

SYMPTOMATOLOGY (SYMPTOMOLOGY)

The diagnosis of parasitic disease on the basis of clinical symptoms (described by patient) or clinical signs (observed by clinician) is difficult because most are nonspecific. Diarrhoea may be caused by viral, bacterial, protozoal and helminth infections; likewise fever, anaemia, etc. It is important that clinicians carefully record presentation signs (abnormal structure/function, pain, etc.), obtain an appropriate history (nature, intensity, location, duration, onset, concomitant, aggravating, relieving), monitor vital signs (respiration, circulation, temperature), and request appropriate laboratory investigations (diagnostic tests). Few parasitoses can be diagnosed on the basis of clinical presentation, other than those where the aetiological agent is conspicuous in host tissues (such as visible ectoparasites). Nonetheless, clinical presentation helps the diagnostic process by allowing the clinician to consider the usual suspects in each case, collect the most appropriate samples and request the most appropriate diagnostic tests from their service laboratories.

Characteristics of common parasitic infections

Site	Symptoms	Transmission	PROTOZOA	HELMINTHS	ARTHROPODS
Gut	diarrhoea, blockage, anaemia	faecal-oral, vector-borne, direct	amoebae diplomonads coccidia ciliates	round-, pin-, whip-, thread-, hookworms tapeworms enteric flukes	bot flies
Blood	anaemia, fever, ischaemia	vector-borne	trypanosomes haemosporidia piroplasm	filarial worms blood flukes	(most ecto- parasites feed on blood)
Organs	lesions dysfunction inflammation	predator-prey, direct	cyst-forming coccidia microspora	hydatids cysticerci liver flukes <i>Trichinella</i>	bot flies
Skin	lesions inflammation	direct, vector-borne	leishmanias	larval migrans, filarial worms	flies fleas lice mites ticks

By definition, parasites cause harm to their hosts, but that harm may be overlooked in asymptomatic or subclinical infections involving few parasites of low virulence. However, heavier infections involving more parasites, or more virulent parasites, can cause sufficient harm for disease expression to become apparent to the host and clinician. Clinical symptoms are felt and described by human patients to their doctors, while clinical signs are observed in human or animal patients by medical or veterinary practitioners. Although certain clinical manifestations may 'typically' be associated with certain parasites, in many instances their occurrence is not pathognomonic (e.g. eosinophilia and helminthiasis) as other aetiological agents or disease processes may be involved. Nonetheless, diagnosticians should be cognizant of the 'usual suspects' in their deliberations.

Symptomatology regularly associated with parasitic infections

Tissue/organ system	Clinical symptoms/signs*	Usual suspects (human parasitoses)*
alimentary	anorexia, fever, pain, diarrhoea, vomiting, dehydration, oedema, unthriftiness, anaemia, eosinophilia, hypoalbuminaemia	amoebiasis, giardiasis, leishmaniasis, coccidiosis, cryptosporidiosis, balantidiasis, enterobiasis, trichuriasis, ascariasis, hookworm diseases, strongyloidiasis, capillariasis, anisakiasis, taeniasis, fascioliasis, schistosomiasis, clonorchiasis, opisthorchiasis,
urogenital	haematuria, eosinophilia, abortion, sterility	trichomoniasis, toxoplasmosis, sarcocystosis, schistosomiasis
respiratory	anorexia, sneezing, coughing, nasal discharge, tachypnoea, dyspnoea, eosinophilia	leishmaniasis, lungworm diseases, hookworm diseases, paragonimiasis, echinococcosis
nervous	anorexia, depression, stupor coma, ataxia, paresis, paralysis, seizures, tremors, dysmetria, eosinophilia	toxoplasmosis, African trypanosomiasis, malaria, onchocercosis, angiostrongyliasis, paragonimiasis, cysticercosis, echinococcosis, coenurosis, schistosomiasis
circulatory	anorexia, cardiac dysfunction, vasculitis, fever, lethargy, oedema, anaemia, leucopenia, eosinophilia	American trypanosomiasis, malaria, babesiosis, filariasis, onchocercosis, schistosomiasis
musculature	anorexia, weakness, myalgia, haemorrhages, bruising	toxoplasmosis, sarcocystosis, microsporidiosis, trichinosis, gnathostomiasis, cysticercosis, echinococcosis, coenurosis, pentastomiasis
skin	pruritus, erythema, scales, crusts, excoriations, alopecia, nodules, papules, vesicles, lichenification, pigmentation abnormalities, anaemia	leishmaniasis, hookworm diseases, dracunculiasis, onchocercosis, scabies, tungiasis, pediculosis, myiasis, demodocosis, tick bites, insect bites

*cf. Mehlhorn H (Ed) 2001 *Encyclopedic Reference of Parasitology*, 2nd ed, Springer

SAMPLES/SPECIMENS

A wide range of clinical samples may be collected from diseased hosts for testing in the laboratory, including fluids, solids and suspended material (blood, urine, cerebrospinal fluid, faeces, vomitus, sputum, aspirates, swabs, scrapings, tissue biopsies, etc.). It is important that the integrity of the sample be preserved so that no contamination occurs and the samples do not rapidly degrade. There are numerous guidelines available from diagnostic agencies as to what samples are considered appropriate for individual tests, how to collect them, how to store them and how to transport them. These guidelines generally comply with occupational health and safety, biohazard, transportation and even quarantine regulations in order to protect people and industries. Remember that parasites cause infectious diseases so all diagnostic samples should be considered as potentially infectious. The vast majority of samples submitted to diagnostic laboratories consist of faeces, blood or tissue biopsies from live patients, or post-mortem tissue samples from deceased patients. A range of coprological, haematological, biochemical, immunological, molecular biological and histopathological techniques has been developed to process samples for evidence of parasitic infections.