Microsporidiosis: Reviewing Clinical Presentation and Treatment Strategies

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Background

- The phylum Microsporidia has been described as early as 1838. Currently there are over 1000 species of microsporidia, 15 of them known to be pathogenic to humans (**Fig. 1**) [1].
- Microsporidiosis is caused by an array of eukaryotic pathogens spread through ingestion of contaminated food and water, *Enterocytozoon bieneusi* spp. being most common (**Fig. 2**) [1,2].
- Infection is most common in patients experiencing immunodeficiency, organ transplant recipients, malnourished children, and travelers. But concern for further cases is rising [1].
- Microsporidia species has been found in drinking water, wastewater, and recreational rivers, notably in Sweden and Spain [3].

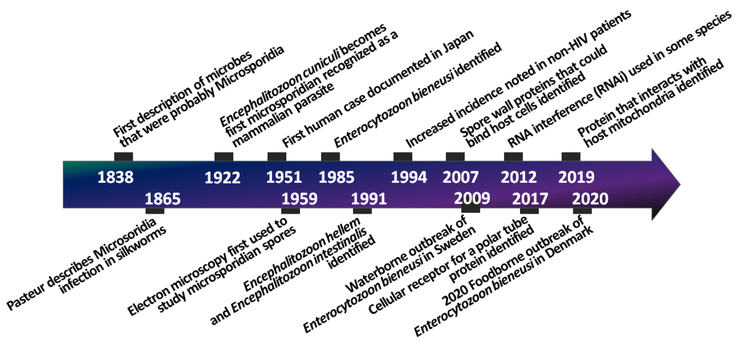

Figure 1. Timeline of Microsporidia. Adapted from Refs. 1 and 2.

Clinical Presentation and Diagnosis

- Microsporidiosis most often affects the GI tract, and common symptoms are persistent diarrhea along with abdominal pain, nausea, vomiting, and fever [1,4].
- Some studies suggest that microsporidiosis may increase the chance of wasting disease and death, particularly in HIV patients [1,4].
- Parasite is diagnosed by serological immunofluorescent antibody staining, complement fixation, enzyme-linked immunosorbent assay, and western immunoblot assays [2].

Management

- While incorporation of antiretroviral therapy for HIV patients has significantly decreased mortality in a subset of the vulnerable populations, treatment for microsporidiosis is still not standardized or well explored.
- Antiparasitic drugs are often used to treat microsporidiosis, but resistance to first-line albendazole is increasing. Another antiparasitic, fumagillin, is not approved as a systemic treatment in the U.S.
- Given that microsporidiosis is an emerging disease that affects the global population, there is an increasing need to develop a standard of care [1].

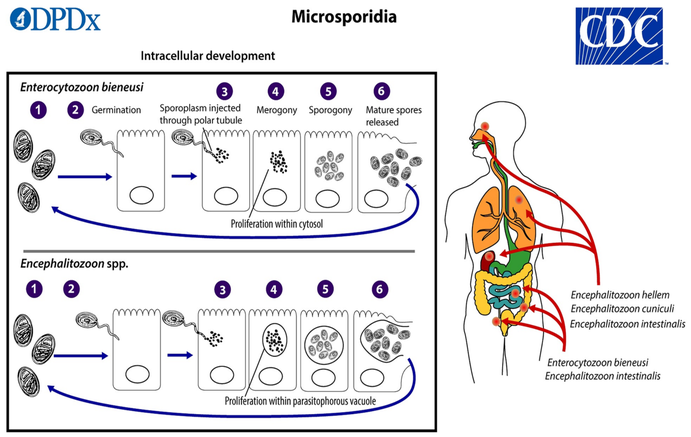

Figure 2. Life cycle of intestinal Microsporidia. From Ref. 2.

Why Perform a Scoping Review?

- Clinical microsporidiosis has been reviewed for patients with HIV and other immunosuppressive comorbidities. Epidemiology and risk factors have also been reviewed.
- With increased threat of microsporidia infections in immunocompetent patients, review of clinical features would help inform providers.
- A structured approach to diagnosing and treating microsporidiosis has not been established.

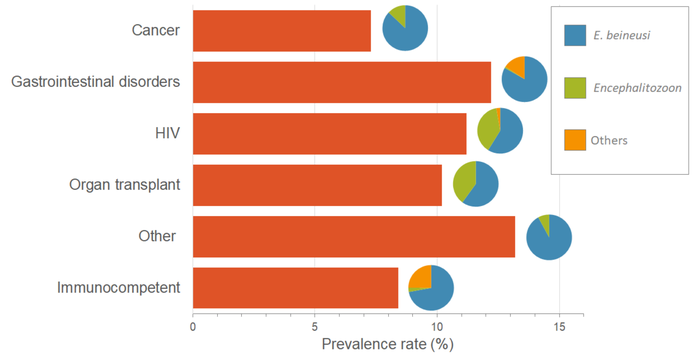

Figure 3. Prevalence and distribution of microsporidia in different patient populations, as reported in from Ref. 4.

Acknowledgment

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Figure 4. Search strategy.

Methods and Preliminary Results

- This scoping review follows JBI Methodology.
- Searches are conducted for microsporidiosis/Microsporidia and genera. Title/abstract screens and full text screens will confirm human only cases and pharmacological intervention (**Fig. 4**).
- Search for microsporidia yielded 4515 results, for enterocytozoon yielded 1042 results, and for encephalitozoon yielded 1289 results (**Fig. 5**).
- Of the 6846 results in the preliminary MEDLINE (PubMed) search, 27 systematic reviews were found, none of which cover human treatment strategies or presentation in immunocompetent individuals.

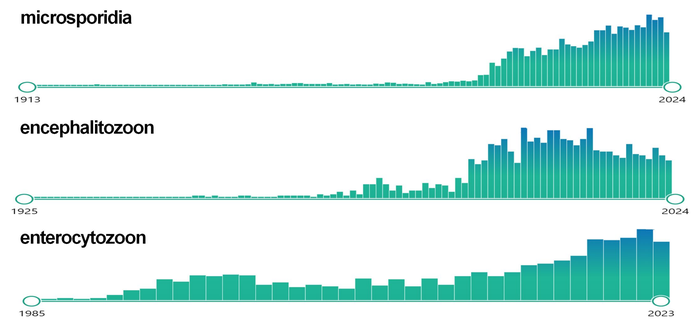

Figure 5. Preliminary search results (Accessed 11 December 2023).

Next Steps

- Search strategy will be refined.
- Scoping review protocol will be registered with Open Science Framework.
- Review protocol will be submitted to JBI Evidence Synthesis for peer-review [5].

References

1. Han B, *et al. Clin Microbiol Rev* (2021) 34(4), e00010-20.
2. www.cdc.gov/dpdx/microsporidiosis/ (Accessed 10 Jan 2023)
3. Li W, Xiao L. *One Health* (2021) 12, 100209.
4. Ruan Y, *et al. Parasit Vectors* (2021) 14(1), 1-14.
5. Zhou J, *et al. Manuscript in preparation* (2024).