Gastrointestinal Parasite Panels

Indications for Ordering

Aid in the diagnosis of gastrointestinal (GI) infections caused by common protozoal pathogens

Test Description

Test methodology

Qualitative polymerase chain reaction

Clinical validation

Validated with specimens identified by conventional stool parasite tests including

- Ova and parasite examination
- Modified acid-fast stain
- *Giardia, Cryptosporidium,* and *Entamoeba histolytica* antigen detection assays

Tests to Consider

Typical testing strategy

- Stool antigen testing for
  - *Giardia* spp
  - *Cryptosporidium* spp
  - *E. histolytica*
- At least three separate stool specimens, collected on separate days, should be submitted for
  - Ova and parasite examination
  - Modified acid-fast stain for coccidian parasites
- Often, only ova and parasite examination is ordered on a single specimen
  - May be inadequate frequency of testing with inappropriate method to detect pathogen(s)
- Gastrointestinal parasite with or without microsporidia by PCR
  - Order if GI infection due to protozoal pathogens is suspected
  - Do not order for patients with diarrhea developed during prolonged hospitalization

Primary tests

Gastrointestinal Parasite and Microsporidia by PCR 2011660

- Most comprehensive and sensitive alternative to traditional, insensitive ova and parasite examinations of stool specimens for the evaluation of GI infections
- Includes Gastrointestinal Parasite Panel by PCR and Microsporidia by PCR

Gastrointestinal Parasite Panel by PCR 2011150

- Sensitive alternative to traditional, insensitive ova and parasite examinations of stool specimens for the evaluation of GI infections
- Detects
  - *Cryptosporidium hominis, C. parvum*
  - *Cyclospora cayetanensis*
  - *Dientamoeba fragilis*
  - *Entamoeba histolytica*
  - *Giardia lamblia/intestinalis/duodenalis*

Related tests

Cryptosporidium Antigen by EIA 0060045

Entamoeba histolytica Antigen, EIA 0058001

Giardia Antigen by EIA 0060048

Microsporidia by PCR 2011626

- Detects DNA of *Encephalitozoon* spp (*E. intestinalis/E. hellem/E. cuniculi*) and *Enterocytozoon bieneusi*

Parasitology Stain by Modified Acid-Fast 0060046

- Detects *Cryptosporidium*, *Cyclospora*, and *Cystoisospora*

Ova and Parasite Exam, Fecal (Immunocompromised or Travel History) 3001662

- Detects *G. duodenalis*, *E. histolytica*, *Dientamoeba fragilis*, helminth eggs, protozoa, larval worms, and segments of tapeworms
- Does not specifically detect *Cryptosporidium, Cyclospora, Cystoisospora,* or Microsporidia

Disease Overview

Incidence

- *C. cayetanensis*
  - Clustered outbreaks associated with contaminated food products
  - Outbreaks have been occurring recently in higher frequency
    - Not associated with foreign travel, but rather, foreign food products sold domestically
- *C. hominis, C. parvum*
  - Found in large outbreaks associated with contaminated water sources
  - Can occur year-round when artificial water storage systems are involved

- *D. fragilis*
  - Has been described as the second most common parasitic pathogen after *Giardia* spp
    - Difficult to identify using ova and parasite examinations
      - May lead to an underestimate of true prevalence
- *E. histolytica*
  - Typically limited to individual cases, with possible spread to sex partners or close contacts
- *G. lamblia/intestinalis/duodenalis*
  - Typically limited to individual exposures to contaminated water sources in warm-weather months
- Microsporidia
  - Enteric microsporidiosis in patients with HIV infection
    - ~15% prior to combination antiretroviral therapy (cART)
    - Rates are lower for patients on cART
  - Undetermined incidence in non-HIV populations

Symptoms

- *Cryptosporidium*
  - Watery diarrhea, stomach cramps, nausea, vomiting, fever, dehydration
- *Cyclospora*
  - Watery diarrhea, loss of appetite, weight loss, cramping, bloating, gas, nausea, fatigue
- *D. fragilis*
  - Asymptomatic **or**
  - Diarrhea, abdominal pain, loss of appetite, weight loss, nausea, fatigue
- *E. histolytica*
  - Asymptomatic **or**
  - Mildly symptomatic
    - Diarrhea, stomach pain/cramping **or**
  - Dysentery
    - Stomach pain, bloody diarrhea, fever
- *Giardia*
  - Diarrhea, gas, abdominal cramps, nausea, vomiting, dehydration
- Microsporidia
  - Persistent diarrhea
  - Abdominal pain, nausea, vomiting

Diagnostic issues

- Conventional ova and parasite examinations
  - Sensitivity depends on the proficiency of the laboratory and number of specimens submitted for testing
- Adjunct methodologies, such as modified acid-fast stains and antigen tests, are historically underutilized
- To detect pathogens in the panel, at least seven tests are traditionally required for maximum performance/detection

Treatment issues

- Treatment is not indicated for all patients
  - Not universally effective at curing infections
  - Treatment is different for each parasite
- Most infections are self-limiting
- Spread to close contacts is a concern for several of these parasites

Test Interpretation

Analytical sensitivity

- *C. cayetanensis*: 80 copies/reaction
- *Cryptosporidium parvum/hominis*: 216 copies/reaction
- *D. fragilis*: 200 copies/reaction
- *E. bieneusi*: 1,600 copies/100 µL stool
- *E. histolytica*: 100 copies/reaction
- *Encephalitozoon* spp (*E. intestinalis*): 440 copies/100 µL stool
- *Giardia* – 960 copies/reaction

Analytical specificity

- No cross-reactivity observed for 48 organisms tested

Results

- Detected: detection of protozoal parasites in stool is considered diagnostic for infection
- Not detected: no protozoal parasites identified
- Inhibited: stool specimens may contain inhibitors of molecular tests
  - These specimens cannot be resolved

Limitations

- Due to the periodic shedding of some parasites, a result of "not detected" cannot completely rule out infection with these parasites
  - If clinical signs and symptoms persist, an additional specimen for testing may be indicated
  - Viral and bacterial gastroenteritis are more common than parasitic gastroenteritis and should be considered as alternative diagnoses
- Asymptomatic infections are known to occur, and therefore correlation of test results with clinical signs and symptoms is imperative
- Panel does not detect
  - Helminths (flatworms, roundworms, and flukes)
  - Nonpathogenic protozoa
  - *Cystoisospora*
  - Microsporidia
    - Detected in Gastrointestinal Parasite and Microsporidia by PCR
- Negative result does not rule out
  - Presence of PCR inhibitors in specimen
  - Assay-specific nucleic acid in concentrations below the level of detection