Parasites
The Hidden Culprits of Poor Health

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Objectives

- Review Common Pathogenic Parasites
  - frequency
  - lifecycle
  - symptoms

- Discuss clinical presentations of parasites and how they mimic conditions like IBS and IBD

- Outline confirmatory testing options

- Explore integrative treatment strategies
Pathogenicity

- **Parasite**—“Invertebrate organisms that live on or in another organism (the host), and benefit at the expense of the other”

- **Pathogenicity**—ability of organism to cause disease
  - Pathogenic parasites—known to cause disease (e.g., *Giardia lamblia*)
  - Nonpathogenic parasites—not known to cause disease (e.g., *Entameoba dispar*)

- **Virulence**—degree of pathology caused by an organism
How Common Are Parasites?

• Over 80% of patients have some type of parasite or pathogenic bacteria
• Slight inflammation of the abdomen, and unrelated pains and aches which indicate the presence of parasites
• The most common of all are tapeworms
• Patients report seeing pieces of tapeworm in the toilet bowl, varying from a few inches to a few feet
  – The longest one reported was 57 inches
• Various other parasites including hook worms, pin worms, whip worms and many other exotic forms
• Tapeworms are usually beef, pork or fish variety
• Many vegetarians also have various parasites
• Their eggs may be eaten with vegetables or fruit
• Thread worms and hook worms may pass through the unbroken skin and they are sometimes picked up when one walks through the grass
• A 2010 survey of water and sand samples at a popular recreational beach in Florida showed the presence of Giardia in the water and Cryptosporidium in the sand
• A national parasite review of nearly 6000 fecal specimens published in 2002 showed:
  – 1/3 of specimens tested positive for parasites
  – 10% of cases had multiple (2-4) parasites
  – B. hominis, E. hystolytica, C. parvum, and G. lamblia most common

• In many cases, pathogenic parasites caused “asymptomatic subclinical infections,” while in numerous cases, symptoms were associated with parasites generally considered nonpathogenic
Life Cycle of Parasites

• Eggs hatch in the intestine
• Larvae migrate to the liver, then to the blood, then to lungs, pharynx, and back to the intestine
• They mature and mate in the intestine
• The eggs are released with the feces
• Ingestion leads to infection of the next host
• The eggs are ubiquitous & hard to kill
• A female worm can produce 27 million eggs
• Parasites feed on fluid in the small and large intestine
• A large numbers can block the intestine
• Can be lethal but usually causes malnutrition
Parasites or *Helminths*

- Over 340 varieties of parasites can live in the human body. The scientific name for parasites is *helminths*. Many form large colonies inside the folds within your colon. Others attach themselves to the inner walls of your colon and small intestine. Some parasites live in the skin, blood, tissues, and organs - and even in the brain!

- A *human parasite* is an organism or animal which lives inside the host human and survives and thrives by either eating the food ingested by the host, or by eating body cells and tissues of the host. The parasite which is able to find enough food to survive will reproduce and eventually cause an infestation.

- WHO statistics show that at least 58% of the world’s population has worms and flukes without realizing it. It is not unusual for someone to have a dozen or more different parasites from a list of about 125 common human parasites.

- In its award-winning documentary, “*The Body Snatchers*”, National Geographic magazine reported: "In fact, parasites have killed more humans than all the wars in history." In the August 2000 issue of Discover magazine, an article titled “*Do Parasites Rule the World?*” stated: "Every living thing has at least one parasite that lives inside or on it, and many, including humans, have far more."
Where Human Parasites (helminths) Live in Our Bodies

- Alimentary tract (digestive system): 197 species
- Cavities, organs and tissues: 107 species
- Circulatory system (blood and heart): 21 species
- Skin and tissues: 56 species
Parasite Symptoms

Some common symptoms which may indicate the presence of human intestinal parasites (*helminthiasis*) such as colon parasites and blood parasites:

- lethargy and slow reflexes, feeling tired all the time (chronic fatigue)
- neither you nor your doctor can figure out why you just don't feel well
- depression
- gastrointestinal symptoms, bulky stools with excess fat in feces
- digestive problems such as gas, bloating, constipation, or diarrhea that come and go but never really clear up
- irritable bowel syndrome (IBS)
- burning sensation in the stomach
- anemia or iron deficiency (*pernicious anemia*)
- eating more than normal but still feeling hungry
- difficulty in losing or gaining weight no matter how you try
- excessive number of bacterial or viral infections
- tried a program to get rid of a Candida yeast infection which didn't help (or it keeps coming back), and you still have cravings for bread, fruit, fruit juices, or alcohol
- headaches
• restlessness or anxiety
• fast heartbeat, heart pain
• insomnia, multiple awakenings during the night (particularly between 2 and 3 am)
• bed wetting
• teeth grinding and drooling during sleep
• transmandibular jaw syndrome (TMJ)
• depressed immune system
• constant coughs and colds
• joint pain, muscle pain, and arthritis-like symptoms
• pain in the back, shoulders, and thighs
• pain in navel
• numbness in hands
• skin ailments such as hives, rashes, weeping eczema, itchy dermatitis, acne, cutaneous ulcers, sores, papular lesions, inflammation or swelling
• allergic-like reactions with no apparent cause
• itchiness in ears, nose, and anus
• food allergies, food sensitivities, environmental intolerance or over-sensitivity (to smoke, chemicals, perfumes, etc.)
• loss of appetite or strong cravings for greasy foods and sugary foods
• forgetfulness, lack of focus, lack of clarity in thinking
• sexual dysfunction in men
• menstrual cycle problems in women
• hyperactivity and nervousness in children.
Parasites can be the cause of many ailments which are often mistakenly diagnosed as a bacterial infection, for which antibiotic drugs may be inappropriately prescribed. Antibiotics are usually ineffective against parasites, and they can make matters worse by killing the beneficial probiotic bacteria which normally help keep parasites, pathogenic bacteria, yeast and fungus under control.
Parasite Nematodes (Worms)

The scientific name for worms is Nematodes. Most nematode species are not parasitic, but some common types of parasitic intestinal worm are the pinworm, roundworm, Trichinella, whipworm and hookworm. Tapeworms are not nematodes, but are actually a species of Platyhelminth or flatworm, and are more closely related to flukes.
Enterobius or Strongyloides stercoralis

• AKA “pin worms”
• The most common parasitic worm in the United States
• The chief symptom of this small, threadlike worm is rectal itching, especially at night
• Pinworms are transmitted when the eggs, which lodge under the fingernails when a person scratches, contaminate foods
• Personal hygiene is most important for the control of pinworms
Ascaris lumbricoides

• AKA “roundworm”
• Most common in children
• From ingestion of contaminated soil
  Ingested eggs hatch in gut → larvae enter bloodstream and lymphatics → migrate to the lung and esophagus (as well as the liver and heart) → once in the esophagus, larvae are swallowed and ultimately settle in the intestine → mature to adults
• Adult worms live about one year and they are spontaneously expelled (throughout that year, eggs are shed into feces)
• Ordinarily causes few symptoms (usually just vague abdominal pain)
  – Passage of migrating larvae may not cause any symptoms, particularly at the time of initial exposure to infection
• When the worm burden is heavy, however, infected individuals may experience nausea, vomiting, abdominal discomfort, and anorexia
• Danger of intestinal obstruction
• Rarely, young worms emerge from the nares and lacrimal ducts or are coughed up
• These worms can leave the intestines and settle in different areas of the body, causing diseases such as pneumonia, jaundice or seizures
• Roundworms such as Ascaris lumbricoides can grow to be 12 to 14 inches long! The adult males are smaller than the females. Each year an estimated 60,000 deaths world-wide are attributed to Ascaris lumbricoides and is the most common of all human worm infections
Ascaris lumbricoides (roundworm)
Trichinella spiralis

- Cause of Trichinosis
- Natural parasite to swine, rats, and a variety of wild animals
- From eating undercooked meat (pork is the major source in the U.S.)
- Tiny adult worms inhabit the intestinal mucosa → larvae invade the mucosal epithelium → enter the bloodstream → migrate to skeletal muscle and other organs (heart, lung, and brain included) where they mature → become encapsulated by host tissues and remain in this infective state for many months and even years (unless ingested, larvae eventually die and calcify in the tissues)
- May be asymptomatic or present clinically
- Muscles most often affected: diaphragm, tongue, larynx, masseters, intercostals, biceps, pectorals, deltoid, and gastrocnemius
- Week one—abdominal pain and diarrhea mainly (may continue for several days)
- Week two—fever, myalgia, periorbital edema, and peripheral eosinophilia develop in response to larval invasion of muscles (lasts about one month)
- Week five—convalescence begins (myalgia, weakness, and periorbital edema may persist for several weeks)
Trichuris trichiura or Trichocephalus trichiuris

• AKA “Whipworm”
• An estimated worldwide distribution of 1 billion human infections
• Rare in the U.S, except in the rural Southeast where 2.2 million people are thought to be infected
• Infection occurs through ingestion of eggs (which are usually found in dry goods such as beans, rice, and various grains)
Ancylostoma duodenale and Necator americanus

• AKA “Hookworm”
• Are often found in the soil or sand in moderate climates
• They can enter the body by boring holes in the skin of bare feet, or can enter the mouth if food contaminated by dirty hands is eaten
Hookworm in therapy

- Moderate hookworm infections have been demonstrated to have beneficial effects on hosts suffering from diseases linked to overactive immune systems. This is possibly explained by the hygiene hypothesis.[38] Research at the University of Nottingham conducted in Ethiopia observed a small subset of people with hookworm infections were half as likely to experience asthma[48] or hay fever.[49] Potential benefits have also been hypothesized in cases of multiple sclerosis,[50] Crohn’s Disease[51] and diabetes.[52]

- Research conducted by the Queensland Institute of Medical Research (QIMR) and the Princess Alexandra Hospital (located in Australia) has shown favorable results in clinical trials using hookworms to treat celiac disease.[53][54]

http://en.wikipedia.org/wiki/Hookworm
Protozoa are single-celled animal organisms of microscopic size which reproduce through cell division. Many protozoa are harmless, but some parasitic protozoa like *Giardia lamblia* cause serious illnesses in humans and mammals.

Like the parasitic worms (*nematodes*), these microscopic **protozoan parasites** can be transmitted through mammal and human feces when poor hygiene causes fecal to oral contact. But worse, the very hardy *cyst* form of these protozoa (similar to the *spore* stage of fungus organisms) can survive in many unfavorable soil and water environments and then be transmitted to humans and mammals through contaminated drinking water when the level of chlorination or purification is insufficient to kill the protozoa cysts. When they enter the favorable environment of the mammalian or human body, the *cysts* transform into the parasitic *trophozoite* form of the protozoa and infect the body of the host.
Entamoeba histolytica

• AKA “amebiasis”
• A morphologically similar form called Entamoeba dispar is considered nonpathogenic
  – Impossible to distinguish on microscopic examination
  – Genomic variances account for difference in pathogenicity
• Multiplies within lumen of the colon (readily sheds into feces) → penetrates colon wall → damages epithelial cells causing ulcerations (especially in cecum, appendix, and ascending colon) → may disseminate throughout body
• May be asymptomatic
• Initial presentation often malaise, loss or appetite, weight loss, and abdominal pain
• May be followed by acute bouts of bloody diarrhea
• Next phase often characterized by formed stools and otherwise absent symptoms
  – Called the “chronic form”; more prevalent than acute presentations
Can still become extra-intestinal
Giardia lamblia

• For many years was considered to be nonpathogenic, and even today many individuals have no GI symptoms when the parasite is present
• Most frequently reported intestinal protozoal parasite causing diarrhea
• From contaminated food and water
• Cysts viable for months in cold water; not readily killed by chlorination
• Wild animals, especially the beaver, are reservoirs; domestic pets can also be infected
• Can cause watery diarrhea that lasts up to a month or longer if untreated; also malaise, fatigue, nausea, anorexia, gas/bloating, cramping, and weight loss
• Stools are fatty with mucus but not bloody
• Lives in the lumen and crypts of the small intestine
• Attaches to the epithelium and damages villi and brush border
Giardia lamblia

- Does not invade the tissues or become extraintestinal
- Sometimes referred to as Lamblia intestinalis or Giardia duodenalis.
- In developing countries the rate of giardiasis may be 20% or higher, and it is a major cause of epidemics of childhood diarrhea.
- Travelers who wish to avoid an infection by Giardia and other illnesses caused by a parasite, bacteria, virus, yeast or fungus should look into the benefits of taking 24-48 mg. per day of natural alliin from garlic during their journey.
- Backcountry disinfection with 2% iodine solution – 0.4 ml. (1/10 tsp.) in 1 l. water for 30 min.
- Healthy individuals with strong immune systems usually recover from giardiasis, but those with a compromised immune system can suffer recurring or chronic Giardia infections.
Giardia lamblia
Cryptosporidium parvum

- Not recognized as a cause of human disease until the 1980s
- Municipal water supplies often become contaminated with *C. parvum*
  - Chlorine levels 30x higher than those used in water treatment plants are required to kill *C. parvum*; standard chlorination has little effect
- Cows are the major reservoir
- Colonizes the brush border but does not invade
- 2 types of cysts: thin-walled and thick-walled
- Acute presentations: watery diarrhea, cramping, abdominal pain, nausea, anorexia, and weight loss
- Milder presentations: self-limiting, mild to severe diarrhea that lasts for several days to two weeks (sometimes longer)
- Excretion in stool may continue for several days after symptoms cease
- Immunocompromised patients may have involvement of the pancreas, liver, and respiratory tract
Toxoplasma gondii

- Third most common cause of lethal food born disease in the U.S.
- One of the TORCH infections (TOxoplasmosis, Rubella, Cytomegalovirus, HErpes simplex) – a medical acronym for a set of infections that are passed from a pregnant woman to her fetus
  - Cause congenital conditions (mainly mental retardation, seizures, deafness, and blindness) if fetus is exposed in utero
- Infection most commonly from ingestion of undercooked meat (especially lamb and pork)
- Also acquired through handling of contaminated soil (unwashed garden vegetables) or cat litter
- **Acute infections**—rapidly invades and multiplies in every type of mammalian cell except nonnucleated erythrocytes
  - May cause lesions in the cardiac tissue, liver, lung, brain, and connective tissue (myocarditis, hepatitis, pneumonia, encephalitis)
- **Chronic state**—replication occurs more slowly; most frequently found in skeletal or cardiac muscle, the brain, and other CNS tissues
- In immunocompetent individuals, clinical manifestations are often unrecognized or present as a flu-like condition of a few days’ duration
- Tissue cysts remain in tissues as a latent infection
  - At times of immunosuppression, infection can become reactivated
“Crazy Cat Lady” Disease?

• *T. gondii* is able to reproduce **only** in feline digestive tracts
• Can be passed to other hosts and cause infection but must ultimately find its way back to cats to survive
• Parasite has evolved to cause changes in host causing it to be attracted to cats
• An estimated 16 to 40 percent of people in the United States are infected with *Toxoplasma gondii*
• Only about 1 percent of cats in a population are found to be shedding oocysts at any given time, and oocysts are shed for only a short period (one to two weeks) during the life of the cat.
• In some European countries, including France and Austria, the testing of all pregnant women for *T. gondii* infection is compulsory
Dientamoeba fragilis

• General prevalence in U.S. 2-5%
  – As high as 69% in populations such as those that travel to developing countries
• Not invasive; does not cause cellular damage
• Invokes eosinophilic inflammatory response in colonic mucosa; thus, signs and symptoms are related to superficial colonic mucosal irritation
• Thought to infect humans via pinworm (vector) because these parasitic infections commonly occur (consider additional testing for pinworms)
• May be asymptomatic (however, it’s thought that 90% of colonized children develop symptomatic)
• Most common clinical symptoms include **abdominal pain**, **persistent diarrhea**, loss of appetite, weight loss, and flatulence
• Occasionally eosinophilia, urticaria, and pruritis
• Symptoms usually present within the first 1-2 weeks during the acute infection phase
• Chronic infection occurs after 1-2 months of illness (mainly abdominal pain)
Parasite Flatworms

Trematodes (Flukes) and Cestoda (Tapeworms)
Flukes or Trematodes

• similar to Nematodes (worms) but have flatter bodies that are typically diamond-shaped
• Trematodes are of the phylum Platyhelminthes or flatworms, which also includes the Cestoda or tapeworms.
• World-wide, about 2.4 million people are infected with Fasciola haepatica, a fluke which invades the liver.
• Over 20 million people world-wide are infected in the lungs by a family of flukes known as Paragonimus, of which the most common is Paragonimus westermani or "the Oriental Lung Fluke" found in Asia (particularly China, Japan and Korea), parts of Africa, and parts of South America. In North America the most common species is Paragonimus kellicotti.
Taenia solium (Cestoda)

- AKA “tapeworm” or “cysticercosis”
- Adult tapeworm develops in the small intestine after ingestion of cysticerci
- Adult worms have **lifespans of 1-2 decades** or more
- Invasion of the CNS by the larval parasite (neurocysticercosis) is an especially important cause of human morbidity and mortality
- Develops mostly in the subcutaneous and muscle tissues; the eye and CNS are the next most common sites of infection
  - With CNS, may cause seizure and late-onset epilepsy
  - In eye, may cause severe pain and blurring or loss of vision
- Diagnosis through the identification of eggs in feces is uncommon, because eggs are not routinely liberated
- Can be contracted from eating insufficiently cooked meats, especially beef, pork and fish
- The most common tapeworm in the United States is the beef tapeworm (Taenia *saginata*), which can grow to a length of 65 feet in the intestines
Taenia solium scolex - pork tapeworm
“Classic” Parasite Presentation

• Diarrhea and abdominal pain
• Anorexia, weight loss, nausea, vomiting, bloating, flatulence, alternating constipation and diarrhea,
• Occasionally tenderness upon examination (especially children)
• Extraintestinal complaints: headache, fever, malaise, fatigue, irritability, weakness, pruritis, urticaria
The Great Mimicker

Inflammatory Bowel Disease?

• Abdominal cramps, diarrhea, fever, weight loss, rectal bleeding can result from parasitic infection

• Inflammatory enzymes such as lysozyme and alpha antichymotrypsin may be elevated

• Interestingly, scientists are researching how “helminth therapy” may be beneficial in IBD patients
Food Sensitivities?

• Abdominal pain, stool changes, fatigue, and cognitive issues are associated with some parasites
• May cause secondary food sensitivities with elevations in food-specific immunoglobulin responses (such as salivary SIgA to gliadin, casein, albumin, and soy protein)

Must not be mistaken as primary food sensitivities

Irritable Bowel Syndrome?

• Parasites may present with bowel disturbances, abdominal cramping, fatigue, and gas/bloating
• Important to rule out parasites before diagnosing patients with this condition
Diagnosis

• Clinical picture

• Stool microscopic examination
  – Stool may need to be collected on alternate days because of the cyclic excretion pattern of some parasites

• Stool antigen testing
• Saliva testing

Diagnos-Techs: GI Health Panel (GI-02) or FlexiMatrix Combination (Saliva/Stool)

http://diagnostechs.com
800.878.3787

• Blood tests (immunoglobulin titers, CBC, etc.)
Management of Intestinal Worms & Parasites

Therapeutic Strategy

• Eliminate with anthelmintics such as Stemona, Wormwood, Black Walnut Hulls, Clove bud essential oil, Thyme, Turmeric and Garlic
• These herbs can act synergistically with each other and with other herbs not particularly noted as anthelmintic because of the phenomenon of bursting of worm larvae
• Tannins act synergistically (bursting) and can be provided by herbs such as Grape Seed and Green Tea
• Improve immune activity with immune-enhancing herbs, especially Andrographis and Echinacea
• Proteolytic enzymes to digest intestinal parasites with Zymex II
  "Contains enzymatic factors from figs and almonds that act as a vermifuge digesting the parasite." Royal Lee
• Promote the gastric acid barrier to resist reinfestation with:
  – Bitter herbs such as Gentian, Andrographis and Wormwood
  – Nutrition such as Betaine HCL or Zypan to support the presence of stomach acid
• Promote the elimination of damaged worms or larvae and eggs via the bowel with laxative herbs such as Cascara (Colax by MediHerb) and dietary fiber (Whole Food Fiber or Gastro-Fiber by Standard Process)
MediHerb
Wormwood Complex

Each tablet contains:

Stemona root 5:1 extract 200 mg
from Stemona sessilifolia root 1.0 g

Black walnut green hulls 4:1 extract 25 mg
from Juglans nigra green hulls 100 mg

Wormwood herb 4:1 extract 25 mg
from Artemisia absinthium herb 100 mg

Clove bud (Syzygium aromaticum) 20 mg
essential oil
Artemisia absinthium - full bloom
Black Walnut nut & leaves
MediHerb Wormwood Complex

• These three herbs along with the clove bud essential oil are all well known for their anthelmintic activity

• This unique synergistic formula allows the individual components to complement each other providing a very potent formulation for the control of intestinal parasites

• Additionally the formula will provide a soothing carminative effect to the G.I. tract and have a beneficial effect on the production of digestive enzymes
Protocol:
Intestinal Worms & Parasites

• Note: doses for products given below represent adult doses
• For children’s doses use calculations based on a ratio using body weight
  • See accompanying:
    “Recommended Protocol for Parasite Control”
Comprehensive Synergistic Protocol

• Standard Process Zymex II: 8-12 capsules on arising on an empty stomach for a minimum of 9 weeks

• Standard Process Zypan: 2-3 tablets three times daily 30 min. after meals for a minimum of 9 weeks

• MediHerb Wormwood Complex: 2 tablets three times daily before meals for the first 10 days, then stop for 10 days, then repeat

• MediHerb Vitanox: 1-2 tablets two times daily, separate from the MediHerb Wormwood Complex and the Zymex II by at least 2 hours
Additional Treatment Options

• MH Garlic Forte tablets, 2 tablets two times per day on the same days as the Wormwood Complex

• DiGest: 2 tabs (suck for a few minutes) before meals
  – Low gastric acid barrier and poor digestion are thought to contribute to reinfestation

• Colax: 2 to 4 tablets before bed twice a week during treatment with the Wormwood Complex
  – To assist the expulsion of worms.
  – The dose should be sufficient to create a very loose stool
Nutritional Deficiency

When a person is afflicted with worms, the body's supply of all nutrients is depleted to the point that supplementation of all nutrients is necessary to restore normal health.
Preventing Parasitic Infections (and their recurrence)

• Avoid potentially contaminated water sources
  - Boiling water can kill G. lamblia and E. histolytica cysts
  - Halogens and filtration are also options
  - 24-48 mg. per day of natural alliin from garlic
  - 2% iodine solution – 0.4 ml. (1/10 tsp.) in 1 l. water for 30 min.
  - Zymex 2 - 3 capsules between meals
• Wash fruits and vegetables thoroughly
• Cook meats (especially pork) completely
• Wash hands regularly and according to exposures
Prevention cont.

Gastric Barrier Protection with:

• Digest: 2 tabs 15-30 minutes before meals.

• Zypan: 2-3 tabs 30 min. after meals

• Immune enhancing herbs
e.g. Echinacea Premium (3-4 tablets per day) &/or Andrographis Complex Tablets (4 tablets per day) – to enhance the body's natural immune function and assist in the immune consequences of worm infestation.
Final Comments

• Drug treatment is not necessary for asymptomatic patients
• Indiscriminate use of anti-parasitic drugs can result in resistance and future treatment failure
• Natural therapies must be dosed sufficiently and even so, may not be sufficient on their own
• Retest to confirm eradication
• Consider referral to specialist if necessary
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Thank You!

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