

Pathological Changes from Parasitic Infection / Raphael d'Angelo, M.D. / ParaWellness Research

In the course of performing parasite testing on urine and stool samples I send out a health history form that contains many different signs, symptoms and pathologies. People circle what applies to them and send this in with their samples. It is rare but not unusual that a person has nothing to circle. There are those on the other end of the spectrum that have circled a multitude of signs and symptoms. The questions arise from practitioners and patients as to why this is? How is it that two people with the same amount and type of parasites may have different levels of symptoms? Let us examine some possibilities.

The ability of a parasite to cause a disease is known as its pathogenic potential. Some parasites may have a low pathogenic potential but in large numbers they may cause symptoms in the host. Others may have a high pathogenic potential and can cause disease when only a small number are present. To say that there is a wide diversity in the parasitic kingdom is an understatement. Parasites may be trying to adapt to the host and consequently cause symptoms. The host may be trying to fight the parasite with an inflammatory response which in turn can cause symptoms.

The different kinds of pathological changes caused by parasites may be due to mechanical trauma to the person's cells, tissues and organs; interference with the nutritional status of the host; the toxic waste products emitted by the parasite; and the inflammatory reaction created by the person's immune system. Let's look at some examples.

The roundworm *Ascaris lumbricoides* normally likes to reside in the upper part of the small intestine. In that location it has first crack at the nutrients coming from the stomach. However its presence may create a sense of nausea and an uncomfortable feeling after eating. This actually may reduce the quantity of food taken in and weight loss may result. If it lodges a little farther down in the intestinal tract it may interfere with digestive enzymes emanating from the pancreas or it may partially block the bile duct opening into the intestinal tract. Vague right upper quadrant abdominal pain may be present.

Another example comes from the one celled organisms known as Protozoa. Some intestinal protozoa are classified as non-pathogens such as *Iodamoeba butchii* and *Endolimax nana*. When found in a stool sample they are considered markers of exposure to unclean water. They may not invade intestinal tissues but in sufficient numbers they can clog the absorptive surfaces of the small intestine and limit a person's ability to absorb nutrients. This may result in symptoms such as bloating, excess gas, intestinal discomfort and may result in diarrhea or weight loss.

Parasites release chemical molecules and waste products that may impair cellular functions and stimulate an immune response. It is this inflammatory response that often creates the most symptomatology experienced by the person so infected. The immune system response may kill some or all of the infecting parasite but in the process it may also create some damage to the intestine itself. Chronic inflammation has been associated with cancers of the liver and bile ducts from liver flukes and bladder cancer from Schistosomes.

So in summary, to answer the question about symptomatology in a given person: it must be said there is a multifactorial response based upon the type of parasite, its location, how numerous it is and its pathogenic potential; as well as the person's immune response or lack of response.

The final consideration is that in the process of eliminating parasites through an immune response or by a treatment, the dead parasite material may create symptoms of its own until this too is eliminated.

References

Combes C (1997). Fitness of parasites: pathology and selection. *Int J Parasitol* (27) 1-10

Sharma M, Vohra H, Bhasin D (2005). Enhanced proinflammatory chemokine/cytokine response triggered by pathogenic *Entamoeba histolytica*: basis of invasive disease. *Parasitology* (131): 783-796

Coop RL, Holmes PH (1996). Nutrition and parasite interaction. *Int J Parasitol* Vol 8,9:951-962

Long GH, Boots M (2011). How can immunopathology shape the evolution of parasite virulence? *Trends Parasitol* 27: 300-305

Girones N, Fresno M (2003). Etiology of Chagas' disease myocarditis: autoimmunity, parasite persistence or both? *Trends Parasitol* 19: 19-22

Lynne Garcia (2009). *Practical guide to diagnostic parasitology* 2nd Ed. ASM Press

Ash Orihel's *Atlas of Human Parasitology* 5th Ed.