Challenge PA2210-3

September 2022

Stool: *Blastocystis* species

CMPT QA/QC/ Statistics

This sample was verified by two reference laboratories. Laboratories were expected to report the presence of *Blastocystis* species

All challenge components are confirmed before shipping by the reference laboratories. No further statistical analysis is performed on the results beyond that described under "Suitability for grading."

SURVEY RESULTS

Reference laboratories: both laboratories reported the presence of *Blastocystis* species; one of the laboratories also reported *Schistosoma mansoni* and *Endolimax nana*

Participants: All participants reported *Blastocystis* species. In addition to that report, 3 participants reported *Schistosoma mansoni*; 2 reported *Endolimax nana*, and one reported *Hymenolepis nana* (Table 1)

Suitability for Grading

A challenge component is considered suitable for grading if agreement is reached by both (100%) reference laboratories and at least 70 percent of the participants.

Parasite identification was correctly performed by both reference laboratories and greater than 70 percent of all laboratories and was thus, determined to be suitable for grading.

COMMENTS ON RESULTS

Although *Schistosoma mansoni* was observed by three laboratories (one of them a reference lab), there was no consensus to consider it for grading. It is possible that the organism is present in low concentration and thus, was detected by a few labs.

The grades assigned in Table 1 were awarded taking into account the report of the laboratories regarding *Blastocystis* species.

One participant reported *H. nana*. This laboratory was graded "Unacceptable" as this organism was not seen by any other laboratory.

The technical committee decided to give an "Unacceptable" grade; considering the note that only one ova was seen on examination, the laboratory should have included a comment stating the next step, such as a request to submit another specimen

IDENTIFICATION

Blastocystis has been traditionally named Blastocystis hominis when isolated from human fecal materials. However, recent phylogenetic analyses suggest limiting its name to "*Blastocystis* species" because of their wide genetic diversity, it is sufficient to assign them to different species. Recent studies show that Blastocystis should be considered as a species complex, comprising 13 subtypes, at least 9 of which are found in humans; some of these subtypes produce virulence factors and are linked to disease.

Grading

Reporting Blastocystis species was graded Acceptable.

Table 1. Results reported

Reported	Labs	Grade
***Blastocystis* species**	10	Acceptable
Blastocystis* species, *Schistosoma mansoni	1	Acceptable (B)
Blastocystis* species, *Schistosoma mansoni*, *Endolimax nana	1	Acceptable (B)
Blastocystis* species, *Schistosoma mansoni*, *Hymenolepis nana	1	Unacceptable
***Blastocystis* species, *Endolimax nana*,** 1+ White Blood Cells	1	Acceptable
Total	**14**	

Blue: possible pathogen – **Bold:** pathogen (B): only *Blastocystis* species component graded

Blastocystis species are anaerobic protozoan parasites (previously considered to be a harmless yeast) living in the gastrointestinal tract. *Blastocystis* has several species (previously known as *B. hominis*) and is the most common human parasite in the world. Blastocystis species usually are identified microscopically by the presence of the vacuolar form, which is easily recognized by its large size and characteristic appearance. This form usually has a large central body (vacuole), which occupies 90% of the cell. The cell lacks internal nuclear structure, but has a rim of peripheral granules, the function of which is not known. The central body is surrounded by small, multiple nuclei.

Variability in the size and shape of the organism also has been noted, and a size range of 6 to 40 µm has been reported from smears of fecal material. [1-3]

Reporting

In the case of *Blastocystis* species, some laboratories add a comment to their report indicating that some species of Blastocystis are pathogenic thus, in the absence of other organisms capable of causing diarrhea *Blastocystis* species could be the causative agent.

CLINICAL RELEVANCE

Blastocystis species are commonly found in healthy individuals as well in patients with gastrointestinal symptoms. In general, prevalence of infection is higher in developing than in developed countries. Within communities, groups from lower socio-economic levels who suffer from poor environmental hygiene, due largely to lack of water supply, sewer, and waste removal services are at greater risk of infection. [4]

The presence of *Blastocystis* species in stool samples from patients showing gastrointestinal symptoms does not necessarily imply that symptoms are due to this organism, and other infective and non-infective causes should be investigated.

Similarly, large numbers of *Blastocystis* species in stools may be incidental in patients being investigated for other infections or disease conditions.[3] In the absence of other identified causes of symptoms, patients presenting with diarrhea or other gastrointestinal symptoms should be assessed for the presence of *Blastocystis* species. The symptoms may be tentatively ascribed to *Blastocystis* species. However, the possibility of other unidentified etiological agents, especially viruses, toxins, and non-infectious causes, should not be discounted, even if large numbers of *Blastocystis* species cysts are found in fecal samples.[1,3]

Recent studies have shown *Blastocystis* species, in heavy infections, may cause periodic, mild to moderate diarrhea and intestinal discomfort in children.[4] Many laboratories quantitate *Blastocystis* species on the report form as “few”, “moderate”, or “many”.[2]

REFERENCES

1. Novak-Weekley S. Leber AL. Intestinal and urogenital amebae, flagellates, and ciliates. In: Carrol K. C. ea, ed. Manual of Clinical Microbiology. Vol 2. 12th ed. Washington, DC.: ASM; 2019:2497.
2. Garcia L.S. Intestinal protozoa: Amebae. In: Diagnostic Medical Parasitology. 5th ed. Washington, DC: ASM Press; 2007:6 - 32.
3. Stenzel DJ, Boreham PF. *Blastocystis hominis* revisited. Clin Microbiol Rev. 1996;9:563-584.
4. Tan KSW, Singh M, Yap EH. Recent advances in *Blastocystis hominis* research: hot spots in terra incognita. Int J Parasitol. 2002;32:789-804.