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Recurrent Symptomatic Amoebiasis in a Rural Kenyan Hospital: A Case Report

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ABSTRACT

Entamoeba histolytica is an extraintestinal protozoa that is feco-orally transmitted and exists as cysts or trophozoites, which may cause either asymptomatic infection or invasive intestinal and extraintestinal disease, respectively. Most infections (amoebiasis) are found in communities with poor environmental sanitation and unhygienic water and food handling practices. Recurrent symptomatic amoebiasis is associated with significant personal and public health cost implications and warrants a deliberate and thorough search for a source of the feco-oral transmission. In this study, we present a case of a woman with recurrent symptomatic amoebiasis to underscore the importance of a detailed social history in establishing source control in the case management of amoebiasis.

INTRODUCTION

Amoebiasis is a parasitic disease caused by the extracellular intestinal protozoa *Entamoeba histolytica* (i.e., *E. histolytica*), which is the most common cause of symptomatic disease. Three other species of intestinal amoebae are morphologically identical to *E. histolytica* and include *E. dispar*, *E. bangladeshi*, and *E. moshkovskii*. The pathogenicity of the non-histolytica species is unclear, with *E. dispar* generally considered non-pathogenic. Amoebiasis occurs worldwide, with a disproportionately higher prevalence in developing and low-income countries due to low socioeconomic status and poor sanitation conditions, e.g., in India, Africa, and parts of central and south America (Carrero *et al.*, 2020). A systematic scoping study showed wide variations in the prevalence of amoebiasis

in Eastern Africa, i.e., 4.6-15.3% (Ethiopia), 5.9-58.3% (Kenya), 54.5% (Rwanda), 0.7-2.7% (Sudan), and 19.93% (Uganda) (Ngowi, 2020). The parasite exists in a cyst form (the infective stage) and a trophozoite form (which causes invasive intestinal disease). Infection occurs when amoebic cysts are ingested in contaminated food or water via the feco-oral transmission route. Sexual transmission may also be seen in men having sex with other men. The cysts pass through the stomach to the small intestines, where they excyst in the terminal ileum to form invasive trophozoites. The latter can invade the mucosae of the colon to cause invasive bloody diarrhea (amoebic dysentery) (Marie & Petri, 2013) or cause extra-intestinal disease, e.g., amoebic abscess in the liver (Usuda *et al.*, 2022), and in the brain and lungs (Petri &

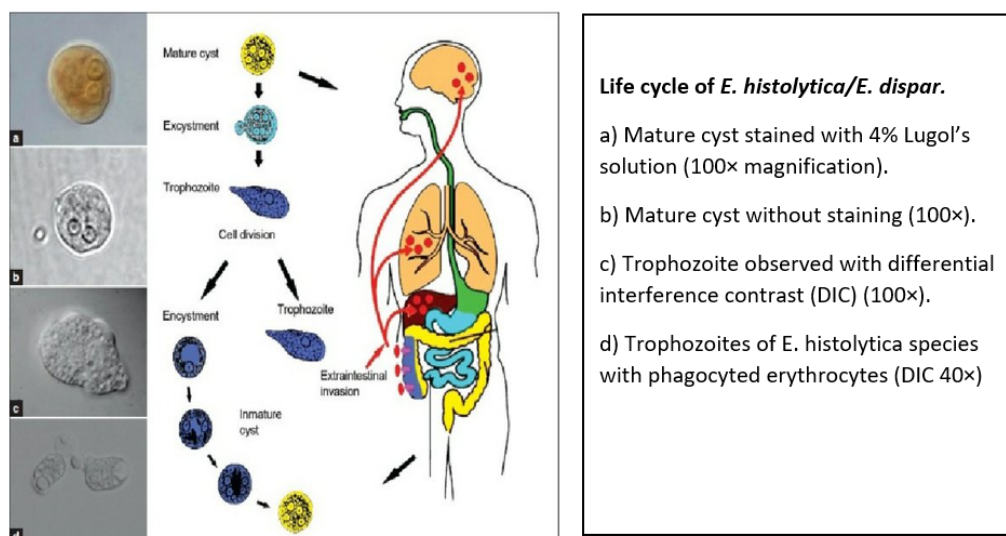


Figure 1: Life cycle of *E. histolytica*/*E. dispar*. (Ximénez *et al.*, 2011)

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Haque, 2013; Shamsuzzaman & Hashiguchi, 2002). A diagnosis can be made by various methods, including stool microscopy, which demonstrates amoebic cysts and trophozoites; rapid antigen detection in stool or serum; molecular detection using polymerase chain reaction (PCR); antigen and antibody detection by serology; and histology from colonic samples (Saidin *et al.*, 2019). Figure 1, adapted from the excellent review by Ximenez and colleagues, illustrates the life cycle of *E. histolytica* and *E. dispar*, with the corresponding appearances of the cysts and trophozoites under microscopy (Ximénez *et al.*, 2011). Antimicrobials commonly used to treat amoebiasis include nitroimidazoles (metronidazole, tinidazole, secnidazole, etc.), paromomycin, iodoquinol, and diloxanide furoate (Morán *et al.*, 2023). Drug therapy must be combined with improved hygienic handling of food and drinks, as well as environmental sanitation, to prevent feco-oral transmission.

Case Summary

Clinical Presentation and Management

A 53-year-old single mother of five from Gilgil, Nakuru County, Kenya, with a history of well-controlled hypertension, was first treated for symptomatic amoebiasis in our facility in February 2020. She had presented with a two-week history of cramping periumbilical and suprapubic pains, flatulence, nausea with a one-day history of postprandial non-bilious vomiting, and loose mucoid non-bloody stools (about 3-4 episodes daily) with associated tenesmus. She was moderately dehydrated at the time but hemodynamically stable. She was afebrile, with abdominal examination findings only significant for vague diffuse periumbilical and suprapubic area tenderness without any features of peritonism. The rest of the physical examination was unremarkable. Her stool microscopy showed numerous trophozoites of *Entamoeba histolytica* with many pus cells (qualitative report). She was treated with 5 days of oral metronidazole 400mg thrice daily (as per our local protocol), antiemetics, rehydration, and education on personal hygiene, environmental sanitation, and food and water sanitation practices. One month later, her stool was normal, and she was asymptomatic. However, from the months of July to November 2020, she re-presented with similar gastrointestinal symptoms and tested positive for *Entamoeba histolytica* trophozoites in her stool following a wet-preparation microscopy. She remained asymptomatic throughout 2021 during routine follow-ups for the hypertension, with normal random stool examinations. However, in 2022, she developed similar recurrent gastrointestinal symptomatology with positive stool microscopy for *Entamoeba histolytica* trophozoites from the months of September to December 2022. She was treated each time with various nitroimidazole compounds, i.e., metronidazole at a dose of 400mg thrice daily for 5 days or tinidazole at 1gm twice daily for 3 days, together with antiemetics (metoclopramide 10mg thrice daily for the duration of the metronidazole or tinidazole) and

other supportive therapy. She did not have any episodes of vomiting while on the antiprotozoal, and she was fully compliant with her medications.

Further Social History

She lives alone in a 2-bedroom house in a 2-story apartment complex, which she shares with at least 14 other different families. She uses a pit latrine and a simple bathing room, which she shares with one other household. These are located about 10 meters behind the apartment complex, with the design and allocation such that two families share a pit latrine and a bathroom and are also responsible for cleaning them. She obtains water for drinking and other home uses from a large borehole in front of the apartment complex and several plastic water tanks that harvest rainwater from the apartment roof. She reported regularly washing her hands with water and soap (and more so with the advent of the COVID-19 pandemic) and regularly boiling her drinking water, which she stored in two plastic 20-liter jerrycans. No other person from her apartment complex had been treated for recurrent diarrheal illness in that period. Importantly, 2 of her daughters who had visited her overnight at various times in 2020 and 2022 had each subsequently been treated for stool-microscopy-confirmed amoebiasis (positive trophozoites) about 5-7 days after each visit. In 2021, she had temporarily relocated to stay with her ailing sister about 10 kilometers away, where she used running tap water from the local municipal supply lines. In view of the foregoing, the source of the recurrent amoeba infection was deemed to be within her house, especially from the stored water in the jerrycans. A community health worker with basic training in public health and sanitation was consulted to visit her at home and inspect her water and food handling practices with a view to locating the source of the recurrent amoebic infection. Upon closer inquiry, it was revealed that she had refilled the jerrycans on several occasions with “clean” water from a specific local water vendor during periods of water scarcity in the area and had neither boiled nor purified the said water, which was reportedly marketed as “fresh spring water”, and whose actual source was unknown. When she discarded all the stored jerrycan water and thoroughly washed the cans with hot water and soap, the amoebiasis stopped. The matter was reported to the local public health authorities for administrative remedial interventions. She has had no more presentations with amoebiasis, and her random stool microscopic examinations from time to time have been normal.

DISCUSSION

E. histolytica is transmitted by the feco-oral route when amoebic cysts contaminating food and drinks are ingested. These cysts contaminate food, water, and drinks during the processes of preparation, handling, packaging, storage in various containers and bottles, transportation, serving, and consumption. Once ingested, the cysts reach the terminal ileum, where excystation occurs with

the release of active trophozoites, which may invade the colonic mucosa to cause active disease or remain dormant in the mucosa, causing chronic asymptomatic infection. A history of feco-oral transmission must always be sought meticulously through detailed inquiry about personal hygiene, environmental sanitation, sources of food and water, and water storage and handling at home and in the community. In most cases, infections (including recurrent infections) occur due to a lack of access to safe drinking water and sanitation facilities (Atabati *et al.*, 2020). Our patient's source of recurrent infection was the contaminated water sold to her by a vendor during periods of water scarcity in her home. She did not boil the water or treat it in any way before storing it in the various jerrycans. On further probing, it was revealed that the same vendor had also sold water to three other families in the apartment complex, but each of these families had boiled all the water and cooled it before use. None of them got any amebic infections. Although a majority of patients who get infected remain asymptomatic, some present with symptomatic disease of varying severity (e.g., from mild to severe gastroenteritis to severe life-threatening fulminant amebic colitis with toxic megacolon, colonic perforation and peritonitis, etc.), including extra-intestinal manifestations, e.g., amebic liver and lung abscess (Carrero *et al.*, 2020; Kantor *et al.*, 2018; Usuda *et al.*, 2022). Anti-amebic drugs are recommended to cure amebiasis and may act only in the intestinal lumen (i.e., luminal amebicides, e.g., paromomycin, iodoquinol, diloxanide furoate, nitazoxanide, and metronidazole) or in the tissues (i.e., tissue amebicides, e.g., metronidazole, tinidazole, and emetine) (Morán *et al.*, 2023). Metronidazole remains the first-line drug in the treatment of amebiasis, as it is active as both a tissue and a luminal amebicide. Our patient was successfully treated with metronidazole or tinidazole during various presentations as per the local guidelines. The amebic cysts and trophozoites can be eliminated by improved water safety (e.g., through boiling and filtration or adding chlorine to water) and sanitation. It is quite interesting that our patient never had amoebic cysts in her stool during asymptomatic random stool microscopy examinations. The simple act of washing hands with soap and water can reduce mortality associated with diarrheal illnesses (of which amoebiasis is a major etiology) by up to 50% (Kantor *et al.*, 2018). There are ongoing trials at various phases to develop vaccines effective against *E. histolytica* infections in humans (Quach *et al.*, 2014; Singh *et al.*, 2016).

CONCLUSION

A thorough history must be sought in all cases of suspected and confirmed amoebiasis to determine the source of the feco-oral transmission. This is especially important in cases of recurrent infections. Metronidazole remains the first-line amebicide for effective drug treatment of amoebiasis. Most importantly, drug therapy must be done in conjunction with improved personal hygiene through frequent hand-washing with soap and

water, as well as improved environmental sanitation and water safety.

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