Common Parasitic Infections
Recognition, Exposure & Canadian Screening

Grand Rounds Presentation

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DISCLOSURES

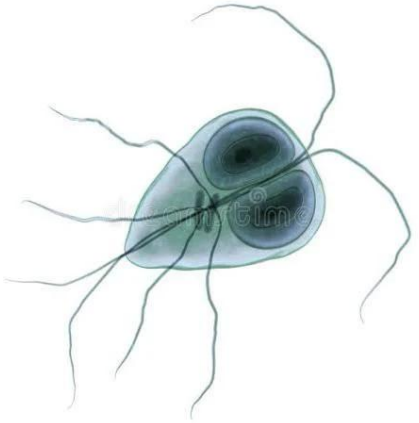
- Nothing to disclose
- I am not paid
- Shout out to Dr. Pam McDermott - this was totally her Idea on a day of casual chatting .

Learning Objectives

- List Common Parasitic Infections
- Describe attributes of common parasitic infections
- List Investigations and Treatments

Giardia lamblia – Overview

- Most common protozoal intestinal infection in North America
  - Transmission: fecal-oral
  - Reservoirs: contaminated water, daycare spread



Giardia – Exposure Settings/Life cycle

- Untreated freshwater (camping, lakes, wells)
  - Daycare centers
  - Household contacts
  - Oral–anal sexual contact
  - Person to person contact because the cysts are shed in stool.

Giardia – Clinical & Diagnosis

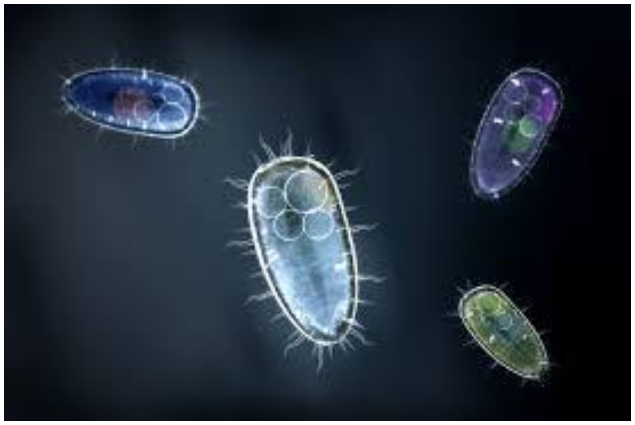
- Greasy, foul-smelling diarrhea Is the main one
  - Bloating, weight loss, Nausea , vomiting , Dehydration, Joint swelling , skin irritation/rash
  - Post-infectious lactose intolerance
  - Incubation period of 1-14 days
  - Acute infection lasts 1-3 weeks
  - Chronic infection can lead to malabsorption
  - Diagnosis: stool antigen or PCR

Giardia – Management

- Tinidazole 2 g PO once
  - OR Metronidazole 500 mg PO TID x 7 days
  - Or a combination of both In chronic giardiasis
  - Nitazoxanide Liquid formulation for children : 1-3 years 100 mg q 12 hours x 3 days , 4-11 years 200 mg q 12 hours x 3 days , 11- 12 years 500 mg tab once daily x 3 days.
  - Treat symptomatic patients
  - Consider testing close contacts in outbreaks

Entamoeba histolytica – Overview

- Causes invasive colitis and liver abscess
  - Acquired via contaminated food/water
  - Common in South Asia, Africa, Latin America
  - Third leading Parasite causing death in 100,000 people annually. (CDC)
  - Cysts are infective and survive in soil, water and moist foods.



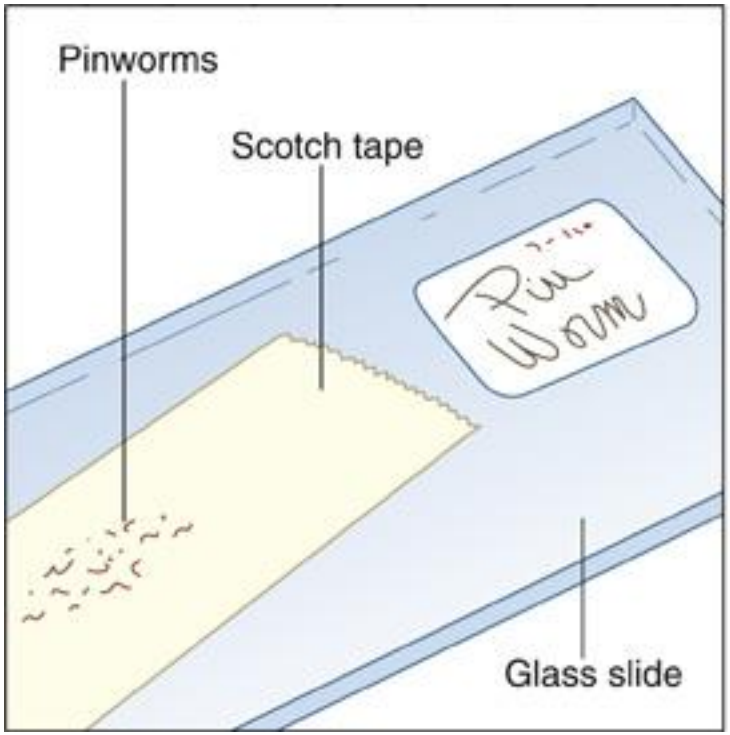
Entamoeba – Clinical & Diagnosis

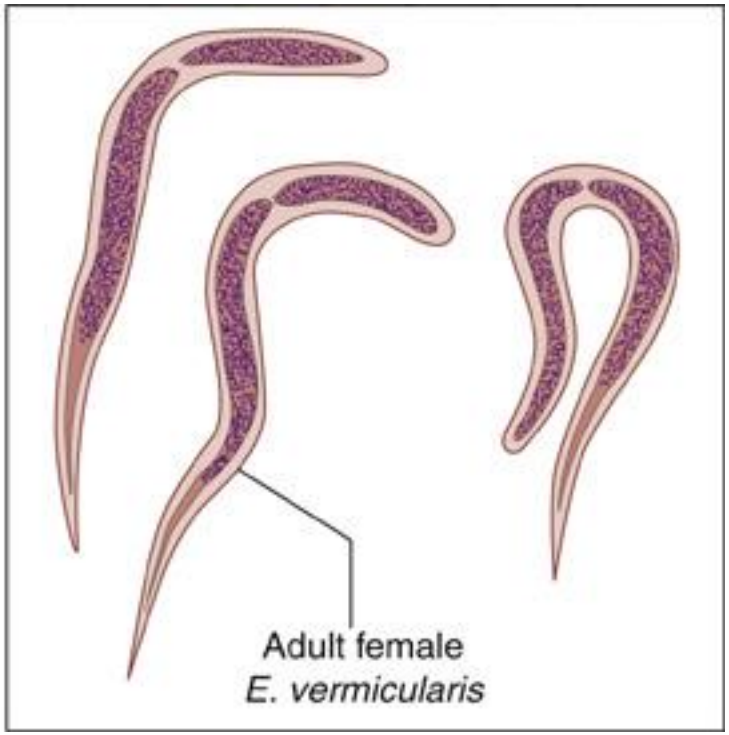
- Bloody diarrhea big give away
  - RUQ pain if liver abscess
  - Fever, Nausea, profuse diarrhea not just bloody
  - Most common extra intestinal organs are the liver and brain : Liver and brain abscess , peritonitis , Pleuropulmonary abscesses and cutaneous and genital amoebic lesions.
  - Diagnosis: stool PCR, serology (if abscess), Samples must be taken 3 days in a row the amount of cysts excreted varies daily
  - Imaging for hepatic abscess/ brain abscess if neurological symptoms
  - Note that 80% of patients may be asymptomatic, Asymptomatic carries can shed millions of cysts per day for years SO people with these infections should not be handling or preparing food .

Entamoeba – Management

- Metronidazole 750 mg PO TID x 7–10 days
  - Follow with Paromomycin 25–30 mg/kg/day ÷ TID x 7 days
  - Always use luminal agent after metronidazole
  - For Live abscess Therapeutic aspiration is recommended with addition of broad -spectrum antibiotics .
  - These are the only medications that can treat the invasive form of disease.

Enterobius vermicularis – Overview





Pinworm – Clinical & Management

- Nocturnal perianal itching, female pinworms lay their eggs at night on the skin around the anus.
  - Diagnosis: tape test
  - Pinworm eggs can survive up to 2-3 weeks on objects
  - Mebendazole 100 mg once, repeat in 2 weeks
  - Treat all household members

Ascaris lumbricoides – Overview

- Soil-transmitted helminth
  - Common in areas with poor sanitation- highest in tropical and subtropical regions.
  - Rare in Canada unless immigrant/traveler
  - Hosts: Humans and Swine
  - How it works you eat the egg with the larvae , the egg hatches, the larvae find your circulation (how rude) then they find your lungs and then you cough and swallow them again- then maturation of this worm happens in the intestine (the adults live in the small intestine)
  - Adult worms can live 1-2 years

Ascaris – Clinical & Management

- May be asymptomatic
  - Eosinophilia
  - Pulmonary migration (Loeffler syndrome)
  - High burden of adult worms cause abdominal pain, intestinal obstruction and possible perforation.
  - Migrating worms can cause symptomatic occlusion of the biliary tract , appendicitis or they come out of your nose.
  - Heavy infections in children can cause stunted growth due to malnutrition
  - Albendazole 400 mg PO once, Mebendazole 500 mg once or 100 mg BID x 3 days -cure rate is over 90% the worms starve then die
  - Pregnancy : Pyrantel Pamoate and wait until after the 1st trimester
  - Surgical intervention for obstruction

Strongyloides stercoralis – Overview

- Soil exposure, barefoot contact
  - Endemic in Southeast Asia, Caribbean, Africa
  - Risk of fatal hyper-infection with steroids
  - Hosts : Humans and Dogs , monkeys and apes
  - The larvae is passed in the stool then it develops into infective larvae or free living adult worms that make babies (eggs). The infective larvae penetrate the skin and then start the parasitic cycle -the ones in the intestine cannot be free living adults and need a new host. Parasitic cycle - larvae in the soil penetrate human skin then they find the small intestine, they also go through the bloodstream and lymphatics to the lungs. The females are embedded in the submucosa of the small intestine and they are the root of all evil. (Auto infection)

Strongyloides – Clinical & Screening

- Intermittent abdominal pain
  - Eosinophilia
  - Localized pruritic rash at the site of penetration , tracheal irritation and dry cough, diarrhea, constipation, anorexia
  - Can be asymptomatic
  - Hyper infection can be seen in asymptomatic patients with high dose corticosteroids- mortality is close to 90% if left untreated.
  - In infants infected with S.Fuelleborni subtype there is often Fatal and systemic illness and presents with sever peritoneal ascites (swollen belly syndrome)
  - Screen before immunosuppression if from endemic area
  - Test: serology , Microscopy after concentration
- Baermann funnel technique (still regarded as the gold standard)
- Formalin–ether concentration technique (FECT)
- Microscopy after culture
- Harada–Mori filter paper culture
- Koga agar plate culture
- Direct microscopy
- Use of a dissecting microscope to visualize larvae on agar plates
- Direct smear of feces in saline–Lugol iodine stain

Strongyloides – Management

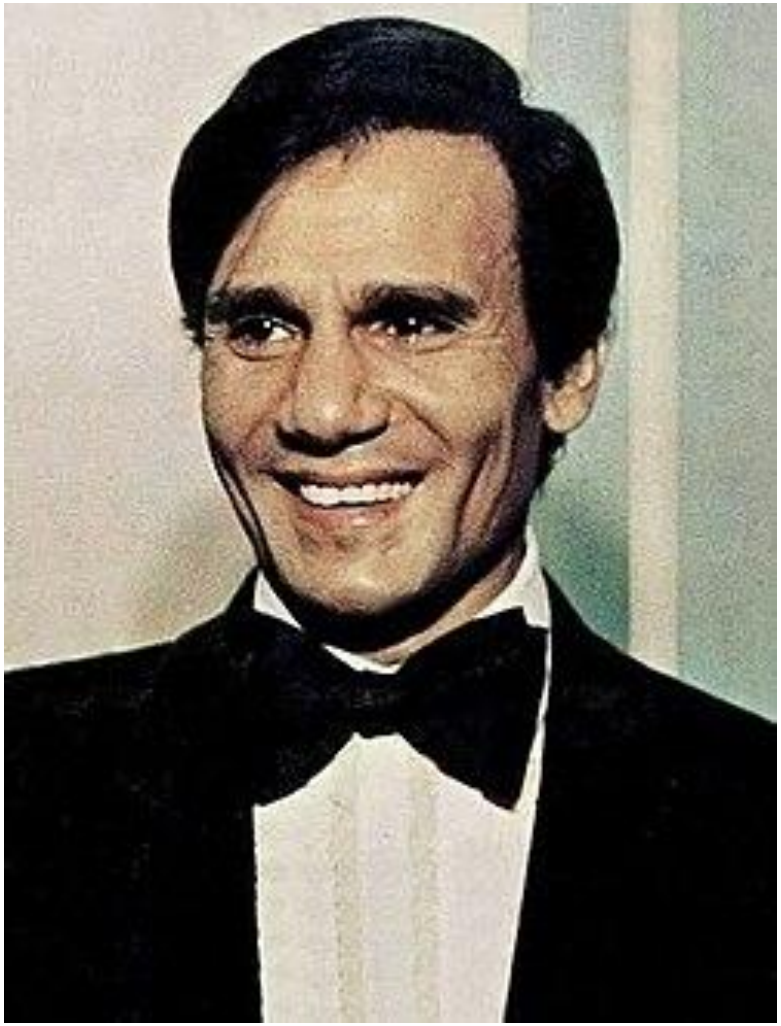
- Ivermectin 200 mcg/kg PO daily x 2 days (uncomplicated)
  - Hyperinfection: daily ivermectin until clearance
  - Treat before steroids whenever possible
  - Stool examination should be done 2-4 weeks after treatment to ensure eradication
  - Can use albendazole if no ivermectin but not as effective .

Schistosoma AKA Bilharzia – Overview

- Acquired from freshwater exposure
  - Endemic in Sub-Saharan Africa, parts of Asia & South America
  - 200 Million people world wide are infected
  - Human infections arecaused by these species : Schistosoma Mansoni, S.Haematobium, S.Japonicum
  - Defecation in freshwater, the eggs hatch , find a freshwater snail develop then leave the snail and enters the water and can live there for 48 hours. The parasite then enters the skin.

Schistosoma – Clinical & Management

- Symptoms develop within 1-2 months of infection.
- Fever, chills , cough , myalgia, anemia , malnutrition, learning difficulties , hematuria.
- If not treated early can lead to inflammation and scarring while traveling to Liver, intestine or bladder.
- Praziquantel (40-60 mg/KG) x 1-2 days this kills the adult worms. For travelers this is delayed 6-8 weeks post exposure to ensure all the worms have matured.
- If they have “katayama fever” which is intractable fever steroids can also be used with Praziquantel.



ABDEL HALIM HAFEZ
FAMOUS EGYPTIAN
SINGER

DIED in 1977 from complications of liver failure related to a chronic Schistosomal infection.

Part of the reason I had a whole year in medical school dedicated to the study of Parasitology and yes I had to learn every life cycle.
PSA:
don’t go swimming in the NILE thanks.

Toxoplasma gondii – Overview

- Exposure: undercooked meat, cat feces, soil
  - Severe disease in immunocompromised patients and Pregnant women (don’t touch the kitty litter)
  - Transmission foodborne, animal to human , Mother to child.
  - Avoid unpasteurized goats milk, oysters, mussels or clams.

Toxoplasma – Clinical & Management

- Most are asymptomatic
- Mild fever, headache, myalgia, swollen and painless lymph nodes.
- Immunocompromised patients can have headaches, and neurological symptoms due to infection in the brain
- Often causes miscarriages or stillborn births in pregnant women
- Ocular Toxo causes blurring of vision, loss of vision , iritis , sensitivity to light.
- Congenital Toxo: vision loss, mental disability, seizures, Jaundice, hepatosplenomegaly, rash, hydrocephalus.
- Diagnosis: MRI (Ring enhancing lesions in the brain)+ serology
- Treatment: Pyrimethamine + Sulfadiazine + Leucovorin x 6 weeks

Taenia solium – Overview

- Pork tapeworm
  - Neurocysticercosis = common cause of acquired epilepsy worldwide
  - Humans are the only definitive hosts, cattle and pigs ingest contaminated food/soil, the eggs hatch and invade the intestinal wall they migrate to the muscle and develop into cysticerci. Humans ingest them through undercooked meat they then take about 1-2 months to develop into a complete tapeworm. This can live for years. They can grow up to 25 m long.
  - The eggs are hatched after they have been passed in the feces.


5cm
alamy
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Taenia – Clinical & Management

- Abdominal pain , nausea, vomiting , diarrhea , anal discomfort, weight loss
- If they migrate they cause neurocysticercosis which can lead to new onset seizures, headaches, confusion.
- Diagnosis : stool O&P , IgG antibodies or antigen, MRI to see cysts with scolex.
- Treatment : Albendazole 15 mg /kg/day BID x 10-14 days and give steroids prior to antiparasitic therapy to suppress the severe inflammatory response caused by the death of the parasite. Helps to manage neurological symptoms as well . Steroids are started a few days before the antiparasitic treatment and continued during the course of treatment.

Plasmodium falciparum(Malaria) – Overview

- Transmitted by Anopheles mosquito
  - Endemic in Sub-Saharan Africa, South Asia
  - Transmission RUDE FEMALE MOSQUITOS . The life cycle is complicated so I will spare you the details they can be found on the CDC website. Basically you get bit they inoculate you with these things called sporozoites and then you grow them in your Liver !!! They hang out for many years and can reactivate .

Malaria – Clinical & Management

- Uncomplicated malaria has non specific symptoms , fever , chills, headache, myalgia , arthralgia , weakness, fatigue , vomiting and diarrhea.
- Clinical features :splenomegaly, anemia, thrombocytopenia, hypoglycemia , pulmonary or renal dysfunction and neurological changes.(cerebral malaria, Nephrotic syndrome)
  - Diagnosis: thick & thin smear microscopic exam is the gold standard, PCR, Rapid diagnostic tests(binaxNow) look for specific antigens in the blood stream.

Can only test for P. Falciparum
Will not detect P. Ovale or P. Malariae

Will still need to obtain Microscopy to
Assess the number of blood cells infected

IS NOT THE GOLD Standard

Treatment

- P. Falciparum assume chloroquine resistance unless proven other wise: Atovaquone-Proguanil (Malarone) Adult dose 4 tabs once daily x 3 days (250mg/100mg) or Quinine + Doxycycline : quinine 650 mg POq8h + Doxy 100 mg PO BID x 7Day (can use clindamycin 450 mg PO TID x 7 Days in pregnancy).
- P. Vivax or P.Ovale : Chloroquine 1g PO then 500 mg at 6 hrs, then 500 mg at 24 hrs, then 500 mg at 48 hours
- If the liver is affected Use Primaquine 30 mg PO daily x 14 days (avoid in G6PD pts)
- Severe Malaria : IV artesunate 2.4 mg /kg IV timing 0hr, 12hr, 24 hr then daily until patient can tolerate oral therapy and continue with malarone x 3 days

PROPHYLAXIS

- Malarone 1 tab daily , start 1-2 days before your travel continue daily during travel and then 7 days after leaving endemic area.
- Doxycycline 100 mg PO daily , start 1-2 days before travel continue daily during travel and then daily for 4 weeks after leaving endemic area (avoid in pregnancy)
- Mefloquin 250 mg PO once weekly, start 2 weeks before travel take weekly during travel and continue 4 weeks after leaving endemic area. (my least fav because can cause neuropsychiatric reactions , avoid in patients with a psychiatric history and seizure disorders)

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Canadian Screening Recommendations

- Screen Strongyloides if from endemic region or before steroids
  - Screen Schistosoma if Sub-Saharan Africa freshwater exposure
  - Stool O&P if eosinophilia or GI symptoms
  - Malaria testing if febrile traveler

Key Canadian Sources

- Canadian Collaboration for Immigrant and Refugee Health (CCIRH)
  - Public Health Agency of Canada
  - Committee to Advise on Tropical Medicine and Travel (CATMAT)
  - CDC Parasite Guidelines
  - World Health Organization

SORRY IF YOU NEVER EAT AGAIN.