



Parasitologie Intestinale: Aspects cliniques

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Formation Continuée en Biologie Clinique

Les Jeudis de Fleurus 14/12/2017



Parasites – commensals - symbionts (*Murray 6th ed.*)

- **Parasites**

- organisms that live on or within a host from which they derive benefits without making any useful contribution in return;
- in the case of pathogens, the relationship is harmful to the host

- **Commensals**

- organisms living in a close relationship in which one benefits from the relationship, and the other neither benefits nor is harmed

- **Symbionts**

- organisms that live together and in which the association is of mutual advantage



Parasitic intestinal infections endemic in Europe

- Protozoa

- *Giardia lamblia*,
- *Cryptosporidium spp.*, *Microsporidium spp.* (in immunodepression)

- Helminthes

- *Enterobius vermicularis*
- (*Ascaris lumbricoides*, *Taenia saginata*, *Anisakis simplex*, *Fasciola hepatica*, *Trichinella spp.*,...)



Parasitic intestinal infections in the tropics

- Protozoa

- ***Giardia lamblia***, *Entamoeba dispar/histolytica*, *Dientamoeba fragilis*
- ***Cryptosporidium spp.***, *Cyclospora cayetanensis*, *Cytoisospora belli*, ***Microsporidium spp.*** (immunosuppression)

- Helminthes

- ***Enterobius vermicularis***, *Ascaris lumbricoides*, *Trichuris trichiuria*, *Ancylostoma duodenale/Necator americanus*, *Strongyloides stercoralis*, *Capillaria philippinesis*, *Anisakis simplex*, *Trichinella spp.*,...
- *Taenia saginata* and *T. solium*,...
- *Fasciola hepatica/gigantica*, *Clonorchis/Opisthorchis*, intestinal flukes,...



Case 1: Mother in panic; worm in child's stool



Case 1: Mother in panic; worm in child's stool

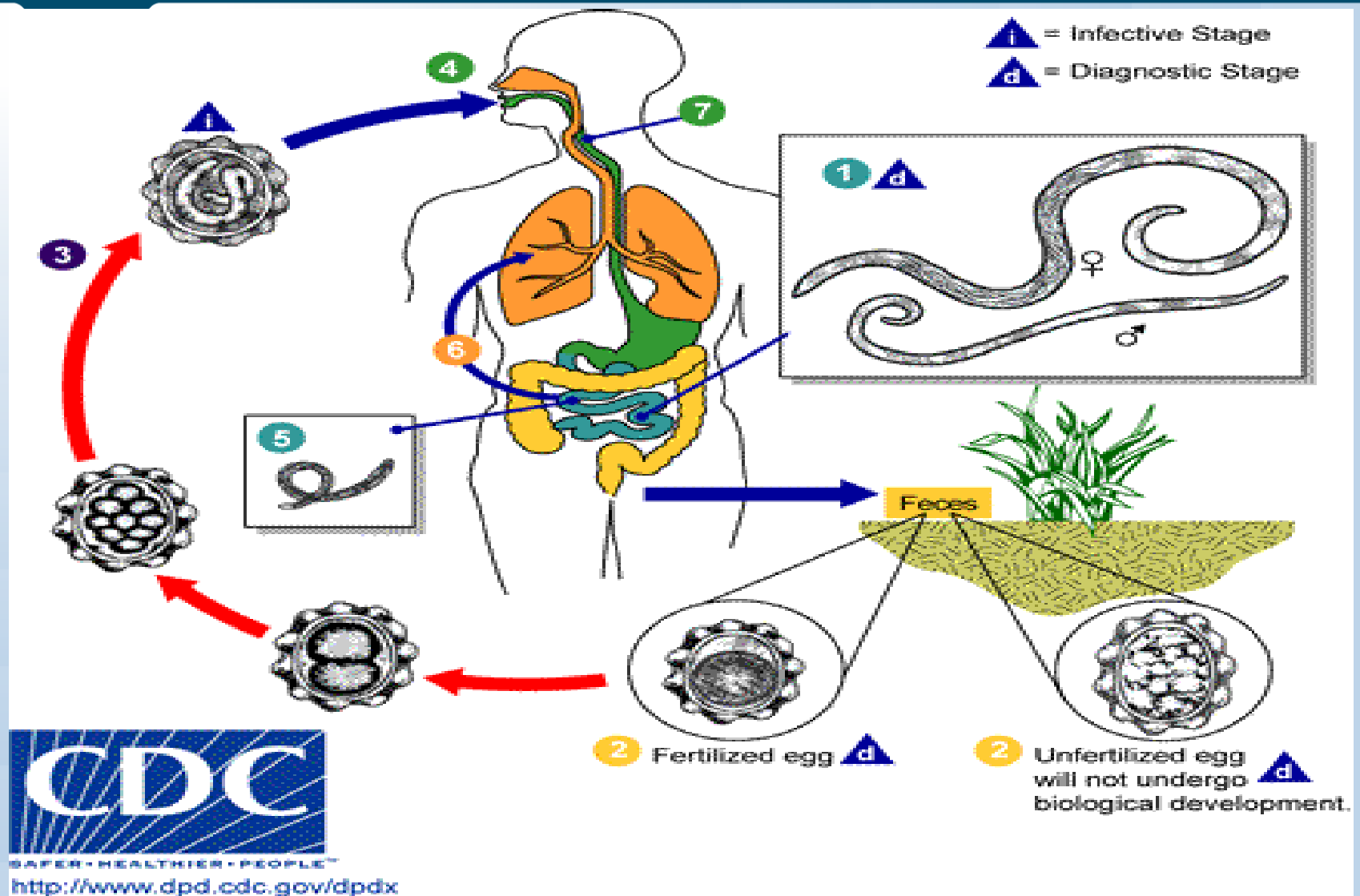


Ascaris lumbricoides

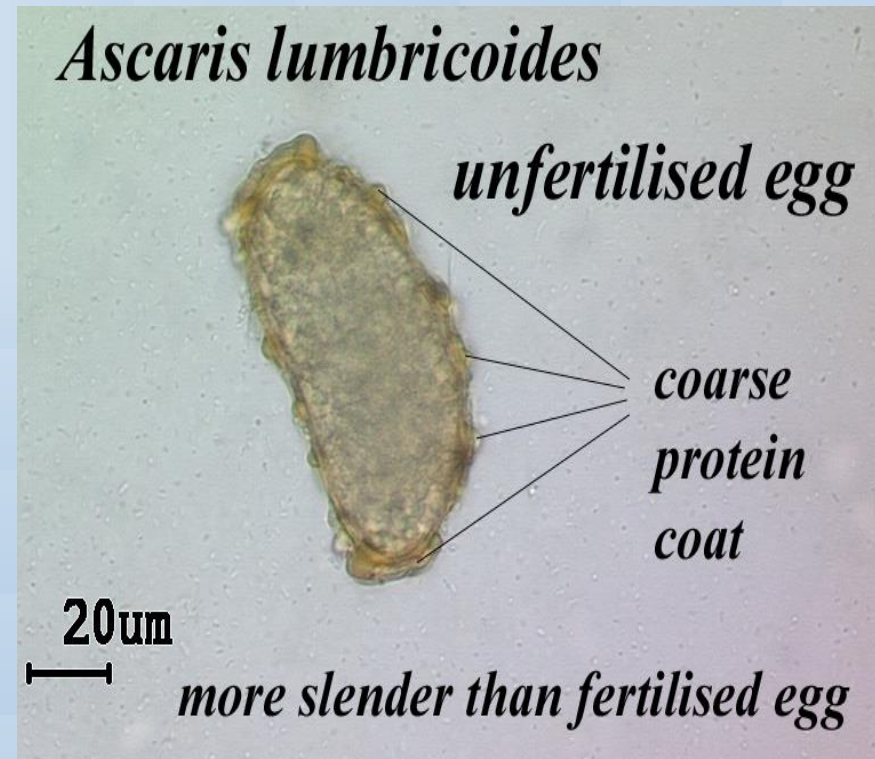
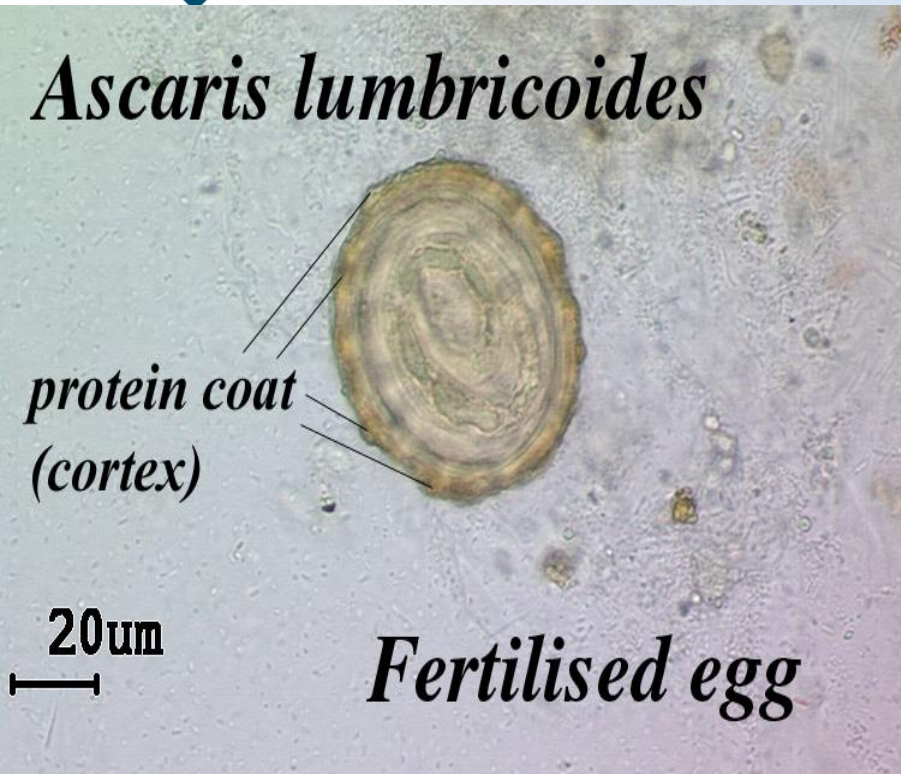


Ver de terre

Ascaris lumbricoides: cycle

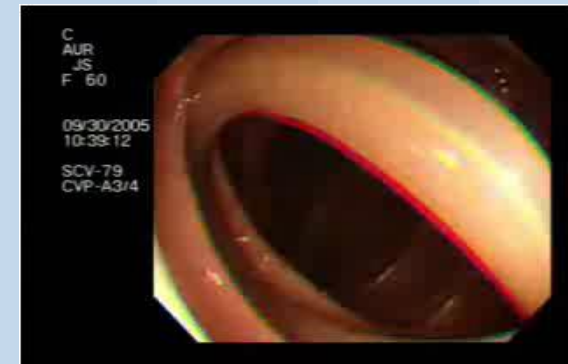
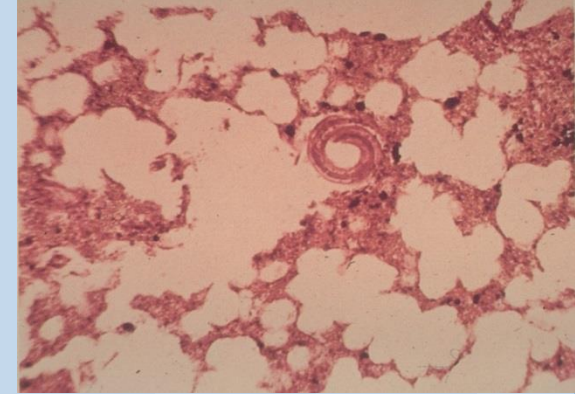


Ascaris lumbricoides: diagnosis



Ascariasis: clinical manifestations

- Larva migrating in the tissues
 - Very often: asymptomatic
 - Rarely: Loeffler syndrome, urticaria
- Adult worms in intestines
 - Most of the time: asymptomatic
 - Sometimes: non specific abdominal discomfort
 - Sometimes: **mechanical obstruction**
 - In low-resource settings: co-factor of malnutrition



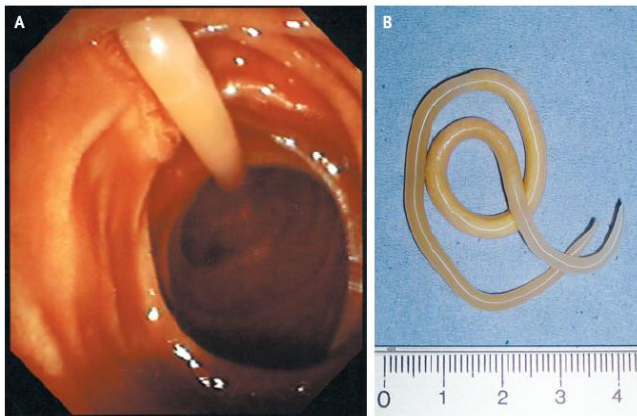
Ascariasis: clinical manifestations

The NEW ENGLAND JOURNAL of MEDICINE

IMAGES IN CLINICAL MEDICINE

Ascaris lumbricoides Blocking the Common Bile Duct

N ENGL J MED 352:5 WWW.NEJM.ORG FEBRUARY 3, 2005



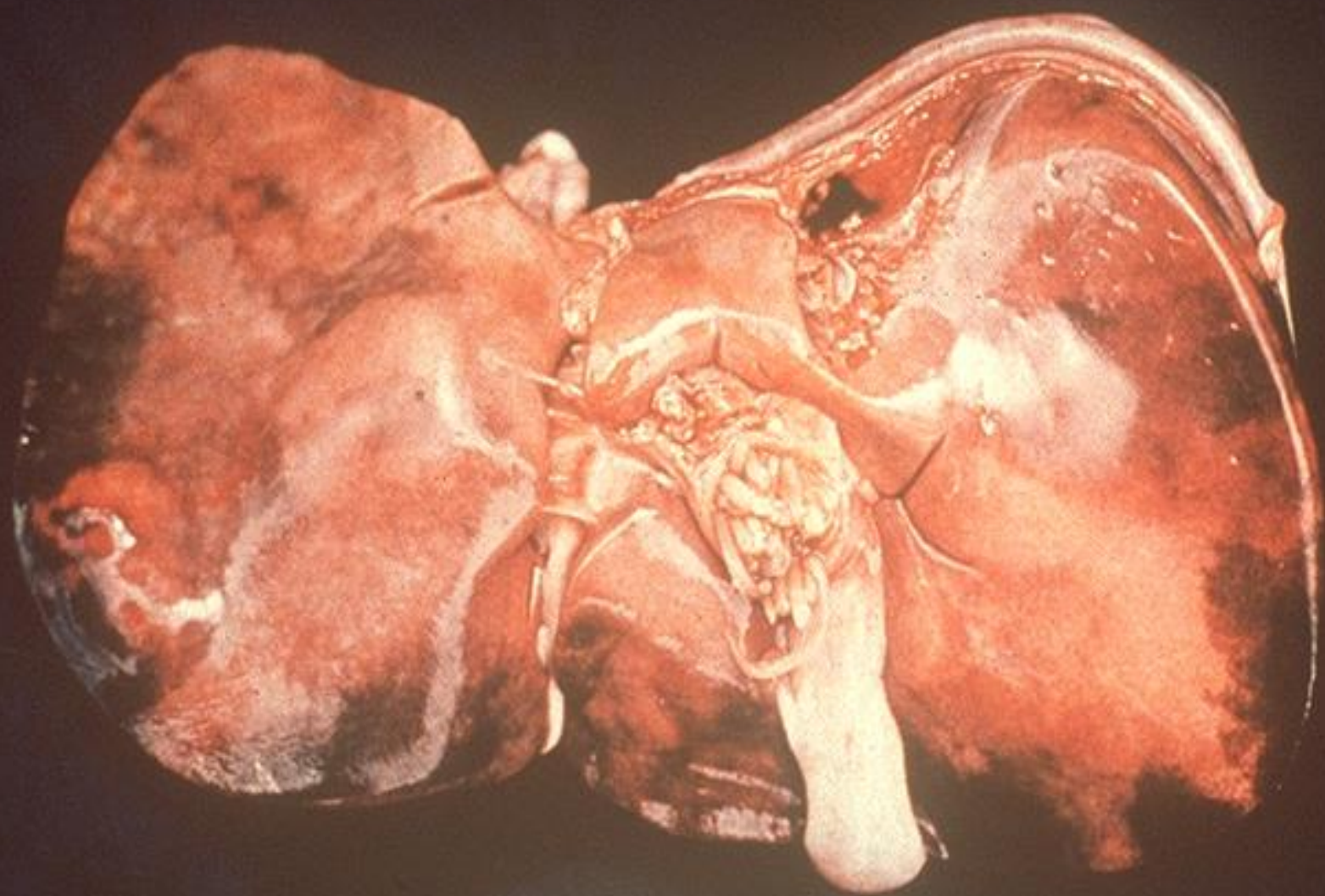
Betram G. Esser-Köchling, M.D.
Friedrich W. Hirsch, M.D.

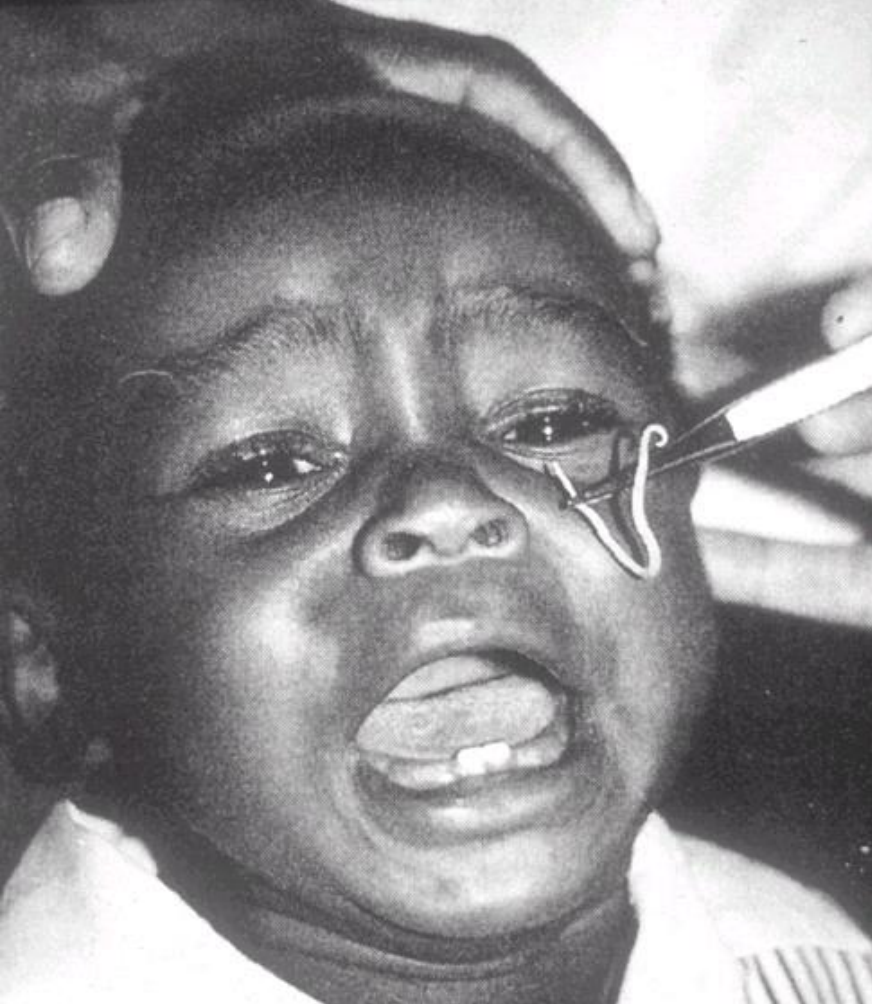
Klinikum Offenburg
77654 Offenburg, Germany

A 63-YEAR-OLD WOMAN WAS ADMITTED TO THE HOSPITAL WITH VOMITING and abdominal pain. Approximately one year earlier, she had undergone a papillotomy and laparoscopic cholecystectomy for biliary colic. Laboratory examination revealed elevated liver enzyme levels (alkaline phosphatase, 560 U per liter; γ glutamyltransferase, 230 U per liter; lactate dehydrogenase, 399 U per liter; and bilirubin, 1.2 mg per deciliter [20.5 μ mol per liter]). On ultrasonography, the intrahepatic bile ducts were not substantially widened; however, the lumen was filled with sludge-like material. Endoscopic retrograde cholangiopancreatography showed a worm-like structure measuring 10 cm in length at the papilla (Panel A); the worm was extracted endoscopically (Panel B). The patient was discharged from the hospital three days later. The abdominal symptoms had resolved, and the liver-enzyme elevation had markedly improved. Currently, the patient is well, without signs of cholangitis. Biliary obstruction is an important complication of *Ascaris lumbricoides* infestation.

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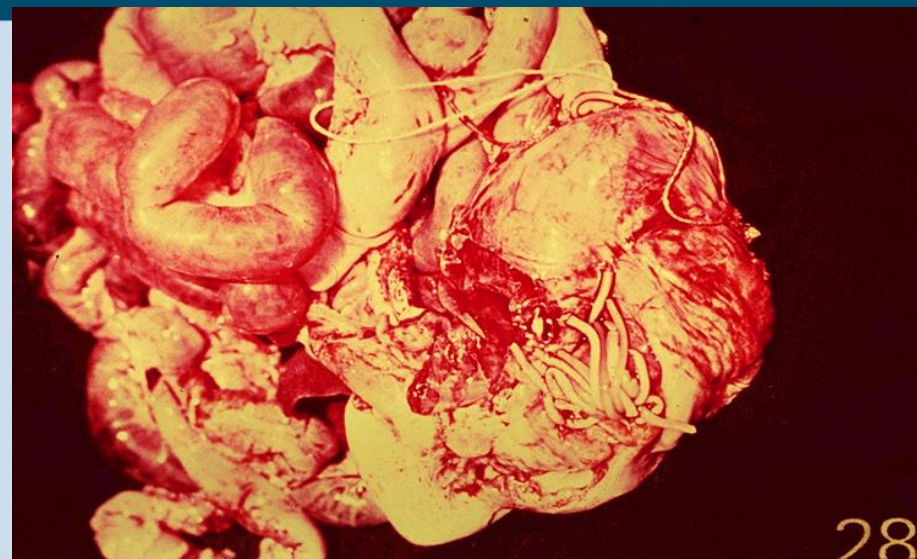




GE Clinics NA Sept 1996

Khuroo. Ascaris via lacrimal duct





Ascariasis: treatment

- (Piperazine derivates; levamisole; pyrantel pamoate SD)
- **Mebendazole (Vermox)**
 - Suppressive : SD
 - Curative: 2 x 100 mg/day for 3 days
- **Albendazole** (Zentel, Eskazole): 400 mg SD
- **Ivermectin** (Mectizan, Stromectol) 150-200 µg/kg SD

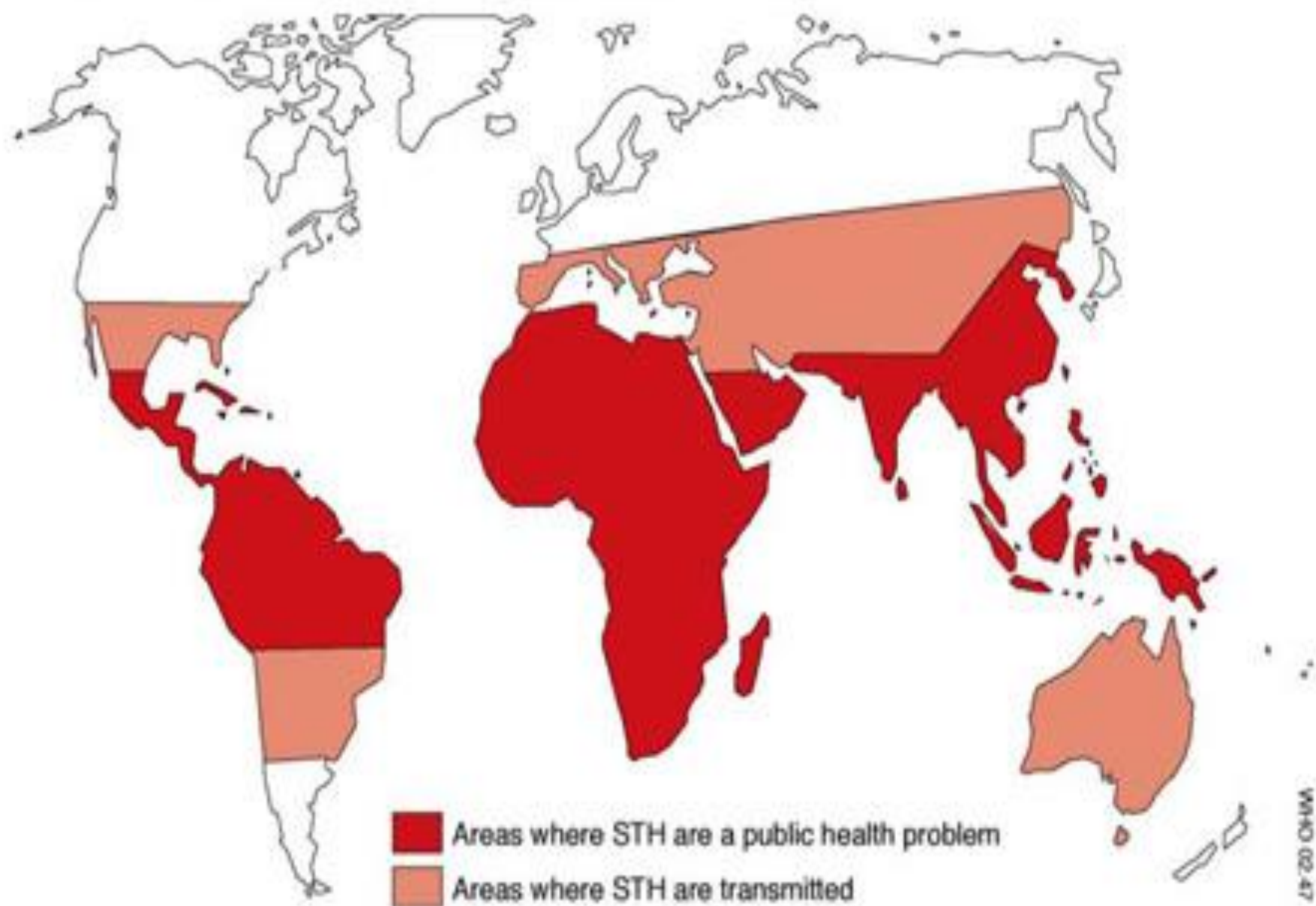






Figure 3: Girl from Paraguay with heavy ascaris infection before deworming and worms extracted
Photographs courtesy of Dr Nora Labiano-Abello (left image) and reproduced with permission reference 10 (right image).

Global distribution of soil-transmitted helminth infections



Summary: soil-transmitted helminthiasis, parasites

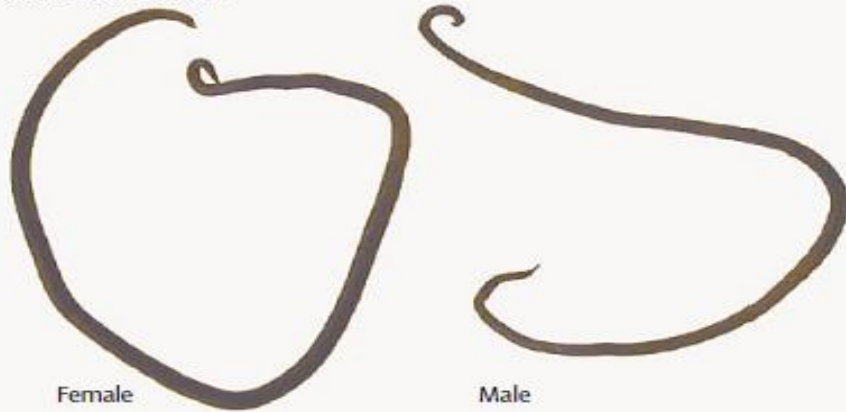
Species	Length (mm)	Daily egg output per female worm	Location in host	Lifespan (years)
Large common roundworm				
<i>Ascaris lumbricoides</i>	150–400	200 000	Small intestine	1
Whipworm				
<i>Trichuris trichiura</i>	30–50	3000–5000	Caecum and colon	1.5–2.0
Hookworms				
<i>Necator americanus</i>	7–13	9000–10 000	Upper small intestine	5–7
<i>Ancylostoma duodenale</i>	8–13	25 000–30 000	Upper small intestine	5–7

Table 2: Characteristics of the soil-transmitted helminths: adult worms of greatest public-health significance

	Disease	Estimated population infected (millions)	Geographic region
Major worldwide pathogens			
<i>Ascaris lumbricoides</i>	Common roundworm infection	807–1221	
<i>Trichuris trichiura</i>	Whipworm infection	604–795	
<i>Necator americanus</i> and <i>Ancylostoma duodenale</i>	Hookworm infection	576–740	
<i>Strongyloides stercoralis</i>	Threadworm infection	30–100	
<i>Enterobius vermicularis</i>	Pinworm infection	4–28% of children	
<i>Toxocara canis</i> and <i>Toxocara cati</i>	Visceral and ocular larva migrans	2–80% of children	
Pathogens of minor or local importance			
<i>Ancylostoma braziliense</i>	Cutaneous larva migrans		Coastal regions worldwide
<i>Uncinaria stenocephala</i>	Cutaneous larva migrans		Coastal regions worldwide
<i>Ancylostoma caninum</i>	Eosinophilia enteritis		Australia
<i>Ancylostoma ceylanicum</i>	Hookworm infection		Asia
<i>Baylisascaris procyonis</i>	Eosinophilic meningitis		North America
<i>Oesophagostomum bifurcum</i>	Nodular worm infection		West Africa
<i>Strongyloides fuelleborni</i>	Swollen belly syndrome		Papua New Guinea
<i>Ternidens diminutus</i>	False hookworm infection		Southern Africa

Table 1: Soil-transmitted helminth infections of human beings

Ascaris lumbricoides



Female

Male

Trichuris trichiura



Female



Male

Hookworm



Female

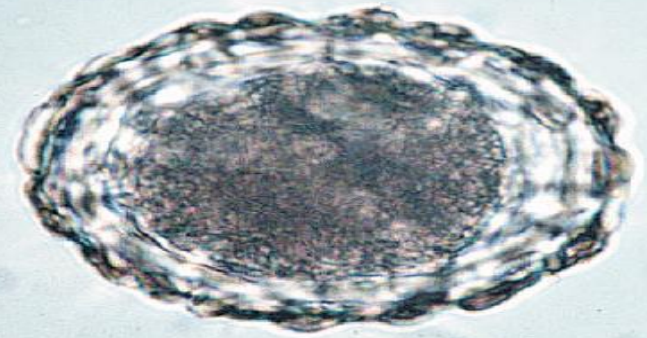


Male

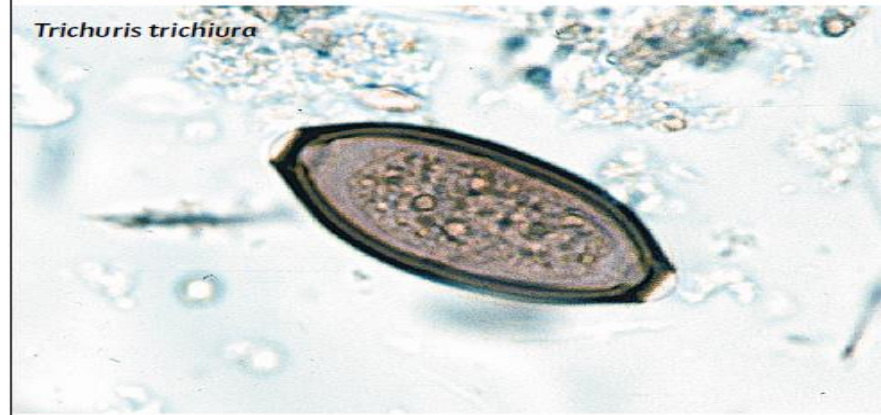
Figure 1: Adult male and female soil-transmitted helminths
Reproduced with permission.³⁰

Adult worms

Ascaris lumbricoides



Trichuris trichiura



Hookworm



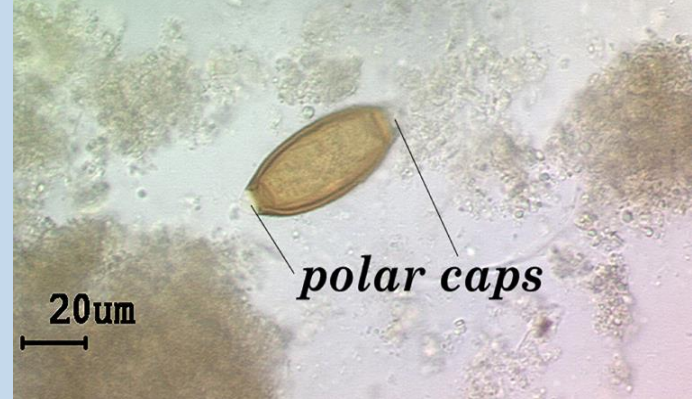
Figure 2: Soil-transmitted helminth eggs

Eggs

Trichuris trichiura



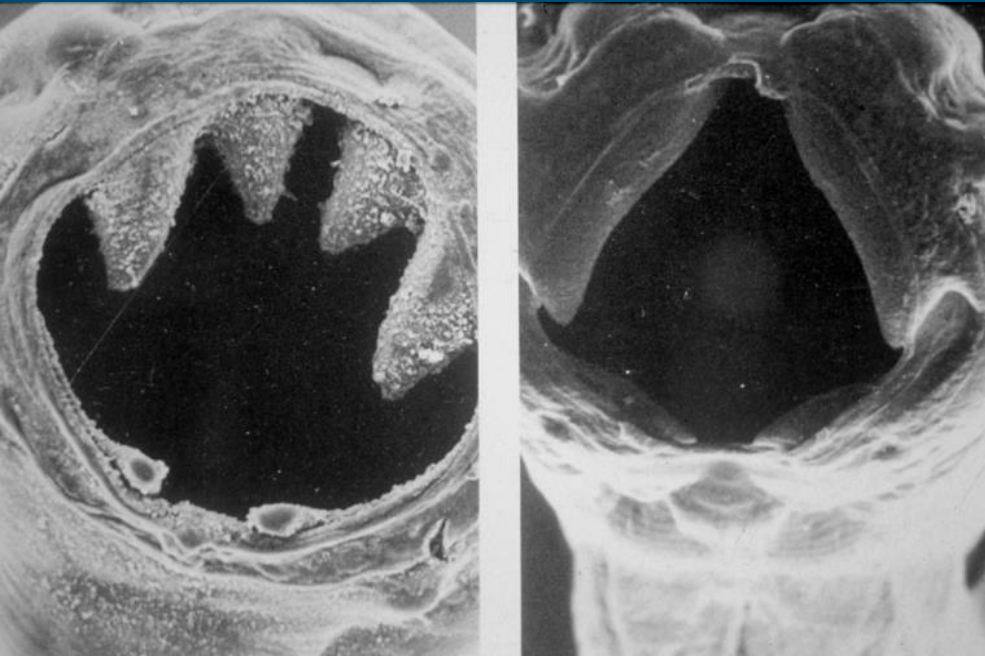
Trichuris trichiura egg



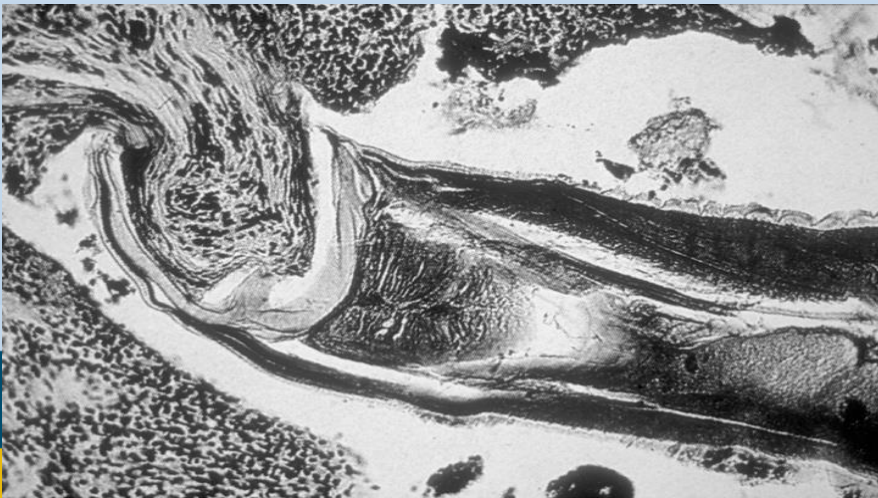
Rectal prolaps
due to *T. trichiura*



Hookworms (*A. duodenale*/*N. americanus*)



Severe anemia



Intestinal nematodes: hygiene and deworming



Soil-transmitted helminthiasis

Case 2: 8-year child intermittent diarrhea

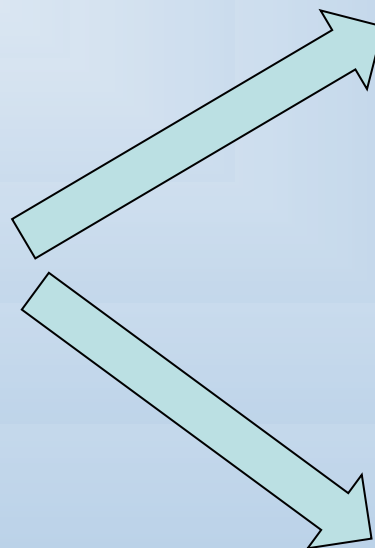
- No medical history
- Since 2-3 weeks, episodes of diarrhea; stomachache and abdominal blunting; loss of appetite, loss of weight
- Worsening after drinking milk
- No improvement with antibiotics
- What would you do ?



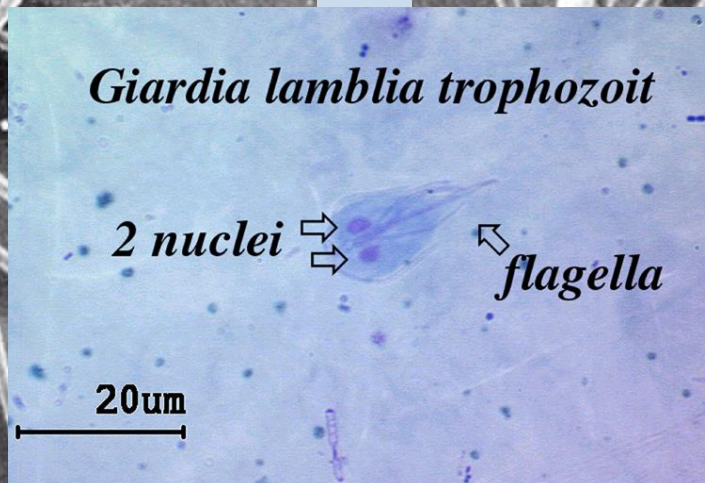
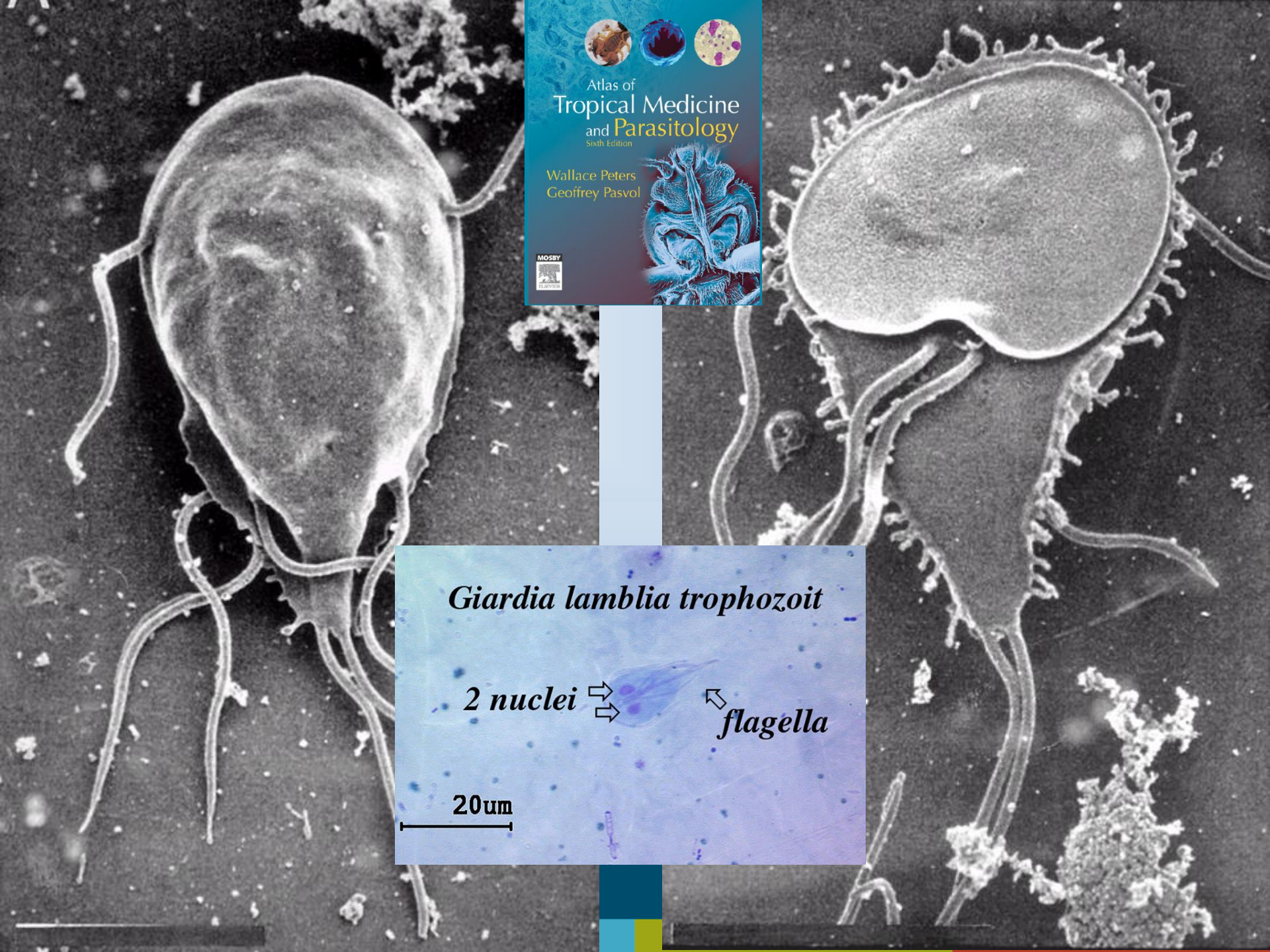
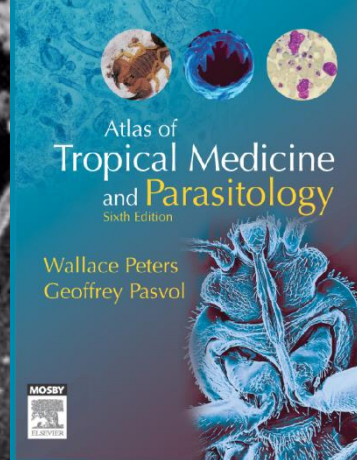
Case 2: stool examination; *Giardia lamblia*

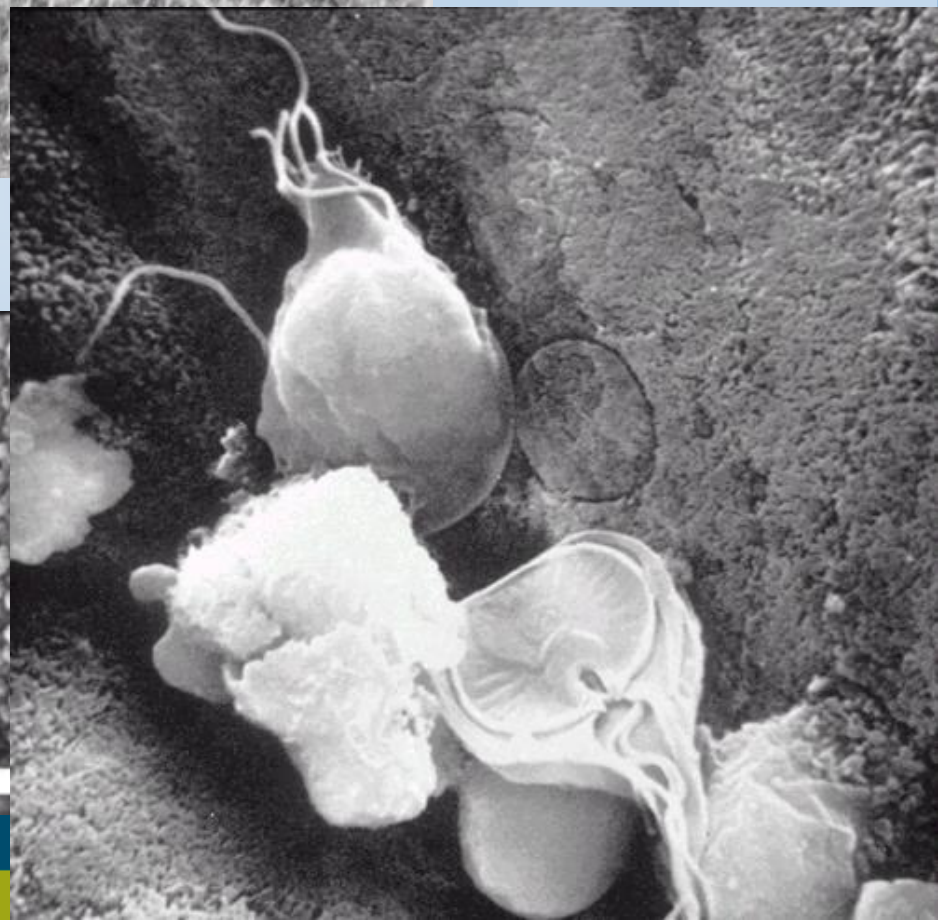
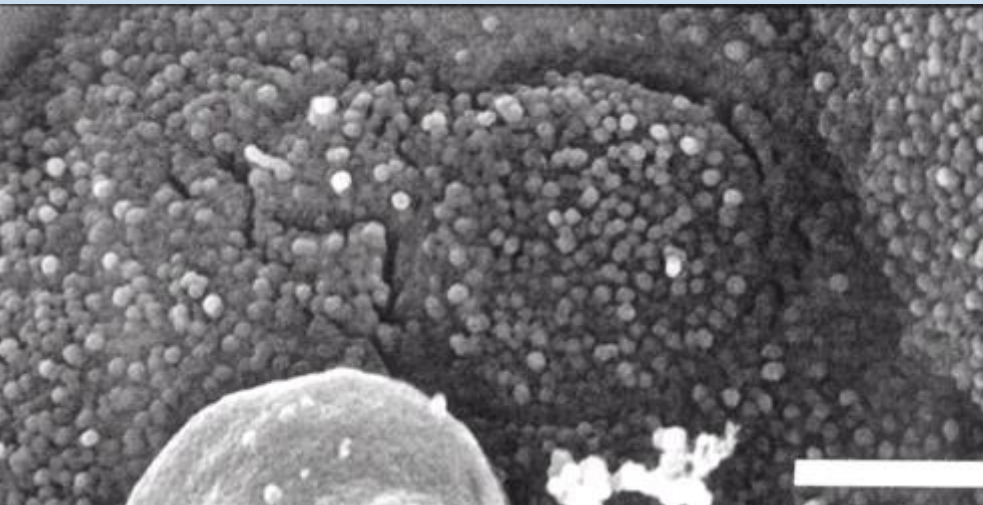
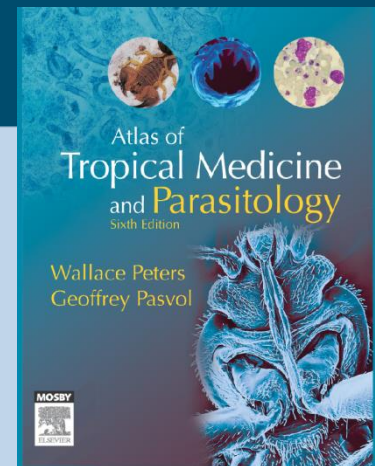


Picture: A typical stool from a patient with giardiasis. *Giardia* causes reduced absorption of nutrients, especially fats. This gives the stool a high fat content (steatorrhoea) and an oily appearance.

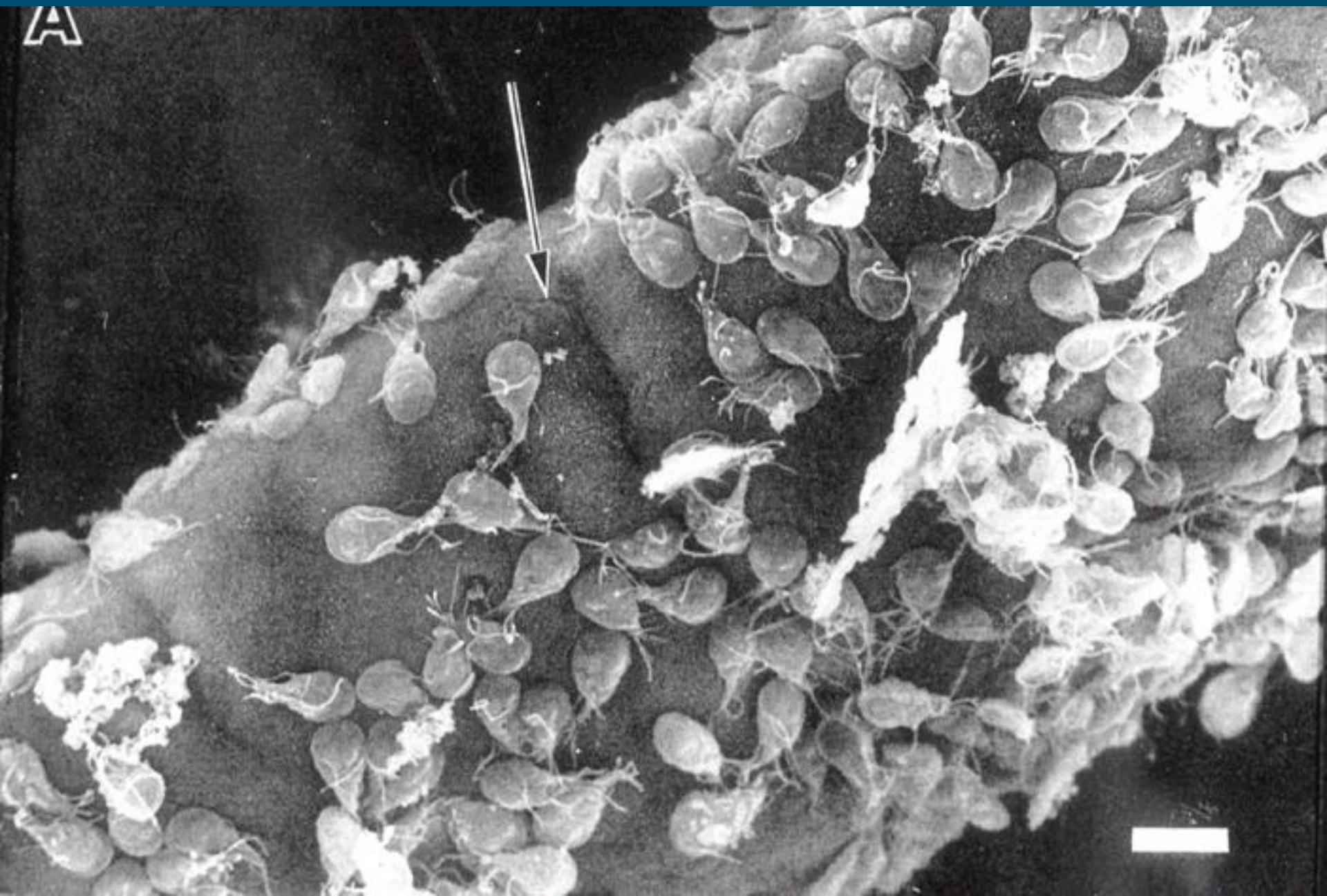


Picture: A *Giardia lamblia* cyst in a stool specimen. In a patient with persistent diarrhoea, this finding is an indication for giving treatment with metronidazole.





A



Répertoire commenté de médicaments

- Centre Belge d'Information Pharmacothérapeutique
- <http://www.cpip.be> (ou bcfi.be)

□ **tinidazole (Fasigyn®)**

4 tablets 500 mg, once



**GECOMMENTARIEERD
GENEESMIDDELEN-
REPERTORIUM
2014**



BCFI

BELGISCH CENTRUM VOOR
FARMACOTHERAPEUTISCHE INFORMATIE

Maandelijkse updating op www.bcfi.be

Case 3: anal itching and tiny threads visible in stool



Enterobius vermicularis

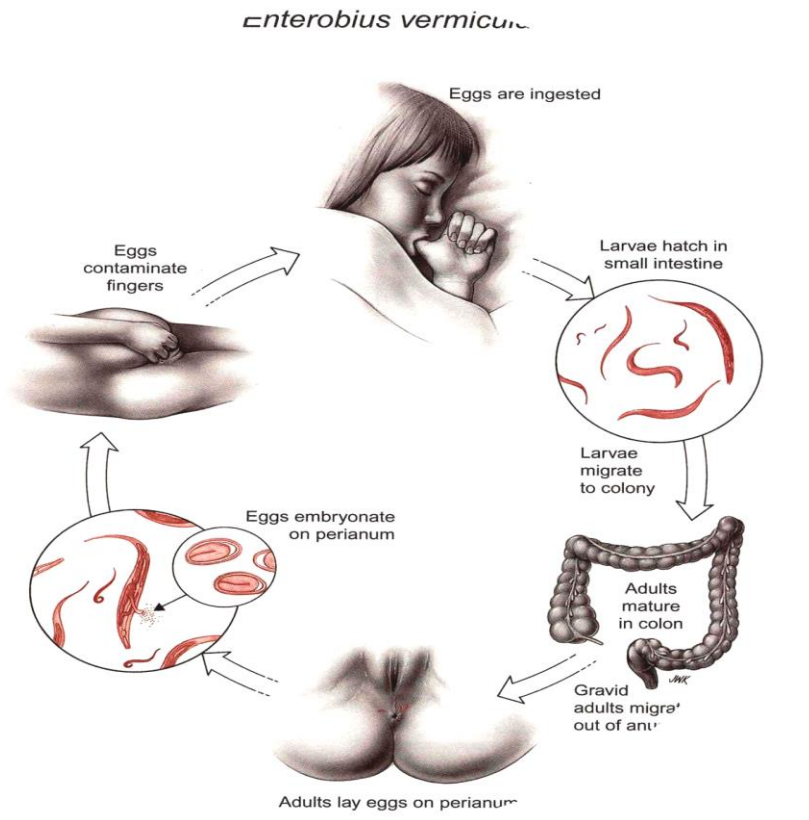
N ENGL J MED 354;13 WWW.NEJM.ORG MARCH 30, 2006



A 55-YEAR-OLD MAN PRESENTED WITH INTERMITTENT, CRAMPY PAIN IN the right lower quadrant of the abdomen. The pain had started two days after his return from a two-week trip to Hungary. He reported no change in bowel movements and no nausea, vomiting, perianal itching, hematochezia, fever, or other systemic symptoms. The physical examination was remarkable only for mild tenderness on deep palpation in the right lower quadrant. The results of routine laboratory testing, including a complete blood count and a metabolic panel with liver-function tests, were normal. A plain radiograph of the abdomen was normal. A colonoscopy was ordered and revealed multiple mobile 1-cm worms, *Enterobius vermicularis*, in the cecum (Panels A and B and Video Clip). The patient was treated with albendazole, and the abdominal pain resolved. Pain is uncommon but can occur in patients with *E. vermicularis* infections. The more common symptom of anal pruritus is seen in only 33 percent of patients.

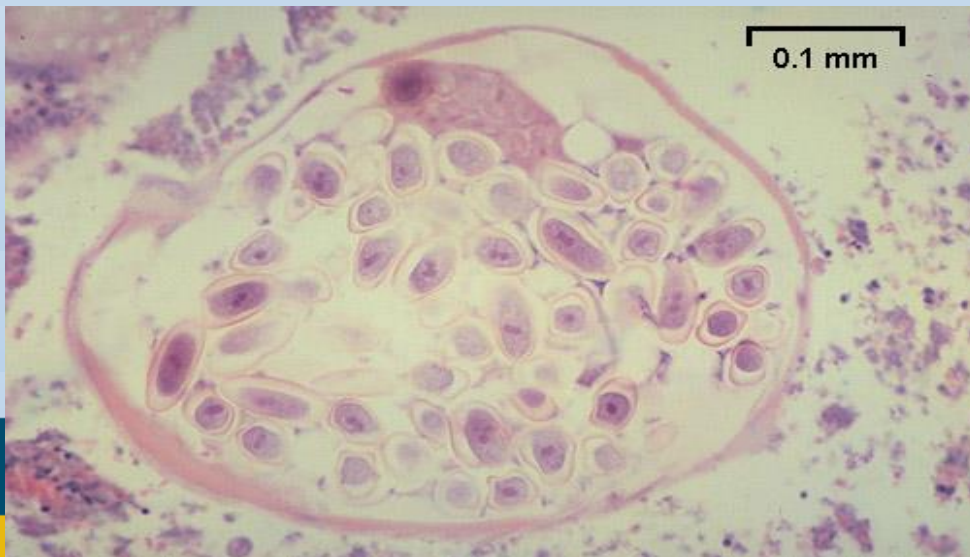
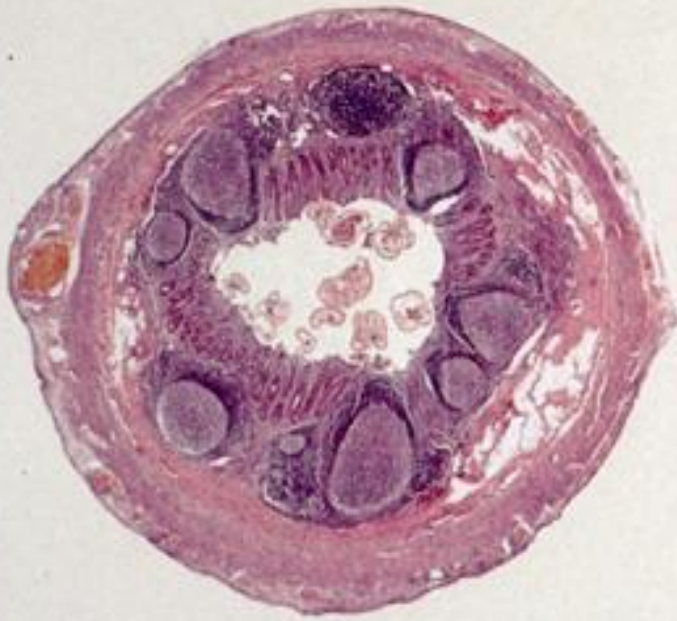
<http://content.nejm.org/cgi/content/full/354/13/e12/DC1> = met videoclip

Enterobiasis, clinical manifestations



- Anal or vaginal itch (night)
- Non-specific abdominal discomfort
- Appendicitis



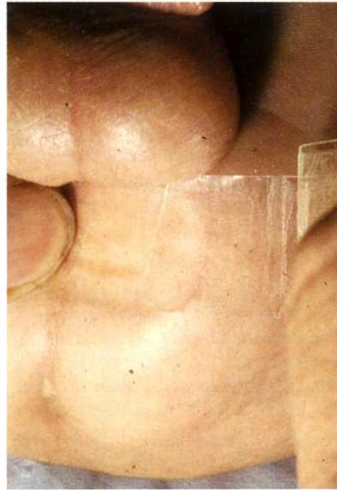


Appendix with *E. vermicularis*
Numerous eggs (50 by 25 μm),
flattened on one side.

Enterobiasis, diagnosis

Scotch tape test (selles)

594

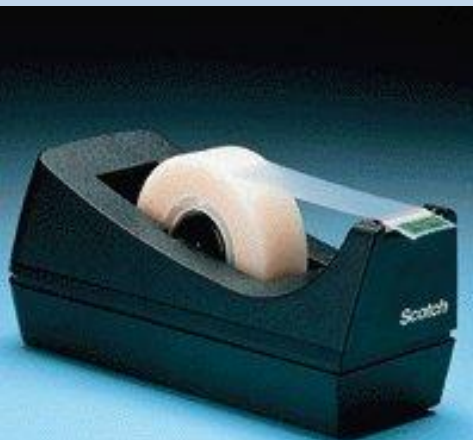


595



594 & 595 Scotch tape swab to demonstrate perianal eggs The eggs (323) are found on the perianal skin. They adhere to the Scotch tape, which can then be placed on a slide and examined directly under a microscope.

Because of severe pruritus ani, children frequently reinfect themselves from eggs under their fingernails. Bedding is also a source of infection which tends to persist in households and institutions such as orphanages.



Slightly flattened
↙

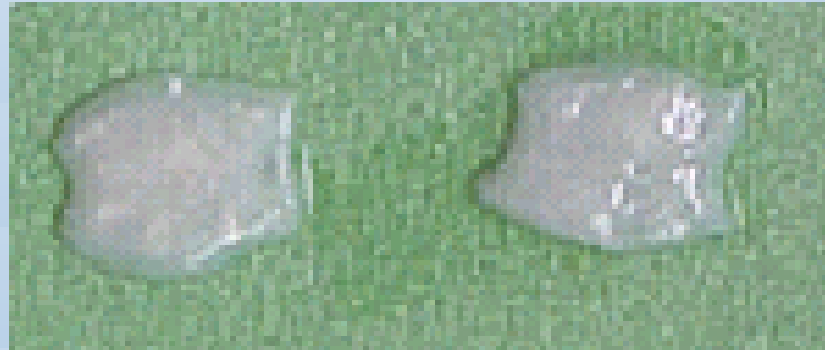
*Enterobius
vermicularis* egg

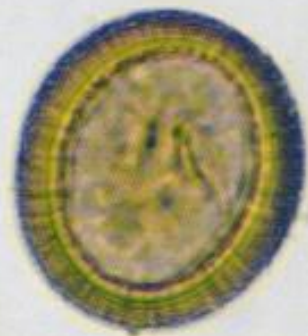
Mebendazole 100 mg single dosis

(to repeat after 2 weeks)
(treat the whole family)

Case 4: worm in stool

- A young man consults as he has noticed 'white worms' in his stool.
- Further inquiry learns that there are white flat elements as big as post stamps.
- He has already found elements like these in his underwear before.
- No tropical travel



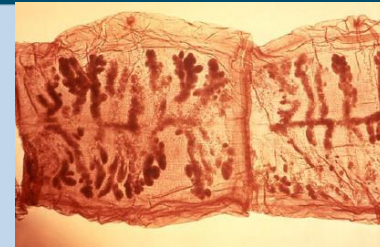




Teniasis, clinical aspects

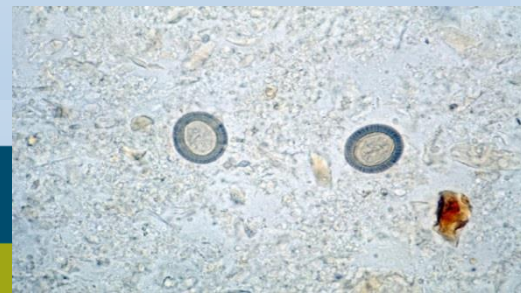
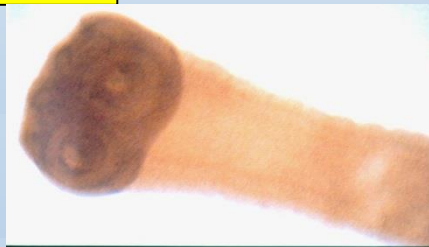
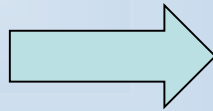
- Most of the time asymptomatic
- Sometimes abdominal discomfort
- Expulsion of proglottis (*T.saginata*) and anal itching
- Appendicitis, intestinal occlusion,...
- Co-factor malnutrition





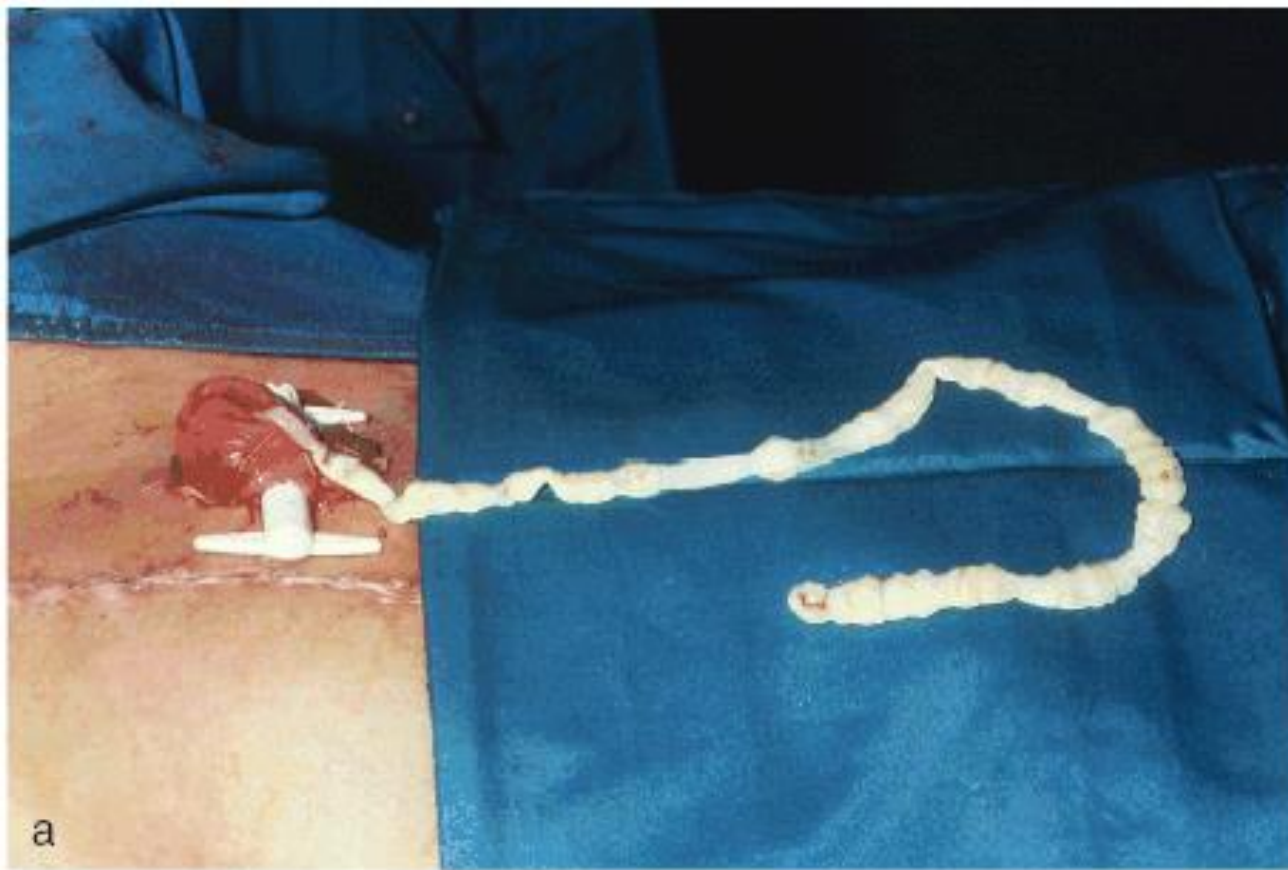
Taenia solium (asiatica)

Taenia saginata



Ingestion of uncooked meat with cysticerci





Tania saginata (asymptomatic) in patient with colostomy

NTVG 2003;147(41):2020

Teniasis, treatment

Niclosamide

Yomesan (Bayer)



[niclosamide]

compr.

€ 4 x 500 mg

€ 5,63

Posol. *Taenia saginata* en *solium* en andere platwormen:

volw. en kind > 6 jaar: 2 g in één gift

kind 2 à 6 jaar: 1 g in één gift

kind < 2 jaar: 500 mg in één gift

Belgisch Centrum voor Farmacotherapeutische Informatie (B.C.F.I. vzw)
c/o Heymans Instituut, De Pintelaan 185, 9000 Gent

<http://www.bcfi.be> - folia@UGent.be - [Waarschuwing/Disclaimer](#)

Taeniasis

versus

cysticercosis

- Ingestion of infected raw meat (cysticerci)
 - Both *T. saginata* or *solium*
 - Adult worm in intestines
 - Moderate morbidity
- Ingestion of eggs, soil, contaminated food,...)
 - Only *T. solium*
 - Larva (cysticerci) in tissue
 - Severe illness

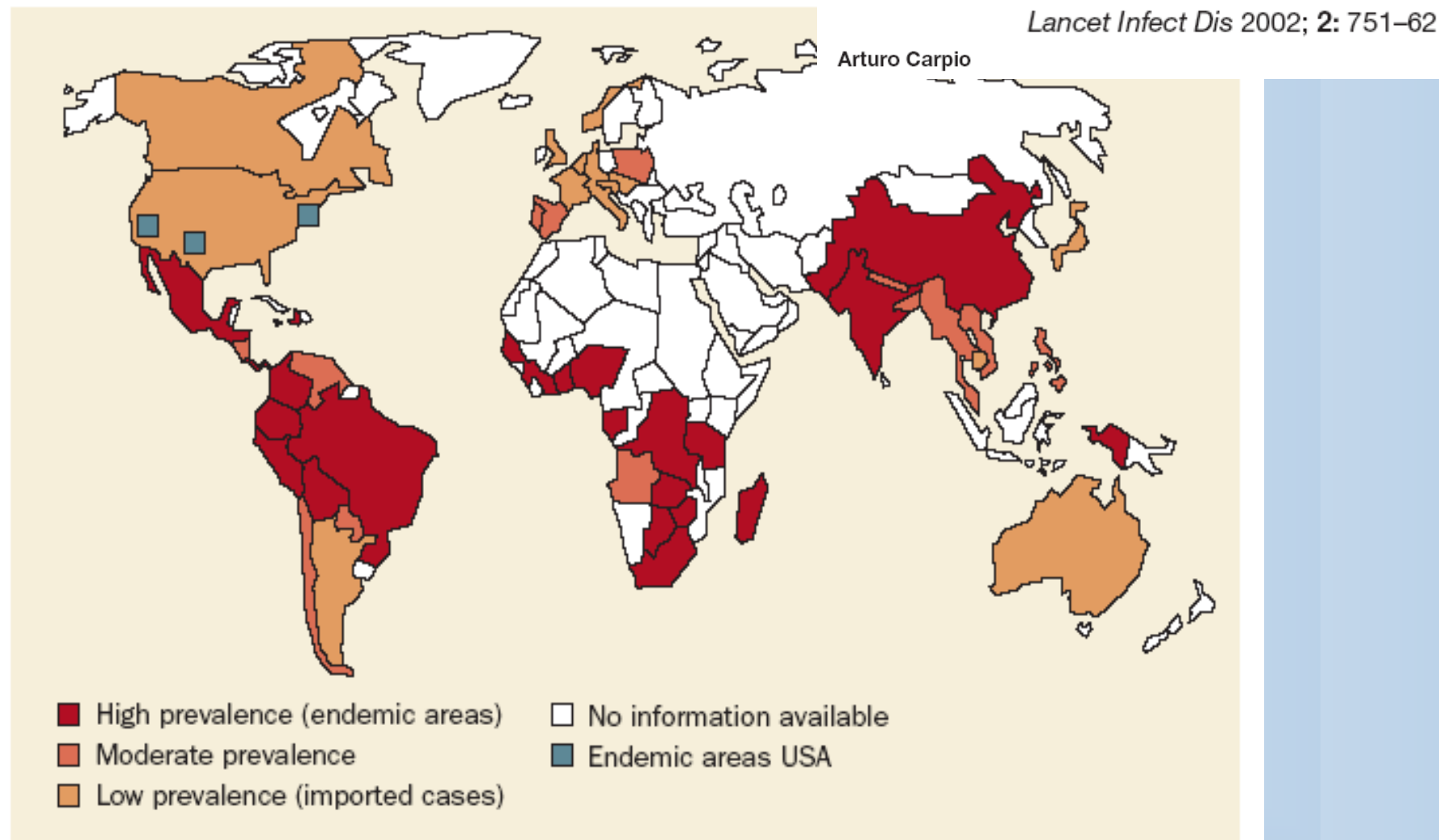


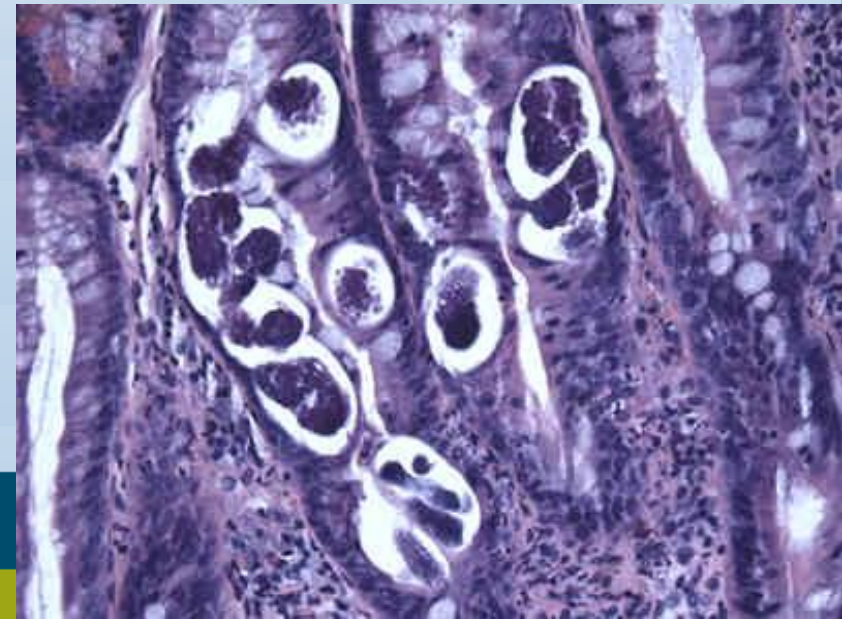
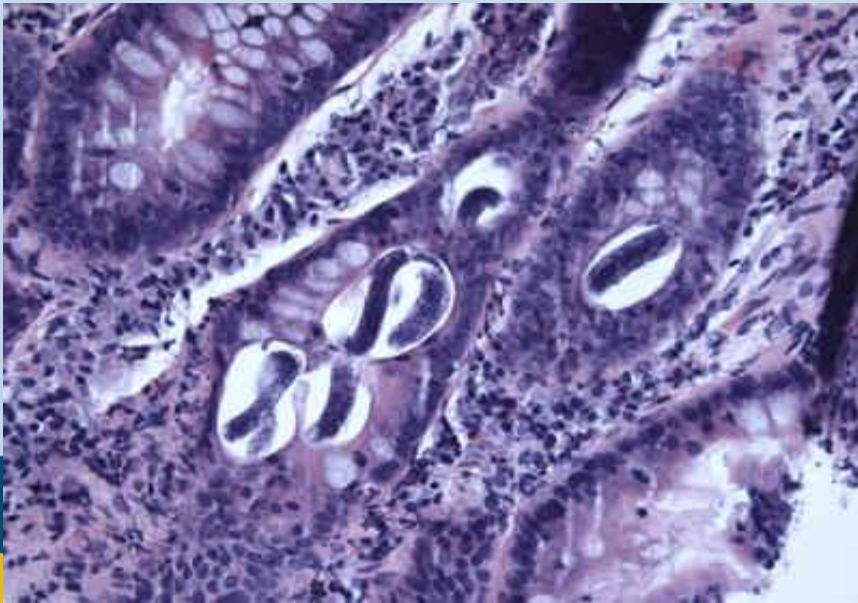
Figure 2. Estimated geographical distribution of taeniosis/cysticercosis. Adapted from Roman and colleagues.¹⁴

Case 5: adult with intermittent epigastric pain

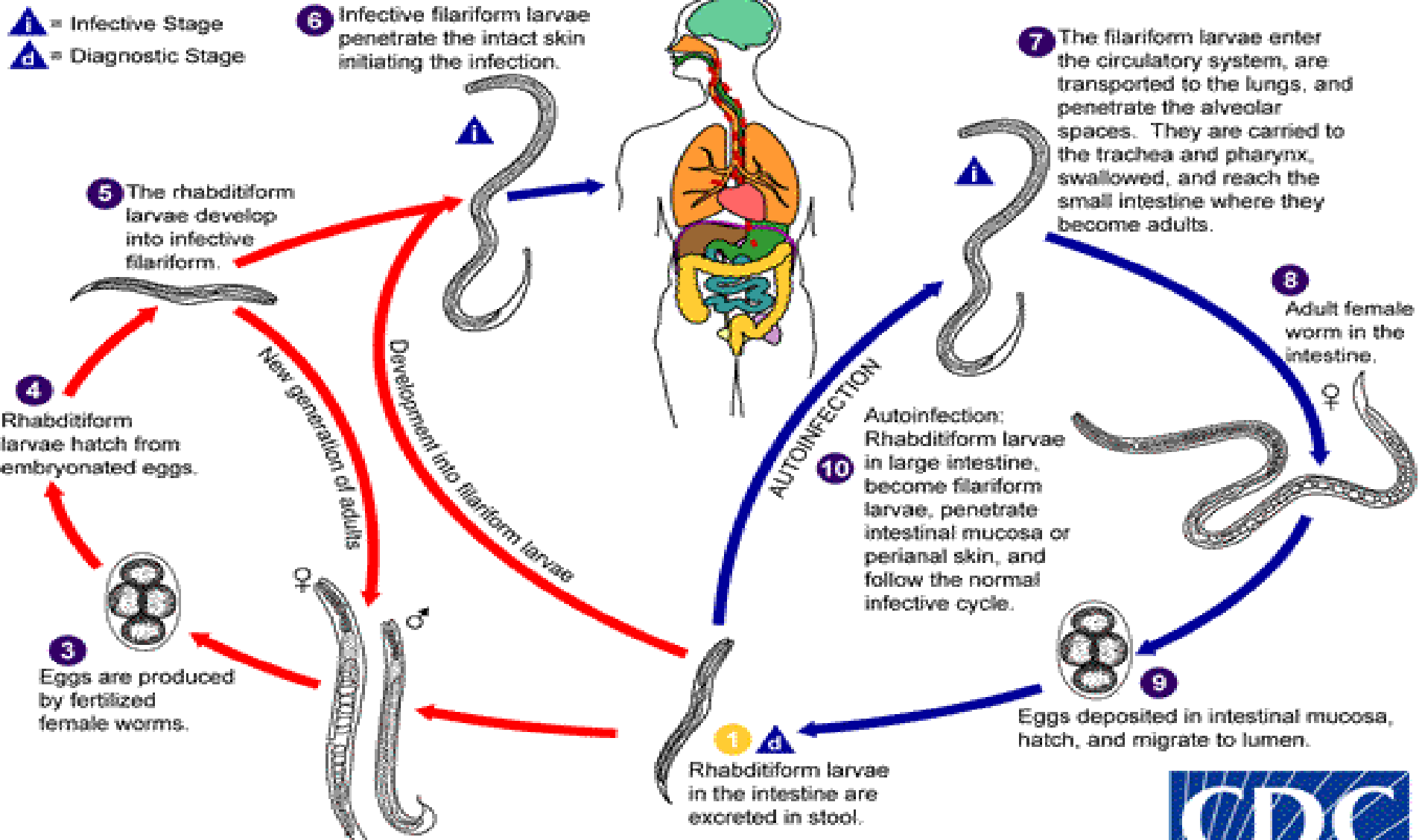
- Since 10 years (?), recurring epigastric pain and intermittent diarrhea
- 2003: “negative” gastroscopy
- Several therapeutic trials (tinidazole, omeprazole, ...) not effective



Case 5: gastroscopy



Strongyloides stercoralis, cycle



Replication / auto-reinfection /lifelong infection !!

Strongyloidiasis, diagnosis

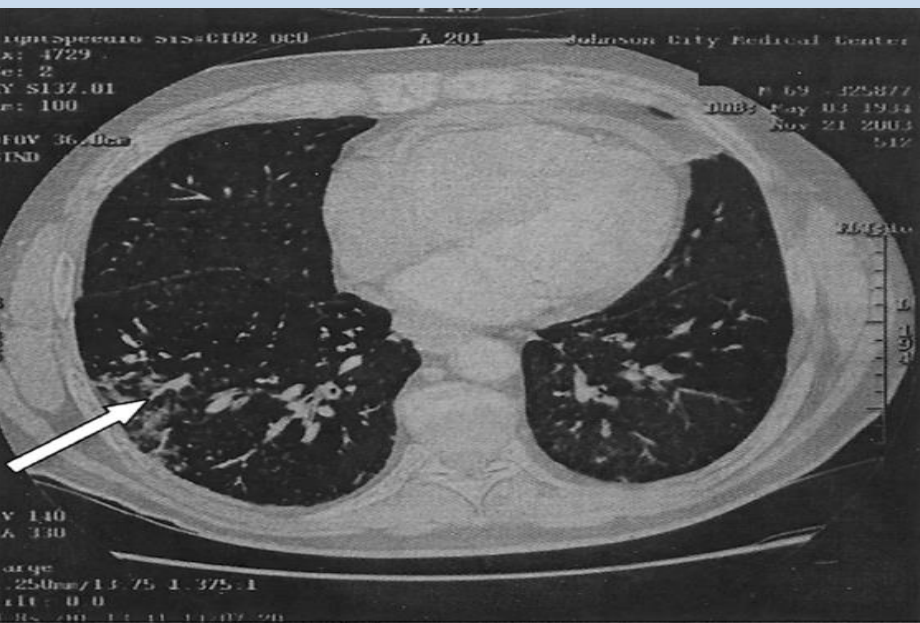
- Parasite-based
 - Direct smear
 - Spontaneous sedimentation
 - Baermann technique
 - Koga agar plate culture
 - PCR



- Antibody-based (serology)

Strongyloidiasis and immunosuppression

- Auto-reinfection and replication / life-long infection
- Risk of “reactivation” if immunosuppression, with malignant course



Strongyloidiasis, treatment

Ivermectin
200 µg/kg single dose
90% efficacy



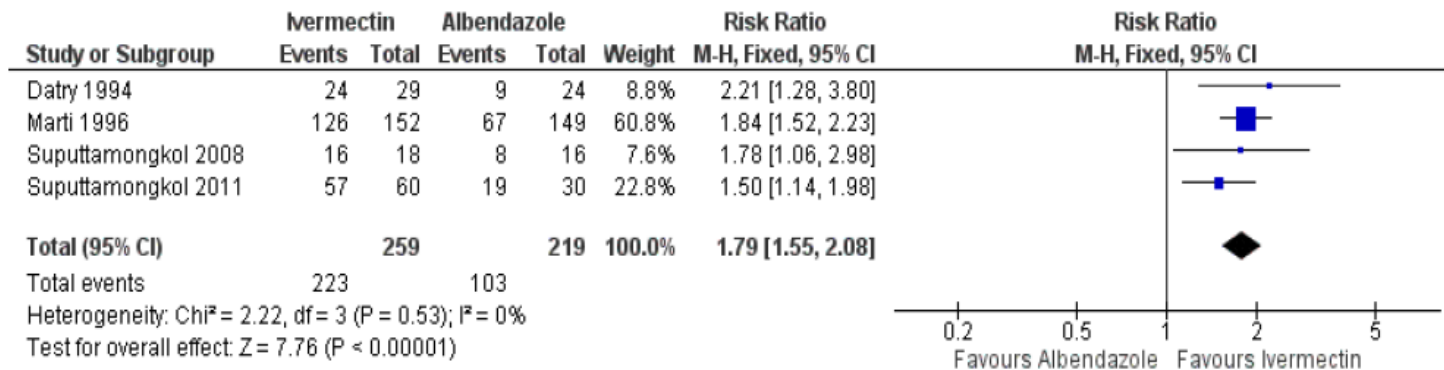
Cochrane
Library

Cochrane Database of Systematic Reviews

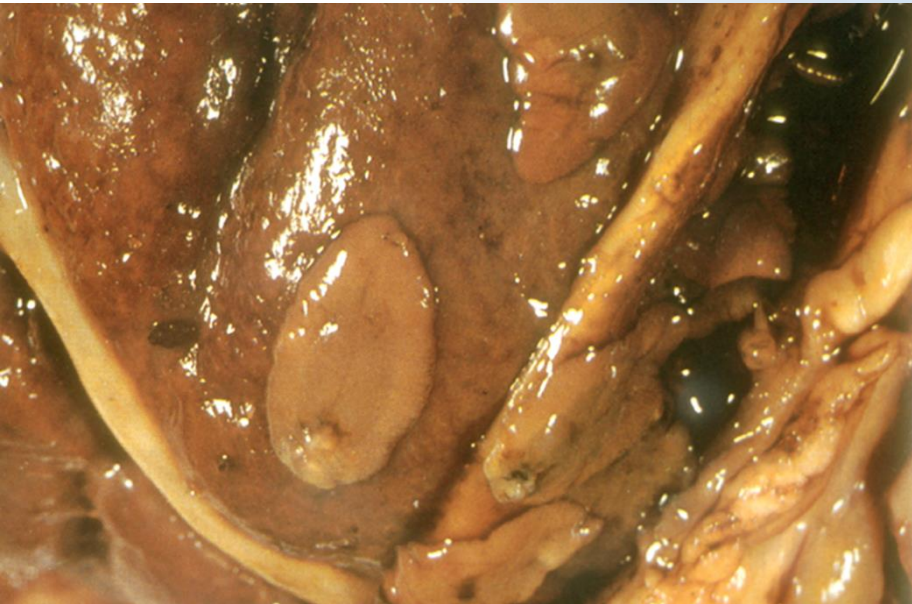
Ivermectin versus albendazole or thiabendazole for
Strongyloides stercoralis infection (Review)

Henriquez-Camacho C, Gotuzzo E, Echevarria J, White Jr AC, Terashima A, Samalvides F, Pérez-Molina JA, Plana MN

Figure 4. Forest plot of comparison: I Ivermectin versus albendazole, outcome: I.I Parasitological cure.



Other intestinal helminthiasis: *Fasciola hepatica*



Fascioliasis, acute (larval migration)

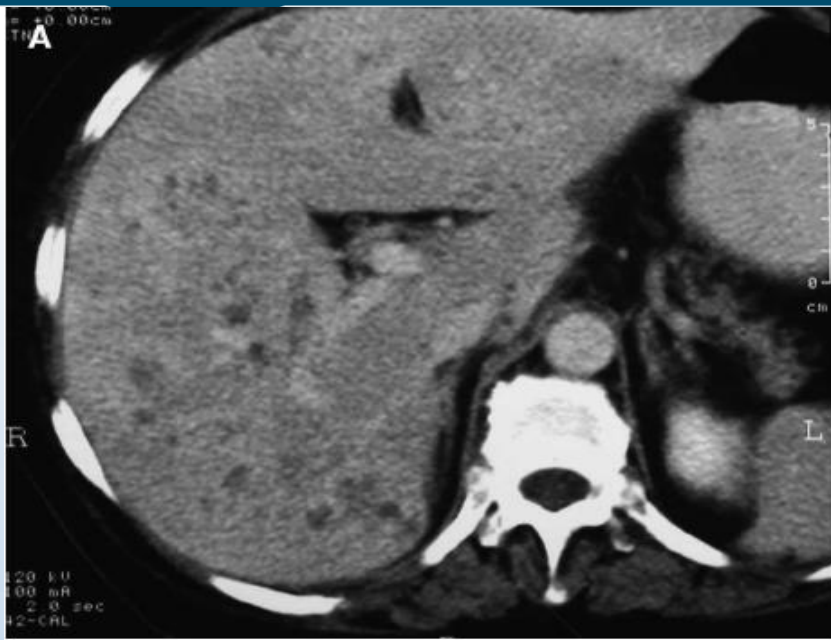


FIGURE 2. Early-stage infection: 2 weeks of symptoms. Lesions

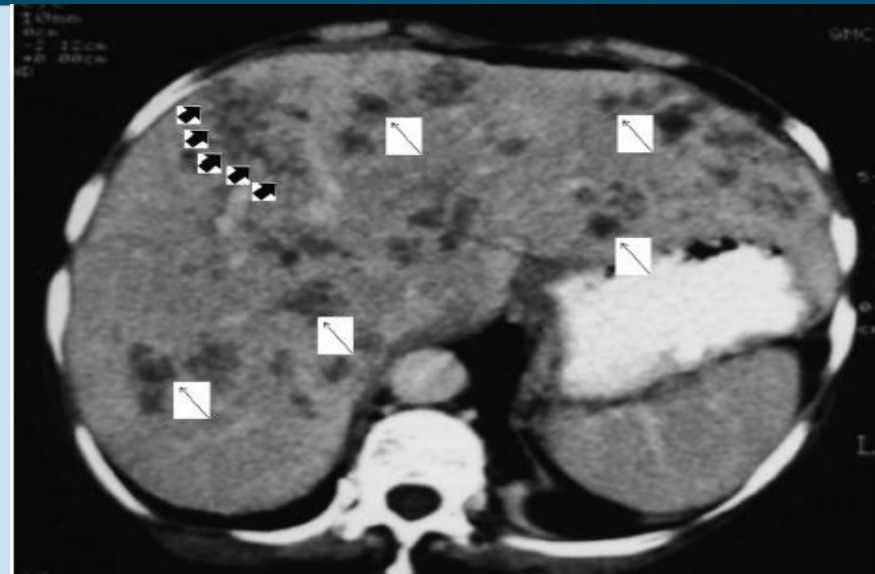
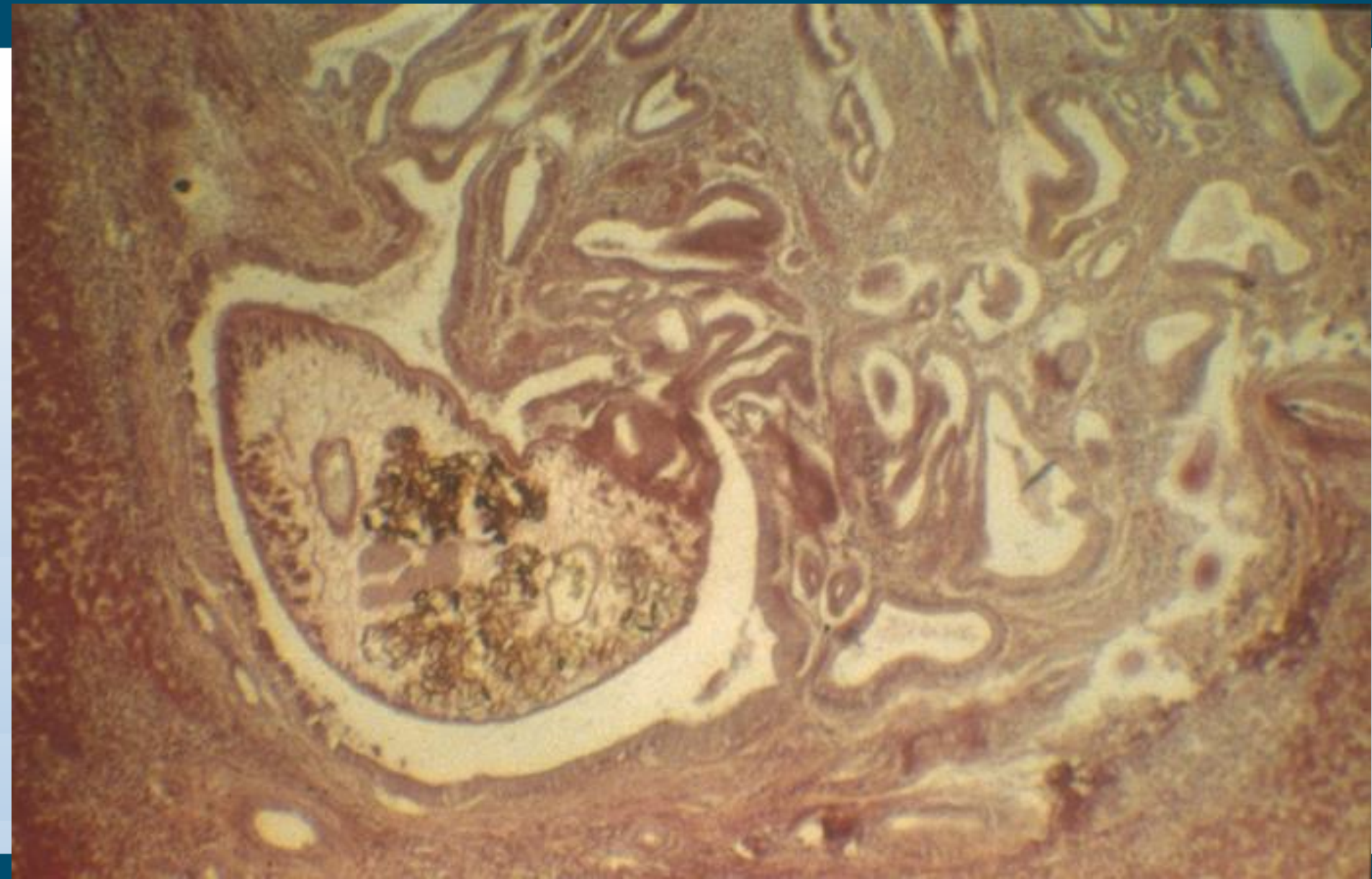


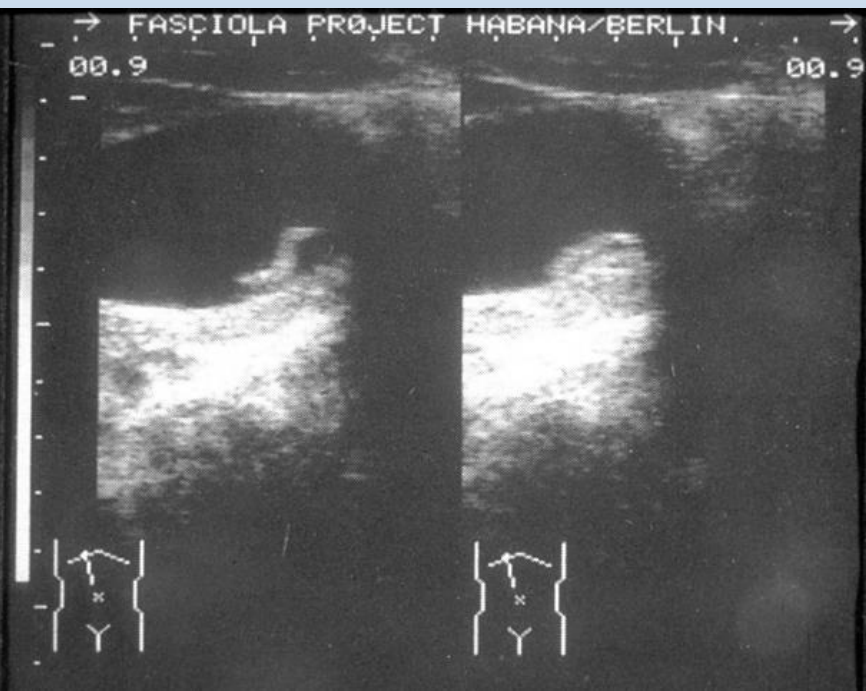
FIGURE 5. Late stage of acute infection: 5 months of symptoms.



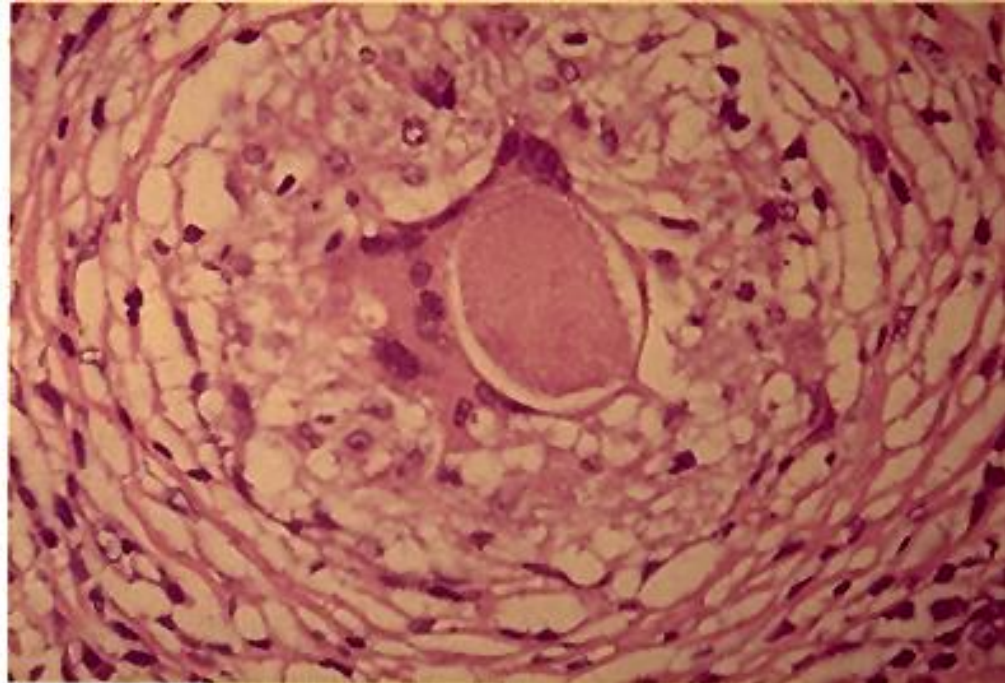
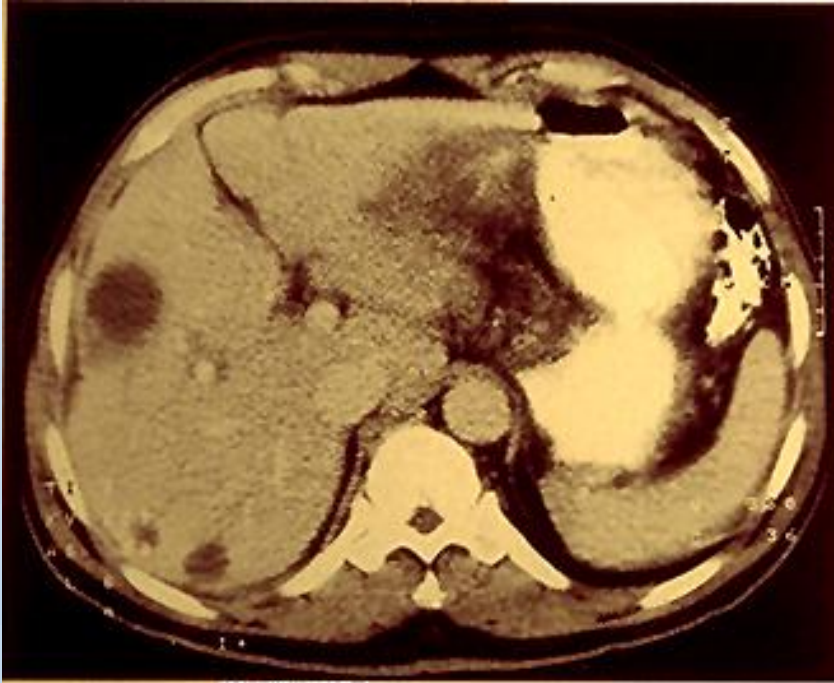
FIGURE 6. Residual lesions after treatment as demonstrated by



Fascioliasis, chronic (adults in biliary tract)



Fascioliasis, liver biopsy



Fascioliasis, treatment

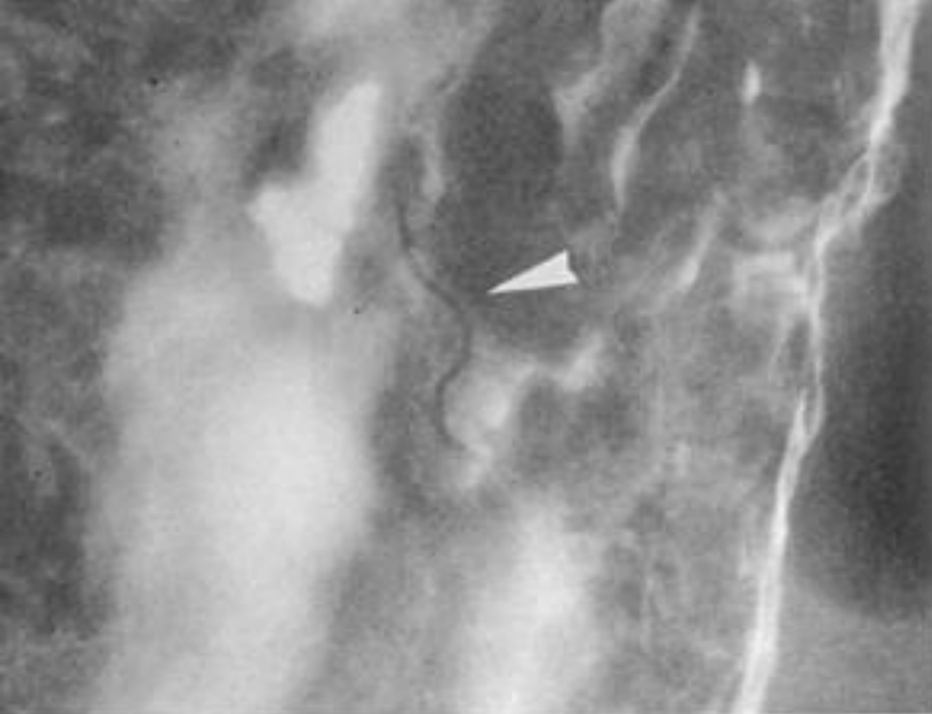


Other intestinal helminthiasis: anisakiasis

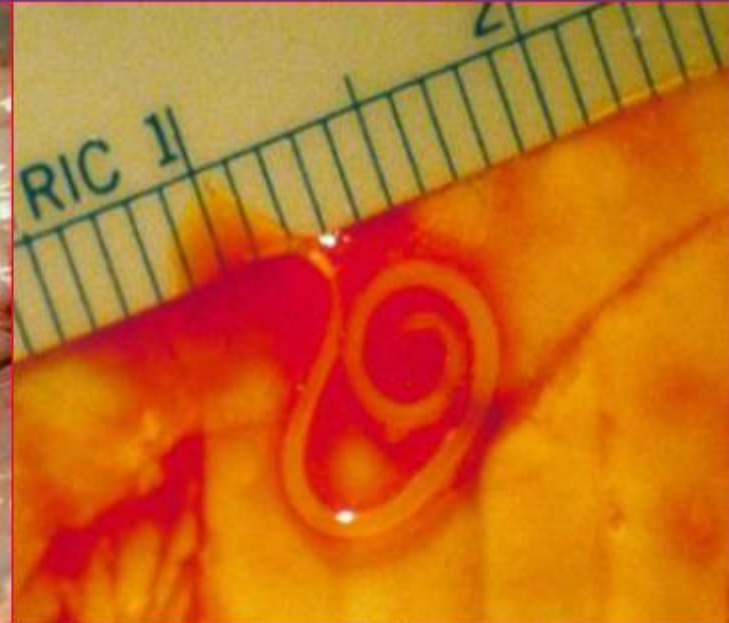


- Women 25-year
- Admission for acute stomachache, vomiting, generalized itchy rash, edema of the lips
- Questions ?





Anisakis larvae--obvious either you or your sushi chef needs to have a look



Intestinal helminthiasis: surprise!



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SURVEILLANCE REPORT

Outbreak of trichinellosis related to eating imported wild boar meat, Belgium, 2014

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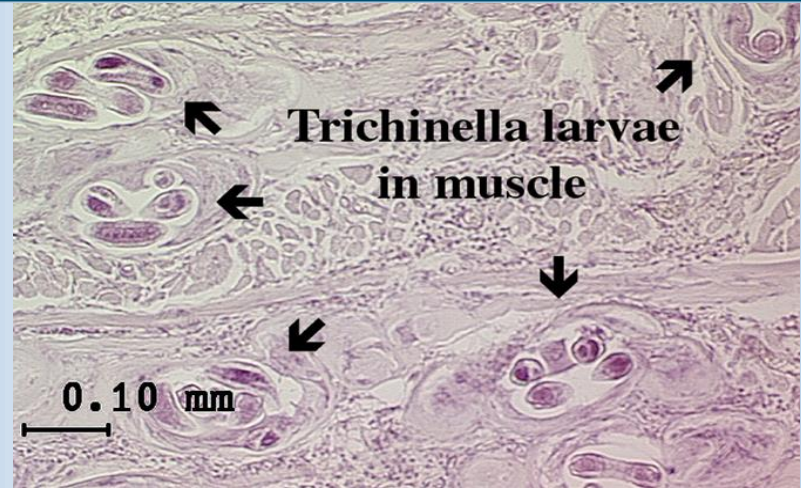
by P Messiaen, A Forler, S Vanderschueren, C Theunissen, J Nijs, M Van Esbroeck, E Bottieau, K De Schrijver, IC Gyssens, R Cartuyvels, P Dorny, J van der Hilst, D Blockmans

SURVEILLANCE AND OUTBREAK REPORT

Outbreak of trichinellosis related to eating imported wild boar meat, Belgium, 2014

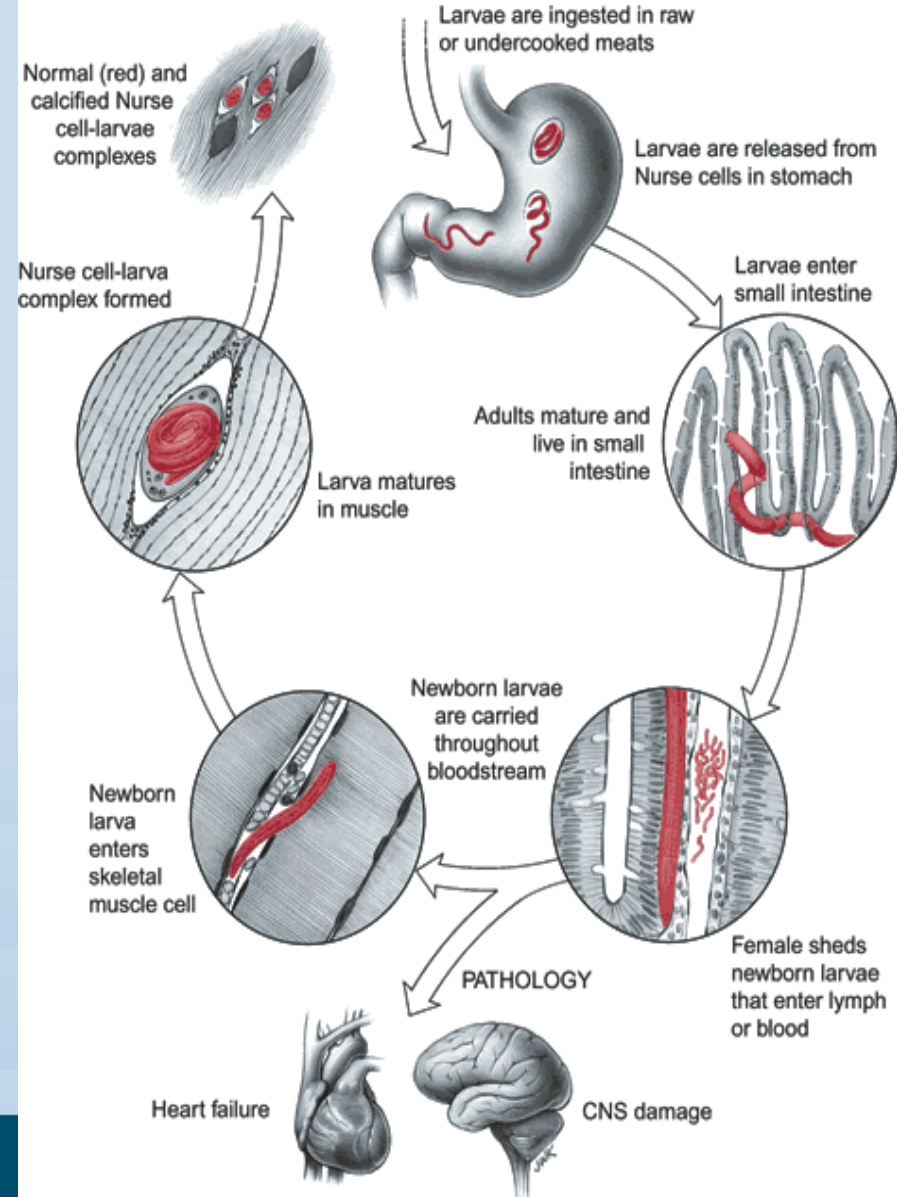
Trichinella spiralis

Ingestion raw meat



Trichinellosis, clinical features

- Incubation: 1 week
- Adult worms in intestinal wall
 - Acute gastroenteritis
 - Release of new born larvae
- Larval migration in tissue
 - Myositis
 - Edema, urticaria
 - Encephalitis, myocarditis,...





NEJM, July 29, 2004

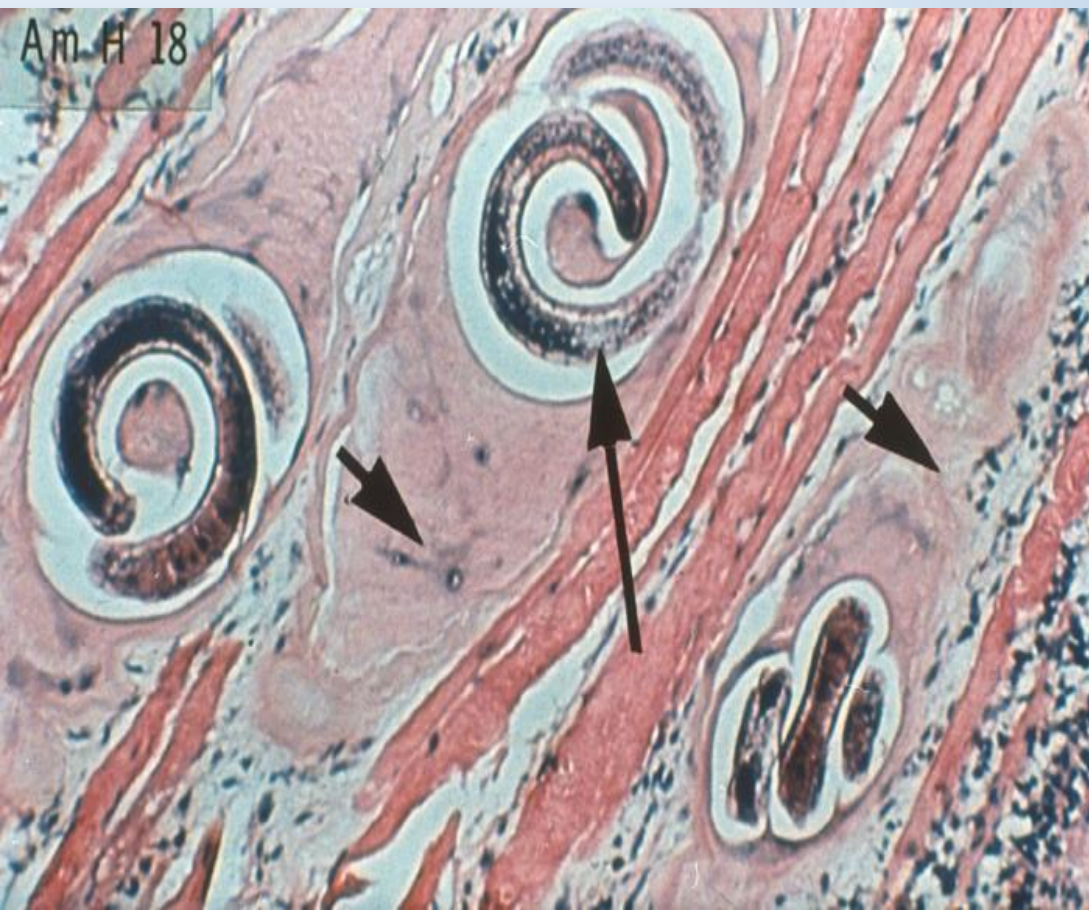
Outbreak trichinellosis, Belgium, 2014

TABLE

Characteristics of trichinellosis cases according to level of exposure^a, Belgium, November–December 2014 (n = 16)

Characteristics	Number of cases ^b among all cases n = 16	Number of cases ^b among those with severe exposure ^a n = 10	Number of cases ^b among those with mild exposure ^a n = 6	P value ^c
Median age in years (IQR)	37 (31–48)	47 (34–50)	30 (20–39)	0.02
Female	6	3	3	0.61
Median time to symptom onset after eating wild boar meat, in days (IQR)	13 (8–22)	9 (8–13)	22 (21–23)	< 0.00
Intestinal-stage gastrointestinal symptoms	6	4	2	1.00
Symptoms reported at presentation				
Fatigue	16	10	6	1.00
Fever	14	9	5	1.00
Night sweats	14	10	4	0.12
Periorbital oedema	14	9	5	1.00
Ophtalmological inflammation	14	9	5	1.00
Photophobia	6	4	2	1.00
Headache	12	7	5	1.00
Muscular pain	14	9	5	1.00
Abdominal pain	5	3	2	1.00
Rash	1	1	0	1.00
Lymphadenopathy	1	1	0	1.00
Outcome				
Hospitalisation	10	7	3	0.65
Myocarditis	4	4	0	0.23
Complete recovery	15	9	6	1.00

Trichinellosis, diagnosis



Cheers...

