

Faecal PCR testing now available



MELBOURNE
PATHOLOGY

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Laboratory investigation of gastrointestinal infections and infestations

Insight - September 2018

- Melbourne Pathology is now offering in-house Faecal PCR testing.
- Acute infectious diarrhoea caused by most viruses, bacteria or parasites is generally self-limiting and doesn't require specific antibiotics.
- The role of pathology testing is to diagnose severe cases, infections (that may require treatment) in immunocompromised or at-risk patients, and outbreaks in institutions or the community which may have infection control or public health implications.

Viruses

In institutions, it is critical to make a diagnosis of Norovirus to ensure the appropriate infection control precautions are implemented.

In unvaccinated children or in institutions, if Rotavirus is suspected, it is important to make the diagnosis for management and infection control reasons.

Otherwise, the specific viral etiologic diagnosis is not overly critical as all patients in an institution with diarrhoea and/or vomiting should be placed in isolation, irrespective of the diagnosis. In all cases of viral gastroenteritis, there is no specific antiviral treatment, therefore fluid and electrolyte replacement is the mainstay of management.

Bacteria

For severe infectious diarrhoea in immunosuppressed patients, or in returned travellers, it is important to identify the causal organism and test antibiotic sensitivity.

For some bacterial infections, such as Shigellosis or *Yersinia enterocolitica*, susceptibility testing is performed for optimal antibiotic treatment. Bacterial strain typing is also done in an outbreak to help identify the source.

Major limitations of bacterial faecal PCR include its limited range of bacterial targets, inability to provide susceptibility information and inability to differentiate non-viable genetic elements from living organisms.

Clostridioides difficile (formerly *Clostridium difficile*) can be tested if clinically indicated and requested.

Testing

In returned travellers from countries with endemic diarrheal infections that are associated with significant morbidity and mortality, such as typhoid fever (*Salmonella Typhi* and *Salmonella paratyphi*):

- Send a faecal sample for culture to make the diagnosis (current PCR assays are not able to speciate *Salmonellae*) and to perform antimicrobial susceptibility testing to inform treatment options.
- If febrile, take blood cultures and other inflammatory markers such as CRP, FBE, LFT and consider hospitalisation for resuscitation and intravenous antibiotics, even in the absence of diarrhoea.
- Typhoid serology is not a useful tool to diagnose infection or assess immune status.

Parasites

In Australia the most common pathogenic parasites that cause diarrhoea are *Giardia intestinalis* (formerly *G. lamblia*) and *Cryptosporidium parvum*, and in returned travellers *Entamoeba histolytica*. Testing for these is ideally performed by PCR.

Many other parasites can cause gastrointestinal infections and infestations without diarrhoea; some, such as *Strongyloides stercoralis*, *Taenia solium* (pork tapeworm) are particularly important for their invasive capacity whereas *Enterobius vermicularis* (pinworm or threadworm), cause other symptoms like pruritus ani and would require specific treatment.

Furthermore, parasites such as *Blastocystis hominis* and *Dientamoeba fragilis* are very common in the general population and considered unlikely to be pathogenic. Treatment is not recommended as these parasites often persist asymptomatically following treatment, whereas the treatment itself can disrupt normal bowel flora.

Testing

At Melbourne Pathology we diagnose *Giardia lamblia*, *Cryptosporidium parvum* and *Entamoeba histolytica* by faecal PCR, which has a much greater sensitivity and specificity than Immunoassays or microscopy.

If any other parasitic gastrointestinal infections or infestations are suspected, it is important to state this on the referral with clinical notes.

Importantly, please give a recent travel history, including the names of countries visited, and return date. Two separate faecal samples for OCP (preferably in SAF fixative) collected within seven days (Medicare rebatable) should be requested which may help in further identification of the pathogens.

Important information

Include clinical notes on referral:

Returned traveller, country of travel, symptoms, eosinophilia, if immunosuppressed/HIV; In these patients request for Faecal PCR AND OCP for full parasite testing.

If febrile and returned from a tropical/sub-tropical area, consider blood cultures, CRP, FBE, LFT and FMC (faecal microscopy and culture) for investigation of ?Typhoid/Paratyphoid.

Faeces collection

- Faeces no. 1 (PCR) + Culture + OCP (if indicated) = fresh faeces
- Faeces no. 2 for OCP Parasitology only = fresh faeces or SAF fixative
- Faeces for *Strongyloides* (Harada Culture) = fresh faeces (DO NOT refrigerate sample)



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Table 1. Investigation of Protozoa

Gastrointestinal Protozoa	Disease association
<i>Entamoeba histolytica</i>	Amoebic dysentery, amoebic liver abscess
<i>Giardia intestinalis</i>	Watery diarrhoea
<i>Cryptosporidium</i> spp*	Self-limiting diarrhoea
Non-pathogenic protozoa: Non-pathogenic <i>Entamoeba</i> spp. <i>Dientamoeba fragilis</i> <i>Blastocystis hominis</i>	



Diagnostic tests	Pros	Cons
Stool Microscopy	Traditional gold standard method for parasite detection. Good for helminths.	Less sensitive. Improved with multiple sampling (2 samples).
Faecal parasite PCR	Sensitive for pathogenic protozoa	Detection of non-pathogenic protozoa leading to patient anxiety
<i>E. histolytica</i> serology	Only in patients with suspected extra-intestinal infection such as amoebic liver abscess	

Table 2. Information about Helminths

Helminths		Disease association	Diagnostic tests available
Roundworm		<i>Strongyloides stercoralis</i>	Abdominal pain, diarrhoea, Severe disseminated infection Stool microscopy, Harada Culture Strongyloides serology
		<i>Ascaris lumbricoides</i>	Abdominal pain, intestinal obstruction Stool microscopy - Eggs
		Whipworm (<i>Trichuris</i>)	Abdominal pain, diarrhoea, rectal prolapse in severe infection Stool microscopy
		Pinworm/threadworm (<i>Enterobius</i>)	Pruritus ani Cellotape preparation
Flatworm	Tapeworm	Pork Tapeworm (<i>Taenia solium</i>) Beef tapeworm (<i>Taenia saginata</i>)	Pork tapeworm: passing tapeworm or seizures (brain neurocysticercosis) Beef tapeworm: passing tapeworm Tapeworm segment (proglottid) passed per rectum Stool microscopy
	Flukes	Schistosoma (<i>S. haematobium</i> , <i>S. mansoni</i> etc)	Bloody diarrhoea, haematuria (<i>S. haematobium</i>) Stool or urine microscopy Schistosoma serology



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