GSC Biological and Pharmaceutical Sciences
eISSN: 2581-3250 CODEN (USA): GBPSC2
Cross Ref DOI: 10.30574/gscbps
Journal homepage: https://gsconlinepress.com/journals/gscbps/

(REVIEW ARTICLE)

Revision of public health and clinical importance of amoebiasis in Iraq

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GSC Biological and Pharmaceutical Sciences, 2022, 19(03), 329–333

Publication history: Received on 18 May 2022; revised on 26 June 2022; accepted on 28 June 2022

Article DOI: https://doi.org/10.30574/gscbps.2022.19.3.0247

Abstract

Amebiasis, related to the pathogenic parasite *Entamoeba histolytica*, is a prominent cause of diarrhea globally. Amebiasis is primarily a disease of impoverished communities in developing nations, although it has recently arisen as a significant infection among returning tourists and immigrants. Severe cases are linked to a high case fatality rate. Although polymerase chain reaction (PCR)-based diagnosis is becoming more widely available, it is still underutilized. Treatment with nitroimidazoles is now suggested, however novel parasite medication research is a top priority. To avoid problems, amebiasis should be considered before corticosteroid therapy. Because there is no effective vaccination, sanitation and availability to clean water are the mainstays of prevention. The article aimed to identify the methods Future tailored therapeutic and previous studies to a better understanding of parasite biology and disease.

Keywords: Amoebiasis; *Entamoeba histolytica*; Public Health; Trophozoites; Iraq

1. Introduction

The World Health Organization (WHO) and Pan American Health Organization (PAHO) describe amebiasis as infection with *Entamoeba histolytica*, regardless of symptomatology (1). This protozoan parasite has a global distribution and is particularly prevalent in regions with poor socioeconomic and sanitary circumstances. (2) Infections may be seen in tourists to and emigrants from endemic areas in resource-rich countries. Most infections are asymptomatic, but tissue penetration can lead to amebic colitis, potentially fatal hepatic abscesses, and even hematogenous dissemination to distant organs (3&4). Importantly, sickness can arise months to years after exposure and must be considered in at-risk populations. Technological advances in molecular biology have transformed our understanding of this organism (4). Most notably, other *Entamoeba* species that are morphologically indistinguishable from *E.histolytica* have been identified in humans (2). New clinical algorithms are being created as our understanding of the global epidemiology and pathogenicity of Entamoeba spp grows (1) The most recent nomenclature and recommendations, while unfamiliar and baffling to many, are critical for providing optimal patient care. What is known about these is discussed in our review (4). *Entamoeba* spp. and summarizes the widely accepted diagnostic and therapeutic guidelines.

Amoebiasis affects 50 million people worldwide, with an annual mortality rate of 40,000 to 100,000. (1). This high infection rate is most likely inflated by false positives caused by morphologically identical, nonpathogenic *E. dispar/moshkovskii* and/or polymorphic nuclear leukocytes and macrophages with similar morphology in stool samples (5).

1.1. Classification of Amoebasp

- Domain:Eukaryota
- Phylum: Amoebozoa

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- Class: Tubulinea
- Order: Euamoebida
- Family: Amoebidae
- Genus: Amoeba (6).

2. Species of *Amoeba*

Humans and animals contain a variety of species. *Entamoeba histolytica* is the pathogen that causes invasive'amoebiasis' (which includes amoebic dysentery and amoebic liver abscesses). Others, such *Entamoeba coli* (not to be confused with *Escherichia coli*) and *Entamoeba dispar*, are completely harmless. All *Entamoeba* species are located in the intestines of the animals they infect, with the exception of *Entamoeba gingivalis*, which dwells in the mouth, and *E. moshkovskii*, which is frequently isolated from river and lake sediments. *Entamoeba*invadens is a species that can cause an illness in reptiles that is comparable to *E. histolytica. E. invadens*, unlike other species, develops cysts in vitro in the absence of bacteria and is used as a model system to investigate this aspect of lifecycle.Many other Entamoeba species have been described, and it is likely that many more are yet to be discovered. (7).

3. Morphology of *Amoeba*sp

Entamoeba cells are small, with a single nucleus and a single pseudopod forming a distinct anterior bulge. They have a straightforward life cycle. The trophozoite (feeding-dividing form) has a diameter of 10-20 m and feeds primarily on bacteria. It divides into two smaller daughter cells via simple binary fission. Almost all species produce cysts, which are used in transmission (the exception is *Entamoeba gingivalis*). These can have one, four, or eight nuclei and vary in size depending on the species; these characteristics aid in species identification (8).

4. Life cycle

Entamoeba spp. does not require a vector for transmission and infects in a cyst-resistant form, typically through the ingestion of contaminated water or food. Excystation occurs in the terminal ileum, where the cysts produce motile and potentially invasive trophozoites (amoebae). The amoebae proliferate in this location and may accumulate as polyploid cells that adhere to the mucosal surface and invade the large intestine, causing diarrhea and colitis. The majority of these infections are self-limiting, and the amoebae are transformed back into cysts that are excreted with the feces, restarting the cycle in other hosts (9&10). (Fig 1).

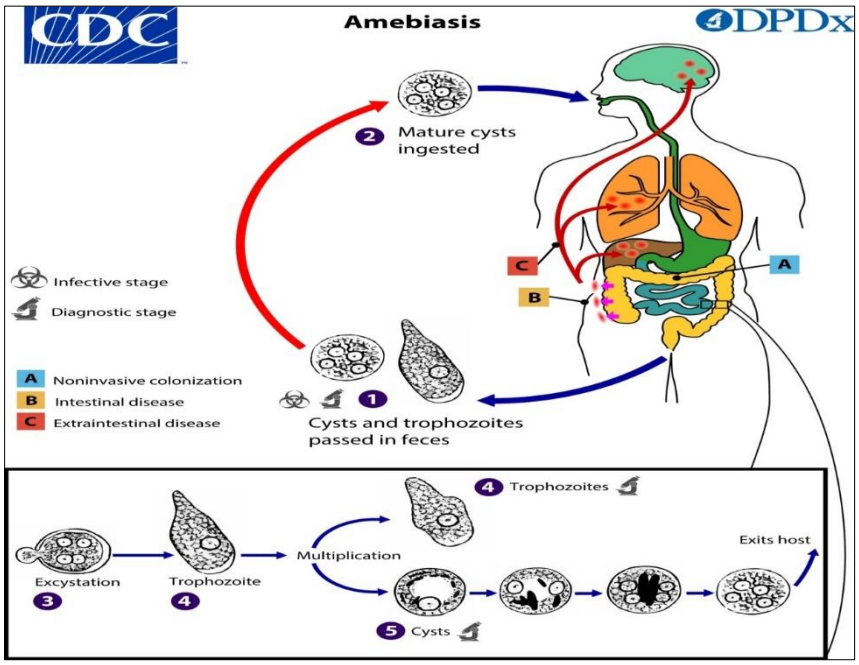

Figure 1 life cycle of Entamoeba spp

5. Pathogensis

Amoebae are well-known pathogens in both human and veterinary medicine. Several species have been classified as pathogens or opportunistic pathogens in human medicine. Among these species, the free-living amphizoic amoeba *Acanthamoeba spp., Naegleriafowleri, Balamuthia mandrillaris,* and *Sappinia* sp. (11), *Endolimax nana or Iodamoebabuetschlii* as the purest form of end commensals particularly *E. histolytica*, but also other opportunistic species such as (*E. coli*). Because amphyzoic amoebae, unlike true parasites, are not well adapted to parasitism, they tend to be very aggressive within the host, resulting in their death in the majority of cases. *Entamoeba histolytica* is the only pathogenic endocommensal or endoparasite species found in the human intestine.*Entamoeba dispar, E. moshkovskii, E. hartmanni, E. coli, E. polecki, Endolimax nana, and Iodamoebabuetschlii,* on the other hand, are very common and are usually considered non-pathogenic. *Entamoeba histolytica* infections typically include an intestinal phase ranging from asymptomatic colonization to severe invasive infections (dysentery, colitis); and an extraintestinal phase affecting the liver (amoebic liver abscess), with eventual progression to other organs (lung, brain, heart) via blood dissemination (12).*Iodamoebabuetschlii* has also been linked to the development of brain granuloma (13). Amphyzoic amoebae have been found in a variety of vertebrates, including non-human primates, dogs, bulls, horses, sheep, and kangaroos (14), and their pathogenesis varies depending on the species. They usually cause granulomatous inflammatory lesions in nervous tissue, but they can also cause lesions in other organs or even systemic infections. Endoparasitic amoeba have also been described in other vertebrates with varying degrees of pathogenicity. *Entamoeba nuttalli and Entamoeba invadens* are closely related species with similar pathogenicity that can affect nonhuman primates and reptiles, see (15).and citation herein, In addition to the role of primary pathogens in human and animal diseases, the recently described role of amoeba as reservoirs for human and animal pathogenic bacteria should be highlighted (16). Concerning these unusual associations of amoebae with internalised bacteria, it is particularly interesting to compare this relationship with the association of macrophagic cells, a cell type also distinguished by the ability to develop pseudopods, with several intracellular pathogenic bacteria such as Chlamydia and Rickettsia, as well as pathogenic bacteria that develop autophagy mechanisms (17).

5.1. Review of some previous studies of Amebiasis in Iraq

Infection with E. histolytica is contracted by ingesting cysts from fecally contaminated food or water. As a result, *E. histolytica* is a waterborne and foodborne parasitic protozoa in developing countries. In Iraq, the most likely sources of *E. histolytica* infection are human sewage contamination of various sources of drinking water, as a result of direct dumping of untreated sewage into rivers or leaking sewage pipes or septic tanks, resulting in contaminated drinking water network and ground water. In Baghdad, Iraq's capital, the contamination proportion of tap water and sewage with *E. histolytica* was 10% and 30%, respectively. (18). Residents of village's offeredexcessiveincidence of *E. histolytica* (17.85%). This might also additionallyreplicate the shortages of purified water resources and compromised sanitation with inside the villages of Babylon and Basrah provinces in which the samples of stools have been taken and examined. The infection of consuming water with *E. histolytica*becamepronounced to be 8% in Basrah marshes villages, south of Iraq (19). Recorded incidence of *E. histolytica/dispar* in Iraq became 20.61%. The *E. histolytica/dispar*incidence in Iraq. (20)

Most of included examinations were distributed online after 2003 since there was no web access before that in Iraq. The pervasiveness of *E. histolytica* expanded from 5.98% in 1990–1999 to 26.68% in 2000–2009. The modest number of distributed investigates in 1990–1999 could be the justification behind the lower predominance. The most noteworthy pervasiveness of *E. histolytica* was connected with the years 2000 2009, that prompted the resettlement and interior dislodging of millions and this was related with unfortunate sterilization and restricted admittance to wellbeing administrations. The general pervasiveness *E. histolytica* in Iraq has announced a decline (18.46%) in 2010–2017 contrasted with 26.68% in 2000–2009. This general reduction could be a mark of progress in the disinfection and water supplies quality. Despite that, this might recommend that *E. histolytica* is as yet thought to be as a medical problem in Iraq. in Thi-Qar Province, were recorded as having amoebiasis, which represented the most noteworthy extent of diseases in 2015 (26.1%) and the least in 2020 (8.1%)(21). Amoebiasis was dispersed among all age gatherings, with the age gathering of 5-14 years representing the most noteworthy extent (27.3%). The review kept a higher extent of diseases in rustic regions than in metropolitan regions, which is viable with past investigations, for example, those directed by (22).

(23) Which discovery of significant harmfulness element of *Entamoeba histolytica* by involving PCR strategy in Al-Qadisiyah (24) location of *Entamoeba histolytica*Trophozoites in stool by utilizing Real-time-PCR measure in view of phosphoglycerate kinase quality in Holy Karbala in Iraq. The disease rates varied by age, and were most noteworthy in the 5-14 age bunch. Variety in gastrointestinal parasitic contaminations by age is normal, as day to day exercises and conduct propensities assume a significant part in deciding the time and sort of openness to the infective phase of the

parasite (25). Detection pervasiveness of gastrointestinal parasite among the going to people groups to Al-Hashimyah medical clinics for quite a long time, Babylon region, Iraq (26).

There was high heterogeneity in predominance contamination with *E. histolytica* in Iraq among the included investigations. This is uncovering the varieties that might have been because of populace of the review, discovery strategy, region and year of study.

6. Treatment

Treatment Colonization with *E. histolytica* ought to be treated with a luminal specialist. Oral medications that are compelling against luminal contamination incorporate diloxanidefuroate (accessible just through the Centers for Disease Control and Prevention; causes successive gastrointestinal aggravations and interesting diplopia), paromomycin (seldom causes ototoxicity and nephrotoxicity however often causes gastrointestinal unsettling influences), and iodoquinol (seldom causes optic neuritis and decay with delayed use). The suggested term of treatment with paromomycin is 7 days, with diloxanidefuroate is 10 days, and with iodoquinol is 20 days (27). For a situation where luminal specialists can't be utilized, it appears to be a sensible (if dubious) way to deal with treat luminal disease with metronidazole and test for fix with the stool antigen location test. Antibodies for security from gastrointestinal disease. Progress in this field proceeds, in any case, to move at a quick speed. It is invigorating to consider that since people are the main huge repository of disease, an antibody that hindered colonization could prompt end of amebiasis.

7. Conclusion

Amebiasis, an ailment because of this parasite because the 1/3 main motive of loss of life after malaria and schistosomiasis. Besides people, *E. histolytica* additionally infects non-human primates, dogs, cats, and crimson pandas with very various proportions. Although, this parasite can infect numerous forms of mammals. However, s encysts with inside the intestinal lumen of animals that is a critical element with inside the transmission of this parasite. And conversely, subclinical amebiasis in people acts because the dominant host for transmission of this parasite both from human to human or from human to animal.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest.

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