Tropical Diseases affecting the Gastrointestinal Tract

Ahmed Laving

Lecturer & Paediatric Gastroenterologist, University of Nairobi

ESPGHAN post graduate course, September 2015
Tropics
Tropical Infections

• Viruses:
  – Ebola
  – Dengue
  – Yellow fever
  – Marburg

• Bacteria:
  – Cholera
  – E. coli
  – M. tuberculosis

• Parasites:
  – Malaria
  – Giardia
  – Schistosoma
  – Trypanosomes
  – Leishmania
  – Filaria
  – Toxoplasma

• Helminths
Other Tropical Diseases

- Malnutrition: *environmental enteropathy*
- *Tropical sprue*
- Sickle cell disease

- Life long “presidency tendencitis”
- Ministerial greed fever
- “Tribalitis”
Case 1

- A 9 year old female presents with a 4 day h/o fever, lethargy, joint aches, eye pain
- h/o travel to Coastal region (Mombasa)
- Sick looking, febrile, dehydrated, no pallor, mildly jaundiced, petechiae+
- Labs: WBC 3.9, platelets 78, Hb 11.8, AST/ALT 59/62, Hepatitis A/B/C negative
- Diagnosis?
Dengue

• ssRNA virus of the family *Flaviviridae*; types 1-4
• Transmitted by *Aedes* mosquito
  • *daytime* feeders!
• Endemic in tropical areas
• WHO: 50-100 million infections per year
• Outbreak in New Delhi in September 2015
• Incubation period: 3-7 days
Dengue: clinical features

• High fever, chills, malaise, lethargy
• Muscle/joint pains, headache, eye pain
• Maculopapular skin rash
• GIT: nausea, vomiting, splenomegaly
• Petechiae/bleeding in the skin, gums (dengue haemorrhagic fever)
• Dengue shock syndrome: severe abdominal pain, bleeding, hypotension
Dengue: diagnosis

- CBC: thrombocytopenia, leukopenia
- LFT: elevated transaminases, low albumin
- Coagulation profile: may be deranged
- Serology, PCR
- Isolation of dengue virus from serum, plasma or autopsy
Dengue - management

- Mainly supportive: oral fluids, antipyretics (avoid NSAID’s), bed rest
- Hemorrhagic fever/shock: admit, IV fluids, inotropes
- Steroids: no role
- Platelet transfusions: no change in bleeding
- Vitamin E: modest increase in platelets
- No specific antiviral therapy available
- Vaccines under development


Case 2

7 year old boy with a 3 month h/o:

• intermittent abdominal pain
• loose, greasy, foul smelling stools
• anorexia and weight loss
• No h/o fever, blood in stool, joint swelling, mouth sores
• h/o camping in Drakensberg mountain

Examination: unremarkable

Diagnosis?
Giardiasis
Giardia

- Giardia intestinalis (G. lamblia)
- A flagellated protozoan parasite, endemic in areas with poor sanitation
- Most common protozoal parasite *worldwide*
- Found in 80% of raw water supplies, 15% of filtered water samples
- Infection by ingesting only 10 cysts
- In developing world, prevalence is 20-30% & more common in children

Giardia: Risk factors, transmission

- Travellers to endemic areas
- Immunocompromised patients
- Malnourished patients
- Sexually active homosexual men

Transmission:
- fecal-oral
- ingestion of contaminated water
- person to person
Giardia: simple life cycle

• Ingestion of cyst
• excystation in stomach or duodenum
• trophozoites pass into small bowel and multiply rapidly
• encystation in large bowel and excreted
Giardia: mechanism of injury

- Multifactorial
- Damage to endothelial brush border
- Enterotoxins, immunologic reactions
- Altered gut motility
- Fluid hyper secretion via increased cAMP activity
- Results in villus flattening, inhibition of disachharidase activity with varying degrees of malabsorption
Giardia: Clinical Features

- Diarrhea
- Malaise, weakness
- Abdominal distension
- Abdominal cramps
- Flatulence
- Malodorous, greasy stool
- Anorexia, weight loss
Giardiasis

• Clinical outcomes:
  – 50% asymptomatic and clear the infection
  – 5-15% asymptomatic shed cysts
  – 35-45% of have symptomatic infection:
    • Acute disease
    • Chronic disease

• Diagnosis: Fresh stool specimen, 3 days
  – Stool microscopy: trophozoites or cysts
  – Stool ELISA
  – Nasojejunal specimens, upper endoscopy

* 2012 UpToDate ,Release: 20.9 - C20.24
Giardia: complications

• Chronic diarrhea
• Malabsorption
• Failure to thrive in children
• Growth retardation
• Zinc deficiency
Giardia: treatment

• Metronidazole for 5-7 days; 85-90% cure
• Albendazole, tinidazole, nitazoxanide, paramomycin (pregnant women)
• Do NOT treat asymptomatic persons who excrete cysts
• Lactose free diet may be needed for a few weeks
Protozoal Infection

Sushi. Still your best bet for intestinal worms.
Case 3a

• 12 year old with 1st episode acute upper GI bleed
• Severe pallor, anicteric, no oedema, no finger clubbing, not malnourished
• Firm liver, enlarged spleen, no ascites
• Lives in Kenya but grew up in South Sudan
• INR 1.3, albumin 38, AST/ALT normal
• Diagnosis?
Schistosomiasis

- Parasitic disease caused by blood flukes of genus Schistosoma
- >200 million people infected & 200,000 deaths/year due to Schistosomiasis
- S. haematobium, S. mansoni and S. hematobium (S. mekongi, S. intercalatum)
- Snails are intermediate hosts
- Common in people living near rivers, lakes, rice fields
Worms mate and lay eggs in hepatic portal blood vessels.

Male worm holds female within a cleft in his body.

Fertilized eggs leave intestinal wall and pass to outside in feces.

Eggs hatch in water.

Free-swimming cercaria.

Cercaria enter the body, lose their tails, and encyst as metacercaria.

Sporocysts develop into cercaria and are released into water.

Free-swimming miracidium enters snail (alternate host) and develops into a sporocyst.
Schistosomal liver disease

- One of most common causes of non-cirrhotic portal hypertension in the world
- Pathology due to immunologic reaction to Schistosoma eggs, resulting in granuloma formation and fibrosis
  - bowel wall: bloody diarrhea, inflammatory colonic polyposis
  - liver: periportal fibrosis (chronic inflammation to eggs trapped in terminal portal veins)

**2012 UpToDate ,Release: 20.9 - C20.24
Schistosomalous disease: clinical features

- Upper GI bleeding
- GI obstruction
- Hematuria
- Severe anaemia
- Portal hypertension (splenomegaly, varices)
- Hemospermia
- Obstructive uropathy
- Carcinoma of the liver, gall bladder, bladder
Schistosomal liver disease

- Underlying hepatic function remains preserved
- Diagnosis
  - detection of schistosomal ova in stool
  - biopsies of rectal mucosa or liver
  - immunologic assays
- Treatment
  - Praziquantel (or oxamniquine) in acute stage of disease; will not affect fibrosis once set in
  - preventing or treating consequences of portal hypertension


Case 3b

- 14 year old boy with blood per rectum for 6 months
- Frank blood, tablespoon full, not associated with pain
- No h/o constipation
- No h/o bleeding disorder
- Boarding school in Eastern Kenya
Case 3b..

- Examination: NAD!
- Diagnosis?
- Management?
- Colonoscopy: 1 pedunculated polyp at 25cm, removed
- Histology: juvenile retention polyp with multiple eggs of Schistosoma!
Giardiasis (2)

• clinical manifestations:
  – 50%: asymptomatic and clear the infection
  – 5 to 15% asymptomatic shed cysts
  – 35 to 45% of individuals have symptomatic infection:
    • Acute disease
    • Chronic disease

• Diagnosis:
  – Stool microscopy

* 2012 UpToDate, Release: 20.9 - C20.24

And you thought your job sucked
Case 4

12 year old girl with 6 month h/o:
- abdominal pain and progressive abdominal swelling (accused of being pregnant)
- no jaundice/hematemesis/dysuria/flank pain/hematuria/cough
- intermittent fever, some weight loss
- no h/o contact with persons with TB
- joined boarding school 9 months earlier
Case 4 ...(cont’d)

- Wasted, mild pallor, no lymphadenopathy, no oedema
- Distended abdomen with moderate ascites
- Chest, CVS, CNS: normal
- Hb 10, ESR 54, UEC/LFTs normal
- Other tests?
- Diagnosis?
Tuberculosis (TB)

• A life threatening disease which can virtually affect any organ system
• Global burden/emergency
  • 30-40% of the world has TB (2 billion)
  • 8.6 million annual incidence
  • 450 thousand have MDR
  • 1.3 million people died in 2012

Global tuberculosis report 2013. WHO
Abdominal TB

• GIT involved in 25% of cases and 6\textsuperscript{th} most frequent form of extra-pulmonary TB

• Pathogenesis attributed to four mechanisms:
  – Swallowing infected sputum
  – Hematogenously spread - miliary TB
  – Ingestion of contaminated milk or food
  – Contiguous spread from adjacent organs

• Ileocecal region is most common site of intestinal involvement

Classification of Abdominal TB

Intestinal TB
• ulcerative
• perforative
• hyperplastic

Peritoneal TB
• Acute peritonitis
• Chronic/fibrotic
• Wet ascitic type
• Dry/plastic type

Visceral TB
• Liver, pancreas, spleen

Mesenteric TB
• Nodal
• Abscess
• Mass
Abdominal TB: features

- Non specific
- Intestinal obstruction: acute, subacute
- Perforation
- Mass: abscess, LN mass, bowel mass, omental mass
- Ascites: diffuse, loculated
**Tuberculosis - Liver Involvement**

- Liver usually involved in disseminated TB, & may present as:
  - Cholecystitis
  - Scattered granulomatous lesions
  - Fulminant hepatic failure (rare)

- Usually presents with non-specific symptoms of hepatic dysfunction: RUQ pain, nausea, vomiting

---

*Abdominal tuberculosis in a district general hospital: a retrospective review of 86 cases. Ramesh J, Banait GS, Ormerod LP QJM. 2008;101(3):189*
Abdominal TB: Diagnosis

- Non specific: high ESR, anaemia, low albumin
- Ascitic fluid: high protein, SAAG <1.1, high cell count (lymphocytes)
- Ascitic adenosine deaminase levels high
- AAFB stain in <3%; culture yield low
- US: lymphadenopathy, ascites, peritoneal/omental & bowel wall thickening
- Multiplex PCR high sensitivity, specificity

Treatment

• Anti-TB Rx for 6-9 months
  • 4 drugs for 2 months
  • 2 drugs for 4-7 months
  • ?role for steroids

• Surgery

Malnutrition Associated Enteropathy (Environmental Enteric Dysfunction)

- Environmental enteropathy
- Tropical enteropathy
Malnutrition associated enteropathy

Reduced food input

Malnutrition

Reduced immunity

Diarrhoeal disease

Increased nutritional demand

Convalescent period not enough to catch up nutrients
Infant Diets

• Children who received interventions gained
  • 0-760 g more weight (0.0 - 0.76 WAZ)
  • 0 - 1.7 cm taller (0.0 - 0.64 LAZ)
• The very best of these interventions produced a 0.7 Z-score improvement
• BUT, the average growth deficit of African and Asian children is -2.0 Z-score
• At best, diet solved 1/3 of the problem
Environmental Enteric Dysfunction (EED)

- An acquired syndrome of impaired gastrointestinal mucosal barrier function
- Thought to play key role in the pathogenesis of stunting in early life
- Conceptualized as an maladaptive response to excess environmental pathogen exposure
- EED: Chronic inflammation of the gut, characterized by:
  - Villous flattening, inflammatory cell infiltrate, increased permeability, bacterial overgrowth
Malnutrition associated enteropathy

• Starved infants pass frequent green liquid stools of small volume (less than 10 grams).
• Pathogenesis
  – Impaired development and function of the immune system, therefore increase in enteric infection
  – Generalized increase in inflammatory mediators
  – Impaired tissue repair mechanisms
  – Specific nutrient deficiencies, such as vitamin A and zinc deficiencies
• Inpatient or outpatient management of malnutrition
• Multivitamin (and zinc) supplementation
• Empiric use of antibiotics
• Improve hygiene and sanitation
• Role of anti-inflammatory agents: recent pilot trial of mesalamine showed modest improvement of inflammatory markers

Mesalazine in initial management of severely acutely malnourished children with environmental enteric dysfunction: a pilot randomized controlled trial
Tropical Sprue
Tropical sprue

• A syndrome characterized by acute or chronic diarrhoea, weight loss, and malabsorption
• Malabsorption of at least 2 nutrients, when other causes are excluded
• It occurs in residents of or visitors to the tropics and subtropics
• Aetiology unknown, but intestinal microbial infection may cause initial insult
• Coliform bacteria (E.coli, Klebsiella, Enterobacter) usual organisms isolated
Tropical sprue (2)

• Pathogenesis:
  – Infection results in enterocyte injury, intestinal stasis and possible bacterial overgrowth
  – Results in malabsorption with deficiencies of Iron, Folate, B12
Tropical sprue (3)

- CBC: megaloblastic anaemia, Iron deficiency
- Stool: fat malabsorption
- Diagnosis: endoscopy
  - Tropical sprue involves the entire small bowel
  - Gross findings at endoscopy include flattening of duodenal folds and "scalloping"
  - Histology: shortened, blunted villi and elongated crypts with increased inflammatory cells
- Must rule out other causes of diarrhoea, especially infective
Tropical Sprue: diagnosis

Diagnosis based on:
• steatorrhea
• mucosal malabsorption of 2 substances (eg, fat, D-xylose)
• villous atrophy (on biopsy)

Response to treatment is considered by some to be confirm the diagnosis

Tropical Sprue: Management

- Antibiotics for 3-6 months
- Folate, Vitamin B12, Iron supplements
- No role for antibiotic prophylaxis to prevent sprue
Thank You!
Asante!
Enkosi!