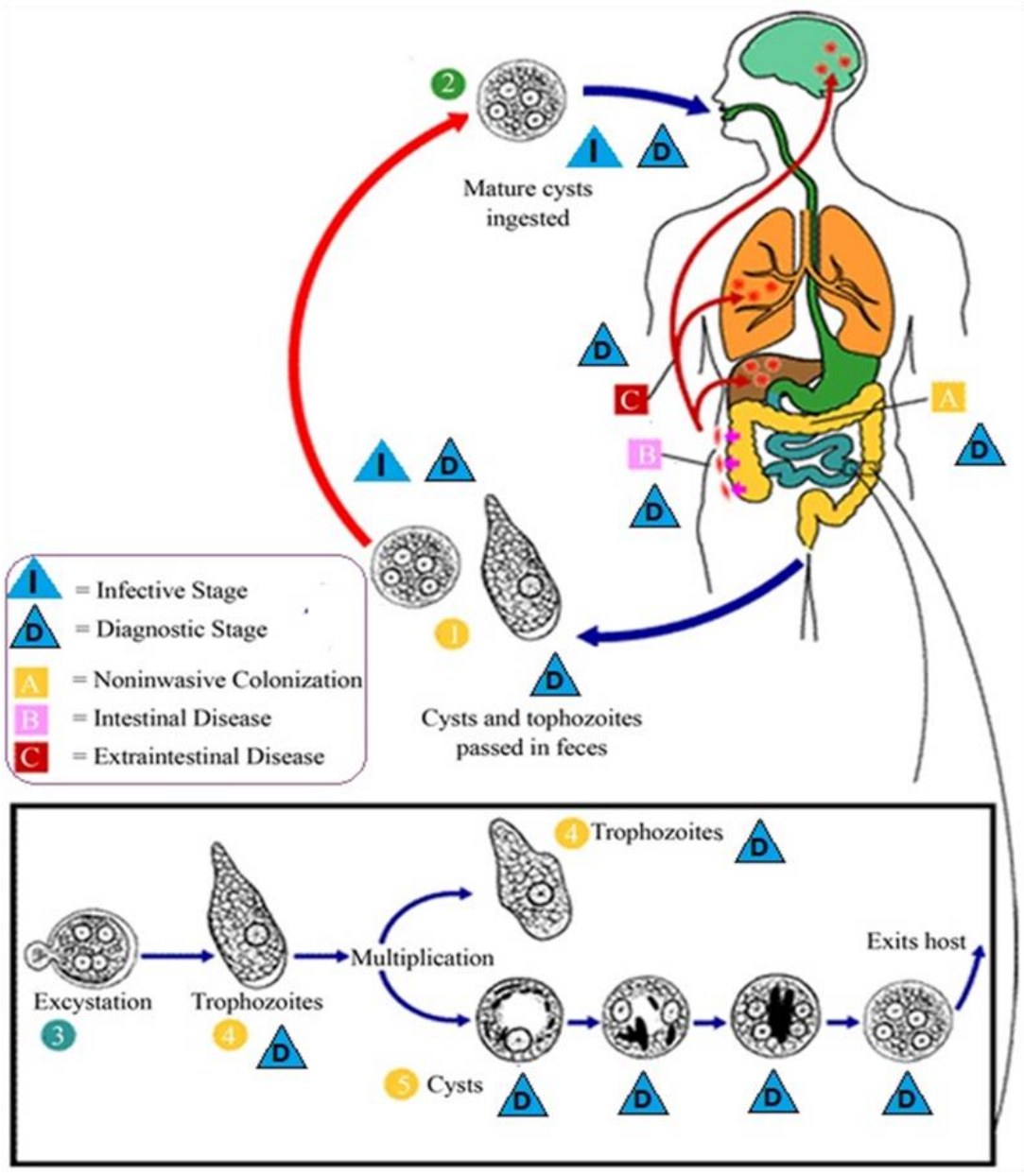
During this first step in the human body, the cyst will start differentiating into trophozoites upon its passage through the stomach and small intestine as shown in **Figure – 1**. Then, once in the colon, the trophozoites bind to enterocytes, colonize the colon, and survive. For

How to cite this article: Sharif BO, Ali ZR, Mohammed HM. Impact of Entamoeba histolytica on the human body. Int J Sci and Med Res 2022;2(4):5-8

unknown reasons, the invasion process into the tissues starts when the trophozoites residing in the colon disrupt the gut barrier.

These events need parasite adhesion to human cells, carried out by a set of proteins called virulence factors at the trophozoite surface. Amoebic cysteine can also contribute to trophozoites' ability to suppress a host's immune response by being able to cleave and inactivate anaphylatoxins C3a, C5a, IgA, and IgG. Trophozoites can reach other areas of the body, most commonly the liver, which can cause tissue necrosis and abscess formation. [3]

Figure – 1 Following diagram shows life cycle of Entamoeba Species and its relationship with the host [4]



Causes and risk factors of Entamoeba histolytica:

Infections are mostly related to fecal-oral transmission due to poor hand hygiene, defecation into water sources such as rivers, and being near animals. In developed countries such as the United States, amebiasis infections are rare, accounting for at least five deaths per year, and are commonly seen in individuals exposed to endemic areas, such as immigrants or recent travelers. [5] Amoebic colitis generally affects males and females of all ages equally. There are reports of increased risk of infection from gay or bisexual males due to the risk of fecal-oral contamination through oral and anal sex. Factors that are associated with increased risk for complicated infection and mortality are associated with the following: pregnancy, corticosteroid treatment, malignancy, malnutrition, and alcoholism. Amoebic liver abscess infections are at least three times more likely to affect middle-aged men between 18 and 50. [2]

The incubation period of Entamoeba histolytica:

The incubation period for amebiasis is variable. Entamoeba histolytica is spread by the fecal-oral route by an infected person, so it is contagious. The contagious period lasts as long as the infected patient excretes cysts in their feces. Consequently, the contagious period may last weeks to many years if untreated. [6]

Clinical manifestation and complications of Entamoeba histolytica:

Infection is usually asymptomatic or has vague clinical symptoms. Early symptoms (in about one month) after ingestion of the cysts; include diarrhea and mild abdominal cramping; (however, the range may be from a few days to years), loss of appetite, fatigue, loss of body weight, flatulence, dysentery, and hepatic liver abscess. If the trophozoites reach the intestinal walls and go through them, may produce symptoms, and the complications start with a specific organ and lead to severe illness main complications such as liver infection and tenderness and lung, liver, and brain abscesses. Toxic megacolon, and rational rectal fistula, also increased the risk for cancer. The fever is related to liver abscess formation and affects other organs such as the heart, lungs, and brain (meningoencephalitis). Finally, sometimes, it leads to death. [2, 6, and 7]

Method of transmission of Entamoeba histolytica:

Infection occurs through fecal-oral transmission, wherein the mature cyst of E. histolytica from fecal-contaminated food or water is ingested. Entamoeba histolytica infection is particularly problematic in developing nations due to less capacity for sanitation and hygiene practices. Common complications spread through blood circulation into the brain, liver, spleen, lungs, and gonads. Here the trophozoites of E. histolytica invade and destroy the tissues causing amoebic abscesses. The liver is the most typical site of E. histolytica in a human being. The affected liver becomes enlarged, congested, and painful to touch. This pathological condition is to as amoebic hepatitis. [3] The infection begins with ingesting focally contaminated water or food, in which E. histolytica cysts can be found. During this first step in the human body, the cyst will start differentiating into trophozoites upon its passage through the stomach and small intestine. Then, once in the colon, the trophozoites bind to enterocytes, colonize the colon, and survive. For unknown reasons, the invasion process into the tissues starts when the trophozoites residing in the colon disrupt the gut barrier. These events need parasite adhesion to human cells, carried out by a set of proteins called virulence factors at the trophozoite's surface. [2]

Diagnosis of Entamoeba histolytica:

This condition is diagnosed by taking a complete history and testing stool samples for the presence of E. histolytica cysts. Liver function and Serological tests, Enzyme-linked immunosorbent assay (ELISA), Ultrasound of the liver, CT scan of the liver, and perhaps other organs, and Colonoscopy of the large intestine to search for parasites. [2, 6]

Treatment of Entamoeba histolytica:

Pharmacological treatment: some symptomatic infections may be treated with medications that eliminate the parasite from inside the intestines or other areas of the body.
- Surgical treatment: infrequently may be needed to remove large abscesses or if certain other complications, such as gastrointestinal bleeding or perforation of the intestinal tract. [6]

Complications of Entamoeba histolytica:

- Asymptomatic infection
- Symptomatic noninvasive infection
- Fulminant amoebic colitis with perforation
- Toxic megacolon
- Chronic non-dysenteric colitis

Extraintestinal conditions resulting from E. histolytica infection include the following:

- Liver abscess
- Pleuropulmonary disease
- Brain abscess
- Peritonitis
- Pericarditis
- Genitourinary disease
- Perianal cutaneous amebiasis
- Hepatic vein thrombosis
- Inferior vena cava thrombosis
- Ameboma
- Appendicitis [6]

Prevention Entamoeba histolytica:

The main role of nurses and all health care workers to educate people in a community to protect themselves from this condition; generally,

amebiasis can be prevented by:
- stopping the fecal contamination of food and water and correcting poor sanitation.
- Identification and treatment of food handlers or other parasite carriers can reduce the chance of getting food-borne amebiasis.
- Avoiding sexual practices involving fecal-oral contact may also reduce the chance of getting
the disease.
- Avoiding malnutrition and alcohol use can reduce the risk of the disease.

Prevention of infection is entirely a matter of hygiene, both personal and community prophylaxis.

Personal and community prophylaxis:

1. Use boiled drinking water and avoid drinking water supplied by pollution.
2. Protection of all food and drink from contamination by houseflies and cockroaches.
3. Avoid consuming raw vegetables, improperly washed vegetables, and raw salads.
4. Cutting fingernails regularly, washing hands with soap before preparing meals and after eating food, changing diapers, and using the toilet.
5. Personal cleanliness and elementary hygienic conditions should be observed during meals.
6. Effective disposal of sewage.
7. Proper sanitation of roads and lanes. [8].

Conclusion

We have concluded that the Entamoeba histolytica is an infection mostly related to fecal-oral transmission due to poor hand hygiene, defecation into water sources such as rivers, and being near animals. It is the second leading cause of death from parasitic intestinal disease worldwide, and this parasite leads to distinct clinical manifestations, including diarrhea, mild abdominal pain, loss of appetite, fatigue, dysentery, and hepatic liver abscess. During this first step in the human body, the cyst will start differentiating into trophozoites upon its passage through the stomach and small intestine. Then, once in the colon, the trophozoites bind to enterocytes, colonize the colon, and survive. However, ninety percent of people are asymptomatic for this infection, but still, it has many dangerous complications if not treated immediately, such as liver and brain abscesses, Pericarditis, Genitourinary disease, Hepatic vein thrombosis, and Appendicitis. Because prevention is crucial to prevent this contagious disease, such as; personal cleanliness and elementary hygienic conditions should be observed during meals, stopping the fecal contamination of food and water and correcting poor sanitation, avoiding sexual practices involving fecal-oral contact, and avoiding malnutrition and alcohol.

Author Contributions:

BOS, ARA, HMM – Conceived and designed the article. Wrote the full paper and checked by all the authors.

Here, **BOS** – Bayan Omar Sharif, **ZRA** – Zhino Raouf Ali, **HMM** – Hawar Mardan Mohammed

Conflict of Interest:

The author not having any kind of conflict of interest in this study.

Source of funding:

We didn't receive any kind of financial support from any institutions or organizations.

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