Schistosomiasis

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Disclosures

- None

My experience with schistosomiasis

- Working at Gulu Regional Referral Hospital in northern Uganda
  - Many patients with splenomegaly and massive upper GI bleeding from esophageal varices

Take home points

- What is schistosomiasis?
  - Intestinal/liver – *S. mansoni*
  - Bladder – *S. haematobium*
- How do you get schistosomiasis?
  - What is "swimmer's itch"
  - What is acute schistosomiasis
  - The story of the Diama Dam in Senegal and the Cavu River in Corsica
- What are the complications of chronic schistosomiasis
  - Intestinal, liver (variceal bleeding), genitourinary

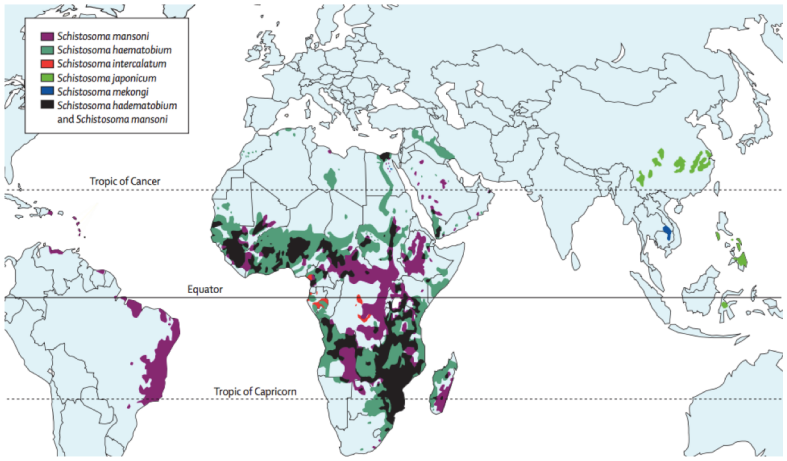
Schistosomiasis
Parasitic infection

- **Protozoa** – single-cellular, multiply in the host
  - Malaria, Giardia, etc etc
- **Helminths** – multicellular, complex life cycles (usually 1 egg = 1 worm)
  - Roundworms - like ascaris and filaria
  - Tapeworms – like pork tapeworm
  - **Flukes (Trematodes)** – schistosomiasis and food-borne trematodes

Schistosomiasis

	Species	Geographic distribution
Intestinal	***1. S. Mansoni***	Africa, Middle East, Caribbean, Brazil
	2. S. Japonicum	China, Indonesia, Philippines
	S. Mekongi	Parts of Cambodia and Laos
	S. Intercalatum	Central Africa
Urogenital	***3. S. Haemotobium***	Africa, Middle East, Corsica (France)

Schistosomiasis



Lancet 2014

McManus et al. Nat Rev Dis Primers. 2018 Aug 9;4(1):13

Burden of disease

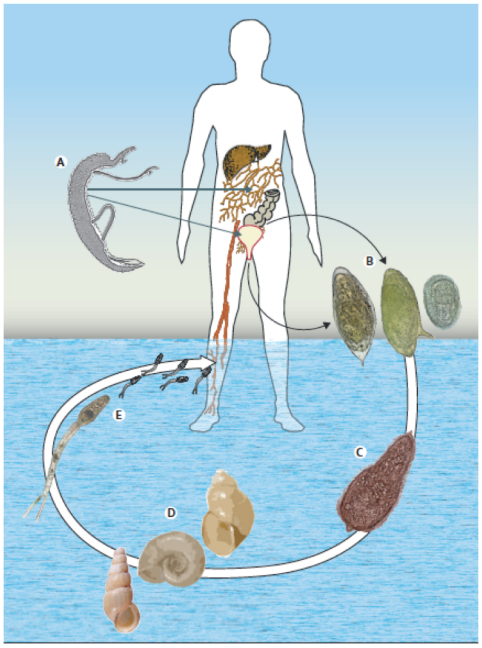
- Over 200 million people chronically infected
- Over 200, 000 death per year
- Main causes of death:
  - **Variceal bleeding.** 130,000 deaths/year
  - Kidney disease 100,000 deaths/year
  - Bladder cancer 10,000 deaths/year

https://www.who.int/schistosomiasis/epidemiology/table/en/

Transmission
Exposure to contaminated freshwater

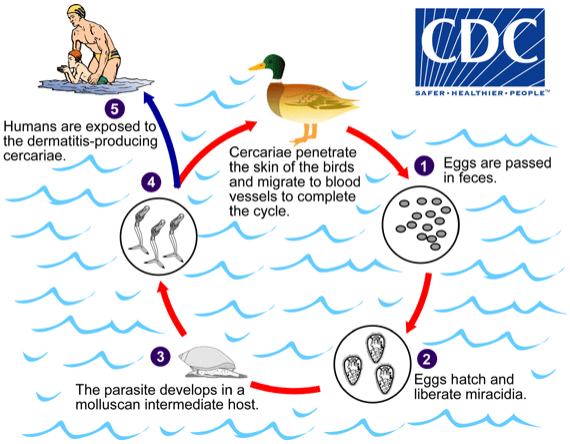
WHO

Lifecycle



Lancet 2014

Cercarial dermatitis
Bird schistosomiasis

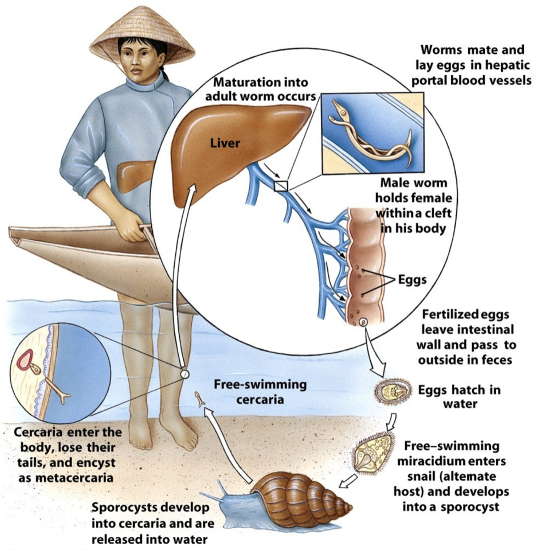


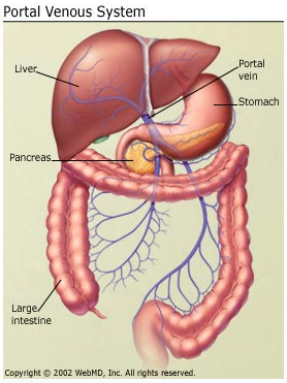
US CDC

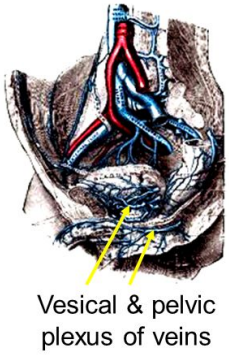
Acute schistosomiasis
Katayama Fever

- Hypersensitivity reaction
  - Usually travelers, not if born in endemic region
- 2 - 12 weeks after exposure
- Flu-like, fever, malaise, cough, headache
  - Can be urticaria
  - Always eosinophilia

J Paediatr Neonatal Dis 3(1): 106
Clin Microbiol Infect 2010;16: 225–23







Vesical & pelvic plexus of veins

https://www.ppdictionary.com/parasites/mansoni.htm

Pathophysiology

- Eggs trigger an inflammatory reaction
- Worms, within the venules, manage to hide from immune attack –
- Most eggs go to:
  - **intestine** → mucosal ulceration, bleeding and fibrosis
  - **Liver** → periportal fibrosis, portal hypertension –esophageal varices
  - B**ladder** → inflammation, ulceration, pseudopolyps and cancer
  - **Vagina and cervx** → ulceration can increase risk for HIV trasmission
- Rarely, ectopic migration can occur → including to the CNS

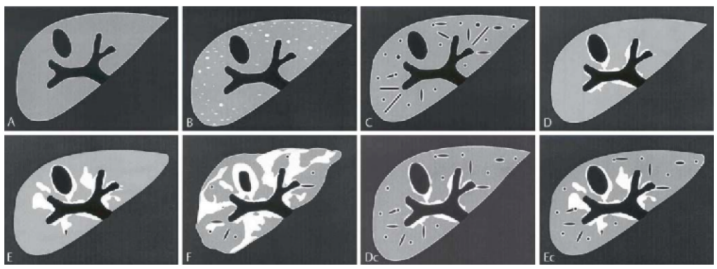
This young boy has schistosomiasis What is this doctor feeling on exam?

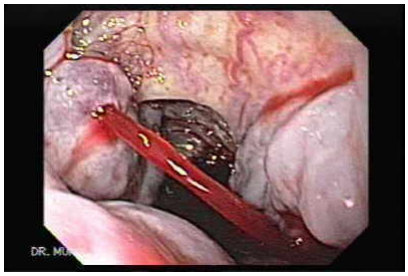
A. Huge Spleen
B. Enlarged Intestines
C. Bladder cancer

WHO

Periportal hypertension

- Non-cirrhotic portal hypertension
  - No jaundice (contrasted with viral hepatitis and alcohol)
  - Characteristic features on liver ultrasound





https://www.who.int/tdr/publications/documents/ultrasound-schistosomiasis.pdf

Neuroschistosomiasis

- In endemic areas may account for more than 10% of non-traumatic spinal cord lesions …
- Inflammatory response to ectopic migration of the eggs

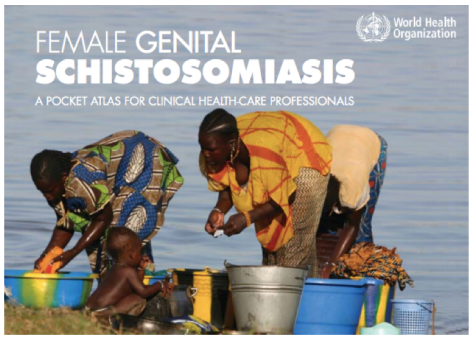
Lancet Neurol 2011; 10: 853–64

Genitourinary

- Bladder involvement and hematuria in kids
  - So common in some regions that hematuria was misinterpreted as a sign of puberty in boys
- Chronic inflammation can lead to cancer risk
- Can also effect genitals (and not bladder)
  - Vaginal and cervical ulceration → risk for HIV transmission

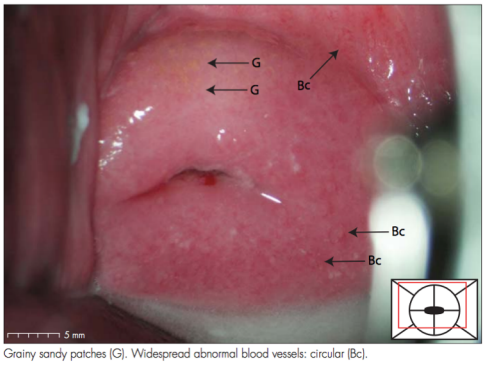
Female genital schistosomiasis

- Under-recognized cause of disease
  - Vaginal discharge and bleeding
  - Pelvic pain
  - Infertility
  - Increased risk for HIV transmission
- Colposcopy
  - Grainy sandy patches
  - Homogenous sandy patches
  - Abnormal blood vessls
  - Rubbery papules



WHO pocket atlas - 2015

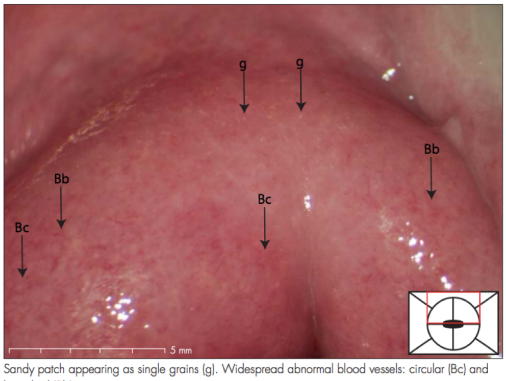
Female genital schistosomiasis



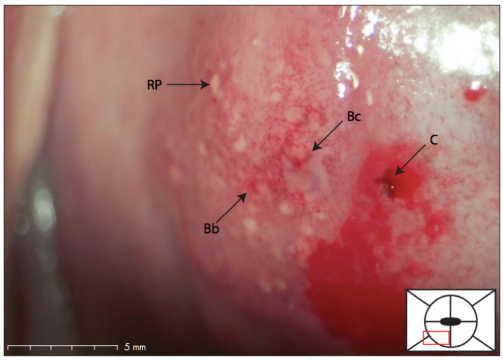
Grainy sandy patches (G). Widespread abnormal blood vessels: circular (Bc).

WHO pocket atlas - 2015

Female genital schistosomiasis



Sandy patch appearing as single grains (g). Widespread abnormal blood vessels: circular (Bc) and branched (Bb).

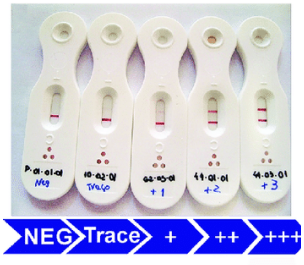


Rubbery papules (RP). Abnormal blood vessels: circular (Bc) and branched (Bb). Contact bleeding (C).

WHO pocket atlas - 2015

Diagnosis

- Serology – most sensitive
- Microscopy – looking for the eggs directly
  - Stool (or rectal mucosa)
  - Urine
- Rapid antigen detection tests (on urine)
  - Circulating cathodic anion (CCA)
  - More sensitive than stool microscopy



Treatment
For chronic schistosomiasis (adult worms).

- Praziquantel (biltricide)
  - 600 mg tablets
  - **Standard**: **40mg/kg x one dose** = 4 tablets
    - For *S. Japonicum* 60mg/kg in split doses x 1 day

- Cure rates 30 - 90% with single dose therapy
  - Additional doses may be beneficial for cure
  - Safe drug – take with food
  - Combine with steroids for CNS neuroschistosomiasis
- 40 mg/kg daily x 3 days

PLoS Negl Trop Dis 2014; 8: e3286.

Treatment considerations

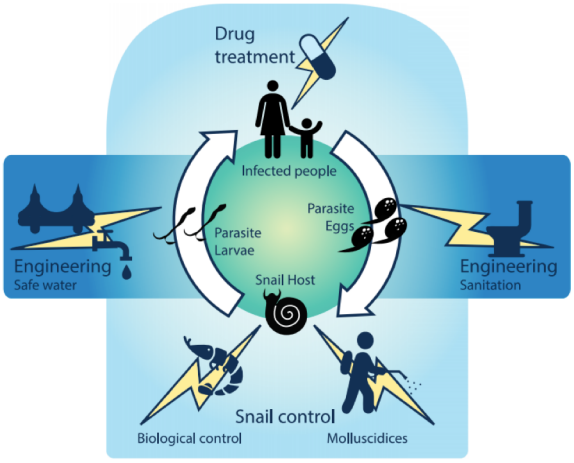
- There are three distinct phases of clinical disease progression:

1. Acute infection – before all adults are mature, praziquantel may not work
2. Established active infection
3. Late chronic infection – scarring and damage, trematodes may already be dead

Control measures

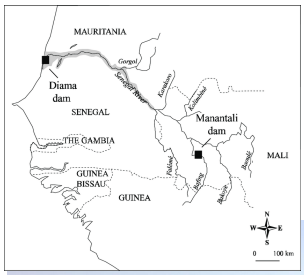
- Environmental control
  - Sanitation
  - Killing snails - example of Japan
- Annual mass drug administration

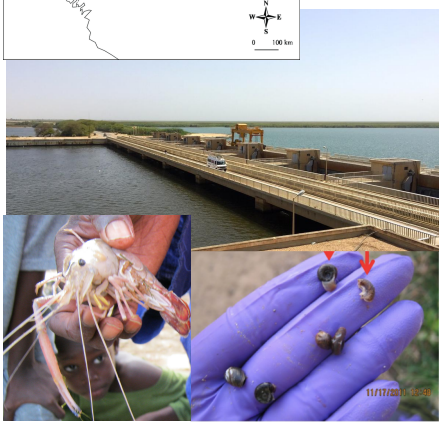
Control measures



Diama Dam in Senegal

- Interrupted salt water flow back into the river
  - Improved irrigation for crops
  - But, lead to more snails → more cases of schistosomiasis
- Reintroducing prawns into the Senegal river may help reduce the number of snails

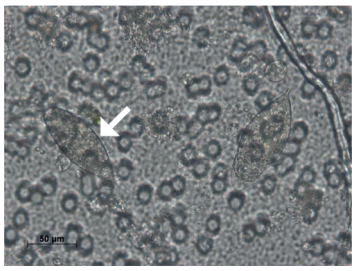




RAPID COMMUNICATIONS

Schistosoma haematobium infections acquired in Corsica, France, August 2013

- 12 year old boy from Germany
- Developed painless hematuria 5 months after visiting Corsica
  - His urine was positive
  - His 3 siblings had positive serology



Euro Surveill 2014; 19: 20821.

Cavu River
Corsica, France

- **How did schistosomiasis get introduced into the river in Corsica?**

A. Someone visiting with schistosomiasis urinated in the river?
B. Crayfish from Senegal were introduced for fishing?
C. Snails migrated on boats crossing the Mediteranean?

Euro Surveill 2014; 19: 20821.

Summary review

- What is schistosomiasis?
  - Intestinal/liver – *S. mansoni*
  - Bladder – *S. haematobium*
- How do you get schistosomiasis?
  - The story of the Diama Dam in Senegal and the Cavu River in Corsica
  - What is "swimmer's itch"
  - What is acute schistosomiasis
- What are the complications of chronic schistosomiasis
  - Intestinal, liver (variceal bleeding), genitourinary

How would you treat female genital schistosomiasis?

A. Albendazole 400mg x 1 dose
B. Ivermectin 0.2mg/kg (12mg) x 1 dose
C. Praziquantel 40mg/kg (2,400mg) x 1 dose
D. Praziquantel 40mg/kg (2,400mg) daily x 3 days

Freshwater exposure?

- Swimming in freshwater in subSaharan Africa?
  - Think of **Schistosomiasis**

- Swimming in freswater in Borneo or South America - and fevers?
  - Think of **Leptospirosis**